FINAL WELL REPORT

SGL # 1

Contents

FINAL WELL REPORT

SGL # 1

SUMMARY

STRUCTURE : LANGATALA

BLOCK : RJ-ON/6

FIELD : JAISALMER BASIN

NAME OF WELL : SGL # 1

WELL CATEGORY : EXPLORATORY

WELL TYPE : VERTICAL

LOCATION : LATTITUDE – 27° 08' 23.54"
LONGTITUDE – 69° 45' 03.25"
UTM X 574410.00
UTM Y 3002150.00

ELEVATION : GL – 66.62MSL
KB – 74.12 MSL

SPUDDED ON : 04.03.2006 @ 23:40 hours

REACHED DRILLED DEPTH ON : 29.05.2006 @ 20:45 hours

RIG : ZJ70 LC

DRILLED DEPTH : 3311.79 m

PROJECTED DEPTH : 4700 m

FORMATIONS PENETRATED : SHUMAR, BANDAH, KHUIALA, SANU, PARH, GORU, PARIWAR,

CASING AND CEMENTATION :

DATE	HOLE DIA (inches)	CSG. DIA (inches)	WELL DEPTH (meter)	CSG. SHOE (meter)	CMT RISE (meter)
07.03.06	26"	20"	154.00	153	SURFACE
29.03.06 -30.03.06	17 ½"	13 $^{3}/_{8}$"	1403.85	1398.60	899
08.05.06 -09.05.06	12 ¼"	9 $^{5}/_{8}$"	2887.35	2884.17	2187
25.09.06 -26.09.06	8 ½"	7	3200	3199.50	50 m above TBR top (2785 m)

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CORES	: CC-1 (from 3109.55 m – 3114.09 m)
SIDE WALL CORES	: NIL
DST	: 1. TEST INTERVAL (3167 – 3159 m) Strong blow of air in 1 min, gas surfaced out in 4 minutes, inflamed combustible gas Formation pressure: 4742 psi 2. TEST INTERVAL (3200 – 3159 m) Weak to strong blow of air in 1 min, gas surfaced out in 3 min, inflamed combustible gas with fluid spray flowed on valve open. Formation pressure: 4739 psi
COMPLICATIONS	: 26" PHASE: NIL 17 ½" PHASE: Bit balling, plugged nozzles, Mud cut near nozzles, Held up, Reaming 12 ¼" PHASE: Fishing Junk, Held Up, Reaming, Bit balling, Nozzle plugged, Tight spot, Held up, Reaming, 8 ½" PHASE: Fishing Junk, Milling, Mud cut, Stuck pipe, Fishing, Fish in hole, Plug back Sidetrack
HERMATICAL TESTING ON	: 01.10.2006 @ 10:15 hours
WELL STATUS	: Under Production Testing

GEOLOGY

Jaisalmer Basin constitutes the part of western Rajasthan shelf, which represents the westerly dipping eastern flank of the shelf portion of Indus Basin. Western Rajasthan shelf has evolved through vertical uplifts and subsidence during and after the Proterozoic Delhi orogeny. The important Phanerozoic sedimentary basins developed on this shelf are the Bikaner-Nagaur, Jaisalmer and Barmer basins.

Jaisalmer basin is a peri-cratonic shelf and is separated from Bikaner-Nagaur basins by Pokhran-Nachna high to the northwest and Barmer Basin by Barmer-Birmana-Nagar Paikar high in the south. The geological sequence started with the depositional cycle of Permian shallow marine Karampur Formation overlying unconformably on metamorphic schist of Pre-Cambrian basement. Later the Triassic and early Jurassic phase indicated a major regression and deposition of predominantly fluvial to brackish deltaic clastic represented by Sumarwali and Lathi formations. The Jaisalmer and Baisakhi-Bedasar (shallow marine) Formations of Middle and Upper Mesozoic Era represent the marine environment. During this phase, the transgression took place and continued till the end of the Mesozoic. The beginning of Pariwar Formation marks the regression with shallow marine and brackish type depositional environment during Lower Cretaceous. The Goru and Parh Formations of Upper Cretaceous represent the start of marine transgression. The Tertiary Period saw the continuation of the regression. The Sanu Formation of this period enjoyed fluvial brackish to shallow environment while the Khuiala and Bandah Formations deposited on stable shelf under shallow marine condition. The recent Shumar Formation of Quarternary age is deposited under fluvial sedimentary environment. The oldest NE-SW trending lineament parallels to Aravalli are offset by younger NW-SE sublatitudional lineaments.

The Jaisalmer basin occupies an area of 30,000 sq. km and has been classified as “Category II type” basin. Jaisalmer basin is bounded by Devikot-Nachna uplift in east and south east and Barmer high marks the southern limit. The Jaisalmer basin is separated from Nagaur-Bikaner basin by Pokhran-Nachna high to the north-west and Barmer basin by Barmer-Birmana-Nagar Paikar high in the south. Jaisalmer basin experienced sedimentation since Late Proterozoic-Early Cambrian to Quaternary with intervening hiatuses. Most of the sedimentations were under marine stable platform conditions with carbonates dominating over clastics during mid Jurassic and Eocene. The basin deepens towards west and north-west with a gentle dip of 3 to 5 degrees.

Jaisalmer basin is divided from North to South into four sub-basins.

(i) Kishangarh sub-basin
(ii) Jaisalmer Mari high
(iii) Shahgarh sub-basin
(iv) Maijler sub-basin

Bouger anamoly depicts deepening of basin towards north-west in Kishangarh sub-basin and south-west in Shahgarh sub-basin. These two sub-basins are separated by Jaisalmer Mari high. Jaisalmer Mari High, which separates the Kishangarh and Shahgarh sub-basins, is out come of a system of NW-SE trending enechlon step faults, wrench faults on either side.

GENERAL WELL DATA

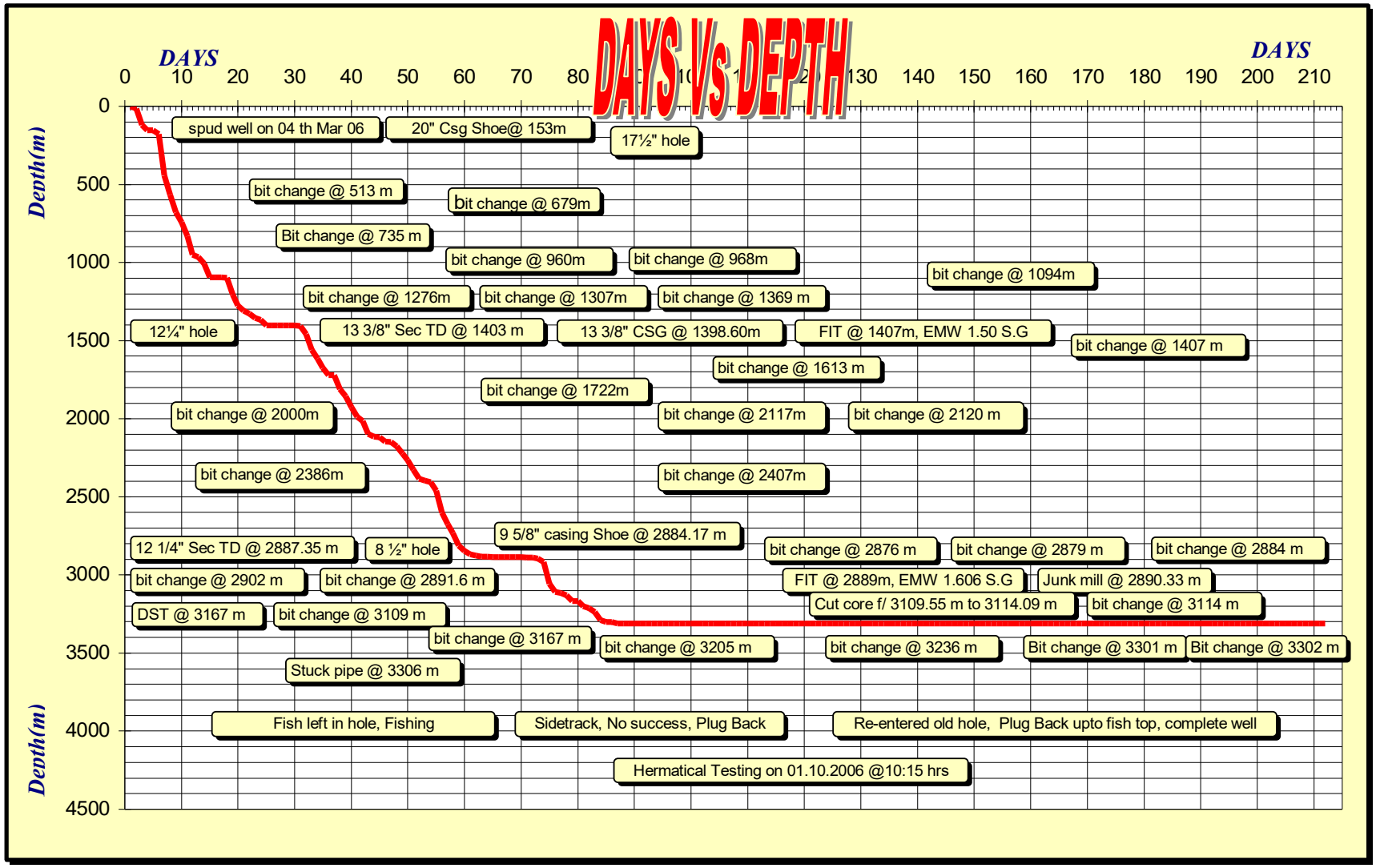
Structure	: Langatala
Block	: RJ-ON/6
Field	: Jaisalmer Basin
Name of well	: SGL # 1
Well Category	: Exploratory
Well Type	: Vertical
Location	: Latitude - 27° 08' 23.54"
	Longitude - 69° 45' 03.25"
	UTM X 574410.00
	UTM Y 3002150.00
Elevation	: GL – 66.62 MSL
	KB – 74.12 MSL
Spudded on	: 04.03.2006 @ 23:40 hours
Reached Drilled Depth on	: 29.05.2006 @ 20:45 hours
Rig	: ZJ70LC
Projected depth	: 4700 m
Present Drilled depth	: 3311.79 m
Hermatical Testing on	: 01.10.2006 @ 10:15 hours

OBJECT OF DRILLING

The well SGL # 1 was drilled to explore and evaluate the hydrocarbon potential in Pariwar (Lower Cretaceous), Baisakhi & Bedesir (Upper Jurassic) and Jaisalmer (Middle Jurassic) formations.

WELL HISTORY

DAYS Vs DEPTH



FINAL WELL REPORT

SGL # 1

BIT RECORD

BIT RECORD																			
SGL # 1																			
Run	Bit No	Size	Make	Type	IADC	Serial no	Nozzles	Depth In (m)	Depth Out (m)	Meterage (m)	Bit Hrs (hrs)	ROP (m/hr)	WOB (tons)	RPM	K rev	SPP (psi)	Flow (lpm)	M.Wt. (SG)	Dull Grading
26" Phase																			
RR1	1	26"	Hughes (Tricone)	W15CH	1-1-1	260R154CR1	20x3	0	154	154	16.00	6.86	3-6	50		534-535	2070-2124	1.05-1.12	Reusable
17 1/2" Phase																			
RR1	2	17½"	China (Tricone)	7-0095	1-1-5		23x3	154	154	0									Drilled Cement only
RR1	3	17½"	Hughes(Tricone)	X74GT353	1-1-7	T32CJ	18x3	154	513	359	23.50	15.28	1-16	50-60		610-1091	2233-2925	1.07-1.11	
RR2	3	17½"	Hughes(Tricone)	X74GT353	1-1-7	T32CJ	18x3	513	679	166	17.75	9.35	1-11	55-60		127-1137	1058-2747	1.11-1.12	
RR3	3	17½"	Hughes(Tricone)	X74GT353	1-1-7	T32CJ	18x3	679	735	56	5.50	10.18	1-10	60-65		1008-1210	2568-2711	1.12-1.13	
RR1	4	17½"	Reed (Tricone)	T11CKPR	1-1-5	D18426	20 x 3, 16x1	735	960	225	42.25	5.33	1-16	60-80		906-1418	2566-2918	1.12-1.16	
1	5	17½"	China(Tricone)	7-0095	1-1-5	2004-11-014	20x3	960	968	8	11.00	0.73	2-13	61-125		1253-1491	2507-2775	1.17	
RR1	6	17½"	Reed(Tricone)	T11CKPR	1-1-5	D18428	20x3,16x1	968	1094	126	27.25	4.62	7-13	52-114		1298-1717	2604-2736	1.17-1.18	2-2-FC-N-0-I-ER-CM
RR2	6	17½"	Reed(Tricone)	T11CKPR	1-1-5	D18428	16x4	1094	1276	182	21.75	8.37	1-16	55-68		1367-2126	2333-2745	1.18	2-2-BU-A-E-1/16"-ER-PR
RR1	7	17½"	Reed(Tricone)	T11CKPR	1-1-5	D18421	20x1,16x3	1276	1307	31	9.00	3.44	4-15	58-62		1546-2303	2164-2624	1.18	2-1-WT-M-E-I-PN(2)-PR
RR1	8	17½"	China (Tricone)	7-0095	1-1-5	2004-11-013	23x3	1307	1369	62	43.25	1.43	6-17	49-64		1551-2025	2408-3007	1.18	1-2-WT-A-E-1/16"-BU-PR
RR2	5	17½"	China (Tricone)	7-0095	1-1-5	2004-11-014	23x3	1369	1403	34	13.00	2.62	3-11	57-68		1994-2093	2796-2857	1.18	
12 1/4" Phase																			
RR1	9	12¼"	Security(Tricone)	MM44NG	2-1-5	96883	OPEN	1403	1407	4	1.25	3.20	7-11	56-64	4.18	661-694	1932-1948	1.19	1-2-BT-N-0-I-WT-BHA
1	10	12¼"	China (Tricone)	7-0095	1-1-7	2004-11-058	16x3	1407	1613	206	33.18	6.21	1-12	50-64	117.48	1087-1722	1689-2136	1.19-1.21	1-2-CD-G-E-1/16"-WT-PR
1	11	12¼"	China (Tricone)	7-0095	1-1-7	2004-11-057	16x3	1613	1722	109	29.00	3.76	1-9	56-95	103.16	1698-1900	2010-2082	1.23-1.36	2-1-WT-A-E-1/16"-NO-HP
1	12	12¼"	Reed (Tricone)	EHP11CKPR	1-1-7	DM9303	18 x3, 8 x1	1722	2000	278	33.08	8.40	1 -11	56-117	308.33	1586-2067	2022-2333	1.36+	2-3-WT-G-E-1/8"-ER-HR
1	13	12¼"	Reed (Tricone)	EHP11CKPR	1-1-7	DM9302	18 x3, 8 x1	2000	2117	117	37.37	3.13	1-13	55-65	138.55	1899-2074	2202-2294	1.36+	1-1-CD-G-F-1/16"-SD-PR
1	14	12¼"	Hughes(Insert)	AD11H	4-3-7	D017LK	18x2, 20x1	2117	2120	3	6.06	0.50	8-14	60-94	22.93	1943-2298	2200-2404	1.36+	1-1-CD (2)-A-E-1/16"-RR-PR
1	15	12¼"	China (Tricone)	7-0095	1-1-7	2004-11-040	16x1,18x1,19x1	2120	2145	25	19.78	1.26	9 - 14	61-89	93.08	1725-2073	2142-2295	1.36+	1-1-FP-A-E-1/16"-CT-PP
RR1	16	12¼"	Hycalog (PDC)	DS134HGW	M 3-2-3	107930	14x6	2145	2386	241	95.88	2.51	3 - 17	36-139	572.87	2101-2519	2386-2598	1.36+	3-4-LT-S-X-1/16"-CT-TQ/PR
RR2	11	12¼"	China (Tricone)	7-0095	1-1-7	2004-11-057	16x3	2386	2407	21	21.76	0.97	6-15	54-112	98.50	2263-2373	2085-2130	1.36+	2-2-ER-A-E-I-RR-PR
1	17	12¼"	New Tech (PDC)	NT S606	S 3-2-2	60223	12x6, 10x3	2407	2694	287	34.57	8.30	1-10	96-141	256.41	2020-2370	2225-2536	1.36+	
RR2	17	12¼"	New Tech (PDC)	NT S606	S 3-2-2	60223	12x6, 10x3	2694	2814	120	24.36	4.93	1-6	47-128	106.46	2647-2862	2413-2491	1.36+	
RR3	17	12¼"	New Tech (PDC)	NT S606	S 3-2-2	60223	12x6, 10x3	2814	2858	44	15.27	2.88	2-10	36-87	59.82	2712-2992	2367-2450	1.36+	2-2-WT-A-X-I-BT(1)/CT(2)/ER-PR
RR4	17	12¼"	New Tech (PDC)	NT S606	S 3-2-2	60223	12x6, 10x3	2858	2876	18	11.57	1.56	1-10	61-129	59.51	2640-2894	2367-2500	1.36+	2-3-LT(2)/BT(5)-A-X-I-ER/BU-PR
RR2	10	12¼"	China (Tricone)	7-0095	1-1-7	2004-11-058	16x3	2876	2879	3	3.82	0.79	12-13	56-66	12.60	2714-2760	2211-2213	1.36+	2-4-WT-ER-A-E-1/16"-NO-PR
1	18	12¼"	Smith (PDC)	M88SX	M 2-2-3	H86076	14x6	2879	2884	5	3.00	1.67	3-11	57-117	16.74	2810-2918	2421-2440	1.36+	2-5-WT-S-X-I-PN/BU-PR
RR	19	12¼"	Reed (Tricone)	T-11	1-1-7	M-2514	OPEN	2884	2887	3	2.90	1.03	8 - 17	32-61	10.52	2216-2277	2473-2522	1.36	
RR2	19	12¼"	Reed (Tricone)	T-11	1-1-7	M-2514	OPEN	2887	2887.35	0.35	0.50	0.70	10-16	55-60	1.77	2230-2280	2462-2493	1.36	
8 ½" Phase - I																			
RR	20	8 ½ "	Smith (Tricone)	MFDSH	1-1-7	YA5248	16x3,14x1	2887.35	2889.83	2.48	3.25	0.76	8	55	13.90	1084-1094	1330-1345	1.34	4-4-JD-M/G-E-I-RG-LIH
		8¼"	REVERSE CIRCULATING JUNK BASKET					2889.83	2890.33	0.5	1.75	0.29	1-1.5	50-55	4.95	606-704	1176-1209	1.34	
		8¼"	JUNK MILL				22 x 3	2890.33	2891.60	1.27	5.25	0.24	2-4	63	19.28	1275	1220	1.35+	
1	21	8 ½ "	Security (Insert)	S82F	4-3-7	655621	14 x 3	2891.60	2902	10.40	13.53	0.77	6	100	80	1270	1230	1.35+	
RR1	22	8 ½ "	Hycalog (PDC)	DSX146GJN+WA1	M 1-4-6	103032	13 x 3	2902	3109.55	207.55	28.18	7.37	1-9	90-117	178.33	1308-1993	1338-1626	1.35+	
1	23	8 7/16" x 4"		CB 301 J		SOF 715		3109.55	3114.09	4.54	4.8	0.95	4-5	106-117	30.68	1033-1216	985-1087	1.35	
RR2	21	8 ½ "	Security (Insert)	S82F	4-3-7	655621	14 x 3	3114.09	3117.39	3.3	3.13	1.05	4-8	89-92	16.79	1496-1540	1439-1450	1.35	
RR2	22	8 ½ "	Hycalog (PDC)	DSX146GJN+WA1	M 1-4-6	103032	13 x 3	3117.39	3167.21	49.82	7.85	6.35	2-8	86-112	47.10	1675-1915	1491-1581	1.35	
RR3	22	8 ½ "	Hycalog (PDC)	DSX146GJN+WA1	M 1-4-6	103032	13 x 3	3167.21	3205.3	38.09	10.52	3.62	2-9	89-122	64.32	1465-1860	1395-1561	1.35	Ringed out
RR3	21	8 ½ "	Security (Insert)	S82F	4-3-7	655621	14 x 3	3205.3	3236.66	31.36	13.82	2.27	5-11	87-106	79.82	1374-1832	1388-1592	1.35	2-3-BT(3)-A-E-1/16"-LT(1)-PR
1	24	8 ½ "	DBC (PDC)	6136 J		PR0006	14 x 3, 13 x 3	3236.66	3301	64.34	21.68	2.97	3-11	53-129	126.95	962-1464	1346-1646	1.35	Ringed out / LN (1)
1	25	8 ½ "	Security (Insert)	S82F	4-3-7	712876	12 x 3	3301	3302.75	1.75	2.51	0.70	7	96	13.25	1404	1415	1.38	2-3-BT(9)-M-E-I-CT-PP
RR	26	8 ½ "	Hycalog (PDC)	DSX168HDGJUVW	M-4-3-2	698802	13 x 4	3302.75	3311.79	9.04	6.38	1.42	2-6	84-98	33.90	1614-1664	1498-1518	136-1.38	Stuck pipe
RR		8 ½ "	China (Tricone)	7-0095	1-1-7	2004-11-005	OPEN												To clean hole
8 ½" Phase - II (Sidetrack)																			
RR	27	8 ½ "	Smith (Tricone)	MFDSH	1-1-7	YA5248	14x1,16x3	3168	3179	11	1.75		9-15			1250	1340	1.26	Dress cement
RR1	27	8 ½ "	Smith (Tricone)	MFDSH	1-1-7	YA5248	14x1,16x3	3179	3200	21	1.00		1-5			780	1338	1.26	S/T w/mud motor, drld cmt
RR2	27	8 ½ "	Smith (Tricone)	MFDSH	1-1-7	YA5248	14x1,16x3	3104	3110	6	2.00					396	1232	1.26	Dress cement
1	28	8 ½ "	China (Tricone)	7-0095	3-1-7	004	16x1,14x2	3110	3200	90	5.50	-	2-8	-		1000	1062	1.26	S/T w/mud motor, drld cmt
RR2	28	8 ½ "	China (Tricone)	7-0095	3-1-7	004	16x1,14x2	3092	3123	31	3.25		2-5	30-34		810	1100	1.26	Dress cement
RR3	28	8 ½ "	China (Tricone)	7-0095	3-1-7	004	16x1,14x2	3123	3166	43	3.00		5-14	36		763	1100	1.26	S/T w/mud motor, drld cmt
RR4	28	8 ½ "	China (Tricone)	7-0095	3-1-7	004	16x1,14x2	3166	3180	14	1.50		5-14			1040	975	1.26	Mech.S/T w/bend sub, drld cmt
RR5	28	8 ½ "	China (Tricone)	7-0095	3-1-7	004	16x1,14x2	3180	3201.87	21	5.75		2-25	50		680	975	1.26	S/T w/mud motor, drld cmt
RR6	28	8 ½ "	China (Tricone)	7-0095	3-1-7	004	16x1,14x2	3056	3076	20	1.00		2-3	55		950	1221	1.26	Dress cement
1	29	8 ½ "	China (Tricone)	7-0095	1-1-7	006	OPEN	3076	3098	22	40.00		0-9			480-974	1036-1274	1.24-1.25	S/T, Drld cmt & fm
1	30	8 ½ "	China (Tricone)	7-0095	1-1-7	019	12x1,14x1,16x1	3098	3118	20	2.50		8-10	60		980-1445	1187-1255	1.25	S/T; Drld cmt & fm
RR1	29	8 ½ "	China (Tricone)	7-0096	1-1-7	006	OPEN	3118	3118									1.25	POOH from Shoe
1	31	8 ½ "	Hughes (Tricone)	201ATJ7	3-1-7	CE477	OPEN	3118	3133.19	15.19	70.00		2-3	50		977	1504	1.24	S/T; Drld cmt & fm
8 ½" Phase - III (Re-entered original hole)																			
RR2	29	8 ½ "	China (Tricone)	7-0095	1-1-7	006	OPEN	3080	3133	53	3.25		1	50		750	1395	1.21	Drilled Cement only
RR2	30	8 ½ "	China (Tricone)	7-0095	1-1-7	019	OPEN	3074	3196	122	15.25			30		850-915	1450-1550	1.21	Drilled Cement only
RR3	30	8 ½ "	China (Tricone)	7-0095	1-1-7	019	OPEN	3196	3200	4	1.50		0-1	50		750	1315-1450	1.21	Drilled Cement only
RR4	30	8 ½ "	China (Tricone)	7-0095	1-1-7	019	OPEN	3200	3200					43		425-475	1035-1076	1.21	To clean hole
RR5	30	8 ½ "	China (Tricone)	7-0095	1-1-7	019	OPEN	3200	3200									1.20	To prove hole upto btm
RR6	30	8 ½ "	China (Tricone)	7-0095	1-1-7	019	OPEN	2705	2785	80	4.00		0-1	50-55		700	1485	1.20	To tag cmt/drill cmt upto H/Top
RR7	30	8 ½ "	China (Tricone)	7-0095	1-1-7	019	OPEN	2785	2785									1.20	R/I w/ 9 5/8" casing scrapper
RR1	32	6"	Smith (Tricone)	MFDSH	1-1-7	LM 9011	OPEN	2785	3186	62	3.50			60		1090-1280	1310-1415	1.20	wash down to proved 7" casing
RR2	32	6"	Smith (Tricone)	MFDSH	1-1-7	LM 9011	OPEN												R/I w/ 7" casing scrapper

TOTAL TIME ANALYSIS

TOTAL TIME ANALYSIS: (04.03.06 to 01.10.06)

ACTIVITY	TOTAL HOURS	PERCENT
Drilling	998.00	19.72
Reaming	118.00	2.33
Coring	5.00	0.10
Circulation	507.00	10.02
Tripping	1231.50	24.34
Lubricate Rig	1.50	0.03
Repairs	70.50	1.39
Cut & Slip Drill line	41.75	0.83
Wireline Logging	69.50	1.37
Casing & Cementation	86.50	1.71
WOC	305.25	6.03
Nipple Up BOP	55.00	1.09
Test BOP	7.00	0.14
DST	14.00	0.28
Plug Back	13.75	0.27
Fishing	45.25	0.89
Miscellaneous	1490.25	29.45
TOTAL	**5059.75**	**100.00**

N.B: As per IADC

Misc.: includes arrangements for spudding, repair of leakage of cellar pit, arrangements for lowering 20”casing and cementation; cut 20” casing and weld flow line; preparation of KCL mud, welding of flow line, servicing of pumps, TOTCO, waiting on chemicals, cutting of casing 13 3/8”; fixing of flow line, poor boy degasser, wear bushing, CIT, FIT, mud preparation, Flow Check, General/Mechanical maintainence, arrangements for next operation, electrical trip, stuck pipe and related operations, testing of mud motor, hermatical testing.

FINAL WELL REPORT

SGL # 1

26” PHASE

Period : 04.03.2006 to 09.03.2006
Interval : Surface – 154.00 m
No. of bits : 1
Mud type : Water based bentonite suspension
Time taken : 4 ¼ days

DRILLING REVIEW

This phase commenced with the spudding of the well SGL # 1 with 26” bit at 23:40 hrs and drilled down 1m, found leakage in cellar pit, repaired the same and resumed drilling and drilled down to 15 m. Again found cellar pit leaking, repaired the same and drilled ahead to 154.00 m. This section was represented by Shumar Formation of Quaternary age, constituting lithology of unconsolidated sands and clay with minor limestone. Circulated and conditioned mud, and P/O upto surface. RIH and circulated and conditioned mud, POOH for lowering 20” casing. Lowered 12 joints of 20’’casing with shoe at 153 m. While lowering casing observed held up at 47 m, cleared the same by reciprocation. Circulated prior to cementation, flushed and tested cementing lines to 2000 psi and pumped 5 bbls of water as pre flush. Mixed and pumped 110 bbls cement slurry of 1.63 S.G and 75 bbls of 1.84 S.G. Pump 3 bbls water behind displaced with 120.26 bbls of mud by rig pumps. WOC, bleed pressure, found holding.

DRILLING PARAMETERS IN 26” PHASE

DEPTH (m)	WOB (Tons)	RPM (rpm)	TRQ (f*lbs)	SPP (psi)	Flow Pumps (lts/min)	Av. ROP (m/hr)	ROP max (m/hr)	ROP min (m/hr)
K.B - 15	5 – 6	50	--	534	2070	6.00	--	--
15 – 154	3 – 4	50	--	535	2124	8.00		

MUD PARAMETERS IN 26” PHASE

DEPTH (m)	M.W (sg)	F.V (sec)	P.V (cP)	Y.P	Gel 0 / 10	Water Loss (cc/30')	Solids (%)	pH	Sand (%)	Oil/Water (%)
K.B – 154	1.05 – 1.12	48 – 63	--	--	--	--	--	--	--	--

BIT DATA OF 26” PHASE

Bit #	Size (inch)	Make	Type	IADC	Serial	Nozzle	In m	Out m	Metrage m	Hrs
1	26”	Hughes	W15CH	1-1-1	260R154C R1	20x3	0	154	154	16.25

FINAL WELL REPORT

SGL # 1

CASING AND CEMENTATION IN 26" PHASE

Casing Data

Date of casing : 07.03.06
Size of casing : 20"
Inner Diameter : 19"
Weight : 106.50 PPF
Grade : K-55 (12 Joints)
Well depth : 154 m
Well diameter : 26"
Casing shoe @ : 153 m

Cementation Data

Date of cementation : 07.03.06
Type of cement : G - Grade
Volume of lead cement slurry : 110 bbls
Av. sp.gr of lead cement slurry : 13.6 ppg
Volume of tail cement slurry : 75 bbls
Av. sp.gr of tail cement slurry : 15.4 ppg
Av. sp.gr of displacing mud : 9.34 ppg
Cement Rise : Upto surface

TIME ANALYSIS OF 26" PHASE :(04.03.06 – 09.06.06)

ACTIVITY	TOTAL HOURS	PERCENT
Drilling	16.25	15.97
Reaming	1.00	0.98
Circulation	2.75	2.70
Tripping	3.00	2.95
Casing and Cementation	12.00	11.79
WOC	20.00	19.66
Miscellaneous	46.75	45.95
TOTAL	**101.75**	**100.00**

N.B: As per IADC

Misc.: includes arrangements for spudding, repair of leakage of cellar pit, arrangements for lowering 20"casing and cementation; cut 20" casing and weld flow line.

17 ½" PHASE

Period : 09.03.2006 to 02.04.2006
Interval : 154 m – 1403 m
No. of bits : 7
Mud type : KCl Polymer
Time taken : 25 days

DRILLING REVIEW

This phase constituted Quarternary, Tertiary column. Quarternary was represented by Shumar formations. Tertiary were represented by Bandah (Middle Eocene), Khuiala (Lower Eocene) and Sana (Middle-Lower Paleocene) Formations.

This phase commenced with the lowering of 17 ½" bit. The 17 ½" RR bit China (1-1-5) was lowered with the following BHA [Bit (0.42 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 3 joints of HWDP (27.97 m) i.e. Total BHA 143.22 m], and tagged cement at 111 m, drilled cement and shoe and POOH.

RIH with RR bit Hughes (1-1-7), incorporaed string stabilizer in BHA [Bit (0.42 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + String Stablizer (2.48 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 3 joints of HWDP (27.97 m) i.e. Total BHA 143.22 m], drilled ahead and incorporated more HWDP in BHA, drilled from 154 m to 366 m and made a wiper trip upto shoe. Further drill ahead from 366 m to 513.50, circulate and condition and POOH to check bit and hole angle, the bit was dull graded as 2-3-NO-A-E-G-1/16-NO and the TOTCO deviation recorded was ¾°.

RIH with same RR bit Hughes (1-1-7), BHA [Bit (0.42 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + String Stablizer (2.48 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 229.67 m], and drilled down from 513.5 m to 679.48 m, observed torque and decided to POOH for bit change. Circulate and condition mud, drop TOTCO and POOH. After P/O found stabilizer fully balled up, the TOTCO deviation recorded was 1°.

RIH with same RR bit Hughes (1-1-7), having the same BHA [Bit (0.42 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 5 joints of HWDP (46.67 m) i.e. Total BHA 164.40 m], in BHA [Bit (0.42 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + String Stablize (2.48 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 229.67 m], encountered held up at 640 m, reamed from 640 m to bottom (679.48 m) and drilled ahead to 735.50 m. Circulate and condition mud

prior to POOH for bit change. POOH and the bit was dull graded as 4-3-WT-A-F-1/8"-TQ/HR and the TOTCO deviation recorded @ 735 m was 1°.

RIH with RR bit Reed (1-1-5), having the same BHA [Bit (0.42 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + String stablizer (2.48 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 229.67 m], drilled ahead from 735.5 m to 823 m and made a wiper upto 689 m (while P/O observed tight pull at interval 748-754 m of 8-10 Tons), resume drilling and drilled ahead from 823 m to 960.50 m and decided to POOH due to poor ROP. While drilling washed bit after every 2-3 m at high RPM between intervals 744-896m. Circulate and condition mud, dropped TOTCO and POOH, while P/O observed tight pull at intervals 917-905 m (15 tons), 862-852 m (20 Tons), 850-820 m (15-20 Tons), 762-748 m (30 Tons), 739-729 m (10 Tons), 715-709 m (30 Tons) and 624-614 m (15 Tons). The TOTCO deviation recorded @ 960 m was 1°.

RIH with new bit China (1-1-5), removed string stabilizer from BHA [Bit (0.42 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.19 m], encountered held up at 646 m of 10 tons, reamed from 646 m to 734 m and clean hole. Further R/I to bottom and resumed drilling from 960.50 m to 968.42 m and decided to POOH for bit change because of poor ROP. After P/O found bit balled up and one nozzle chocked.

RIH with RR bit Reed (1-1-5), having the same BHA [Bit (0.46 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.23 m] and drilled ahead from 968.42 m to 1043 m and made a wiper trip upto 927. Tagged bottom and drilled ahead from 1043 m to 1094 m and POOH due to shortage of mud chemicals. The bit was dull graded as 2-2-FC-N-O-I-ER-CM.

RIH with same RR bit Reed (1-1-5) and changed nozzles size from 20x3 to 16x4, having the same BHA [Bit (0.46 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.23 m] and RIH upto 143 m and waited on chemicals for 50 hours. Further RIH and break circulation at 146 m, 400m and 858 m, while R/I observed held up at 930 m, reamed from 930 m to 1023m. Further R/I from 1023 m to 1078 m and reamed down ahead to bottom (1094 m). Resume drilling and drilled ahead from 1094m to 1106m. While picking up Kelly observed held up at 1091 m of 10-15 tons, removed single and cleared the tight spot and further drilled ahead from 1106 m to 1239.23 m and made a wiper trip upto 1000m. While P/O encountered tight pull at intervals 1168 m (12 Tons), 1162 m (8 Tons), 1159 m (10 Tons), 1153 m (14 Tons) which was cleared by reciprocations. Tagged bottom and drilled ahead from 1239.23 m to 1276 m and decided to POOH because of poor ROP. After POOH found bit balled up and the bit was dull graded as 2-2-BU-1-E-1/16"-PR. The TOTCO was not recorded as watch malfunctioned.

FINAL WELL REPORT

SGL # 1

RIH with RR bit Reed (1-1-5), having the same BHA [Bit (0.46 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.23 m] and drill ahead from 1276 m to 1307 m and while drilling observed continuous drop in pressure, so decided to POOH to check string. Dropped TOTCO and POOH and after P/O found mud cut near nozzle. The bit was dull graded as 2-1-WT-M-I-PN (2)-PR. The TOTCO deviation recorded was1°.

RIH with RR bit China (1-1-5), having the same BHA [Bit (0.40 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.17 m] and drill ahead from 1307 m to 1369.62 m and decided to POOH due to poor ROP. Circulate and condition mud, dropped TOTCO and POOH. After P/O found bit balled up and the bit was dull graded as 1-2-WT-A-E-1/16"-BU-PR and the TOTCO deviation recorded was 2°.

RIH with RR bit China (1-1-5), having the same BHA [Bit (0.40 m) + Bit sub (0.92 m) + 2 joints of 9" Drill Collar (18.78 m) + X-over (0.32 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.17 m] and drilled ahead from 1369.62 m to 1403.85 m and decided 17 ½" section TD. Circulate and condition mud and made a wiper trip upto shoe and tagged bottom, circulate and conditioned mud and POOH for lowering 13 3/8" casing.

The 13 3/8" casing (123 joints) was lowered with with shoe at 1398.60 m. Made up cementing head and established circulation prior to cementation. Pumped 5 bbls of water and tested cementing lines to 2000 psi. Dropped bottom plug and pumped pre-flush of 5 bbls, mixed and pump lead slurry 146 bbls of 13.7 ppg and tail slurry 104 bbls of 15.4 ppg and dropped top plug. Pumped 10 bbls water behind and displaced cement with 696 bbls of mud by rig pumps, bump plug at 800 psi, and bleed off pressure, found float holding and wait on cement.

Cut flow line, false conductor casing and 20" casing and grinded 13 3/8" casing and installed well head, nippled up spacer, drilling spool and BOP, fixed kill manifold spool flange and and kill line and choke line.

Carried function test of BOP, found okay. Pressure tested kill manifold lines at 3000 psi, found okay. Presure tested first valve and second valve in kill @ 3000psi, found okay. Closed blind RAM and pressure tested at 1000 psi, found okay. Put test plug, close pipe RAM and pressure tested Hydraulic Choke and Pipe RAM @ 2000 psi, found okay. Tested step by step all choke manifold valve @ 2000 psi, found okay. Presssure tested annular BOP @ 1000 psi. Set 13 3/8" wear bushing and tightened finger bolts in 13 3/8" well head. N/Up bell nipple and welded the same to flow line, fix poor boy degasser.

FINAL WELL REPORT

SGL # 1

DRILLING PARAMETERS IN 17 ½" PHASE

DEPTH (m)	WOB (Tons)	RPM (rpm)	TRQ (f*lbs)	SPP (psi)	Flow Pumps (lts/min)	Av. ROP (m/hr)	ROP max (m/hr)	ROP min (m/hr)
154 – 366	2 – 8	50 – 60	--	610 – 860	2233 - 2781	7.00	85.61	7.32
366 – 513	1 – 16	50 – 60	2 – 7	851 – 1091	2532 – 2925	8.00	98.00	2.21
513 – 662	1 – 11	55	1 – 4	127 – 1137	1058 – 2747	8.00	90.12	2.52
662 – 735	1 – 11	60 – 65	1 – 11	1008 – 1210	2568 – 2711	8.00	77.42	3.14
735 – 896	1 – 16	70 – 80	1 – 42	906 – 1191	2566 – 2838	5.60	648.00	1.19
896 – 960	7 – 14	60 – 62	2 – 51	1147 – 1418	2664 – 2918	4.80	72.00	0.97
960 – 968	2-13	61 – 125	15 – 75	1253 – 1491	2507 – 2775	2.66	5.25	0.63
968 – 1065	6 – 11	61 – 114	3 – 73	1298 – 1492	2604 – 3105	5.00	29.65	1.33
1065 – 1094	7 – 13	52 – 67	4 – 23	1374 – 1717	2566 – 2736	6.00	19.89	3.69
1094 – 1139	1 – 13	55 – 65	2 – 8	1367 – 1846	2333 – 2704	5.00	13.69	1.29
1139 – 1247	4 – 16	55 – 68	1 – 8	1675 – 1995	2389 – 2745	5.70	15.13	2.52
1247 – 1284	6 – 15	56 – 62	1 – 92	907 – 2189	1799 – 2611	5.00	8.91	1.37
1284 – 1314	4 – 14	54 – 62	3 – 48	1546 – 2303	2179 – 2963	3.40	10.39	1.20
1314 – 1340	7 – 15	49 – 63	13 – 48	1821 – 2020	2408 – 3007	1.30	2.82	0.86
1340 – 1369	6 – 17	58 – 64	6 – 29	1850 – 2025	2808 – 2934	1.40	3.89	0.85
1369 – 1382	3 – 12	57 – 68	19 – 40	1999 – 2093	2803 – 2852	2.00	3.53	0.76
1382 – 1403	4 – 11	58 – 62	13 – 43	1994 – 2084	2796 – 2857	2.70	15.67	2.33

FINAL WELL REPORT

SGL # 1

MUD PARAMETERS IN 17 ½" PHASE

DEPTH (m)	M.W (kg/l)	F.V (sec)	P.V (cP)	Y.P	Gel 0 / 10	Water Loss (cc/30')	Solids (%)	pH	Sand (%)
154 – 290	1.07	46	15	23	6 / 10	9.0	--	9.00	--
290 – 397	1.10	48	15	23	6 / 13	7.5	--	9.50	--
397 – 510	1.11	48	17	25	6 / 11	5.4	--	9.00	--
510 – 529	1.11	46	18	23	5 / 9	5.4	--	9.50	--
529 – 682	1.12	48	17	29	7 / 13	9.4	--	9.00	--
682 – 800	1.13	46	15	22	--	6.5	--	8.65	--
800 – 856	1.13	48	16	30	7 / 13	6.6	--	8.60	--
856 – 936	1.16	47	15	26	7 / 15	6.4	--	8.35	--
936 – 967	1.16	49	17	24	7 / 15	6.8	--	8.75	--
967 – 1002	1.17	48	16	24	--	10.0	--	8.35	--
1002 – 1084	1.17	55	12	30	--	15.0	--	7.75	--
1084 – 1094	1.18	46	15	30	--	6.0	--	8.00	--
1094 – 1115	1.18	46	13	16	--	13.00	--	8.00	--
1115 – 1180	1.18	50	15	29	--	13.11	--	8.00	--
1180 – 1237	1.18	50	13	24	--	13.9	--	8.00	--
1237 – 1270	1.18	50	11	24	--	13.8	--	8.00	--
1270 – 1306	1.18	57	9	37	--	13.6	--	8.00	--
1306 – 1311	1.18	50	10	28	22 / 30	20.0	--	8.00	--
1311 – 1325	1.18	48	10	28	--	20.0	--	8.00	--
1325 – 1330	1.18	50	10	28	--	22.0	--	8.00	--
1330 – 1349	1.18	47	10	21	--	22.0	--	8.00	--
1349 – 1380	1.20	49	9	32	--	27.0	--	8.00	--
1380 – 1391	1.19	43	8	20	--	26.4	--	8.00	--
1391 – 1403	1.20	58	9	39	--	27.5	--	8.00	--

FINAL WELL REPORT

SGL # 1

BIT DATA OF 17 ½" PHASE

Bit #	Size (inch)	Make	Type	IADC	Serial	Nozzle	In M	Out m	Mtg m	Hrs
RR2	17 ½"	China	7-0095	1-1-5	--	23 x 3	154	154	0	--
RR3 (1st run)	17 ½"	Hughes	X74GT35 3	1-1-7	T32CJ	18 x 3	154	513	359	23.50
RR3 (2nd run)	17 ½"	Hughes	X74GT35 3	1-1-7	T32CJ	18 x 3	513	679	166	17.75
RR3 (3rd run)	17 ½"	Hughes	X74GT35 3	1-1-7	T32CJ	18 x 3	679	735	56	5.50
RR4	17 ½"	Reed	T11CKPR	1-1-5	D18426	20 x 3 16 x 1	735	960	225	42.25
5	17 ½"	China	7-0095	1-1-5	014	20 x 3	960	968	8	11.00
RR6 (1st run)	17 ½"	Reed	T11CKPR	1-1-5	D18428	20 x 3 16 x 1	968	1094	126	27.25
RR6 (2nd run)	17 ½"	Reed	T11CKPR	1-1-5	D18428	16 x 4	1094	1276	182	21.75
RR7	17 ½"	Reed	T11CKPR	1-1-5	D18421	20 x 1 16 x 3	1276	1307	31	9.00
RR8	17 ½"	China	7-0095	1-1-5	0013	23 x 3	1307	1369	62	43.25
RR5	17 ½"	China	7-0095	1-1-5	014	23 x 3	1369	1403	34	13.00

DEVIATION SURVEY IN 17 ½" PHASE

DEPTH (meter)	TOTCO READINGS (Degree)
513	3/4º
679	1º
735	1º
960	1º
1307	1º
1369	2º

CASING AND CEMENTATION IN 17 ½" PHASE

Casing Data

FINAL WELL REPORT

SGL # 1

Date of casing : 29.03.06 to 30.03.06
Size of casing : 13 $^{3}/_{8}$”
Type / Grade : J-55
Total No of Joints : 123
Weight : 68 PPF
Well depth : 1403 m
Well diameter : 17 ½”
Casing shoe @ : 1398.60 m

Cementation Data

Date of cementation : 30.03.06
Type of cement : G - Grade
Volume of pre-flush : 5 bbls
Volume of lead cement slurry : 146 bbls
Av. sp.gr of lead cement slurry : 13.7 ppg
Volume of tail cement slurry : 104 bbls
Av. sp.gr of tail cement slurry : 15.4 ppg
Volume of displacing mud : 695.7 bbls
Av. sp.gr of displacing mud : 9.92 ppg
Bump plug @ : 800 psi
Cement Rise : 899 m (Calc.)

TIME ANALYSIS OF 17 ½” PHASE :(09.03.06 – 02.04.06)

ACTIVITY	TOTAL HOURS	PERCENT
Drilling	233.75	39.45
Reaming	24.75	4.18
Circulation	33.75	5.70
Tripping	98.50	16.62
Lubricate Rig	0.50	0.80
Repairs	19.75	3.33
Cut and Slip	0.50	0.08
Casing and Cementation	22.00	3.71
WOC	24.00	4.05
N/Up BOP	22.50	3.80
Test BOP	2.00	0.34
Miscellaneous	110.50	18.65
TOTAL	**592.50**	**100.00**

N.B: As per IADC

Misc. includes preparation of KCL mud, welding of flow line, servicing of pumps, general/mechanical maintainance, TOTCO, arrangements for next operation, waiting on chemicals, cutting of casing, fixing of flow line, poor boy degasser, wear bushing.

12 ¼” PHASE

Period : 03.04.2006 to 12.05.2006

FINAL WELL REPORT

SGL # 1

Interval	: 1403 m – 2887.35 m.
No. of bits	: 11
Mud type	: Water based KCl Polymer
Time taken	: 40 days

DRILLING REVIEW

This phase constituted Tertiary and Mesozoic sedimentary column. The Tertiary was represented by Sanu (Paleocene) formation and Mesozoic were represented by Pariwar (Lower Cretaceous), Baiakhi and Badesar (Upper Jurassic) and Jaisalmer (Middle Jurassic) Formation.

After the WOC of 13 $^{3}/_{8}$" casing, lowered 9" Drill collar stands to break and lay down, encountered held up in Pipe RAM, found casing wear bushing pressed and stuck in Pipe RAM. Opened the side door of Pipe RAM and removed by cutting into pieces. As part of wear bushing was already in hole, so RIH with magnet having the following BHA [Magnet (0.90 m) + 5 joints of 8" Drill Collar (46.98 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 198.26 m], RIH upto 784 m and circulate and condition mud. Further RIH ahead and tagged cement at 1385.30 m. Circulate and condition mud, carried out fishing of junk and POOH and recovered two pieces of junk.

RIH with RR bit and incorporated junk sub in BHA having the following elements [Bit (0.32 m) + 5 joints of 8" Drill Collar (46.98 m) + X-over (0.80 m) + 4 joints of 6 ½" Drill Collar (37.64 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 198.26 m], milled junk and drilled cement and pressure tested casing at 500 psi. Drilled ahead cement, float collar and shoe, and tested integrity of shoe at 500 psi. Further drilled ahead 12 ¼" hole to 1407.80 m, and replaced old mud with new mud conducted LOT, and the EMW recorded was 1.50 S.G. Subsequently POOH and the bit was dull graded as 1-2-BT-N-0-I-WT-BHA and recovered 5 kgs of junk from junk sub.

RIH with new bit (China, 1-1-7), with the following BHA [Bit (0.30 m) + Junk sub (1.07 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.87 m], drill ahead 12 ¼" hole from 1407.80 to 1535.92 and P/O upto shoe for repair of washpipe. While pulling out observed overpull at interval 1437 – 1425 m of 5-15 Tons, reciprocated and cleared tight spot. Changed wash pipe and RIH to bottom and drilled ahead 12 ¼" hole from 1535.92m to 1613.41 m. Circulated and conditioned mud prior to POOH for bit change . Pumped Slug dropped TOTCO and POOH and while P/O encountered tight spot at interval 1559 – 1558 m of 10-20 tons. Pump out singles from 1547 m to 1491 m and POOH. The bit was dull graded as 1-2-CD-G-E-1/16"-WT-PR.The TOTCO deviation recorded at 1631 was 1 ¾°.

RIH with new bit (China, 1-1-7), and removed junk sub from the BHA [Bit (0.30 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.80 m], encountered held up at 1545 m (6 Tons), reamed from 1545 m to 1613.41 m. Drill ahead 12 ¼" hole from

1613.41 m to 1719.40 m, checked flow, negative. Further drill ahead 12 ¼" hole from from 1719.40 m and 1722 m and made a wiper trip. While P/O observed tight pull of 15-20 tons at interval 1705-1703 m, made up Kelly and tried to go down but found string stuck at 1709 m.Tried to establish circulation but observed pressure shoot up. Worked on string and established circulation, the string got released. Pulled out by pumping out single by single (9 singles) upto 1624 m and thereafter P/O stands upto shoe and increased mud weight from 1.23 S.G. to 1.29 S.G. RIH and encountered held up at 1493 m and reamed down single by single upto 1549.91 m. Decided to POOH and change bit having bigger nozzles size. POOH and the bit was dull graded as 2-1-WT-A-E-1/16"-NO-HP.

RIH with new bit (Reed, 1-1-7) with bigger nozzles sizes and same BHA [Bit (0.33 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.83 m], encountered held up at 1533 m (6 Tons), reamed from 1533 m to bottom (1722 m), circulate out at bottom and drilled ahead from 1722 m to 1731.96 m. Circulate and made a wiper trip. While P/O observed tight pull of 15 tons at 1713 m, P/O 12 singles with circulation i.e upto 1547.38 m. Subsequently RIH and encountered held up at 1686 m (15 – 17 Tons), ream ahead single by single to bottom (1731.96 m). Further drill ahead from 1731.96 m to 1837.36 and made a wiper trip. Circulate and condition mud prior to wiper trip upto 1393, while P/O observed tight pull at 1736 m (10 Tons) and at 1707-1704 m (20-24 Tons), reciprocated and cleared tight spot and while R/I encountered held up at 1818 m (5-6 Tons), made up single and washed and reamed down to bottom (1837.36 m). Further drilled ahead 12 ¼" hole from 1837.36 m to 2000 m, circulate and condition mud, pumped slug and POOH for bit change. While P/O observed tight spot at 1890-1889 m (16-26 Tons) cleared the spot by circulation. Further observed tight spot at 1834 m (14-16 Tons), cleared tight spot by reciprocation. The bit was dull graded as 2-3-WT-G-E-1/8"-ER-HR and the TOTCO deviation recorded at 2000 m was ½ °.

RIH with new bit (Reed, 1-1-7) and same BHA [Bit (0.33 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.83 m], observed slight held up at 1861 m (10-12 Tons), cleared the same by reciprocation, reamed from 1978.44 to bottom (2000 m) and resumed drilling ahead 12 ¼" hole from 2000 m and drilled down to 2114.30 m. Circulate prior to wiper trip, made a wiper trip upto 1375 m (25 stands). While P/O observed tight pull at 1919 m (10-12 Tons), cleared by reciprocation; at 1891-1887 m (15 Tons) circulated and cleared the same and at 1837 m (10 tons), cleared by reciprocation. Further RIH upto 2093 m and reamed last two singles and drilled ahead 12 ¼"hole from 2114.30 m to 2120 m. Decided to POOH for bit change due to poor ROP. The bit was dull graded as 1-1-CD-G-F-1/16"-SD-PR and the TOTCO deviation was`not recorded (not punched) at 2117 m.

RIH with new bit (Hughes, 4-3-7) and same BHA [Bit (0.32 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.82 m], R/I upto 1375 and further reamed down to bottom and drilled ahead from 2117 m to 2120 m. Decided to pull out due to poor ROP. . The bit was dull graded as 1-1-CD (2)-A-E-1/16"-RR-PR and the TOTCO deviation recorded at 2120 m was 2 °.

FINAL WELL REPORT

SGL # 1

RIH with new bit (China, 1-1-7) and same BHA [Bit (0.30 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.80 m], R/I upto 2093.27 m and further reamed down to bottom (2120 m) and drilled ahead 12 ¼"hole from 2120 m to 2145.58 m and decided to POOH as observed pressure drop of 120 psi and poor ROP. Dropped TOTCO and POOH. After P/O found one nozzle flow passage washed out and the bit was dull graded as 1-1-FP-A-E-1/16"-CT-PP. The TOTCO deviation at 2145 was ½ °.

RIH with RR PDC bit (Hycalog, M 3-2-3) with same BHA [Bit (0.32 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.82 m], encountered held up at 1818 m (8 Tons) and while picking up observed tight pull (20 Tons) and found string stuck at 1817 m. Laid down two singles and established circulation, worked pipe and released string. Further ream down single by single to bottom (2145.58 m) and drilled ahead 12 ¼"hole from 2145.58 m to 2176 m and made a wiper trip upto 1680 m, circulate and condition mud prior to wiper trip. While P/O observed tight pull at intervals 1960 m (10 Tons), 1986 – 1902 (10 – 14 Tons), 1855 – 1867 (8 – 12 Tons) and 1735 – 1729 (10 – 12 Tons). RIH and observed held up at 2165 m(10 Tons), reamed from 2165 to bottom (2176 m) and subsequently drilled ahead from 2176 m to 2242 m and made a wiper trip upto shoe. While P/O observed tight spots at 1847 – 1845 m (8 – 10 Tons), 1791 – 1778 m (10 Tons), reciprocated and cleared tight spots. RIH to bottom and drilled ahead from 2442 m to 2326 m and made a wiper trip upto 1766 m (19 stands). Subsequently drilled ahead 12 ¼"hole from 2326 m to 2386 and decided to POOH due to high torque and poor ROP. POOH and the bit was dull graded as 3-4-LT (4)-S-X-1/16"-CT-TQ/PR and the TOTCO deviation recorded at 2145 was 1 ½ °.

RIH with RR bit (China, 1-1-7) with same BHA [Bit (0.32 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.82 m], and drilled ahead 12 ¼"hole from 2386 m to 2407.77 m and decided to POOH due to poor ROP. Circulate and condition mud and POOH, the bit was dull graded as 2-2-ER-A-E-I-RR-PR. The TOTCO deviation recorded at 2407 was 1 ½ °.

RIH with new PDC bit (New Tech, S 3-2-2) with same BHA [Bit (0.35 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.85 m], encountered held up at 1404 m (8 Tons), L/dn 10 stands, further RIH and reamed from 1404m to 1474 m. Subsequently R/I stands and encountered held up at 1799 m (15 tons), further reamed down to 1969 m and R/I stands, observed held up at 2380 m, reamed from 2380 m to 2393 m. While picking up Kelly observed tight pull of 30-40 Tons at interval 2379-2376, cleared tight spot and further reamed down to bottom (2407.77 m) single by single. Subsequently drilled ahead 12 ¼ "hole from 2407.77 m to 2457 m and made a wiper trip up 1691 m. While P/O observed tight pull at interval 1845 m – 1834 m (10-15 Tons), 1795m – 1793 m (10 Tons), 1758 m – 1748 m (15-18 Tons), reciprocate and cleared tight spot. R/I to bottom and drilled ahead 12 ¼ "hole from 2457 m to 2556 m and made a wiper trip upto 2266 m and drilled

ahead to 2661 m and made a wiper trip upto shoe, slip drill line and RIH to bottom, circulate with one pump and repaired the other. Resumed drillingfrom 2661 m, observed increase in pressure of 400 psi, suspected nozzle choked or bit balled up, drilled ahead to 2694 m. Circulate prior to POOH to check bit, dropped TOTCO and POOH, after POOH found bit balled up. The TOTCO deviation recorded at 2694 was 1 ¾ °.

RIH with same PDC bit (New Tech, S 3-2-2) with same BHA [Bit (0.35 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.85 m], run in to bottom (2694 m) and drilled ahead to 2814.93 m and P/O upto shoe to change drill line. Further POOH to check bit, after P/O found bit balled.

RIH with same PDC bit (New Tech, S 3-2-2) with same BHA [Bit (0.35 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.85 m], R/I upto 2801.73 m and further reamed down to bottom (2814.93 m). Subsequently, drilled ahead from 2814.93 m to 2858 m, circulate prior to POOH to check bit. Pumped slug dropped TOTCO and POOH, after P/O found bit balled. The TOTCO deviation recorded at 2858 m was 1 °.

RIH with same PDC bit (New Tech, S 3-2-2) with same BHA [Bit (0.35 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.85 m], R/I upto 1375 m and circulate and condition mud and RIH to 2839.98 m, reamed down to bottom (2858.28 m) and drill ahead to 2876 m, circulate prior to POOH due to poor ROP. Pumped slug and POOH, found bit balled up. The bit was dull graded as 2-3-LT (2)/BT (5)-A-X-I-ER/BU-PR.

RIH with RR bit (China, 1-1-7) with junk sub incorporated in BHA [Bit (0.33 m) + Junk Sub (1.10 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.93 m], R/I to bottom, worked on junk sub and drilled ahead 12 ¼" hole from 2876 m to 2879 m and decided to POOH due to poor ROP. Circulated prior to POOH, dropped TOTCO and pumped slug and POOH. The bit was dull graded as 2-4-WT/ER-A-E-1/16"-NO-PR and the TOTCO deviation recorded at 2879 m was 1 °. Recovered 2 and ½ cutters and 2 kgs of rock pieces (Shale/Claystone and Siltstone) from junk sub.

RIH with new PDC bit (Smith, M), and removed junk sub from BHA [Bit (0.38 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.88 m], R/I upto 2868 m and reamed Kelly down length and drilled ahead from 2879 m to 2884.39 m and POOH due to poor ROP. Pumped slug and POOH, found bit balled up and the bit was dull graded as 2-5-WT-S-X-I-PN/BU-PR.

RIH with 10 ½" Magnet, having the following BHA [10 ½"Magnet (0.90 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 226.47 m], R/I upto shoe, slipped 20 m drill line, and RIH to bottom, tagged bottom and reciprocate and circulate. POOH and recovered a small metal piece (3.75"x1"x 1mm) and 300 grams of rust/scales just probably of casing.

FINAL WELL REPORT

SGL # 1

RIH with RR bit (Reed, 1-1-7) with junk sub incorporated in BHA [Bit (0.33 m) + Junk Sub (1.10 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.93 m], R/I to bottom, circulate and worked on junk sub and drilled ahead from 2884.39 m to 2887 m. POOH due to poor ROP, recovered about grams of metal piece from junk sub and rock pieces.

RIH with same RR bit (Reed, 1-1-7) with junk sub incorporated in BHA [Bit (0.33 m) + Junk Sub (1.10 m) + Bit sub (0.93 m) + 6 joints of 8" Drill Collar (56.37 m) + X-over (0.80 m) + 6 joints of 6 ½" Drill Collar (56.46 m) + 12 joints of HWDP (111.94 m) i.e. Total BHA 227.93, to clean hole, R/I upto shoe and changed drill line and RIH, tagged bottom, worked on junk sub and drilled ahead from 2887 m to 2887.35 m and POOH for 9 5/8" casing. Recovered 3.8 grams of metal pieces from junk sub with some rock pieces.

The 9 5/8" casing was lowered with shoe at 2884.17 m, having a total of 253 joints. M/Up circulating head and circulate prior to cementation, pumped 1 bbls preflush, pressure test lines at 2000 psi, found okay, dropped bottom plug and pumped 10 bbls of water, mixed and pumped 15.04 m^3 (94.6 bbls) of lead slurry of 1.6 S.G. (13.3 ppg) and 12.5 m^3 (78.6 bbls) of tail slurry of 1.85 S.G.(15.8 ppg). Dropped top plug and pumped 10 bbls of water behind, displaced with 716 bbls (5777 strokes) of mud, bumped plug at 1270 psi, found float holding. WOC, bleed off pressure from 380 psi to 0 psi, B/off cementing head and L/dn the same.

Lifted casing upto 170 Tons, lift BOP stack and set well head slips. Cut 9 5/8" casing, grinded and fitted seal, L/dn change over spool, fixed 9 5/8" x 7" well head and tested at 3000 psi, found okay.Fixed BOP change over spool, N/Up BOP stack, kill line and choke line and test well head at 2500 psi, found okay.Test BOP by cementing unit, observed leakage from blind RAM and spacer spool ring, decided to changed blind RAM, opened blind RAM bonnet and replaced blind RAM. N/dn kill line, choke line and spacer spool to lift BOP stack. Opened bell nipple and BOP bonnet and changed blind RAM, N/dn BOP stack and changed ring gasket (Bx159). N/Up BOP stack, test blind RAM at 1000 psi, found okay. M/up CUP tester and test pipe RAM at 3000 psi, found okay. Tested choke and kill valve and fixed choke line and kill line and RIH 2 stands of 8" DC and laid down the same.

DRILLING PARAMETERS IN 12 ¼"PHASE

FINAL WELL REPORT

SGL # 1

DEPTH (m)	WOB (Tons)	RPM (rpm)	TRQ (f*lbs)	SPP (psi)	Flow Pumps (lts/min)	Av. ROP (m/hr)	ROP max (m/hr)	ROP min (m/hr)
1403 – 1407	7 – 11	58 – 61	12 – 13	661 – 694	1932 – 1948	3.22	5.46	2.73
1407 – 1514	2 – 11	56 – 64	5 – 88	1087 – 1705	1689 – 2134	6.33	13.93	1.34
1514 – 1613	1 – 12	50 – 64	2 – 53	1540 – 1722	2010 – 2136	5.95	9.29	2.38
1613 – 1643	1 – 8	58 – 95	3 – 71	1698 – 1839	2010 – 2061	3.49	5.48	1.78
1643 – 1722	1 – 9	56 – 65	7 – 50	1788 – 1900	2010 – 2082	3.87	27.44	1.54
1722 – 1836	1 – 11	56 – 117	7 – 50	1652 – 1996	2022 – 2333	4.27	25.53	1.10
1836 – 1888	6 – 11	56 – 114	12 – 100	1586 – 1995	2070 – 2330	3.14	6.61	1.83
1888 – 1957	1 – 10	60 – 98	9 – 70	1855 – 2067	2178 – 2290	2.86	20.99	1.58
1957 – 2000	4 – 10	61 – 65	12 – 33	1910 – 2040	2199 – 2257	2.78	11.54	1.67
2000 – 2051	1 – 12	59 – 65	7 – 25	1899 – 2007	2241 – 2294	3.10	23.76	1.38
2051 – 2114	1 – 11	59 – 65	5 – 40	1930 – 2074	2213 – 2288	4.08	30.38	0.89
2114 - 2120	8 – 14	60 – 94	2 – 40	1943 – 2298	2200 – 2404	0.50	0.71	0.41
2120 – 2133	9 – 14	61 – 89	25 – 65	1900 – 2073	2142 – 2273	1.33	1.77	0.96
2133 – 2145	10 – 12	72 – 89	19 – 54	1725 – 2039	2202 – 2039	1.30	1.40	1.14
2145 – 2164	4 – 15	36 – 109	8 – 60	2101 – 2416	2386 – 2598	1.27	3.81	0.56
2164 – 2198	11 – 16	66 – 111	11 – 62	2286 – 2421	2496 – 2575	1.85	2.61	1.28
2198 – 2242	10 – 16	69 – 124	5 – 65	2201 – 2424	2432 – 2539	2.89	6.63	1.59
2242 – 2307	9 – 16	86 – 118	9 – 56	2281 – 2467	2434 – 2541	2.91	6.96	1.46
2307 – 2372	4 – 14	78 – 133	1 – 57	2267 – 2492	2407 – 2537	3.48	7.88	1.63
2372 – 2387	3 – 13	65 – 139	10 – 61	2333 – 2519	2101 – 2531	1.94	3.74	0.95
2387 – 2407	6 – 15	54 – 112	10 – 30	2263 – 2373	2085 - 2407	1.00	1.68	0.77
2407 – 2427	4 – 10	102 – 128	14 – 35	2470 – 2590	2468 – 2522	6.78	9.70	1.37
2427 – 2536	1 – 7	96 – 141	6 – 34	2020 – 2602	2225 – 2528	5.95	16.00	3.78
2536 – 2661	1 – 7	98 – 135	4 – 33	2377 – 2665	2368 – 2536	8.47	20.90	4.49
2661 – 2694	1 – 6	98 – 128	2 – 28	2615 – 2730	2301 – 2347	6.69	9.99	4.29
2694 – 2787	1 – 6	65 – 128	1 – 26	2647 – 2804	2413 – 2479	5.88	12.10	2.40
2787 – 2814	1 – 5	47 – 102	12 – 30	2720 – 2862	2445 – 2491	4.84	11.69	1.61
2814 – 2858	2 – 10	36 – 87	2 – 17	2712 – 2992	2367 – 2450	2.90	7.48	1.26
2858 – 2876	1 – 10	61 – 129	3 – 30	2640 – 2894	2367 – 2500	1.56	4.29	0.79
2876 – 2879	12 – 13	56 – 66	4 – 15	2714 – 2760	2211 – 2213	0.79	1.01	0.62
2879 – 2884	3 – 11	57 – 117	19 – 33	2810 – 2918	2421 – 2440	1.67	2.18	1.77
2884 – 2887	9 – 17	32 – 61	6 – 10	2216 – 2277	2473 – 2522	1.03	1.05	0.69

DEVIATION SURVEY IN 12 ¼" PHASE

DEPTH (meter)	TOTCO READINGS (Degree)
1613	1 ¾°
2000	½ °
2120	2 °
2145	½ °
2386	1 ½ °
2407	1 ½ °
2694	1 ¾°
2858	1 °
2879	1 °

FINAL WELL REPORT

SGL # 1

MUD PARAMETERS IN 12 ¼" PHASE

DEPTH	M.W	F.V	P.V	Y.P	Gel	Water Loss	Solids	pH	Sand	Oil/Water
(m)	(sg)	(sec)	(cP)		(0 / 10)	(cc/30')	(%)		(%)	(%)
1403 – 1407	1.19	60	31	33	4 / 7	5.8	--	9.50	--	--
1407 – 1425	1.20	55	26	30	4 / 8	5.6	--	9.40	--	--
1425 – 1478	1.20	53	23	29	4 / 8	5.0	--	8.50	--	--
1478 – 1494	1.19	41	31	30	4 / 8	5.0	--	8.53	--	--
1494 – 1598	1.21	53	25	30	4 / 7	5.0	--	8.60	0.2	--
1598 – 1612	1.21	53	25	31	--	5.0	--	8.6	--	--
1612 – 1629	1.23	55	25	31	5 / 7	4.8	--	8.80	--	--
1629 – 1674	1.23	51	25	27	4 / 7	4.8	--	8.65	--	--
1674 – 1701	1.26	52	25	27	4 / 8	4.6	12	8.80	0.1	- / 88
1701 – 1721	1.36+	56	29	33	6 / 12	4.4	15	8.60	0.5	- / 85
1721 – 1808	1.36+	54	28	29	5 / 12	4.4	--	8.70	0.5	--
1808 – 1828	1.36+	53	25	31	5 / 14	4.3	15	8.70	0.3	- / 85
1828 – 1846	1.36+	52	26	30	6 / 13	4.4	15	8.70	0.3	- / 85
1846 – 1871	1.36+	53	26	30	5 / 13	4.4	15	8.70	0.25	- / 85
1871 – 1919	1.36+	52	26	27	6 / 13	4.4	--	8.70	--	--
1919 – 1943	1.36+	60	24	25	4 / 14	4.4	15	8.70	--	- / 85
1943 – 1977	1.36+	51	25	25	5 / 15	4.4	15	8.70	--	- / 85
1977 – 1997	1.36+	52	24	25	4 / 15	4.4	16	8.67	0.3	- / 84
1997 – 2009	1.36+	52	26	28	6 / 14	4.3	--	8.60	--	--
2009 – 2045	1.36+	52	25	30	6 / 18	4.6	18	8.60	0.25	- / 82
2045 – 2067	1.36+	53	25	29	6 / 18	4.4	--	8.80	--	--
2067 – 2114	1.36+	52	24	28	5 / 20	4.4	18	8.75	0.25	- / 82
2114 – 2116	1.36+	51	25	25	5 / 18	4.5	--	8.70	--	--
2116 – 2118	1.36+	52	26	27	5 / 16	4.4	18	8.75	--	- / 82
2118 – 2125	1.36+	53	24	26	5 / 15	4.4	18	8.75	--	- / 82
2125 – 2138	1.36+	53	27	27	6 / 19	4.5	18	8.90	--	- / 82
2138 – 2146	1.36+	53	28	29	6 / 18	4.4	--	8.60	--	--
2146 – 2154	1.36+	52	26	28	5 / 17	4.5	18	8.70	0.30	- /82
2154 – 2174	1.36+	53	27	30	6 / 18	4.4	--	8.80	--	--
2174 – 2200	1.36+	53	29	31	6 / 18	4.2	18	8.74	--	--
2200 – 2238	1.36+	54	30	35	5 / 18	4.0	--	8.80	--	--
2238 – 2244	1.36	58	30	36	6 / 20	4.1	--	9.00	--	--
2244 – 2273	1.36	58	30	37	2 / 21	4.1	--	9.20	--	--
2273 – 2325	1.36+	57	31	36	5 / 23	4.1	21	8.90	--	--
2325 – 2341	1.36+	57	31	35	6 / 22	4.0	21	8.80	--	--
2341 – 2369	1.36+	61	32	36	7 / 22	4.0	21	8.50	--	--
2369 – 2382	1.36+	61	32	36	6 / 24	3.8	21	8.60	--	--
2382 – 2393	1.36+	60	36	41	5 / 22	3.8	21	8.80	--	--
2393 – 2399	1.36+	60	33	36	6 / 21	3.8	21	8.50	--	--
2399 – 2407	1.36+	60	32	37	6 / 21	3.8	21	8.50	--	--
2407 – 2429	1.36+	62	34	39	6 / 20	3.8	20	8.80	--	--
2429 – 2465	1.36+	62	33	38	6 / 19	3.8	20	8.50	--	--
2465 – 2570	1.36+	61	34	39	6 / 19	3.8	20	8.5	--	--
2570 – 2605	1.36+	62	34	38	6 / 20	3.8	20	8.59	--	--
2605 – 2629	1.36+	61	32	35	6 / 18	3.8	20	8.65	--	--

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DEPTH	M.W	F.V	P.V	Y.P	Gel	Water Loss	Solids	pH	Sand	Oil/Water
2629 – 2690	1.36+	61	33	34	6 / 18	3.8	20	8.60	--	--
2690 – 2705	1.36+	60	33	38	5 / 19	3.8	20	8.80	--	--
2705 – 2738	1.36+	58	32	33	5 / 18	3.8	20	8.75	--	--
2738 – 2810	1.36+	62	34	38	6 / 19	3.8	20	8.85	--	--
2810 – 2828	1.36+	61	32	36	5 / 18	3.8	20	8.83	--	--
2828 – 2844	1.36+	61	34	38	6 / 19	3.8	20	8.80	--	--
2844 – 2853	1.37	61	32	36	5 / 18	3.8	20	8.80	--	--
2853 – 2861	1.36	61	32	39	9 / 27	3.8	20	8.80	--	--
2861 – 2873	1.36	59	31	36	10 / 29	3.9	--	8.80	--	--
2873 – 2878	1.36	66	29	38	11 / 25	3.7	--	8.72	--	--
2878 – 2884	1.36	62	32	42	6 / 21	3.6	20	8.80	--	--
2884 – 2886	1.36	57	30	29	5 / 15	3.8	--	8.83	--	--

BIT DATA IN 12 ¼" PHASE

Bit #	Size (inch)	Make	Type	IADC	Serial	Nozzle	In (m)	Out (m)	Mtg (m)	Hrs
RR9	12 ¼"	Security	NN44NG	2-1-5	96883	OPEN	1403	1407	4	1.25
10	12 ¼"	China	7-0095	1-1-7	058	16 x 3	1407	1613	206	33.18
11	12 ¼"	China	7-0095	1-1-7	057	16 x 3	1613	1722	109	29.00
12	12 ¼"	Reed	EHP11 CKPR	1-1-7	DM9303	18 x 3 8 x 1	1722	2000	278	33.08
13	12 ¼"	Reed	EHP11 CKPR	1-1-7	DM9302	18 x 3 8 x 1	2000	2117	117	37.37
14	12 ¼"	Hughes	AD11H	4-3-7	D017LK	18 x 2 20 x 1	2117	2120	3	6.06
15	12 ¼"	China	7-0095	1-1-7	040	16 x 1 18 x 1 19 x 1	2120	2145	25	19.78
RR16	12 ¼"	Hycalog (PDC)	DS134 HGW	M3-2-3	107930	14 x 6	2145	2386	241	95.88
11 RR	12 ¼"	China	7-0095	1-1-7	057	16 x 3	2386	2407	21	21.76
17	12 ¼"	Newtech (PDC)	NT S606	S3-2-2	60223	12 x 6 10 x 3	2407	2694	287	34.57
17RR	12 ¼"	Newtech (PDC)	NT S606	S3-2-2	60223	12 x 6 10 x 3	2694	2814	120	24.36
17RR	12 ¼"	Newtech (PDC)	NT S606	S3-2-2	60223	12 x 6 10 x 3	2814	2858	44	15.27
17RR	12 ¼"	Newtech (PDC)	NT S606	S3-2-2	60223	12 x 6 10 x 3	2858	2876	18	11.57
10RR	12 ¼"	China	7-0095	1-1-7	058	16 x 3	2876	2879	3	3.82
18	12 ¼"	Smith (PDC)	M88SX	M2-2-3	H 86076	14 x 6	2879	2884	5	3.00
19RR	12 ¼"	Reed	T-11	1-1-7	M2514	OPEN	2884	2887	3	2.90
19RR	12 ¼"	Reed	T-11	1-1-7	M2514	OPEN	2887	2887.35	0.35	0.50

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SGL # 1

CASING AND CEMENTATION IN 12 ¼" PHASE

Casing Data

Date of casing : 08.05.06 – 09.05.06
Size of casing : 9 5/8"
Type / Grade : N-80
Total No of Joints : 253
Weight : 43.5 PPF
Well depth : 2887.35 m
Well diameter : 12 ¼"
Casing shoe @ : 2884.17 m

Cementation Data

Date of cementation : 09.05.06
Type of cement : G - Grade
Volume of preflush : 10.00 bbls
Volume of lead cement slurry : 94.6 bbls
Av. sp.gr of lead cement slurry : 13.3 ppg
Volume of tail cement slurry : 78.60 bbls
Av. sp.gr of tail cement slurry : 15.40 ppg
Volume of displacing mud : 716 bbls
Av. sp.gr of displacing mud : 11.34 ppg
Bump plug @ : 1270 psi
Cement Rise : 2187 m (Calculated with 30 % excess)

TIME ANALYSIS OF 12 ¼" PHASE: (03.04.06 – 12.05.06)

ACTIVITY	TOTAL HOURS	PERCENT
Drilling	454.75	47.35
Reaming	74.00	7.70
Circulation	61.50	6.40
Tripping	216.00	22.49
Repairs	20.25	2.11
Cut & Slip Drill line	20.50	2.13
Casing and Cementation	28.75	2.99
WOC	24.00	2.50
Nipple/Up BOP	32.50	3.38
Test of BOP	3.00	0.31
Fishing	2.75	0.29
Miscellaneous	22.50	2.34

TOTAL	**960.50**	**100.00**

N.B: As per IADC

Misc. includes CIT, FIT, mud preparation, TOTCO, Flow Check, General/Mechanical maintainence, arrangements for next operation, electrical trip.

8 ½" PHASE - I

Period : 13.05.2006 to 23.07.2006
Interval : 2887.35 m – 3311.79 m.
No. of bits : 07 (inclusive of core bit)
Mud type : Water based low lime balanced alkalinity system
Time taken : 71 days

DRILLING REVIEW IN 8 ½" PHASE - I

This phase constituted of drilling Mesozoic sedimentary column. Mesozoic was represented by Goru (Upper Cretaceous) and Pariwar (Late Cretaceous) and Baisakhi & Badesar (Upper Jurassic) and Jaisalmer formations.

After the WOC of 9 5/8" casing, RIH with with RR bit (Smith, 1-1-7) with Junk sub having the following BHA [Bit (0.24 m) + Junk Sub (1.07 m) + Bit sub (0.93 m) + 11 joints

of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 226.28 m], and tagged cement at 2857.50 m, pressure test casing at 1000 psi, found okay and drilled out cement, F/C and Shoe and drilled ahead 8 ½" hole from 2887.35 m to 2889.83 m. FIT was carried out upto a maximum pressure of 1100 psi with mud of 1.34 S.G. and MWE was 1.606 S.G. Pumped slug and POOH to check bit and junk sub, recovered 60 grams of metal cuttings and about 2 kgs of rock pieces (Sltst and Sh/Clst). The bit was dull graded as 4-4-JD-M/G-E-I-RG-LIH.

RIH with 8 ¼" reverse circulating junk basket (RCJB) having the following BHA [Reverse Circulating Junk Basket (1.49 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 226.06 m], RIH to bottom, circulate and dropped ball, observed no increase in pressure. Drilled ahead from 2889.83 m to 2890.33 m, pumped slug and POOH. After P/O found 5 catch fingers of RCJB left in hole and 2 catch fingers was recovered from RCJB (Total 12 catch fingers in RCJB).

RIH with 8 ¼" junk mill having the following BHA [Junk Mill (0.40 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 224.98 m], R/I to bottom, milled from 2890.33 m to 2891.60 m, pumped slug and POOH.

RIH with new bit (Security, 4-3-7) with Junk sub with the following BHA [Bit (0.25 m) + Junk Sub (1.05 m) + Bit sub (0.93 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 226.81 m], R/I to bottom and drilled ahead from 2891.60 m to 2902 m. Worked on junk sub, circulate and pumped slug, POOH due to poor ROP and low torque. Recovered 24 grams of catch fingers of RCJB and ½ kg rock pieces from junk sub. The bit was dull graded as 1-1-NO-A-E-I-RR-PR/TQ.

RIH with RR PDC bit (Hycalog, M 1-4-6) with the following BHA [Bit (0.24 m) + Bit sub (0.93 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 225.75 m], RIH to bottom, pumped by high viscous pill and drilled ahead 8 ½" hole from 2902 m to 3052 m, circulate bottoms up prior to wiper trip. Made a wiper trip of 5 stands (upto 2867 m), R/I to bottom, and drilled ahead 8 ½" hole from 3052 m to 3109.55m and decided to cut core. Circulate prior to POOH for coring, dropped TOTCO, pumped slug and POOH. The TOTCO deviation at 3109 m was 1°.

RIH with Core bit (CB 301, loading 315 CTS) with the following BHA [Core Bit (0.31 m) + Core Barrel (10.40 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 235.29 m], cut core from 3109.55 m to 3114.09 m, break core, pumped slug, and POOH due to poor ROP. After P/O found core bit badly damaged and core barrel head (stabilizer) worn out.

RIH with RR bit (Security, 4-3-7) with Junk sub with the following BHA [Bit (0.25 m) + Junk Sub (1.05 m) + Bit sub (0.93 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 226.81 m], R/I to3100.15 m, reamed cored interval, worked on junk sub and drilled ahead 8 ½" hole from 3114.09 m to 3117.39 m, pumped slug and POOH due to poor ROP. After P/O recovered 284 grams of broken core bit piece and some rock pieces (Sst/Sltst and Sh) from junk sub.

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RIH with RR PDC bit (Hycalog, M 1-4-6) with the following BHA [Bit (0.24 m) + Bit sub (0.93 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 225.75 m], RIH to 3106 m, reamed Kelly length and drilled ahead 8 ½" hole from 3117.39 m to 3167.01 m. Decided for DST as observed drilled gas at interval 3160-3167 m, circulate prior to wiper trip, made a wiper trip upto shoe. R/I to bottom, circulate, recorded SCR (46 stks-500psi and 57 strokes-800 psi).Pumped slug and POOH for DST.

M/up DST assembly, RIH DST assembly with the following BHA [DST assembly (26.98 m + X-Over (0.82 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 252.38 m], tagged bottom, Rig up DST flow head, Chickson line and lined up to flare line. Held discussion and safety meeting, set packer at 3159 m at slack of 10 tons, and opened tool. Observed strong blow of air in 1 minute, fluid (gas) surfaced in 4 minutes, flared gas during pre flow of 10 minutes at surface pressure of 400 psi throught 1/2" choke. Shut the well for ISI for an hour, start main flow, initially after 10 minutes the flow pressure was 600 with 1/2" bean size choke manifold. Changed bean size to 3/4" and the surface flow pressure was 750 psi in 20th min, 850 psi in 30th min, 900 psi in the 40th min and no pressure drop was observed till the 60th minute and subsequently shut in the well for 2 hours. The sample collected was injected into the gas chromotograph and it recorded 88 to 91% of C1. Released packer, observed tight pull at 3164 m, worked on string between 80-160 tons (Martin Decker) and released string and POOH. P/O upto shoe, checked flow, -ve, P/O upto 2293 m, checked flow, -ve, POOH and after P/O found both rubber elements left in hole and last drill collar plugged with mud. The virgin pressure of the formation was 4742 psi.

RIH with RR PDC bit (Hycalog, M 1-4-6) with the following BHA [Bit (0.24 m) + Bit sub (0.93 m) + 8 joints of 6 ½" Drill Collar (75.09 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 197.52 m], R/I to 2781 m, circulate out gas, observed trip gas having Total gas of 89.6 % and the chromatographic analysis was C_1 821646 ppm, C_2 39197 ppm, C_3 7281 ppm, $iC_4$1260 ppm, nC_4 981 ppm, iC_5 372 ppm, nC_5 139 ppm. Further R/I to 3145 m, reamed and cut packer rubber element, tagged bottom, observed trip gas having Total gas 99.99 % and the chromatographic analysis was C_1 988693 ppm, C_2 50695 ppm, C_3 11204 ppm, $iC_4$2502 ppm, nC_4 2061 ppm, iC_5 1009 ppm, nC_5 418 ppm and drilled ahead 8 ½" hole from 3167.21 m to 3205.30 m. Circulate prior to POOH due to poor ROP and after P/O found bit badly ringed out.

RIH with RR bit (Security, 4-3-7) with Junk sub with the following BHA [Bit (0.25 m) + Junk Sub (1.05 m) + Bit sub (0.93 m) + 8 joints of 6 ½" Drill Collar (75.09 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 198.58 m], R/I upto shoe, checked flow, -ve, circulate at shoe. Further R/I upto 3184.59 m, reamed down to bottom, and drilled ahead from 3205.30 to 3216 m, and recorded SCR at 32 strokes=184 psi and at 45 strokes=450 psi with MP#2. Subsequently drilled ahead 8 ½" hole ahead to 3236.66 m and POOH for bit change due to poor ROP. After P/O recovered 120 grams of inserts/ cutters and some rock pieces from junk sub. The bit was dull graded as 2-3-BT (3)-A-E-1/16"-LT (1)-PR.

RIH with new PDC bit (DBC), incorporated 3 singles of 6 ½" Drill Collar and removed Junk sub from BHA, having the following BHA [Bit (0.33 m) + Bit sub (0.93 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 225.84 m],

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SGL # 1

R/I upto 3230 m, reamed down Kelly length and drilled ahead from 3236.66 m to 3281.75 m, while picking up kelly observed tight pull of 15 tons at 3274-3275 m, cleared tight spot by reciprocation and circulation. Subsequently drilled ahead to 3301 m and decided for DST, circulate prior to wiper. Pumped slug, P/O upto 2868 m, R/I to bottom and circulate, and POOH for DST, found bit ringed out and one nozzle lost in hole and TOTCO recorded was 1°.

RIH with new bit (Security, 4-3-7) with Junk sub having the following BHA components [Bit (0.24 m) + Junk Sub (1.07 m) + Bit sub (0.93 m) + 11 joints of 6 ½" Drill Collar (103.32 m) + 13 joints of HWDP (121.26 m) i.e. Total BHA 226.82 m], R/I upto 3280 m, reamed down to bottom, worked on junk sub and drilled ahead to 3102.75. As gradual pressure drop of 400-500 psi was observed during drilling, decided to POOH to check string. Checked each joint and observed mud cut in drill collar #1 (Last P/O DC) and recovered 283 grams of broken inserts/cutters/nozzle from junk sub. The bit was dull graded as 2-3-BT (9)-M-E-I-CT-PP.

RIH with RR PDC bit (Hycalog, M 4-3-2) with Junk sub having the following BHA components [Bit (0.23 m) + Junk Sub (1.07 m) + Bit sub (0.93 m) + 9 joints of 6 ½" Drill Collar (84.50 m) + 12 joints of HWDP (111.89 m) i.e. Total BHA 198.62 m], while R/I serviced and checked BHA and observed wash out in tool joints of 4 HWDP and 1 DC. RIH upto shoe and recorded pressure with both pumps (MP#1 @ 70 strokes=1070 psi and MP#2 @ 70 strokes=1065 psi) and further RIH, encountered held up (10 Tons) at 3240 m, reamed down single by single to bottom, worked on junk sub. Subsequently drilled ahead 8 ½" hole from 3302.75 m to 3311.79. While picking up Kelly for reaming observed tight pull of 15 tons, reciprocate but weight transmitter at dead anchor end failed and found string stuck at 3305.81 m (29-05-2006 @ 20:45 hrs). Tried to establish rpm but no success. Repaired weight indicator transmitter at dead end, worked on string between 80-170 tons (Martin Decker) for an hour. Pumped 8 m3 of high density HSD pill, displaced with 1550 strokes, worked on string between 80-170 tons (Martin Decker) for 1.75 hrs but no success, pumped 20 strokes every hour and kept the string in neutral position for 0.75 hour and thereafter worked on string for 0.25 hrs between 60 to 170 tons (Martin Decker), no successs.Kept the string in tension for 0.50 hrs, worked on string between 65-170 tons (Martin Decker) for 0.25 hours. Subsequently, kept the string in tension of 170 tons (Martin Decker) for an hour, reduced tension to 130 tons (Martin Decker) for 0.50 hour. Kept the string in compression of 67 tons (Martin Decker) for 1.25 and again kept the string in neutral position (104 Tons) for an hour. Thereafter, kept the string in compression of 87 tons (Martin Decker) for 1.75 hour, worked on string for 0.25 hour. Kept the string in tension of 170 tons (Martin Decker) for 0.50 hour and subsequently kept the string in compression of 30 tons (Martin Decker) for 4.25 hours. Worked on string for 0.25 hour between 80-180 tons, no success.

Circulate out diesel pill and conditioned mud for two cycles and simultaneously worked on string, no success.

Kept the string in tension of 157 tons for 3 hours and circulate the hole every hour and worked string every fifteen minutes but no success. Kept the string at neutral weight for 6 hours and worked string between, no success.

Thereafter, kept the string in compression of 80 to and progressively increased it to 40 tons (Martin Decker) for 4 hours and thereafter progressively decreased the compression to 85 tons (Martin Decker) for 6 hours and simultaneously continued to circulate every hour for half an hour and worked 10-15 minutes the string.

Kept the string in tension of 150-167 tons (Martin Decker) for 16 hours and worked string between 80-180 tons (Martin Decker) and kept the string in compression of 90-70 tons (Martin Decker) for 20.75 hrs and worked string every hour between 80-180 tons, meanwhile reduced mud weight from 1.39 S.G. to 1.31 S.G. Spot 4m^3 of diesel pill and displaced around BHA, kept the string in compression of 65-85 tons for 13.75 hours, worked on pipe every one hour between 80-180 tons (Martin Decker), meanwhile displaced 10 strokes every two hour, but no success. Kept the string in compression of 65-85 tons (Martin Decker), closed annular BOP, circulate out through choke manifold and worked pipe between 80-180 ton (Martin Decker). Kept the string in tension of 170 tons for 14.75 hours, reduced tension to 150 tons for 3.25 hours and circulate and condition mud, every hour worked on string between 70-180 tons (Martin Decker) and circulate for half an hour.
Kept the string in compression of 64 tons for 13.25 hours and worked string every hour. Continued to keep the string in compression of 75-85 tons (Martin Decker) for 9.75 hours, worked on string every hour between 80-180 tons (Martin Decker), no success.
Pumped air and displaced 4.5 m^3 of mud, bleed pressure and worked pipe between 110-200 tons, no success. Pumped air and mud simultaneously, observed mud flowing from bell nipple, circulate out through choke manifold. Pumped air and displaced 8 m^3 mud from hole, further displaced with 600 strokes of mud and observed mud flowing from bell nipple, closed annular BOP, diverted through choke manifold, opened BOP and worked pipe for 2 hours between 80-180 tons, no success. Kept the string in tension of 158 tons (Martin Decker), circulate and conditioned mud, circulate out through choke manifold as observed mud flowing out from bell nipple.
Continued to keep the string in tension of 158 tons, circulate out through choke manifold, condition mud to 1.28 S.G, checked flow, negative. Kept the string in compression of 80 tons, circulate and condition mud. Backed off mechanically at 99 tons, POOH, recovered 324 joints of 5" Drill pipe (3100.67 m) + 10 joints of 5"HWDP (93.34 m) . The fish left in hole is Bit (0.23 m) + Junk Sub (1.07 m) + Bit Sub (0.93 m) + 9 joints of 6 ½" Drill Collar (84.50m) + 2 joints of 5"HWDP (18.65 m) i.e. Total fish 105.38 m.

RIH open end 5 stands of DP and replaced brake shoes, slipped drill line 8.80 m. P/O 5 stds and M/up DST assembly with tail having the following elements [Bull Nose (0.61 m) + X-over (0.84 m) + 33 joints of 5" Drill pipe (315.54 m) + X-over (0.84 m) + DST assembly (9.38 m) + X-over (0.84 m) + 9 joints of 5"HWDP (83.92 m) i.e. Total 411.97 m], RIH and tagged fish top at 3201 m, set packer in casing at 2880 m, observed weak blow initially, which became stronger progressively. Released packer and POOH, mud surfaced after 9 stands and started flowing with trapped gas. M/up FOSV, connected to flare line, released and flared gas. Observed well for 4 hours, filled drill string with water and POOH to 327.21 m, observed mud mixed gas blowing out from the DST assembly. M/up pump out sub, RIH 1 stands of 5" DP, observed for pressure to be down, RIH 27 stds of 5"DP and M/up kelly and circulate out gas, circulation through pump out sub at 460 m. Observed trip gas Total gas1017124 ppm, and the chromatographic analysis was C_1 878502 ppm, C_2 46666 ppm, C_3 10840 ppm, $iC_4$2060 ppm, nC_4 1002 ppm, iC_5 0 ppm, nC_5 90 ppm. RIH 50 stands upto 1119 m, established circulation, circulate out gas, further RIH to 2440 m (pump out sub depth), established circulation, due to gas in annulus, stop circulation, open choke, close annular BOP, circulate out through choke manifold and poor boy degasser. Observed

trip gas, Total gas 995509 ppm, and the chromatographic analysis was C_1 932559 ppm, C_2 0 ppm, C_3 12273 ppm, $iC_4$3138 ppm, nC_4 2551 ppm, iC_5 0 ppm, nC_5 675 ppm. After circulating out gas checked flow, and established circulation to bring back MW in and MW out to 1.30 S.G.
POOH to 3100 m, checked flow, -ve, P/O to 1185 m, checked flow, -ve, P/O upto 421 m, B/off DST assembly and L/dn the same. POOH, B/off bull nose and X/O. RIH open end with 5" DP upto 2861 m and established circulation, observed trip gas at shoe having Total gas 825158 ppm, and the chromatographic analysis was C_1 801420 ppm, C_2 0 ppm, C_3 6254 ppm, $iC_4$0 ppm, nC_4 1244 ppm, iC_5 0 ppm, nC_5 0 ppm. RIH

RIH from 908 m to 2861 m, M/up kelly and circulate out gas, RIH to fish top, engaged fish, tried to establish circulation, no success, observed pressure shooting up, and backed off mechanically. Backed off at 64 Tons. Worked on string and transmitted torque down, Made three attempts to back off mechanically, backed off between 65-69 tons. B/off Kelly, M/up 1 No of DP and screw in pipe and retorqued string. Made arrangements for logging, R/I CCL

RIH CCL, encountered held up at 3208 m, POOH CCL tool. RIH Back off tool armed with prima chord (3.66 m, Nylon 80grains/ft, XHV), detonated at 3202 m, found back off unsuccessful. POOH back off tool, subsequently RIH back off tool armed with prima chord (10.97 m, Nylon 80grains/ft, XHV) and detonated at 3202 m, no success. POOH back off tool. Tried to back off mechanically, back off at 42 tons and subsequently screw in pipe.

RIH back off tool, armed with prima chord (15 m, Nylon 80grains/ft, XHV) detonated at 3202 m, found back off successful. POOH back off tool and rig down logging gears. B/off single and M/up new single, POOH 1 stand, M/up Kelly and established circulation, observed gas gut mud (1.18 S.G.) and mud flowing from bell nipple, closed annular RAM and circulate out gas cut mud through choke manifold. Opened annular BOP and continued circulation through flow line. POOH and recovered 1 joint of 5" HWDP. **The fish left in hole was 96.05 m [(Bit (0.23 m) + Junk Sub (1.07 m) + Bit Sub (0.93 m) + 9 joints of 6 ½" Drill collar (84.50 m) + 1 joint of 5"HWDP (9.32 m)].**

RIH with RR bit (China 1-1-7) with D/Jar and RIH upto 2865 m, established circulation, further RIH, encountered held up at 3150 m and reamed down from 3142.82 m to 3211 m (Fish Top). Circulate and Condition mud, P/O upto shoe and made arrangements for next operation.

RIH to fish top and continued to condition mud every day, meanwhile made arrangements for next operation. POOH from 2836m and P/O to 2607m. Pumped slug (7 cu.m of 1.33 sg) and displaced. Further POOH upto 2406m. Fixed Torque Guage and Gwen lines. Further POOH upto 2176m. Changed M/up Tong Cat Head Line. Further POOH and while P/O crack every joint opened and checked (Replaced 2 Nos. D/P singls (203 & 260 Nos. S.No. in Tally). 203 # Box damage and 260 # Pin damage).

RIH with wash pipe for wash over job having the following assembly [8 $^1/_8$" Burn shoe (1.18 m) + 6 x 8 $^1/_8$" Wash pipe (60.31 m) + 8 $^1/_8$" Drive Sub (0.92 m) + Safety Joint (0.77 m) + 8 x 5" HWDP (74.62 m) + Jar + 3 x 5"HWDP (28.01 m) i.e. TOTAL 171.11 m), RIH upto 2870

m, circulate and conditition mud every four hours interval meanwhile wait for rotary hose. Rig down old rotary hose and removed male & female hammer union nipples. M/up circulating head and chickson line for circulation. Cut the hammer unions and welded new, rig up the rotatry hose, circulate and condition mud. R/up pneumatic hose to kelly. B/off chickson & circulation head. M/up and tested the kelly hose at 4500 psi, found o.k. Rotated the string inside casing observed torque 2%. RIH from 2870 m to 3205 m. M/up kelly and tagged at fish top (3211 m). Pick up kelly to 3209 m and tested the torque, observed 2% at 60 RPM. Carried on washover job from 3211m to 3295.55 m. Make pipe connection and while going down observed held up of 35-40 tons. Picked up Kelly, observed overpull of 20-30 tons and found string **stuck at 3241 m** (04-07-2006 @ 12:20 hrs). Worked on pipe, tried to establish RPM, no success. Continued to work on string and circulation. Kept the string in tension and continued to circulate.

Kept the string under compression of 75 tons for 3.25 hours, there after kept the string in tension and circulate the hole for one hour. Kept the string in compression of 75 tons for 1.75 hours and circulate for one hour. Kept the string in compression of 75 tons for 2 hours, thereafter kept string in compression of 60 tons for 1.25. Circulate and condition mud at neutral weight for 1.5 hours. Kept the string in compression of 65 tons for 5.25 hours and made arrangements for logging.

Rig up logging gears and RIH CCL tool, encountered held up at 3274 m, POOH CCL tool. Thereafter string kept in tension of 115 tons (Martin Decker) and established circulation for 2 hours.Further kept the string in compression of 75 tons (Martin Decker) for 5.25 hours, subsequently circulate and condition mud for 2.25 hours.

Every 5 hours kept the string under compression of 61-80 tons (Martin Decker), and thereafter circulate and condition mud for 2 hours for **7.75** days.

Back off mechanically at 102 tons and POOH. After POOH found 4 joints of 5"HWDP, safety joint, drive sub, washpipe and burn shoe left in the hole. **The washover fish left in hole 1 x 8 $^{1}/_{8}$" burn shoe (1.18 m) + 6 joints of 8 $^{1}/_{8}$" washpipe (60.31 m) + 8 $^{1}/_{8}$" Drive sub (0.92 m) + Safety joint (0.77 m) + 4 joints of 5"HWDP (28.01 m) i.e. Total fish of washover assembly 100.47 m.**

RIH open end with 5" drill pipe to engage fish, R/I upto 143 m, repair tong hydraulic unit. Further R/I upto 640 m, conducted gas drill, R/I 3138 m, (Torque every joints at 30,000 ft*lbs). M/up kelly, established circulation and tagged fish top at 3142.31 m, engage fish and circulate and condition mud.

Rig up logging gears and RIH CCL tool, encountered held up at 3274 m, POOH CCL tool. Back off mechanically at 105 tons (Martin Decker), P/O from 3043 m to 1991 m, pump slug (5 m3 of 1.32 sg) and displaced the same. Further POOH upto surface and recovered 4 joints of 5" HWDP (37.29 m). The wash over assembly left in hole is 1 burn shoe (1.18 m) + 6 joints of washpipe (60.31 m) + Drive sub (0.92 m) + Safety joint (0.77 m) i.e. Total fish of wash over assembly 63.18 m.

RIH with 8 1/8" over shot dressed with spiral grapple having the following BHA [8 1/8" Overshot (1.22 m) + 1 joint of 5"HWDP (9.32 m) + Jar (5.30 m) + 4 joint of 5"HWDP (37.29 m) i.e. TOTAL 53.13 m); RIH upto 1028 m and changed oil of dead line anchor. Further RIH from 1028 m to 3163 m. Add 2 single and 1 pub joint and M/up kelly and tagged fish at 3181 m with circulation, engaged fish, and jarred upward 180 tons and downward 60 tons for 20 minutes. Back off mechanically at 103 tons and POOH to surface and recovered no fish. B/off overshot, spiral gripple and found spiral grapple lock ring broken and replaced the same.

RIH with 8 1/8" over shot dressed with spiral grapple (changed spiral grapple) having the same BHA [8 1/8" Overshot (1.22 m) + 1 joint of 5"HWDP (9.32 m) + Jar (5.30 m) + 4 joint of 5"HWDP (37.29 m) i.e. TOTAL 53.13 m]; RIH upto 3173 m, checked martin decker oil and charged oil. Further RIH upto 3173 m, M/up kelly and tagged fish with circulation and work to engage fish. Engaged fish and backed off mechanically at 112 tons (Martin Decker) and POOH, recovered 2 joints of 8 1/8" washpipe (20.10 m) + 1 x 8 1/8" Drive sub (0.92 m) + 1 x safety joint (0.77 m) i.e Total fish recovered 21.79 m. The wash over assembly left in hole is 1 x 8 1/8"burn shoe (1.18 m) + 4 joints of 8 1/8" washpipe (40.21 m) i.e. Total fish of wash over assembly 41.39 m.

Made arrangements to RIH with 8 1/8" drive sub meanwhile repair dead line anchor. RIH with drive sub having the following BHA [8 1/8" Drive Sub (0.93 m) + 1 joint of 5"HWDP (9.32 m) + Jar (5.30 m) + 4 joint of 5"HWDP (37.29 m) i.e. TOTAL 52.84 m]; RIH upto shoe and slip drill line (8.8 m) and further RIH upto fish top 3199.79 m. M/up kelly and circulate and condition mud, meanwhile reciprocate string. Engaged fish and jarred string between 140 tons to 60 tons for 1.25 hours. Back off mechanically at 110 tons (Martin Decker) and POOH, recovered no fish.

RIH with drive sub having the same BHA [8 1/8" Drive Sub (0.93 m) + 1 joint of 5"HWDP (9.32 m) + Jar (5.30 m) + 4 joint of 5"HWDP (37.29 m) i.e. TOTAL 52.84 m]; RIH upto 3197 m, M/up Kelly and tried to engage fish. Engaged fish and pulled upto 125 tons, back off mechanically at 110 tons (Martin Decker), i.e. observed same weight so engaged fish again. Back off mechanically again, observed very slight increase in weight, POOH and recovered 1 joint of 8 1/8" wash pipe (10.05 m). The wash over assembly left in hole is 1 x 8 1/8"burn shoe (1.18 m) + 3 joints of 8 1/8" washpipe (30.16 m) i.e. Total fish of wash over assembly 31.34 m.

TOTAL FISH OF WASHOVER ASSEMBLY LEFT IN HOLE = 31.34 m i.e. {1 x 8 1/8"burn shoe (1.18 m) + 3 joints of 8 1/8" washpipe (30.16 m)}

RIH open end with 5" HWDP with jar having the following BHA [1 joint of 5"HWDP (9.32 m) + Jar (5.30 m) + 4 joint of 5"HWDP (37.29 m) i.e. TOTAL 51.91 m]; R/I upto 3209 m, circulate and condition mud, engaged old fish (Fish top) and worked on jar upward 155 tons and downward 55 tons for 0.5 hours. Tried to establish circulation but observed pressure shoot up. Attempt to back off mechanically, but no success.

FINAL WELL REPORT

SGL # 1

Rig up wire line logging gears and RIH CCL tool, encountered held up at 3209 m. POOH CCL tool and rig down logging gears. Subsequently worked on jar, upwards 140 tons and downward 60 tons for 0.75 hours, observed overheating of rotary brake shoe, stand by to cool down rotary brake shoe. Subseqently RIH CCL tool, encountered held up at 3209 m. Attempt to back off mechanically, backed off at 59 tons, 59 tons, 73 tons, 59 tons and 55 tons in the 1st , 2nd ,3rd ,4th and 5th attempts respectively. Screw in pipe and re torque string and decided for string shot.

Rig up logging gears and RIH back off tool, armed with prima chord (10.5 m, Nylon 80grains/ft), detonated at 3201 m, found back off unsuccessful. POOH back off tool.

With the onset of daylight RIH back off tool, armed with prima chord (15 m, Nylon 80grains/ft) detonated at 3201 m, found back off successful. POOH back off tool and rig down logging gears. M/up Kelly, circulate and condition mud, POOH and found 1 joint of 5" HWDP (9.32 m) left in hole. The total fish in hole (exclusive of washover assembly) was 105.37 m (old fish + new fish) [{Bit (0.23 m) + Junk Sub (1.07 m) + Bit Sub (0.93 m) + 9 joints of 6 ½" Drill collar (84.50 m) + 1 joint of 5"HWDP (9.32 m)} + {1 joint of 5"HWDP (9.32 m) }].

New fish left in hole = 9.32 m i.e {1 joint of 5"HWDP (9.32 m)}
Old fish left in hole = 96.05 m i.e {Bit (0.23 m) + Junk Sub (1.07 m) + Bit Sub (0.93 m) + 9 joints of 6 ½" Drill collar (84.50 m) + 1 joint of 5"HWDP (9.32 m)}

TOTAL FISH LEFT IN HOLE = 105.37 m (exclusive of washover assembly) i.e. [Bit (0.23 m) + Junk Sub (1.07 m) + Bit Sub (0.93 m) + 9 joints of 6 ½" Drill collar (84.50 m) + 2 joint of 5"HWDP (18.64 m)].

FISH TOP @ 3200.63 m

RIH open end with 5" Drill pipe for plug back, R/I upto 2870 m to fish top (3200.63 m). While RIH tightened and checked every joints, circulate and condition mud. Rig up C/head and cementing lines and tested the same at 2000 psi. Pumped 5 bbls water ahead, mixed and pumped 15.02 bbls of cement slurry of 15.8 ppg, pumped 5 bbls water behind and displaced with 176 bbls mud (1603 strokes) of 10.51 ppg by rig pumps. P/O upto 3013 m, circulate the hole clean, P/O upto 2871 m and WOC. POOH.

DRILLING PARAMETERS IN 8 ½" PHASE - I

FINAL WELL REPORT

SGL # 1

DEPTH (m)	WOB (Tons)	RPM (rpm)	TRQ (f*lbs)	SPP (psi)	Flow Pumps (lts/min)	Av. ROP (m/hr)	ROP max (m/hr)	ROP min (m/hr)
2887 – 2890	6 – 81	65 – 105	5 – 8	1084 – 1094	1330 – 1345	.076	0.69	1.90
2890 – 2891	2-4	63	8	1275	1220	0.24	--	--
2891 – 2902	6	100	8	1270	1230	0.77	--	--
2902 – 2995	3 – 10	94 – 118	1 – 37	1238 – 1599	1291 – 1451	6.96	13.20	0.55
2995 – 3109	1 – 8	90 – 117	2 – 11	1498 – 1993	1388 – 1626	7.74	14.79	2.84
3109 – 3114	4 – 5	106 – 117	1 – 2	1033 – 1216	985 – 1087	0.95	2.48	0.66
3114 – 3117	4 – 8	89 – 92	1 – 2	1496 – 1540	1439 – 1450	1.05	1.25	0.56
3117 – 3167	2 – 8	86 – 112	6 – 8	1675 – 1915	1491 – 1581	6.35	15.45	1.77
3167 – 3205	2 – 9	89 – 122	4 – 7	1465 – 1860	1395 – 1561	3.62	11.30	0.91
3205 – 3236	5 – 11	87 – 106	3 – 4	1374 – 1832	1388 – 1592	2.24	10.17	1.26
3236 – 3255	4 – 6	84 – 121	3 – 5	1333 – 1434	1575 – 1638	3.98	10.93	1.71
3255 – 3301	3 – 11	53 – 129	2 – 7	962 – 1446	1346 – 1646	2.72	14.20	1.01
3201 – 3202	7	96	3	1404	1415	0.60	--	--
3302 – 3311	3 – 6	84 – 98	13 – 17	1614 – 1664	1498 – 1518	1.44	4.01	0.69

DEVIATION SURVEY IN 8 ½" PHASE - I

DEPTH (meter)	TOTCO READINGS (Degree)
3109	1°
3301	1°

MUD PARAMETERS IN 8 ½"PHASE - I

FINAL WELL REPORT

SGL # 1

DEPTH (m)	M.W (sg)	F.V (sec)	P.V (cP)	Y.P	Gel (0 / 10)	Water Loss (cc/30')	Solids (%)	pH	Sand (%)	Oil/Water (%)
2887.35 – 2889	1.35	55	20	20	4 / 6	--	--	9.0	--	--
2889 – 2891	1.36	48	27	14	2 / 7	5.80	--	12.04	--	--
2891 – 2900	1.34	47	14	02	1 / 2	6.50	--	9.00	--	--
2900 – 2917	1.35	47	23	08	1 / 3	4.60	--	9.00	--	--
2917 – 2952	1.35	46	24	08	2 / 4	4.60	--	11.50	--	--
2952 – 3028	1.35	47	23	08	1 / 3	4.60	--	--	--	--
3028 – 3109	1.35	46	20	05	2 / 4	4.60	--	11.50	--	--
3109 – 3114	1.35	49	18	06	1 / 3	4.50	--	11.05	--	--
3114 – 3117	1.35	44	21	09	2 / 4	6.70	19	11.50	--	--
3117 – 3165	1.35	44	17	08	2 / 5	8.50	19	11.00	--	--
3165 – 3205	1.36	43	18	06	2 / 4	7.60	19	11.40	--	--
3205 – 3226	1.35	43	18	07	2 / 4	7.50	--	11.20	--	--
3226 – 3236	1.36	42	17	07	2 / 4	6.20	--	11.30	--	--
3236 – 3254	1.36	42	19	07	2 / 4	6.20	19	11.50	--	--
3254 – 3256	1.36	42	19	05	2 / 4	5.40	--	11.50	--	--
3256 – 3296	1.36	51	29	16	2 / 6	5.20	--	11.50	--	--
3296 – 3302	1.38	52	27	18	3 / 7	4.80	19	11.50	--	--
3302 – 3311	1.36	50	24	11	3 / 8	5.80	--	11.50	--	--

BIT DATA IN 8 ½” PHASE - I

FINAL WELL REPORT

SGL # 1

Bit #	Size (inch)	Make	Type	IADC	Serial	Nozzle	In (m)	Out (m)	Mtg (m)	Hrs
20	8 ½"	Smith	MFDSH	1-1-7	YA5248	16 x 3 12 x 1	2887.35	2889.83	2.50	3.25 excl. cement drilling
--	8 ¼"	REVERSE CIRCULATING JUNK BASKET WITH MILLER TEETH					2889.83	2890.33	0.50	1.75
--	8 ¼"	JUNK MILL				22 x 3	2890.33	2891.60	1.27	5.25
21	8 ½"	Security	S82F	4-3-7	655621	14 x 3	2891.60	2902	10.40	13.53
22	8 ½"	Hycalog (PDC)	DSX146G JN+WA1	M1-4-6	103032	13 x 3	2902	3109.55	207.55	28.18
23	8 $^{7}/_{16}$ x 4"	Core Bit	CB 301		SOF 715		3109.55	3114.09	4.54	4.9
21	8 ½"	Security	S82F	4-3-7	655621	14 x 3	3114.09	3117.39	3.33	3.13
22	8 ½"	Hycalog (PDC)	DSX146G JN+WA1	M1-4-6	103032	13 x 3	3117.39	3167.21	49.82	7.85
22	8 ½"	Hycalog (PDC)	DSX146G JN+WA1	M1-4-6	103032	13 x 3	3167.21	3205.30	38.09	10.52
21	8 ½"	Security	S82F	4-3-7	655621	14 x 3	3205.30	3236.66	31.36	13.82
24	8 ½"	DBC	6136J		PR0006	14 x 3 13 x 3	3236.66	3301	64.34	21.68
25	8 ½"	Security	S82F	4-3-7	712876	12 x 3	3301	3302.75	1.75	2.51
26	8 ½"	Hycalog (PDC)	DSX168H DGJUVW	M4-3-2	698802	13 x 4	3302.75	3311.79	9.04	6.38
27	8 ½"	China	7-0095	1-1-7	005	OPEN			To clean hole	

CEMENTATION (PLUG BACK) IN 8 ½" PHASE - I

CEMENT PLUG (for Sidetrack) : 50 m
Drilled Depth : 3311.79 m
Well diameter : 8 ½”
Casing shoe @ : 2884.17 m
Fish Top @ : 3200.63 m
Cementation Data
Date of cement plug : 21.07.06
Type of cement : G - Grade
Volume of preflush : 5.00 bbls
Volume of cement slurry : 15.02 bbls
Av. sp.gr of cement slurry : 15.80 ppg
Volume of after flush : 5.00 bbls
Volume of displacing mud : 176 bbls
Av. sp.gr of displacing mud : 10.51 ppg
Top of cement plug : 3150 m (Calculated @ 30% excess)
Bottom of cement plug : 3200 m

TIME ANALYSIS OF 8 ½” PHASE – I: (13.05.06 – 23.07.06)

ACTIVITY	TOTAL HOURS	PERCENT
Drilling	127.75	7.48
Reaming	12.25	0.72
Coring	5.00	0.29
Circulation	245.00	14.35
Tripping	433.00	25.37
Repairs	20.75	1.22
Cut & Slip Drill line	2.25	0.13
Wireline Logging	53.00	3.10
DST	7.75	0.45
Plug Back	2.25	0.13
Fishing	42.50	2.49
Miscellaneous	732.50	42.91
TOTAL	**1707.00**	**100.00**

N.B: As per IADC
Misc. includes CIT, FIT, TOTCO, Flow check, general maintenance, stuck pipe and related operations, arrangements for next operations.

8 ½” PHASE – II (Sidetrack)

FINAL WELL REPORT

SGL # 1

Period	: 23.07.2006 to 29.08.2006
Interval	: 3076 – 3133.19
No. of bits	: 5 bit
Mud type	: Water based low lime balanced alkalinity system
Time taken	: 37 ¼ days

DRILLING REVIEW IN 8 ½" PHASE – Sidetrack

This phase constituted sidetrack drilling of Mesozoic sedimentary column.

During WOC, R/I with RR bit (Smith, 1-1-7) having the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 3 joints of 6 ½" Drill collar (28.07 m) + 3 joints of HWDP (27.96m), Total BHA 57.20 m], R/I upto 2871 m, WOC, slip and cut drill line, circulated and conditioned mud at shoe, further RIH and tag cement at 3168 m. Drilled cement from 3168 m to 3179, circulate the hole clean, circulate and condition mud, dropped TOTCO and POOH. The TOTCO tool malfunctioned and was not recorded.

R/I with same 8 ½" RR bit (Smith, 1-1-7), incorporated downhole motor in BHA, having the following components [8 ½" Bit (0.24 m) + 1.25° Mud motor (7.76 m) + X-over (0.93 m) + 5 joints of 6 ½" Drill collar (46.84 m) + 6 joints of HWDP (55.93m), Total BHA 111.70 m]; R/I upto 3174 m, resumed kick off at 3179 m, tried to sidetrack but no success, drilled cement upto 3200 m. Circulate the hole clean and POOH.

RIH with open end 5" Drill pipe for 2nd cement plug of 50 m; R/I upto shoe, gel break in shoe, further R/I to 3186.77 m, circulate and condition mud, Rig up C/head and cementing lines and tested the same at 2000 psi. Pumped 5 bbls water ahead, mixed and pumped 15.02 bbls of cement slurry of 15.8 ppg, pumped 5 bbls water behind and displaced with 176 bbls mud (1603 strokes) of 10.51 ppg by rig pumps. P/O upto 3013 m, circulate the hole clean, P/O upto 2871 m and WOC.

RIH to tag cement top, could not find hard cement and R/I to fish top (3102.75 m). Circulate the hole clean, cement contaminated with mud sufaced at bottoms up, P/O upto shoe. Further RIH for 3rd cement plug of 100 m, R/I from 2871 m to 3200 m. Circulate and condition mud, B/off kelly, add one pup joint. M/up cementing head, flushed and tested cementing lines at 2000 psi. Pumped 15 barrels of spacer ahead, mixed and pumped 30 barrels of cement slurry of 15.8 ppg. Pumped 6 barrels of spacer behind, and displaced by Rig pump with 172 barrels of mud of 10.5 ppg (1566 strokes). POOH 11 stands upto 2871 m, circulate the hole clean (5000 strokes), WOC, circulate and condition mud and POOH.

R/I with same 8 ½" RR bit (Smith, 1-1-7) having the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 3 joints of 6 ½" Drill collar (28.07 m) + 6 joints of HWDP (55.93m), Total BHA 85.17 m], R/I upto 113 m, cut and slip drill line 2 m, further RIH from 113 m to 2870 m and repaired rotary clutch. Further RIH from 2870 m to 3099 m, M/up kelly and established circulation, tagged cement top 3104 m. Drilled cement from 3104 m to 3110 m, circulate the hole clean, dropped TOTCO, pumped slug and POOH. The TOTCO deviation recorded at 3110 m was 1°.

FINAL WELL REPORT

SGL # 1

R/I with 8 ½" new bit (China, 3-1-7), incorporated downhole motor in BHA, having the following components [8 ½" Bit (0.24 m) + 1.25° Mud motor (7.76 m) + X-over (0.93 m) + 5 joints of 6 ½" Drill collar (46.84 m) + 6 joints of HWDP (55.93m), Total BHA 111.70 m]; R/I upto 3107 m, established circulation and resumed sidetrack drilling, tried to kick off at 3110 m, continued sidetrack drilling but observed no formation on shale shaker upto 3201 m. Circulate the hole clean and pumped slug and POOH.

RIH with open end 5" Drill pipe for 4th cement plug of 100 m; R/I upto shoe, gel break in shoe, further R/I to 3199.07 m, circulate and condition mud. Circulate and condition mud, B/off kelly, add one pup joint. M/up circulating head; flushed and tested cementing lines at 2000 psi. Pumped 10 barrels of spacer ahead, mixed and pumped 32.2 barrels of cement slurry of 15.8 ppg. Pumped 4 barrels of spacer behind, and displaced by Rig pump with 171.40 barrels of mud of 10.5 ppg (1561 strokes). POOH 11 stands upto 2871 m, circulate the hole clean (5000 strokes), WOC; circulate and condition mud and POOH.

RIH with RR bit (China, 3-1-7) with the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 5 joints of 6 ½" Drill collar (46.84 m) + 6 joints of HWDP (55.93m), Total BHA 103.94 m], R/I upto 2860 m and WOC, gel break and further RIH and tagged cement at 3092 m. Drilled cement from 3092 m to 3120 m, circulate the hole clean, circulate and condition mud and P/O upto 2860 m and WOC. RIH from 2860 to 3120 m and drilled cement from 3120 to 3123 m, circulate the hole clean and POOH.

R/I with same 8 ½" RR bit (China,3-1-7), incorporated downhole motor in BHA [8 ½" Bit (0.24 m) + 1.25° Mud motor (7.76 m) + X-over (0.93 m) + 8 joints of 6 ½" Drill collar (75.10 m) + 8 joints of HWDP (74.63 m), Total BHA 158.66 m] , R/I upto 2857 m, slip drill line, and further RIH upto 3115 m. M/up kelly, circulate and resumed sidetrack and drilled from 3123 m to 3158 m, circulate bottoms up, no success. Further tried sidetrack drilling from 3158 m to 3166 m, circulate bottoms up, no success. P/O upto shoe, pumped slug and POOH.

R/I 8 ½" RR bit (China,3-1-7) with 2° bend sub having the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 2° Bend Sub (0.79 m) + 8 joints of 6 ½" Drill collar (75.10 m) + 8 joints of HWDP (74.63m), Total BHA 151.69 m] upto shoe, M/up kelly, circulate and condition mud. Further RIH hole, circulate kelly length, tried to kick off at 3167.60 m, drilled ahead from 3167.60 m to 3178.80 m, and circulate out bottoms up. Pumped slug and POOH.

R/I with 8 ½" RR bit (China, 3-1-7), incorporated downhole motor in BHA [8 ½" Bit (0.24 m) + 1.25° Mud motor (7.76 m) + X-over (0.83 m) + 5 joints of 6 ½" Drill collar (46.84 m) + 6 joints of HWDP (55.93 m), Total BHA 111.60 m] and RIH upto 2879.2 m. M/up kelly, circulate and condition mud. Further RIH to 3180 m, resumed sidetrack, drilled ahead from 3180 m to 3201.83, no success and tagged fish top at 3201.83 m. Circulate the hole clean and POOH.

RIH open end with 5" Drill pipe upto 3190 m, circulated and conditioned mud and made arrangements for 5th cement plug of 200 m. M/up circulating head flushed and tested cementing lines at 2000 psi. Pumped 15 barrels of spacer ahead. Mixed and pumped 46 barrels of cement slurry of 16 ppg. Pumped 6 barrels of spacer behind, and displaced by Rig

pump with 167 barrels of mud of 10.5 ppg (1521 strokes). POOH 11 stands upto 2872 m, circulate two cycles (9030 strokes), WOC.

RIH from 2871 m and tagged suspected cement top at 3013 m, observed cement not set. P/O to shoe at 2871m. Circulate and condition mud, WOC. RIH from 2871 m and tagged cement top at 3056 m, M/Up kelly and circulate and condition mud, P/O upto shoe and circulate and condition mud and POOH.

R/I with 8 ½" RR bit, China 3-1-7, with the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 8 joints of 6 ½" Drill collar (75.10 m) + 8 joints of HWDP (74.63m), Total BHA 150.90 m] drilled cement from 3056 m to 3076 m and circulate the hole clean and P/O upto 2821 m, and made arrangements for next operation. RIH from 2821 m to cement top at 3076 m, circulate and condition mud, B/off kelly and P/O upto 351 m and made arrangements for next operation. Further POOH and made arrangements for next operation.

R/I with 8 ½" new bit (China, 1-1-7), incorporated downhole motor and 2° bend sub in BHA [8 ½" Bit (0.24 m) + Mud motor (7.77 m) + X-over (0.83 m) + 2° Bend Sub (0.79 m) + 6 joints of 6 ½" Drill collar (56.33 m) + 12 joints of HWDP (111.94m), Total BHA 177.90 m], RIH to 3068 m, cleaned bottom, and made set up for kick off from 3076 m. Successfully kicked off and side tracked from 3076 m to 3098 m. Circulate bottoms up and POOH.

RIH with new bit China (1-1-7) and holding assembly having the following BHA components [8 ½" Bit (0.24 m) + Near bit stablizer (1.94 m) + 1 joints of 6 ½" Drill collar (9.38 m) + String Stablizer (1.91 m) + 5 joints of 6 ½" Drill collar (56.33 m) + 15 joints of HWDP (111.94m), Total BHA 200.24 m], RIH upto 3083 m, observed held up at 3083 m, established circulation. Cleared the hole from 3083 m to 3097.50 m by reciprocation with circulation, further reamed down to 3098 m. Resumed drilling (sidetrack) from 3098 m to 3103 m, observed thereafter fast penetration for 1 m, suspected entry in old hole, further drilled down to 3106 m. Circulate bottoms up, observed cement at bottoms up. Subsequently drilled ahead from 3106 m to 3112.48 m to confirm, circulate bottoms up, observed cement cuttings on shale shaker. Further drilled cement upto 3118 m, the next kick point, circulate and condition mud prior to POOH. Dropped TOTCO, pumped slug and POOH. The TOTCO deviation recorded at 3118 m was 2 ½°.

R/I with 8 ½" new bit (Hughes, 3-1-7), downhole motor and 2° bend sub for sidetrack having the following components in BHA [8 ½" Bit (0.24 m) + Mud motor (7.77 m) + X-over (0.83 m) + 2° Bend Sub (0.79 m) + 6 joints of 6 ½" Drill collar (56.33 m) + 15 joints of HWDP (139.82m), Total BHA 205.78 m], RIH upto 243 m, decided to POOH and wait on brake shoes.
RIH with 8 ½" RR bit (China, 1-1-7) without BHA upto 2843 m and wait on shoe, meanwhile carried out mechanical maintenance and cut and slip. Replaced brake shoes, circulate and condition mud and POOH.

R/I with 8 ½" new bit (Hughes, 3-1-7), downhole motor and 2° bend sub for sidetrack having the following components in BHA [8 ½" Bit (0.24 m) + Mud motor (7.77 m) + X-over (0.83 m) + 2° Bend Sub (0.79 m) + 6 joints of 6 ½" Drill collar (56.33 m) + 15 joints of HWDP (139.82m), Total BHA 205.78 m], RIH upto 3110 m, M/up kelly and cleared the hole from

3110 m to 3118 m by reciprocation and circulation. Resumed sidetrack drilling from 3118 m and drilled down to 3133.17 m. Circulation prior to POOH due to poor ROP and frequently stalling of mud motor. POOH and found all the three roller cones of bit missing. The bit was dull graded as x-x-LC (3)-A-F-1/4"-PR/TQ.

RIH open end 5" Drill pipe for 6th cement plug of 50 m, RIH to 2870 m, gel break @ shoe and further RIH to 3118 m and circulate and condition mud. RIH upto 3132 m, circulate and condition mud. Rig up C/head and cementing lines flushed and tested the same at 2000 psi. Pumped 10 bbls water ahead, mixed and pumped 18 bbls of cement slurry of 15.8 ppg, pumped 4 bbls water behind and displaced with 173 bbls mud (1530 strokes) by rig pumps at 100% efficiency. P/O 8 stands (upto 2899 m), circulate the hole clean. WOC, meanwhile POOH.

DRILLING PARAMETERS IN 8 ½" PHASE – II (Sidetrack)

DEPTH (m)	WOB (Tons)	RPM (rpm)	TRQ (f*lbs)	SPP (psi)	Flow Pumps (lts/min)	Remarks
3168 – 3179	0.5 – 2	58	--	530 – 630	1048 – 1118	Cement plug drilling (Dress cement)
3179 – 3200	0.5 – 3	M/motor	--	950 – 1250	1136 - 1258	Kick off, Sidetrack / Cement drilling
3104 - 3110	0.5 - 1	53	--	500 – 510	1048 – 1066	Cement plug drilling (Dress cement)
3110 – 3201	1 – 8	M/motor	--	1000 – 1400	1118 – 1328	Kick off, Sidetrack / Cement drilling
3092 – 3120	1 – 2	52	--	830 – 850	1083 - 1101	Cement plug drilling (Dress cement)
3120 – 3123	5 – 14	52	--	784	1066	Cement plug drilling (Dress cement)
3123 – 3157	1 – 8	M/motor	--	1040	978	Kick off, Sidetrack / Cement drilling
3157 – 3166	5 – 13	M/motor	--	1040	978	Contd. Sidetrack a.a.
3166 – 3178	5 – 20	--	--	660	978	Attempt S/T with 2° Bend sub
3178 – 3180	5 – 20	--	--	660	978	a.a
3180 – 3201	0.5 – 2	M/motor	--	660	961	Kick off, Sidetrack / Cement drilling
3056 – 3076	2 – 3	55	--	950	1223	Cement plug drilling (Dress cement)
3076 – 3088	0 – 9	M/ motor	--	480 – 974	961 – 1276	Kick off, Sidetrack / Time drilling Cmt and formation drilling
3088 – 3098	8 – 10	M/motor	--	980 – 1445	1188 – 1258	Side track (Formation and minor cement drlling
3098 – 3118	2 – 10	M/motor	--	1500	1503	Sidetrack (Formation drilling) Cement drilling (Entered old hole)
3118 – 3120	0	M/motor	--	450 – 475	944 – 961	Sidetrack / Time drilling (Cmt and fm drilling)
3120 – 3125	0	M/motor	--	525 – 780	978 – 1136	Sidetrack / Time drilling (Cmt and fm drilling)
3125 – 3133	4 – 8	M/motor	--	765 – 1000	1171 – 1328	Sidetrack (Formation drilling)

DEVIATION SURVEY IN 8 ½" PHASE – II (Sidetrack)

DEPTH (meter)	TOTCO READINGS (Degree)
3118	2.5°

MUD PARAMETERS IN 8 ½"PHASE – II (Sidetrack)

FINAL WELL REPORT

SGL # 1

DEPTH (m)	M.W (sg)	F.V (sec/QT)	P.V (cP)	Y.P Lbs/100 ft²	Gel (0 / 10)	Water Loss (cc/30')	Solids (%)	pH	Sand (%)	Oil/Water (%)
3168 – 3179	1.26	56	24	10	4 / 17	8.20	--	11.6	--	--
3179 – 3200	1.26	55	21	12	4 / 13	8.40	--	11.8	--	--
3104 – 3110	1.26	58	21	10	4 / 21	8.20	--	11.8	--	--
3110 – 3201	1.26	54	19	06	2 / 12	14.00	--	12.0	--	--
3092 – 3120	1.26	55	24	6	3 / 15	6.50	--	11.8	--	--
3120 – 3123	1.26	56	27	10	2 / 11	8.20	--	11.8	--	--
3123 – 3157	1.26	55	15	05	3 / 14	8.20	--	11.8	--	--
3157 – 3166	1.26	55	15	5	2.5 / 14	8.60	--	12.0	--	--
3166 – 3180	1.26	57	18	06	3 / 13	13.5	--	12.0	--	--
3180 – 3201	1.26	55	13	06	2 / 13	18.0	--	--	--	--
3056 – 3076	1.25+	60	13	07	3.5 / 17.5	22.0	--	--	--	--
3076 – 3076.5	1.24	51	18	08	2 / 13	12.2	--	11.5	0.2	--
3076.5 – 3080	1.25	44	13	06	4 / 18	18.0	--	11.5	--	--
3080 – 3081	1.25	50	19	04	2 / 14	14.0	--	11.8	0.2	--
3081 – 3098	1.25	45	14	07	4 / 16	12.9	--	--	--	--
3098 – 3118	1.24	49	16	09	4 / 24	10.7	--	11.8	--	--
3118 – 3118.5	1.24	55	17	11	4 / 21	16.0	--	11.8	--	--
3118.5 – 3120	1.24	54	17	11	6 / 21	16.2	--	11.5	--	--
3120 – 3118	1.24	55	14	13	10 / 40	19.0	--	11.5	--	--
3118 – 3122	1.24	58	15	15	9 / 37	14.0	--	11.8	--	--
3122 – 3129	1.24	52	14	12	4 / 27	18.0	--	11.8	--	--
3129 – 3132	1.24	58	18	13	6 / 21	--	--	--	--	--
3132 – 3133	1.24	55	--	--	--	--	--	--	--	--

BIT DATA IN 8 ½" PHASE – II (Sidetrack)

FINAL WELL REPORT

SGL # 1

Bit #	Size (inch)	Make	Type	IADC	Serial	Nozzle	In (m)	Out (m)	Mtg (m)	Hrs
27 RR1	8 ½"	Smith	MFDSH	1-1-7	YA5248	14 x 1 16 x 3	3168	3179	11	1.75 Dress cement
27 RR2	8 ½"	Smith	MFDSH	1-1-7	YA5248	14 x 1 16 x 3	3179	3200	21	1.00 (S/T) w/mud motor (Cmt. drld.)
27 RR3	8 ½"	Smith	MFDSH	1-1-7	YA5248	14 x 1 16 x 3	3104	3110	6	2.00 Dress Cement
28	8 ½"	China	7-0095	3-1-7	004	14 x 2 16 x 1	3110	3201	91	5.50 (S/T) w/mud motor (Cmt. drld.)
28 RR2	8 ½"	China	7-0095	3-1-7	004	14 x 2 16 x 1	3092	3123	31	3.25 Dress Cement
28 RR3	8 ½"	China	7-0095	3-1-7	004	14 x 2 16 x 1	3123	3166	43	3.00 (S/T) w/mud motor (Cmt. drld.)
28 RR4	8 ½"	China	7-0095	3-1-7	004	14 x 2 16 x 1	3166	3180	14	1.50 (Mech.S/T w/bend sub) (Cmt.drld.)
28 RR5	8 ½"	China	7-0095	3-1-7	004	14 x 2 16 x 1	3180	3201	21	5.75 (S/T) w/mud motor (Cmt. Drld and v.mnr formation)
28 RR6	8 ½"	China	7-0095	3-1-7	004	14 x 2 16 x 1	3056	3076	20	1.00 (S/T) Dress Cement
29	8 ½"	China	7-0095	1-1-7	006	OPEN	3076	3098	22	40.00(S/T) (Time and normal drlg. of cmt and fm. w/mud motor)
30	8 ½"	China	7-0095	1-1-7	019	12 x 1 14 x 1 16 x 1	3098	3118	20 (5 m fm)	2.5 (S/T) (1.45 hrs drld fm)
31	8 ½"	Hughes	201ATJ7	3-1-7	C477	OPEN	3118	3133.19	15.19	70.00(S/T) (Time and normal drlg. of

										cmt and fm. w/mud motor)

CEMENTATION (PLUG BACK) IN 8 ½" PHASE – II (Sidetrack)

CEMENT PLUG # 2 (for Sidetrack) : 50 m

Drilled Depth	: 3311.79 m
Well diameter	: 8 ½"
Casing shoe @	: 2884.17 m
Fish Top @	: 3200.63 m
Cementation Data	
Date of cement plug	: 25.07.06
Type of cement	: G - Grade
Volume of preflush	: 5.00 bbls
Volume of cement slurry	: 15.02 bbls
Av. sp.gr of cement slurry	: 15.80 ppg
Volume of after flush	: 5.00 bbls
Volume of displacing mud	: 176 bbls
Av. sp.gr of displacing mud	: 10.51 ppg
Top of cement plug	: 3150 m (Calculated @ 30% excess)
Bottom of cement plug	: 3200 m

CEMENT PLUG # 3 (for Sidetrack) : 100 m

Drilled Depth	: 3311.79 m
Well diameter	: 8 ½"
Casing shoe @	: 2884.17 m
Fish Top @	: 3200.63 m
Cementation Data	
Date of cement plug	: 28.07.06
Type of cement	: G - Grade
Volume of preflush	: 15.00 bbls
Volume of cement slurry	: 30.00 bbls
Av. sp.gr of cement slurry	: 15.80 ppg
Volume of after flush	: 6 bbls
Volume of displacing mud	: 172 bbls
Av. sp.gr of displacing mud	: 10.51 ppg
Top of cement plug	: 3100 m
Bottom of cement plug	: 3200 m

CEMENT PLUG # 4 (for Sidetrack) : 100 m

Drilled Depth	: 3311.79 m
Well diameter	: 8 ½"
Casing shoe @	: 2884.17 m
Fish Top @	: 3200.63 m
Cementation Data	
Date of cement plug	: 02.08.06

Type of cement	: G - Grade
Volume of preflush	: 10.00 bbls
Volume of cement slurry	: 32.20 bbls
Av. sp.gr of cement slurry	: 15.80 ppg
Volume of after flush	: 4 bbls
Volume of displacing mud	: 171.4 bbls
Av. sp.gr of displacing mud	: 10.51 ppg
Top of cement plug	: 3100 m
Bottom of cement plug	: 3200 m

CEMENT PLUG # 5 (for Sidetrack) : 200 m

Drilled Depth	: 3311.79 m
Well diameter	: 8 ½"
Casing shoe @	: 2884.17 m
Fish Top @	: 3200.63 m

Cementation Data

Date of cement plug	: 09-10.08.06
Type of cement	: G - Grade
Volume of preflush	: 15.00 bbls
Volume of cement slurry	: 46.00 bbls
Av. sp.gr of cement slurry	: 16.00 ppg
Volume of after flush	: 6.00 bbls
Volume of displacing mud	: 167 bbls
Av. sp.gr of displacing mud	: 10.51 ppg
Top of cement plug	: 3000 m
Bottom of cement plug	: 3200 m

CEMENT PLUG # 6 : 50 m

Drilled Depth	: 3311.79 m
Drilled Sidetrack Depth	: 3133.17 m
Well diameter	: 8 ½"
Casing shoe @	: 2884.17 m
Fish Top @	: 3200.63 m

Cementation Data

Date of cement plug	: 30.08.06
Type of cement	: G - Grade
Volume of preflush	: 10.00 bbls
Volume of cement slurry	: 21.00 bbls
Av. sp.gr of cement slurry	: 15.8.00 ppg
Volume of after flush	: 4 bbls
Volume of displacing mud	: 177 bbls
Av. sp.gr of displacing mud	: 10.34 ppg
Top of cement plug	: 3082 m (Calculated @ 30%)
Bottom of cement plug	: 3132 m

TIME ANALYSIS OF 8 ½" PHASE – II (Sidetrack): (23.07.06 to 29.08.06)

ACTIVITY	TOTAL HOURS	PERCENT

Drilling	139.75	15.65
Reaming	0.50	0.06
Circulation	93.25	10.44
Tripping	278.50	31.13
Repairs	7.00	0.78
Cut & Slip Drill line	11.25	1.26
WOC	178.75	20.02
Plug Back	10.25	1.15
Miscellaneous	174.25	19.51
TOTAL	**893.00**	**100.00**

N.B: As per IADC

Misc. includes arrangements for next operation, servicing and general maintenance, testing of mud motor, TOTCO.

8 ½" PHASE – III (Re-entered original Hole)

Period : 29.08.2006 to 01.10.2006

Interval : 3074 – 3200 m (plug back, drilled cement)

FINAL WELL REPORT

SGL # 1

No. of bits : 3 bit
Mud type : Water based low lime balanced alkalinity system
Time taken : 33 ½ days

DRILLING REVIEW IN 8 ½" PHASE – III

This phase constituted drilling of cement plug to return to original hole.

R/I with 8 ½" RR bit (China 1-1-7), with the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 8 joints of 6 ½" Drill collar (75.17 m) + 15 joints of HWDP (139.82m), Total BHA 216.16 m]; RIH upto 2484 m, laid down 2 damaged drill pipe stands racked on L/hand side. Replaced load cell Hydraulic Hose and further RIH to 2857m, WOC. Circulate and condition mud, RIH and tagged cement at 3080 m. Resumed cement drilling from 3080 m and drilled cement upto 3133.17 m, observed rotary torque, suspected entry in sidetracked hole, circulate and condition mud, pumped slug and POOH.

RIH open end 5" Drill pipe for 7th cement plug of 70 m, R/I upto 3132 m for cement plug, circulate and condition mud. R/up C/head and cementing lines; flush and test the same at 2000 psi. Pumped 10 barrels of spacer ahead. Mixed and pumped 21 bbls of cement slurry of 15.8 ppg and displaced with 177 bbls (1564 stks) of mud of 10.17 ppg by rig pump. Pumped 4 barrels of spacer behind. P/O 10 stands (upto 2854 m) of 5" drill pipe, circulate the hole clean (2 cycles), WOC, meanwhile POOH.

R/I with 8 ½" RR bit, China 1-1-7, with the following BHA [8 ½" Bit (0.24 m) + Near Bit Stablizer (1.94 m) + 1 joints of 6 ½" Drill collar (9.38 m) + String Stablizer (1.92 m) + 1 joints of 6 ½" Drill collar (9.36 m) + String Stablizer (1.91 m) +6 joints of 6 ½" Drill collar (56.43 m) + 15 joints of HWDP (139.82 m), Total BHA 221.00 m]; R/I upto 257 m, slip drill line, L/dn travelling block, changed hook lock seal assembly, greased travelling block and repaired parking brake. Further RIH upto 2862 m, circulate and condition mud, WOC, meanwhile changed parking brake shoes (4 nos.). RIH further and tagged soft cement top at 3065 m. M/up kelly and cleared the obstruction by circulation from 3065 m to 3074 m and tagged hard cement top at 3074 m. Resumed cement drilling from 3074 m and drilled down to 3196 m. Circulate the hole clean, pumped hi-vis pill (5 m^3), circulate the hole clean and POOH. (L/dn 21 nos of Drill pipe). The pulled out bit was dull graded as 1-1-WT-A-E-1/16"-NO-TD.

R/I with 8 ½" same RR bit (China 1-1-7), with the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 2 joints of 6 ½" Drill collar (18.74 m) + String Stablizer (1.91 m) + 6 joints of 6 ½" Drill collar (56.43 m) + 15 joints of HWDP (139.82 m), Total BHA 218.07 m]; R/I upto 275 m and replaced D/works high clutch, further RIH upto 2860 m, and gel break. Subsequently RIH to 3196 m and drilled cement plug from 3196 m to 3200 m. Circulate the hole clean and P/O upto 2859 m. Made arrangements for the next operation, meanwhile carried on cleaning and general maintenance job.

After 24 hours made a short trip from 2859 m to bottom (3200 m), circulate and condition mud (1 cycle) and P/O upto 2859 m.

After 36 hours, gel break at shoe, R/I from 2859 m to bottom (3200 m), circulate and condition mud (2 cycle) and P/O upto 2859 m.

After 48 hours, gel break at shoe, R/I from 2859 m to bottom (3200 m), circulate and condition mud (2 cycle) and P/O upto 2859 m.

After 47 hours, gel break at shoe, R/I from 2859 m to 3200 m, circulate and condition mud (2 cycle) an and P/O upto 2859 m

After 47 hours , gel break at shoe, R/I from 2859 m to 3060 m, observed drill line problem (overlapping), M/up kelly, circulate and condition mud (1 cycle) an and P/O upto 2859 m. Therafter made arrangements for the next operation, meanwhile carried out cleaning, painting, servicing and general maintenance job and filled hole every 2 hours.

Removed drill line from D/works drum and respooled the same. M/up kelly and Gel break at shoe, RIH from 2859 m to 3200 m, circulate and condition mud (1 cycle); Pumped slug, displaced the same and POOH for DST. L/dn Stablizer, bit, cleaned handling tools and L/dn Block and grinded the fast end side of the drum and lubricated drill line with API dope, meanwhile made arrangements for DST.

RIH with **conventional DST assembly** having the following components [Bull nose (0.50 m) + X-Over (0.30 m) + 3 joints of 5"HWDP (28.03 m) + X-Over (0.82 m) + Spacing (5.50 m) + Outside Recorder Carrier (2.68 m) + Perforated Spacing (3.00 m) + Packer Stick down (0.36 m) + Packer Stick up (2.51 m) + Packer Stick down (0.36 m) + Packer Stick up (2.51 m) + Safety Joint (0.80 m) + Hydraulic Jar (2.62 m) + Inside Recorder Carrier (1.70) + Hydraulic shut in valve (2.86 m) + Rotary shut in tool (2.05 m) + Recovery Recorder Carrier (2.13 m) + X-Over Sub (0.30 m) + 3 joints of 6 ½" Drill collar (28.18 m) + Impact Reversing Sub (0.30 m) + 3 joints of 6 ½" Drill collar (28.25 m) + Drilling Jar (5.30 m) + 2 joints of 6 ½" Drill collar (18.74 m) + 12 joints of 5"HWDP (111.79 m) + Pup Joint (4.47 m) i.e. TOTAL 256.06 m]; RIH upto 3200 m (tagged bottom). Rig/up Flow head, DST Floor manifold and chicksen line and lined up to flare line.Recheck all joints and held discussion and safety meetings. Set the Packer with **packer seal at 3159 m**, opened tool. Observed weak to strong blow of air in 1 minute and fluid (gas) surfaced in 3 minutes. flared gas during pre flow of 10 mins at a surface pressure of 600 psi through ¾" bean. Shut In the wells for 1 hour (ISI) for build up. Subsequently started main flow and flowed the well for 1 hour through ¾" bean and flared the gas. Observed surface flow pressure of 800 psi, 1100 psi, 1250 psi, 1300 psi, 1300 psi and 1300 psi in the 10th, 20th, 30th, 40th, 50th and 60th minutes respectively. A fluid spray with gas flowed throughout on valve open. The chromatographic analysis of gas sample was done at drill site and the maximum combustible elements analysed were C_1 571492 ppm, C_2 36506 ppm, C_3 6775 ppm, iC_4 0 ppm, nC_4 1163 ppm, iC_5 0 ppm.and nC_5 397 ppm. Shut in the well for 2 hours for final shut in. Released the Packer and observed shut in tool is closed. Allowed to release all the gas from the string and Pressure come to nil. Rig down DST flow head, chicksen and POOH. B/off DST assembly and laid down the same, found top packer badly damaged and bottom packer slightly damaged and approximately 17 cm of rubber element of top packer left in hole. Encountered water at 121 m (P/O depth) and recovered 85 m (approx.) of formation water. The sample was anlysed having weight 1.01 S.G., pH 8.5, Chlorides (Cl^-) 5050 mg/l; Total Hardness (Ca++) 120 mg/lt. The virgin

formation pressure inferred from DST data was **4739 psi** and the bottom hole temperature was **151°C**.

RIH w/ RR bit (China, 1-1-7) with the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 8 joints of 6 ½" Drill collar (75.17 m) + 15 joints of HWDP (139.82 m), Total BHA 216.16 m]; R/I upto 2857 m, established circulation to circulate out gas. The trip gas observed at 2857 m had Total gas of 100 % (Chromatographic analysis was C_1 838876 ppm, C_2 63226 ppm, C_3 11780 ppm, iC_4 2114 ppm, nC_4 1458 ppm, iC_5 0 ppm.and nC_5 268 ppm) and gas cut mud was 1.10 S.G. Further RIH and encountered held up at 3162 m (10 tons). M/up kelly, cleared tight spot and reamed and washed down to bottom (3200 m) single by single. The trip gas observed at bottoms up (3200 m) had Total gas of 93 % (Chromatographic analysis was C_1 782350 ppm, C_2 52176 ppm, C_3 9491 ppm, iC_4 1961 ppm, nC_4 1511 ppm, iC_5 0 ppm.and nC_5 428 ppm); circulate out gas and circulate and condition mud. Pump slug and P/O upto 2857 m. Slip drill line 8.8m and cut 37m. Every 2 hours filled hole. Made arrangements for next operation, meanwhile carried out cleaning and general maintenace job.

After 40.5 hours gel break in shoe; RIH from 2857 m to 3200 m. Circulate and condition mud and P/O upto 2857 m. Every 2 hours filled hole. Made arrangements for next operation, meanwhile carried out cleaning, painting and general maintenace job.

After 19.5 hours R/I from 2857 m to bottom (3200 m), circulate and condition mud (2 cycles) prior to POOH for Logging, pumped slug and POOH.

Rig/up logging gears and RIH, recorded GR-LLD-MFSL-SP in the 1st run. Subsequently recorded about 100 m of GR-DSN-SDL and POOH due to DSN-SDL tool failure. R/I GR-FWS in the 3rd run and recorded the same. Checked DSNT-SDLT tools at surface RIH the same. Observed problem with DSNT-SDLT stack, POOH and laid down Logging tool and rig down logging gears.

RIH with RR Bit (China, 1-1-7) upto 2857m, gel break in shoe, futher RIH from 2857m to 3200m, circulate and condition mud (1 ½" cycle), P/O from 3200 m to 2857m. Made arrangements for next operation, meanwhile carried out general maintenance and cleaning job.

After 42.5 hours gel break in shoe, RIH from 2857 m to 3200 m. Circulate and condition mud (2 cycles) and P/O from 3200 m to 2857 m. Every 2 hours filled hole, meanwhile carried out general maintenance, cleaning job and assembled liner hanger assembly.

After 46 hours gel break in shoe, RIH from 2857 m to 3200 m (bottom), circulate and condition mud (2 cycles) and P/O upto 2857 m. further made arrangements for landing 7" liner and cementation. Every 2 hours filled hole, meanwhile carried out general maintenance, servicing, cleaning and painting job.

After 34 hours gel break in shoe, RIH from 2857 m to 3200 m (bottom), Circulate and condition mud (3 ¾" cycles) prior to 7" liner casing; Pumped slug and POOH.

FINAL WELL REPORT

SGL # 1

Rig up 7" casing lowering tools, lowered 7" liner casing (36 joints, 29 PPF) and make up liner hanger assembly, (Hook Load 25.6 Tons). Subsequently make up 5" Drill pipe and RIH upto 2857 m and gel break at shoe. Further RIH upto 3197 m and circulate and condition mud (1 cycle). Drop setting ball and allow it to gravitate with slow circulation, observed pressure shoot up upto 2850 psi and set hanger, shear out ball seat of landing collar, observed hanger slipping and found holding at 3199.50 m. Disengage running tool, Rig up C/head and cementing lines, pumped 2 bbls of fresh water and tested lines at 2000 psi, found okay. Pumped 3 bbls water ahead as preflush, mixed and pumped 80.09 bbls of cement slurry of 15.8 ppg. Broke off C/Head and dropped D/P Wiper (dart) and displaced with 211.43 bbls mud (1949 strokes) by rig pumps. Bump plug at 2300 psi, found float holding. Bleed off pressure and set packer. P/O 9 stands (upto 2500 m), circulate to outwash thoroughly, WOC, meanwhile POOH to surface.

RIH with RR bit China (1-1-7) having the following BHA [8 ½" Bit (0.24 m) + Bit Sub (0.93 m) + 8 joints of 6 ½" Drill collar (75.17 m) + 15 joints of HWDP (139.82 m), Total BHA 216.16 m]; RIH upto 2484 m. M/up kelly and gel break, P/O 6 stands to L/dn singles (18 singles), subsequently R/I upto 2484 m. WOC, meanwhile slipped drill line (8.8m). After WOC of 48 hours, gel break at 2484 m, RIH from 2484 m to 2702 m, M/up kelly and tagged cement top at 2705 m. Drilled out cement from 2705 m to 2785.10 m (TBR Top); circulate the hole clean, pumped slug, and POOH.

RIH with 8 ½" RR bit (China, 1-1-7) and 9 5/8" casing scrapper having the following BHA [8 ½" Bit (0.24 m) + 9 5/8" Casing Scrapper (1.12 m) + Bit Sub (0.93 m) + 8 joints of 6 ½" Drill collar (75.17 m) + 15 joints of HWDP (139.82 m), Total BHA 217.28 m];`and RIH upto 2772 m. M/up kelly, washed down kelly length upto TBR top (2785.10 m), circulate and condition mud (2 cycles) and POOH.

RIH with 6 ¼" RR bit (Smith, 1-1-7) by making up new BHA, having the following BHA components [6 " Bit (0.23 m) + Bit Sub (0.93 m) + 9 joints of 4 ¾" Drill collar (84.87 m) + 36 joints of 3 ½" Drill Pipe (344.93 m) + X-Over (0.83 m), Total BHA 431.79 m]; RIH upto 2785 m, established circulation and drilled liner hanger seal and washed down upto 2837 m. Further RIH upto 3176 m, established circulation, washed down and proved hole upto 3186 m (Tagged landing collar at 3186 m). Circulate and condition mud (1 cycle), pumped slug and POOH to surface.

RIH with same RR bit (Smith 1-1-7) and 7" casing scrapper, having the following BHA components [6 " Bit (0.23 m) + 7" Casing Scrapper (0.94 m) + Bit Sub (0.93 m) + 9 joints of 4 ¾" Drill collar (84.87 m) + 36 joints of 3 ½" Drill Pipe (344.93 m) + X-Over (0.83 m), Total BHA 432.73 m]; RIH upto 3186 m. established circulation, circulate (1 cycle) and pumped 8 m3 of high viscous pill. Subsequently washed the hole with fresh water and displaced all mud from the hole. Hermatical test 9 5/8" and 7" casing at 500, 1000 and 1500 psi. Found okay, POOH to surface.

DRILLING PARAMETERS IN 8 ½" PHASE – III (Re-entered original Hole)

FINAL WELL REPORT

SGL # 1

DEPTH (m)	WOB (Tons)	RPM (rpm)	TRQ (f*lbs)	SPP (psi)	Flow Pumps (lts/min)	Remarks
3080 - 3129	2 – 3	60	--	600	1223	Cement plug drilling
3129 – 3133	2 – 3	60 – 65	--	654	1328	Cement plug drilling
3074 – 3084	0.5 – 1	30	--	900	1555	Cement plug drilling
3084 – 3196	2 – 3	50	--	977	1503	Cement plug drilling
3196 – 3200	1	50	--	750	1398	Cement plug drilling

DEVIATION SURVEY IN 8 ½" PHASE – II (Re-entered original Hole)

DEPTH (meter)	TOTCO READINGS (Degree)
--	--

MUD PARAMETERS IN 8 ½"PHASE – III (Re-entered original Hole)

DEPTH (m)	M.W (sg)	F.V (sec/QT)	P.V (cP)	Y.P Lbs/100 ft^2	Gel (0 / 10)	Water Loss (cc/30')	Solids (%)	pH	Sand (%)	Oil/Water (%)
3080 – 3133	1.22	55	17	8	2 / 13	14.6	--	11.85	--	--
3074 – 3130	1.21	54	14	09	3 / 11	16.4	--	11.8	--	--
3130 – 3196	1.21	50	15	07	4 / 19	16.0	--	11.8	--	--
3196 – 3200	1.22	58	18	14	6 / 26	20.0	--	11.8	--	--

BIT DATA IN 8 ½" PHASE – III (Re-entered original Hole)

Bit #	Size (inch)	Make	Type	IADC	Serial	Nozzle	In (m)	Out (m)	Mtg (m)	Hrs
29 RR2	8 ½"	China	7-0095	1-1-7	006	OPEN	3080	3133	53	3.25 Drld cmt. plug
30 RR2	8 ½"	China	7-0095	1-1-7	019	12 x 1 14 x 1 16 x 1	3074	3196	122	15.25 Drld cmt plug
30 RR3	8 ½"	China	7-0095	1-1-7	019	12 x 1 14 x 1 16 x 1	3196	3200	4	1.50 Drld cmt plug
30 RR4	8 ½"	China	7-0095	1-1-7	019	OPEN	3200	3200	--	To clean hole
30 RR5	8 ½"	China	7-0095	1-1-7	019	OPEN	3200	3200	--	To clean hole
30 RR6	8 ½"	China	7-0095	1-1-7	019	OPEN	2705	2785	80	4.00 Drld cmt

FINAL WELL REPORT

SGL # 1

										upto TBR top
30 RR7	8 ½"	China	7-0095	1-1-7	019	OPEN	2785	2785	--	R/I w/ 9 5/8" csg Scrapper
32 RR1	6"	Smith	MFDSH	1-1-7	LM9011	OPEN	2785	3186	62	3.50 Incl. of cmt drlg, wash down and reaming
32 RR2	6"	Smith	MFDSH	1-1-7	LM9011	OPEN	3186	3186	--	R/I w/ 7" csg Scrapper

CEMENTATION (PLUG BACK) IN 8 ½" PHASE – III

CEMENT PLUG # 7 **: 70 m**
Drilled Depth : 3311.79 m
Drilled Sidetrack Depth : 3133.17 m
Well diameter : 8 ½"
Casing shoe @ : 2884.17 m
Fish Top @ : 3200.63 m
Cementation Data
Date of cement plug : 28.08.06
Type of cement : G - Grade
Volume of preflush : 10.00 bbls
Volume of cement slurry : 18.00 bbls
Av. sp.gr of cement slurry : 15.8.00 ppg
Volume of after flush : 4.00 bbls
Volume of displacing mud : 173 bbls
Av. sp.gr of displacing mud : 10.34 ppg
Top of cement plug : 3062 m (Calculated @ 30%)
Bottom of cement plug : 3132 m

CASING LINER AND CEMENTATION IN 8 ½" PHASE – III

FINAL WELL REPORT

SGL # 1

Casing liner Data

Date of casing liner : 25.09.06 – 26.09.06
Size of casing liner : 7”
Type / Grade : N-80
Total No of Joints : 36
Weight : 29 PPF
Well depth : 3200 m (Cement plug top)
Fish Top @ : 3200.63 m
Well diameter : 8 ½”
Casing liner shoe @ : 3199.50 m

Cementation Data

Date of cementation : 26.09.06
Type of cement : G - Grade
Volume of preflush : 3.00 bbls
Volume of tail cement slurry : 80.09 bbls
Av. sp.gr of tail cement slurry : 15.80 ppg
Volume of displacing mud : 211.43 bbls
Av. sp.gr of displacing mud : 10.00 ppg
Bump plug @ : 2300 psi
Cement Rise : 2736 m (Calculated 50 m above hanger top)

N.B. Annular volume as per caliper logs + 20 % excess.

TIME ANALYSIS OF 8 ½” PHASE – III: (29.08.06 to 01.10.06)

ACTIVITY	TOTAL HOURS	PERCENT
Drilling	25.75	3.20
Reaming / Wash down	5.50	0.68
Circulation	70.75	8.79
Tripping	205.00	25.47
Lubricate Rig	1.00	0.12
Repairs	2.75	0.34
Cut & Slip Drill line	2.75	0.90
Wireline Logging	16.50	2.05
Casing and Cementation	23.75	2.95
WOC	35.50	4.41
DST	6.25	0.78
Plug Back	1.25	0.16
Miscellaneous	403.75	50.16
TOTAL	**805.00**	**100.00**

N.B: As per IADC

Misc. includes arrangements for next operation, general maintenance and servicing, Hermatical Testing.

TIME ANALYSIS OF 8 ½” PHASE – CUMMULATIVE: (13.05.06 to 01.10.06)

ACTIVITY	TOTAL HOURS	PERCENT

Drilling	293.25	8.61
Reaming / Wash down	18.25	0.54
Coring	5.00	0.15
Circulation	409.00	12.01
Tripping	916.00	26.90
Lubricate Rig	1.00	0.03
Repairs	30.50	0.90
Cut & Slip Drill line	20.75	0.61
Wireline Logging	69.50	2.04
Casing and Cementation	23.75	0.70
WOC	237.25	6.97
DST	14.00	0.41
Plug Back	13.75	0.40
Fishing	42.50	1.25
Miscellaneous	1310.50	38.49
TOTAL	**3405.00**	**100.00**

N.B: As per IADC

Misc. includes CIT, FIT, TOTCO, Flow check, servicing and general maintenance, stuck pipe and related operations, arrangements for next operations, testing of mud motor, Hermatical Testing.

ELECTRO-LOGGING

Wire line logs were run in this well at the following intervals:

FINAL WELL REPORT

SGL # 1

8 ½" PHASE: (Logged by Focus Energy Ltd.)

Run	Date	Log Interval (m)	Logs Recorded	Remarks
1	10.06.06	3208 – 2884	CCL	Held up @ 3208 m
2	10.06.06	Shooting Depth @ 3202	Back off	No success
3	11.06.06	Shooting Depth @ 3202	Back off	No success
4	12.06.06	Shooting Depth @ 3202	Back off	Back off successful
5	05.07.06	Surface - 3274	CCL	Held up @ 3274 m
6	14.07.06	Surface - 3274	CCL	Held up @ 3274 m
7	19.07.06	Surface - 3209	CCL	Held up @ 3209 m
8	19.07.06	Surface - 3209	CCL	Held up @ 3209 m
10	19.07.06	Shooting Depth @ 3201	Back off	No success
11	19.07.06	Shooting Depth @ 3201	Back off	Back off successful

8 ½" PHASE: (Logged by HLS Asia Ltd.)

Run	Date	Log Interval (m)	Logs Recorded	Remarks
1	18.09.06	3200 – 2884	GR-SP-CALI-LLD-MSFL	
2	18.09.06	3200 – 3105	GR-DSN-SDL-CALI	Tool failure (Recorded 95 m up log)
3	18.09.06	3200 – 2884	GR-FWS	

DRILL STEM TEST

DST in 8 ½" Phase

Run#	Test #	DATE	INTERVAL TESTED(m)	REMARKS
1	1	22-05-06	3167 – 3159	Strong blow of air in 1 min, gas on surface in 4 min, inflameable gas
1	2	13-09-06	3159 – 3200	Weak to strong blow of air in 1 min, gas on surface in 3 min, inflameable gas

CORING

CORE DESCRIPTION:

Core No : CC-1

Cored Interval : 3109.55 m – 3114.09 m

Core Recovered	**: 3.33 m**
Recovery	**: 73 %**
Formation	**: Pariwar**
Age	**: Lr. Cretaceous**
Shows	**: Speckled, pin-point, dotty, light yellowish direct fluorescence, (Suspected mineral fluorescence) / No solvent cut**

3109.55 – 3110.58 m Massive Sandstone with very thin intercalations of Shale
Sandstone: Light gray, gray to grayish white, dirty white, moderately hard to hard, compact, very fine to fine grained, in parts medium grained, poor to moderately sorted, argillaceous matrix, calcareous, pyretic, tight, negligible to poor visible porosity, micro-micaceous, in places glauconitic inclusion, shaly and silty, thin intercalation of Shale with wavy/undulating, obliterated laminations and abundant lensoid structures of sandstone

3110.58 – 3111.26 m Massive Sandstone with very thin lamination of Shale.
Sandstone: Light gray to grayish white, dirty white, moderately hard to hard, compact, massive, very fine to fine grained, in parts fine to medium grained, poorly to moderately sorted, argillaceous matrix, calcareous, pyretic, tight, negligible to poor visible porosity, micro micaceous, in places glauconitic inclusion, thin wave ripple laminations of shale is seen in upper part and in places planar and undulating laminations, lensoid structures of shale in the middle part.

3111.26 – 3112.27 m Massive Sandstone with thin lamination of Shale.
Sandstone: Light gray to grayish white, dirty white, moderately hard to hard, compact, very fine to fine grained, in parts fine to medium grained, moderately sorted, argillaceous matrix, calcareous, pyretic, micro micaceous, tight, in places glauconitic inclusion, thin wavy/obliterated and deformed laminations of shale, horizontal fracture parallel to bedding/ lamination, and an inclined fracture seen in basal part.
Shale: Blackish gray to dark gray, moderately hard to hard, compact, sub fissile, feebly-non calcareous, occasionally pyretic, micro-micaceous.

3112.27 – 3112.88 m Sandstone with thin lamination of Shale.
Sandstone: Light gray to grayish white, dirty white, moderately hard to hard, compact, very fine to fine grained, in parts fine to medium grained, poorly to moderately

sorted, argillaceous matrix, calcareous, pyretic, micro micaceous, in places glauconitic inclusion, thin wavy/ obliterated lamination of shale, abundant lensoid structures of sandstone.

Shale: Blackish gray to dark gray, moderately hard to hard, compact, sub fissile, feebly to non calcareous, thin wavy/undulating laminations/bedding structures.

CORING PARAMETERS (8 ½" Phase)

DEPTH (m)	WOB (Tons)	RPM (rpm)	TRQ (f*lbs)	SPP (psi)	Flow Pumps (lts/min)	ROP (m/hr)	MW In (S.G)	MW Out (S.G)
3111	4.1	108	1.75	1033	1081	2.14	1.35	1.36
3112	4.6	117	1.50	1106	1032	1.76	1.35	1.36
3113	4.0	106	1.42	1064	1087	0.90	1.35	1.36
3114	5.4	110	1.63	1216	985	0.66	1.35	--

Stratigraphy:

The well SGL # 1 was drilled in Langatala area of Shahgarh sub basin within the Jaisalmer Basin. During the drilling of this well, the Shumar Formation of Quarternary age, Bandah, Khuiala and Sanu formations of the Tertiary age and Parh, Goru, Pariwar formations of Mesozoic age were penetrated. The formation tops marked based on lithological description studies are given below:

FINAL WELL REPORT

SGL # 1

Era	Age	Formation	Sub formation	Lithology Type	Top MD (RT)	(m)
QUATERNARY	PLEISTOCENE - RECENT	SHUMAR		Dominantly Sand/Sandstone with interbeds of Clay/Claystone and occasional limestone	--	735
TERTIARY	MIDDLE EOCENE	BANDAH	Clay			
			A4 Limestone	Lst with thin clay intercalations	735	105
			Clay	Clay	840	25
			B2 Limestone	Limestone with thin clay intercalations	865	75
	LATE PALEOCENE - EARLY PALEOCENE	KHUIALA	Up. Ghazij Shale	Clay/Shale with thin interbeds of Limestone	940	260
			B4 Limestone	Lst, occ pyritic with Clay intercalations	--	--
			Lower Ghazij Shale	Shale/clayst with bioclastic Limestone	1200	80
			C2 - C4 Limestone	Limestone, thin interbeds of Clay/Shale	1280	65
	PALEOCENE	SANU	Upper Clay/Shale	Clay/Shale with interbeds of Limestone	1345	65
			D2 Sandstone	Interbeds of Sand, Clay, Shale	1410	25
			Lower Clay/Shale	Clay/Shale, interbeds Limestone & coal	1435	278
			D6 Sandstone	Sandstone, Shale/Claystone interbeds	1713	402
MESOZOIC	UPPER CREATEOUS	PARH		Marl, thin interbeds of Claystone	2115	365
		GORU	Upper Goru	Shale/Marl	2480	558
			Lower Goru	Glauconitic Shale		
	LATE CREATEOUS	PARIWAR		Sandstone with Shale/Clay	3038	26
				Sandstone with some Shale/Clay,Claystones	3064	44
				Sandstone and Shale/Clay, Claystone	3108	46
				Sand/Sandstone with some Clay/Shale	3154	157+
				T.D.	**3311.79**	

STRATIGRAPHIC CORRELATION:

STRATIGRAPHIC CORRELATION OF WELL SGL#1 WITH WELLS SAATCHI - 1, Ed#1, LANG-2

FORMATIONS	Well: SGL#1			Well: Saatchi - 1			Well: Ed#1			Well: LANG-2		
(Sub-Formations)	K.B. 74.12 msl			K.B. 89.3 m msl			K.B. 77.7 m msl			K.B. 76.98 m msl		
	Depth from	Depth to	Thickness	Depth from	Depth to	Thickness	Depth from	Depth to	Thickness	Depth from	Depth to	Thickness
SHUMAR	**0**	**735**	**735**	**0**	**695**	**695**	**0**	**720**	**720**	**0**	**723**	**723**
BANDAH	**735**	**940**	**205**	**695**	**885**	**190**	**720**	**918**	**198**	**723**	**921**	**198**
Cl				695	719	**24**	720	747	27	723	750	27
A4 Lst	**735**	**840**	**105**	719	792	**73**	747	811	64	750	813	63
Cl	**840**	**865**	**25**	792	814	**22**	811	837	26	813	840	27
B2 Lst	**865**	**940**	**75**	814	885	**71**	837	918	81	840	921	81
KHUIALA	**940**	**1345**	**405**	**885**	**1282**	**397**	**918**	**1340**	**422**	**921**	**1349**	**428**
Upp.Ghazij Sh	**940**	**1200**	**260**	885	1000	**115**	918	1063	145	921	1133	212
B4 Lst				1000	1077	**77**	1063	1135	72	1133	1146	13
Lr.Ghazij Sh	**1200**	**1280**	**80**	1077	1182	**105**	1135	1268	133	1146	1249	103
C2-C4 Lst	**1280**	**1345**	**65**	1182	1282	**100**	1268	1340	72	1249	1349	100
SANU	**1345**	**2115**	**770**	**1282**	**1937**	**655**	**1340**	**1973**	**633**	**1349**	**2018**	**669**
Upp. Cl/Sh	**1345**	**1410**	**65**	1282	1310	**28**	1340	1379	39	1349	1358	9
D2 Sst	**1410**	**1435**	**25**	1310	1340	**30**	1379	1419	40	1358	1424	66
Lr. Cl/Sh	**1435**	**1713**	**278**	1340	1563	**223**	1419	1698	279	1424	1686	262
D6 Sst	**1713**	**2115**	**402**	1563	1937	**374**	1698	1973	275+	1686	2018	332
PARH	**2115**	**2480**	**365**	**1937**	**2317**	**380**				**2018**	**2368**	**350**
Upp.GORU	**2480**			**2317**						**2368**	**2617**	**249**
Lr.GORU		**3038**	**558**		**2778**	**461**				**2617**	**2928**	**311**
PARIWAR	**3038**	**3311.79**	**273.79+**	**2778**	**3408**	**630**				**2928**	**3595**	**667**
B&B				**3408**	**4132.92**	**724.92+**				**3595**	**4376**	**781**
JAISALMER										**4376**	**5005**	**629+**

INTRODUCTION

The block is located within the vast Indo-Pakistan subcontinent, within slope of Indian platform, which is locally known as Shahgarh sub-basin of Lower Indus basin, close to the boundary between India and Pakistan**.** Thickness of sedimentary cover within the block ranges from 3300 m. near the eastern boundary up to more than 8 km in the western part.

Prospective part of sedimentary succession includes Paleogene (thickness up to1400 m.), Late- and Early-Cretaceous (thickness 850-1400 m.) and Jurassic (thickness from 1.6 up to more than 3 km) formations. This interval of succession is represented predominantly by shallow-shelf formations with rather favorable distinct differentiation on reservoir horizons and cap-rocks screening fluids movement.
Several unconformities are marked in sedimentary cover, out of which unconformity between Paleogene and Upper Cretaceous (sometimes clearly angular) is most prominent.

Source rock studies indicate that clay beds of Lower Cretaceous Pariwar & Goru formations are the main source due to the advantageous organic carbon percentage, level of vitrinite reflectance and thermal maturity. The stratigraphic succession contains numerous reservoir beds composed both by carbonates (Bandah, Khuiala and Jaisalmer formations) and terrigenous deposits.

Principal terrigenous reservoirs are connected to Sanu formation (Paleocene) and especially to Pariwar (Lower Cretaceous) and Bedesir-Baisakhi (Upper Jurassic) formations. According to cuttings and few core samples reservoirs within most promising Lower Cretaceous - Upper Jurassic interval are represented by sands, sandstones and siltstones with evidences of near-shore and rapid sedimentation.

Intervals with predominant development of reservoirs are distinctly separated by rather thick clay/claystone sequences (in Khuiala formation, Sanu formation, Goru formation, central portion of Baisakhi- Bedesir formation) forming regionally persistent cap rocks, preventing vertical movement of fluids.

FINAL WELL REPORT

SGL # 1
QUATERNARY SEQUENCE

This sequence consists of only Shumar Formation in Jaisalmer Basin, which is the upper most formation of the basin. The Quaternary is the most recent age of the geological time scale. This sequence consists of Pleistocene to recent age.

SHUMAR FORMATION: (SURFACE TO 735 m)

The Shumar Formation is the most recently continental series of Quarternary sediments deposited formation in the Jaisalmer basin and is exposed at the well SGL #1. The sedimentation took place throughout Quaternary Period, from Pleistocene age to recent.
The Shumar formation is having thickness of 735 m. This formation unconformably overlies the Bandah Formation of Tertiary. This formation lithologically constitutes fine, medium to coarse-grained sand/sandstone with occasional argillaceous and microcrystalline limestone and intebeds of Clay/Claystone.

Lithological Description (Shumar Formation):

155 – 160 m

***Clay/Claystone* (70 %):** Yellowish brown to light brownish, soft, amorphous, sticky, washable, smooth.
***Sandstone* (30 %):** Brownish to light b amorphous rownish, yellowish to light yellowish, transparent to translucent; loose to friable; fine to medium grained, rounded to sub rounded, sub spherical; moderately sorted; argillaceous matrix, unconsolidated.

160 – 170 m

***Sandstone* (70 %):** Light brown to dark brownish, light yellowish to yellowish, unconsolidated, loose, fine to medium grained, rounded to sub rounded, moderately sorted; argillaceous matrix, non-calcareous.
***Clay/Claystone* (30%):** Yellowish brown, soft, amorphous, sticky, washable.

170 – 250 m

***Sand/Sandstone* (70 – 100 %):** Colour less, light brown to dark brown, yellowish, loose to friable, dominantly fine to medium grained, in places coarse grained; medium hard, sub angular to sub rounded, moderately sorted, argillaceous matrix.
***Clay/Claystone* (Tr. – 30 %):** Light yellowish brown, yellowish, light brown to dark brown, soft, amorphous, sticky; plastic, washable, non-calcareous.

250 – 270 m

***Sandstone* (60 – 80 %):** Dirty white, white, light brown to dark brown, in places friable, fine grained, in places coarse grained, moderately hard, sub angular to sub rounded, moderately sorted, argillaceous matrix; non-calcareous.
***Clay/Claystone* (10 – 40 %):** Light brown to brownish, soft, amorphous, sticky; washable; non-calcareous.
***Siltstone* (10 %):** Dominantly light brownish to brownish, white, hard, non-calcareous.

270 – 280 m

***Clay/Claystone* (60%):** Light brown to yellowish, soft, in places firm, amorphous, sticky, in places calcareous.
***Sandstone* (40%):** Dirty white to white, light brown, transparent to translucent; fine to medium grained, moderately hard, rounded to sub rounded, moderately sorted, argillaceous matrix, non-calcareous.

280 – 320 m

***Sandstone* (60 – 90 %):** White, yellowish, brownish, in places gray , transparent to translucent, fine to medium grain, in places coarse grained,

moderately hard, sub angular to sub rounded, moderately sorted, argillaceous matrix, non-calcareous.
***Clay/Claystone* (10 – 40 %):** Light brown, yellowish, light gray, yellowish brown, soft, in places firm, amorphous, sticky and washable.

320 – 330 m

***Sandstone* (60%):** White, yellowish, light brown, transparent, loose to friable, fine to medium grained, in places coarse grained, rounded to sub rounded, moderately sorted, argillaceous matrix.
***Clay/Claystone* (40 %):** Light gray, yellowish brown, soft, in places firm, sticky, washable.

330 – 355 m

***Clay/Claystone* (50 – 70 %):** Dominantly yellowish brown, brown, white, soft, amorphous, sticky, washable.
***Sandstone* (30 – 50 %):** Light brown, yellowish brown, white, in places pinkish, transparent, loose to friable, fine to medium grained, in places coarse grained, rounded to sub rounded, moderately sorted, argillaceous matrix, unconsolidated

355 – 380 m

***Sandstone* (60 – 70 %):** Light brown, yellowish brown, white, light yellow, in places pinkish, fine to medium grained, in places coarse grained, moderately hard, rounded to sub-rounded, sub angular, compact, transparent-translucent, argillaceous matrix, moderately sorted.
***Clay/Claystone* (30 – 40 %):** Dominantly brown, yellowish brown, off white, light gray, soft, amorphous, sticky, washable.

380 – 390 m

***Sandstone* (70 – 80 %):** Light brown, white, pinkish, fine to medium grained, in places coarse grained, moderately hard, sub angular to sub-rounded, compact, transparent-translucent, argillaceous matrix
***Clay/Claystone* (20 – 30 %):** Dominantly light gray, yellowish brown, sticky, sticky, washable, amorphous.

390 – 400 m

***Clay/Claystone* (70%):** Light gray, yellowish brown, sticky, sticky, soft, washable.
***Sandstone* (30 %):** Yellowish brown, pinkish, white, moderately hard, fine to medium grained, in places coarse grained, sub angular to sub rounded, compact, argillaceous matrix, non-calcareous.

400 – 445 m

***Clay/Claystone* (80 – 90 %):** Light gray, yellowish brown, light brown, in places pinkish, sticky, sticky, soft, plastic, washable, feebly calcareous,
amorphous.
***Sandstone* (10 – 20 %):** White, yellowish brown, pinkish, transparent to translucent, moderately hard, compact, fine to medium grained, in places coarse grained, sub angular to sub rounded, moderately sorted, moderately cement, argillaceous matrix, non-calcareous.

445 – 450 m

***Clay/Claystone* (100%):** Light gray, yellowish brown, light brown, in places pinkish, soft, amorphous, sticky, washable, feebly calcareous.
***Sandstone & Glauconite*:** in traces.

450 – 455 m

***Clay/Claystone* (70%):** Dominantly dark brown, yellowish brown, light brown, soft, amorphous, sticky, washable and feebly calcareous.
***Sandstone* (30%):** Dominantly white, yellowish, pinkish, transparent to translucent, loose to friable, fine to medium grained, rounded to sub rounded, argillaceous matrix.
Glauconite: in traces.

FINAL WELL REPORT

SGL # 1

455 – 470 m

Sandstone **(80 – 90 %):** Dominantly white, pinkish, yellowish, transparent to translucent, loose to friable, in places moderately hard, fine to medium grained, in places coarse grained, rounded to sub rounded grain, argillaceous matrix, generally unconsolidated, non-calcareous.
Clay/Claystone **(10 – 20 %):** Dominantly white, dirty white, yellowish brown, light brown, pinkish, soft, amorphous, sticky, washable, feebly calcareous, plastic.

470 – 485 m

Sandstone **(70 – 80 %):** Dominantly white, pinkish, yellowish, transparent to translucent, loose to friable, in places moderately hard, fine to medium grained, in places coarse grained, rounded to sub rounded grain, argillaceous matrix, generally unconsolidated, non-calcareous.
Clay/Claystone **(20 – 30 %):** Dominantly white, dirty white, yellowish brown, in places pinkish, soft, amorphous, sticky, washable, non-calcareous.

485 – 535 m

Sandstone **(80 – 90 %):** Dominantly white to dirty white, pinkish, yellowish, transparent to translucent, moderately hard, occasionally compact, fine to medium grained, in places coarse grained, rounded to sub rounded, moderately sorted, argillaceous matrix, moderately cemented, non-calcareous.
Clay/Claystone **(10 – 20 %):** White, off white, gray, dirty white, yellowish brown, in places pinkish, sticky, soft, amorphous, washable, feebly calcareous.
Glauconite: in traces.

535 – 545 m

Sandstone **(70 %):** Dominantly white to dull white, gray, yellowish, transparent to translucent, moderately hard, compact, fine to medium grained, in places coarse grained, rounded to sub rounded , occasionally calcareous.
Clay/Claystone **(30%):** Dominantly gray, yellowish, yellowish brown, soft, amorphous, sticky, washable, in places silty.
Limestone: in traces

545 – 555 m

Clay/claystone **(60 – 70 %):** Dominantly white, gray, yellowish, brown, soft, amorphous, sticky, silty, washable, feebly calcareous to calcareous.
Sandstone **(30 – 40 %):** Dominantly white, dull white, gray, yellowish, transparent to translucent, moderately hard, compact, fine to medium grained, rounded to sub rounded grain, moderately sorted, occasionally calcareous.

555 – 565 m

Clay/Claystone **(70 – 80 %):** Dominantly white, gray, yellowish brown, soft, amorphous, sticky, silty, washable, calcareous.
Sandstone **(20 – 30 %):** Dominantly white, dull white, gray, yellowish, transparent to translucent, moderately hard, compact, fine to medium grained, rounded to sub rounded grain, moderately sorted, occasionally calcareous.
Limestone: in traces.

565 – 570 m

Clay/Claystone **(50 %):** Dominantly white, gray, yellowish brown, soft, amorphous, washable, sticky, in places silty, calcareous.
Sandstone **(40 %):** Dominantly white, dull white, gray, yellowish, transparent to translucent, moderately hard, compact, fine to medium grained, rounded to sub rounded, moderately sorted, occasionally calcareous.
Limestone **(10 %):** White, gray, dull white, moderately hard, brittle, microcrystalline, compact, bioclastic, foraminerous.

570 – 580 m	***Clay/Claystone* (60 – 70 %):** Dominantly white, gray, yellowish brown, soft, amorphous, sticky, washable, calcareous, in places silty. ***Sandstone* (20 – 30 %):** Dominantly white, dull white, gray, yellowish, transparent to translucent, moderately hard, compact, fine to medium grained, rounded to sub rounded, moderately sorted, calcareous ***Limestone* (10 %):** White, dull white, gray, moderately hard, brittle, microcrystalline, moderately sorted, bioclastic.
580 – 595 m	***Clay/Claystone* (100 %):** Dominantly gray, dull white, yellowish brown, soft, amorphous, sticky, washable, calcareous. ***Sandstone:*** in traces.
595 – 600 m	***Clay/Claystone* (80 %):** White, gray, dull white, yellowish brown, soft, amorphous, sticky, soft, washable, feebly calcareous, in places silty. ***Sandstone* (20 %):** White, dull white, yellowish, in places pinkish, transparent to translucent, moderately hard, compact, fine to medium grained, in places coarse grained, rounded to sub rounded grain, moderately sorted.
600 – 615 m	***Sandstone* (60 %):** Dominantly white, dull white, yellowish, in places pinkish, moderately hard, compact, fine to medium grained, in places coarse grained, sub angular to sub rounded grain, argillaceous matrix, moderately sorted, moderately cemented. ***Clay/Claystone* (40 %):** White, light brown, yellowish brown, sticky, soft, silty, washable, feebly calcareous, amorphous.
615 – 630 m	***Sandstone* (80 – 90 %):** White, dirty white, colourless, light yellowish to yellowish, transparent to translucent, moderately hard to hard, medium to coarse grained, , sub angular to sub rounded, sub spherical, moderately sorted, moderately cemented,. ***Clay/Claystone* (10 – 20 %):** White, yellowish brown, light brown, soft, amorphous, sticky and washable.
630 – 635m	***Clay/Claystone* (70 %):** Light gray, brownish gray, non-sticky, soft, silty, washable and non-calcareous. ***Sandstone* (30 %):** White, brown, light yellowish to yellowish, moderately hard to hard, medium to coarse grained, sub angular to sub rounded grain, moderately sorted, moderately cemented.
635 – 645 m	***Sandstone* (70 %):** Dominantly brown, white, colourless, light yellowish, medium to coarse grained, moderately hard to hard, sub angular to sub rounded grain, transparent to translucent, moderately sorted, moderately cemented, sub spherical. ***Clay/Claystone* (30 %):** Light gray, brownish gray, non-sticky, soft, washable, silty, non-calcareous
645 – 660 m	***Sandstone* (80 – 90 %):** Dominantly brown, white, colourless, light yellowish, milky white, transparent to translucent, moderately hard to hard, medium to coarse grained, sub angular to sub rounded, sub spherical, moderately sorted, moderately cemented, occasionally calcareous. ***Clay/Claystone* (10 – 20 %):** Light gray, brownish gray, white, dull white, yellowish brown to brown, soft, amorphous, non-sticky to sticky, washable, silty, non-calcareous to calcareous.

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660 – 675 m

***Clay/Claystone* (80 – 90 %):** Dominantly white, dirty white, light gray, yellowish brown to brownish, in place reddish, soft, amorphous, sticky, silty, washable, feebly calcareous to calcareous.
***Sandstone* (10 – 20 %):** Dominantly brown, white, milky white, colourless, light yellowish to yellowish, transparent to translucent, moderately hard to hard, fine to medium grained, in place coarse grain, sub angular to sub rounded grain, moderately sorted, moderately cemented.

675 – 680 m

***Clay/Claystone* (70 %):** Dominantly white, dirty white, light gray, in place reddish, soft, amorphous, sticky, washable and feebly calcareous.
***Sandstone* (30 %):** Dominantly brown, white, colourless, light yellowish, transparent to translucent, fine to medium grained, in place coarse grain, moderately hard to hard, sub angular to sub rounded grain, moderately sorted.

680 – 690 m

***Clay/Claystone* (50 %):** Light gray, brown, yellowish brown, sticky, soft, washable, feebly calcareous to calcareous.
***Sandstone* (50 %):** Dominantly white, milky white, light yellowish, fine to medium grained, moderately hard, compact, sub angular to sub rounded grain, moderately sorted.

690 – 700 m

***Sandstone* (60 – 70 %):** Dominantly white, milky white, light yellowish, moderately hard to hard, compact, fine to medium grained, sub angular to sub rounded , moderately sorted.
***Clay/Claystone* (30 – 40 %):** Light gray, yellowish brown to brown, soft, amorphous, sticky, washable, calcareous.

700 – 710 m

***Sandstone* (80 – 90 %):** Dominantly white, milky white, light yellowish, fine to medium grained, moderately hard to hard, compact, sub angular to sub rounded grain, moderately sorted, transparent to translucent, moderately cemented.
***Clay/Claystone* (10 – 20 %):** Light gray, yellowish brown to brown, soft, amorphous, sticky, washable, feebly calcareous.

710 – 730 m

***Sandstone* (90 – 100 %):** Dominantly brown, white, milky white, light yellowish, brownish, transparent to translucent, moderately hard to hard, compact, fine to medium grained, in place coarse grain, sub spherical, sub angular to sub rounded grain, moderately sorted, moderately cemented.
***Clay/Claystone* (Tr. – 10 %):** Light gray, yellowish brown to brown, dirty white, in place pinkish, sticky, soft, washable, feebly calcareous to calcareous.

730- 735 m

***Sandstone* (80 %):** Dominantly white, milky white, light yellowish, brownish, moderately hard, compact, fine to medium grained, sub angular to sub rounded grain, moderately sorted.
***Clay/Claystone* (10 %):** Light gray, yellowish brown to brown, sticky, soft, amorphous, washable, calcareous.
***Limestone* (10 %):** White, gray, dull white, moderately hard, brittle, compact, microcrystalline, moderately sorted.
***Pyrite*:** In abundance.

FINAL WELL REPORT

SGL # 1
TERTIARY SEQUENCE:

The Tertiary sequence disconformably underlies the Shumar Formation of Quaternary age. The deposition in this sequence took place in marine environment, which was later overlain by the continentally deposited formation. The lower boundary of this Tertiary sequence unconformably overlies the Parh Formation of Cretaceous age. Disconformity between the gravelly sandstone of upper Tertiary - Quarternary continental deposits and lower fossiliferous deposits of Bandah formation has been taken as the upper boundary. The Tertiary sequence is further differentiated into three formations. The three formations, Bandah, Khuiala and Sanu are further sub divided into members based on the lithology.

BANDAH FORMATION: (735 m – 940 m)

The upper clay of Bandah formation (Middle Eocene) is not well developed in this well and has not been accurately picked up on the basis of lithology or micro fauna and the top of Bandah is assumed at 735 m with the presence of calcareous sediments. The weathered, very coarse grained to gravelly Sand/Sandstone and Clay/Claystone with some limestone of Middle Eocene at 735 m may possible be representing the bottom sediments of Shumar Formations.

Lithological Description (Bandah Formation):

735 – 745 m

Limestone **(80 %):** White to dirty white, off white to milky white, moderately hard, occasionally soft, compact, microcrystalline, bio-clastic, highly fossiliferous.
Clay/Claystone **(10 %):** Blackish gray, greenish gray, dark gray, sticky, soft, moderately hard, occasionally silty, feebly calcareous.
Sandstone **(10 %):** Colourless, white to dirty white, transparent to translucent, moderately hard, fine to medium grained, sub angular to sub rounded, moderately sorted, no fluorescence and no solvent cut
Pyrite: In traces.

745 – 750 m

Limestone **(60 %):** White to dirty white, off white to milky white, moderately hard, occasionally soft, compact, microcrystalline, bio-clastic, highly fossiliferous.
Clay/Claystone **(30 %):** White, dirty white, soft, washable, calcareous.
Sandstone **(10 %):** Colourless, white to dirty white, transparent to translucent, moderately hard, fine to medium grained, sub angular to sub rounded, moderately sorted, no fluorescence and no solvent cut.
Pyrite: In trace amounts.

750 – 755 m

Limestone **(40 %):** White to dirty white, off white to milky white, moderately hard, occasionally soft, compact, microcrystalline, bio-clastic, highly fossiliferous.
Clay/Claystone **(50 %):** White, dirty white, soft, washable, calcareous.
Sandstone **(10 %):** Colourless, white to dirty white, transparent to translucent, moderately hard, fine to medium grained, sub angular to sub rounded, moderately sorted, no fluorescence and no solvent cut.
Pyrite: In trace amounts.

755 – 760 m

Limestone **(70 %):** Dominantly white, dirty white, yellowish white, colourless, soft, in parts moderately hard, bio clastic, fossiliferous.
Clay/Claystone **(20 %):** White, dirty white, soft, washable, calcareous.

Sandstone **(10 %):** Colourless, white to dirty white, transparent to translucent, moderately hard, fine to medium grained, sub angular to sub rounded, moderately sorted, no fluorescence and no solvent cut.

760 – 765 m ***Limestone*** **(70 %):** Dominantly white, dirty white, yellowish white, colourless, soft, in parts moderately hard, bioclastic, fossiliferous to highly fossiliferous.
Clay/Claystone **(30%):** White, dirty white, soft, washable, calcareous.

765 – 775 m ***Limestone*** **(90 – 100 %):** Dominantly White, dirty white, yellowish white, colourless, soft, in places moderately hard, bioclastic, fossiliferous to highly fossiliferous.
Coal (Tr. – 10 %): Dark brown to brownish, brittle, soft.
Clay/Claystone, Glauconite**:** In traces

775 – 780 m ***Limestone*** **(100 %):** Dominantly white, dirty white, yellowish white, colourless, soft, in parts moderately hard, bioclastic, fossiliferous.
Sandstone, Clay/Claystone**,** ***Glauconite*****:** In trace.

780 – 785 m ***Limestone*** **(100 %):** Dominantly White, dirty white, yellowish white, colourless, soft, sometime moderately hard, bioclastic, fossiliferous, found some oolitic type.
Pyrite: In traces (found as octahedral shape also).
Glauconite: In traces.

785 – 800 m ***Limestone*** **(100 %):** Dominantly white, off white, milky white, moderately hard to hard, compact.
Sandstone, Pyrite**,** ***Glauconite:*** In traces.

800 – 805 m ***Limestone*** **(80 %):** Dominantly dirty white, white, off white, milky white, brittle, moderately hard, moderately sorted.
Clay/Claystone **(20 %):** Dominantly gray, light gray, soft to firm, sticky, feebly calcareous.
Sandstone, Pyrite**:** In traces.

805 – 810 m ***Limestone*** **(60 %):** Dominantly dirty white, grayish; white, off white, milky white, brittle, moderately hard, bioclastic.
Clay/Claystone **(30 %):** Dominantly gray, light gray, soft to firm, sticky, feebly calcareous.
Sandstone **(10 %):** Colourless, white, dirty, white, transparent to translucent, moderately hard, fine to medium grained, sub angular to sub rounded.
Pyrite**:** In traces.

810 – 815 m ***Clay/Claystone*** **(50 %):** Dominantly gray, light gray, soft to firm, sticky, feebly calcareous.
Limestone **(40 %):** Dominantly dirty white, grayish; white, off white, milky white, brittle, moderately hard, moderately sorted.
Sandstone **(10 %):** Colourless, white, dirty, white, transparent to translucent, moderately hard, fine to medium grained, sub angular to sub rounded grain.
Pyrite**:** In trace.

815 – 820 m ***Clay/Claystone*** **(60 %):** Dominantly greenish gray, light gray, soft to firm, sticky, feebly calcareous.
Limestone **(40%):** Dominantly white, off white, milky white, brittle, moderately hard, moderately sorted.

***Sandstone, Pyrite*:** In traces.

820 – 825 m

***Clay/Claystone* (50 %):** Dominantly greenish gray, light gray, soft, sticky.
***Limestone* (50 %):** Dominantly white, off white, milky white, brittle, moderately hard.
***Pyrite*:** In trace amount.

825 – 830 m

***Limestone* (60 %):** White, off white, milky white, brittle, moderately hard, moderately sorted.
***Clay/Claystone* (40 %):** Dominantly greenish gray, light gray, soft to firm, sticky, feebly calcareous.
***Pyrite*:** In trace amount.

830 – 840 m

***Limestone* (80 %):** White, off white, milky white, brittle, moderately hard, moderately sorted.
***Clay/Claystone* (20 %):** Dominantly greenish gray, light gray, soft to firm, sticky, feebly calcareous.
***Pyrite*:** In traces.

840 – 855 m

***Clay/Claystone* (50 – 60 %):** Dominantly light gray, dark gray, light brown to dark brown, soft. sticky, plastic, fine grained, washable, feebly calcareous to calcareous.
***Limestone* (40 – 50 %):** Dominantly white, white, milky white, brittle, moderately hard, crystalline, moderately sorted, bioclastic.
***Pyrite*:** In trace amount.

855 – 865 m

***Limestone* (60 – 70 %):** Dominantly white, white, milky white, off white, brittle, moderately hard, moderately sorted, fossiliferous.
***Clay/Claystone* (30 – 40 %):** Dominantly light gray, light brown to dark brown, soft. non-sticky to sticky, fine grained, calcareous.

865 – 875 m

***Limestone* (80 – 90 %):** Dominantly white, milky white, light yellowish, brownish, brittle, friable, moderately hard, microcrystalline, moderately sorted, highly fossiliferous, mineral florescence, calcareous .
***Clay/Claystone* (10 – 20 %):** Greenish, brown, dark greenish, sticky, occasionally silty, washable, feebly calcareous.

875 – 885 m

***Limestone* (70 – 80 %):** Dominantly white, milky white, dirty white, microcrystalline, highly fossiliferous, mineral florescence.
***Clay/Claystone* (20 – 30%):** Gray to dark gray, greenish gray, soft, moderately hard, calcareous, in places grading to shale.
***Shale and Siltstone*:** In traces.

885 – 890 m

***Limestone* (90 %):** Dominantly white, milky white, dirty white, microcrystalline, highly fossiliferous, mineral florescence.
***Clay/Claystone* (10 %):** White, milky white, light gray, greenish gray, bluish gray, brownish, soft to moderately hard, occasionally silty, in places grading towards Shale.
***Shale and Pyrite*:** In traces.

890 – 920 m

***Limestone* (100 %):** Dominantly white, milky white, dirty white off white, brittle, moderately hard, compact, microcrystalline, fossiliferous, mineral florescence.
***Clay/Claystone, Pyrite, Glauconite*:** In trace.

920 – 940 m

***Limestone* (80 – 90 %):** Dominantly white, milky white, off white, light gray, moderately hard, brittle, microcrystalline, fossiliferous, calcareous.
***Clay/Claystone* (10 – 20 %):** Gray, soft, sticky, calcareous.
***Pyrite, Glauconite*:** In traces.

KHUIALA FORMATION: (940 m – 690 m)

The Khuiala Formation is overlain by Bandah Formation and underlain by Sanu Formation of the Tertiary sequence. The age of this formation is late Paleocene to Early Eocene. During the Late Paleocene-Early Eocene transgression, the deposition of alternating fine clastics, marl and carbonates characterize oscillating condition. Lithologically it comprises four members, Upper Ghazij Shale, B_4 Limestone, Lower Ghazij Shale and $C_2 – C_4$ Limestone. The upper half of the Khuiala formation is mainly argillaceous sequence (Ghazij Shales) divided by a marl band with intercalations of fossiliferous microcrystalline limestone designated as the $C_2 – C_4$ limestone

Upper Ghazij Shale: This member is mainly composed of bluish gray, soft, plastic, fossiliferous clay with occasional thin bands of dirty white to bluish gray, soft, fossiliferous marl. It is having the thickness of 260 m, from 940 m to 1200 m.

B_4 Limestone: This member has been not picked up accurately in this well and is not well developed.

Lower Ghazij Shale: This is the third member of Khuiala Formation, which comprises mainly of bluish gray, soft, sticky, plastic, pyritic, fossiliferous clay with dirty white to bluish gray, soft, fossiliferous marl intercalations. It has a thickness of 80 m, from 1200m to 1280 m.

C_2-C_4 Limestone: This is the last member of the Khuiala Formation mainly from the depth 1280 m to 1345 m having thickness of 65 m. It mainly consists of white to dull white, off white, bioclastic, at places chalky, fossiliferous, moderately hard and pyritic limestone and white, soft, occasionally bluish gray, fossiliferous marl.

Lithological Description (Khuiala Formation):

940 – 950 m

***Clay/Claystone* (60 – 70 %):** Dominantly light gray to gray, firm, non-sticky, plastic, washable.
***Limestone* (30 – 40 %):** Dominantly white, milky white, off white, moderately hard, brittle, microcrystalline.
Pyrite and Glauconite: In traces.

950 – 960 m

***Clay/Claystone* (80 – 90 %):** Dark gray, light gray, greenish gray, soft, sub blocky to blocky, in places grading towards siltstone/shale, sticky, calcareous, glauconitic, washable.
***Limestone* (10 – 20 %):** White, milky white, yellowish white, dirty white, moderately hard, compact, rich in forams, microcrystalline, fossiliferous.
Pyrite and Shale: In traces.
Glauconite: Abundant

960 – 985 m

***Clay/Claystone* (70 – 80 %):** Dark gray, light gray, greenish gray, soft, sub blocky to blocky, grading towards siltstone/shale, sticky, calcareous, glauconitic, washable.

***Shale* (10 – 20 %):** Greenish, greenish gray, sub fissile, sub blocky to blocky, platy, flaky, in place elongate, non calcareous, glauconitic.
***Limestone* (10 %):** White, milky white, yellowish white, dirty white, moderately hard, compact, foraminerous, microcrystalline, fossiliferous.
Glauconite: Abundant

985 – 990 m

***Clay/Claystone* (60 %):** Dark gray, light gray, greenish gray, soft, sub blocky to platy, grading towards siltstone/shale, sticky, calcareous, glauconitic, washable.
***Shale* (30 %):** Greenish, greenish gray, sub fissile, sub blocky to blocky, platy, flaky, in place elongate, non calcareous.
***Limestone* (10 %):** White, milky white, dirty white, moderately hard, compact, microcrystalline, fossiliferous.
Glauconite: Abundant
Sandstone: In traces

990 – 995 m

***Clay/Claystone* (60 %):** Dark gray, light gray, greenish gray, soft, sub blocky to platy, grading towards siltstone/shale, sticky, calcareous, glauconitic, washable.
***Shale* (30 %):** Greenish, greenish gray, sub fissile, sub blocky to blocky, platy, flaky, in place elongate, non calcareous.
***Limestone* (10 %):** White, milky white, dirty white, moderately hard, compact, microcrystalline.
Glauconite: Abundant

995 – 1000 m

***Clay/Claystone* (50 %):** Dark gray, light gray, greenish gray, soft, sub blocky to platy, grading towards siltstone/shale, sticky, calcareous, glauconitic, washable.
***Limestone* (10 %):** White, milky white, dirty white, moderately hard, compact, microcrystalline.
***Shale* (40 %):** Greenish, greenish gray, sub fissile, sub blocky to blocky, platy, flaky, in place elongate, non calcareous.
Glauconite: Abundant.

1000 – 1010 m

***Clay/Claystone* (40 – 50 %):** Greenish, greenish gray, sometime soft, washable, feebly calcareous and fossiliferous.
***Shale* (50 – 60 %):** Greenish, greenish gray, changing towards dark gray, fissile, soft to moderate hard, sometime hard, flaky, feebly calcareous to non calcareous.
Limestone: In traces.

1010 – 1020 m

***Shale* (70 – 80 %):** Greenish, greenish gray, changing towards dark gray, soft to moderate hard , occasionally hard, fissile, flaky, feebly calcareous to non calcareous.
***Clay/Claystone* (20 – 30%):** Greenish, greenish gray, sometime soft, washable, feebly calcareous and fossiliferous.
Limestone: In traces.

1020 – 1040 m

***Shale* (90 %):** Greenish, dark gray, greenish gray, moderate hard, flaky, fissile, soft and lenticular.
***Clay/Claystone* (10 %):** White, gray, soft, sticky, washable, calcareous.
Limestone and Pyrite: In traces.

1040 – 1045 m

***Shale* (80 %):** Greenish, dark gray, greenish gray, moderate hard, flaky, fissile, soft and lenticular.
***Clay/Claystone* (10 %):** White, gray, soft, sticky, washable, calcareous.

***Limestone* (10 %):** In traces

1045 – 1070 m

***Shale* (80 – 90 %):** Dark gray to gray, greenish gray, moderate hard, fissile to sub fissile, soft, smooth , flaky, elongated, , feebly calcareous to non-calcareous.
Limestone* (10 – 20 %)*: Off white to white, milky white, moderate hard, microcrystalline, fossiliferous.
Clay/Claystone and Pyrite: In traces.

1070 – 1080 m

***Shale* (80 %):** Gray to greenish gray, flaky, moderately hard, fissile flaky, elongated, smooth and calcareous.
Limestone* (20 %)*: Off white to white, milky white, moderate hard, microcrystalline, fossiliferous.
Glauconite and Pyrite: In traces.

1080 – 1110 m

***Shale* (70 – 80 %):** Greenish, dark gray, light greenish gray to greenish gray, light gray, soft, moderately hard, compact, elongated fissile, in place sub fissile, platy to sub platy, flaky to sub flaky, occasionally sub blocky, in place sandy/silty, feebly calcareous to non calcareous, occasionally calcareous, glauconitic, occasionally micaceous.
***ClayClaystone* (10 – 20 %):** Dominantly greenish gray to light gray, in place, greenish white, soft to firm, amorphous, sticky, plastic, washable, feebly calcareous, glauconitic.
Limestone (10%): Yellowish white to white, dirty white to off white, occasionally milky white, moderately hard to hard, compact, brittle, microcrystalline, forams, fossiliferous, calcareous.
Glauconite and Pyrite: In traces.

1110 – 1140 m

***Shale* (60 – 70 %):** Dark gray, light gray, greenish gray, gray, flaky, elongated, flat, soft, feebly calcareous to calcareous, occasionally micaceous.
Limestone* (20 – 30 %)*: Off white, dirty white to white, sub angular to sub rounded, medium grained, microcrystalline, fossiliferous, calcareous, some fossils found in limestone matrix.
Clay/Claystone* (10 %)*: Dominantly greenish gray, soft, washable, sticky, plastic, feebly calcareous.
Pyrite: In Trace.

1140 – 1175 m

***Shale* (70 – 80 %):** Dominantly gray, light gray, dark gray, dark brown to brown, soft, in place moderately hard, elongated, flaky, fissile, blocky to sub blocky, platy to sub platy, non calcareous to feebly calcareous, occasionally micaceous, brown coloured glittering also found.
Limestone* (10 – 20 %)*: Off white, dirty white to white, yellowish, moderately hard, microcrystalline, fossiliferous, calcareous, forams.
Clay/Claystone* (10 %)*: Dominantly gray to light gray, soft, washable, sticky, plastic and feebly calcareous.

1175 – 1180 m

***Shale* (60 %):** Dominantly gray, light gray, dark brown, dark gray, moderately hard, elongated, fissile, flaky, blocky to sub blocky, platy to sub platy, non calcareous.
Limestone* (30 %)*: Off white, dirty white to white, yellowish, rounded to sub rounded, medium grained, moderately hard, microcrystalline, forams.
Clay/Claystone* (10 %)*: Dominantly gray to light gray, soft, washable, sticky and plastic.

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1180 – 1185 m

***Shale* (80%):** Dominantly gray, light gray, greenish gray, moderately hard, elongated, fissile, compact, sub platy to sub blocky, flaky to sub flaky, non calcareous.
Limestone* (20%)*: Off white, dirty white to white, yellowish, moderately hard, fossiliferous, foraminerous.
***Clay/Claystone and Pyrite*:** In trace.

1185 – 1195 m

***Shale* (70 – 80 %):** Dominantly gray, light gray, greenish gray, moderately hard, compact, fissile, elongated, sub platy to sub blocky, flaky to sub flaky, non calcareous.
Limestone* (10 – 20 %)*: Off white, dirty white to white, yellowish, moderately hard, fossiliferous, sub spherical, foraminerous.
***Clay/Claystone* (10 %):** Gray, light gray, soft, sticky and washable.

1195 – 1210 m

***Shale* (100%):** Greenish gray, gray, light gray to dark gray, occasionally brownish, moderately hard, compact, fissile, flaky, elongated, sub blocky.
***Limestone and Clay/Claystone*:** In traces.

1210 – 1255 m

***Shale* (80 – 90 %):** Gray, greenish gray, brownish gray, moderately hard, flaky, platy, elongated, feebly calcareous to calcareous, in place silty.
***Clay/Claystone* (10 – 20 %):** Light gray, gray, whitish, soft, sticky, washable, feebly calcareous.
***Limestone*:** In traces.

1255 – 1280 m

***Shale* (70 – 80 %):** Gray, greenish gray, dark brown, light gray, moderately hard, flaky, soft, fissile, sub platy to platy, sub blocky to blocky, elongated, feebly calcareous.
Limestone* (10 – 20 %)*: White, dirty white, yellowish, off white, moderately hard, compact, brittle and microcrystalline.
***Clay/Claystone* (10 – 20 %):** Light gray, gray, soft, washable, sticky, feebly calcareous.

1280 – 1285 m

Limestone* (50 – 60 %)*: White, dirty white, yellowish, off white, moderately hard, compact, brittle, microcrystalline, in places bands of calcite.
***Shale* (20 – 30 %):** Gray**,** light gray to dark gray, greenish gray, firm to moderately hard, compact, fissile, platy, flaky, elongated, feebly calcareous.
***Clay/Claystone (*10 – 20 %):** Dominantly gray, light gray to light grayish white, in places brownish gray, soft, amorphous, soluble, fairly sticky, plastic, feebly calcareous and sandy/silty.

1285 – 1305 m

Limestone* (80 – 90 %)*: White, dirty white, yellowish, off white, moderately hard, compact, brittle, microcrystalline, in places bands of calcite.
***Shale* (10 – 20 %):** Gray**,** light gray to dark gray, greenish gray, firm to moderately hard, compact, platy, flat, flaky, fissile, elongated, feebly calcareous.
***Sandstone* (Tr. – 10 %):** Dominantly colour less, brownish white, white to dirty white, transparent to translucent, moderately hard, fine to medium grain, in parts coarse grained, sub angular to sub rounded, sub spherical, argillaceous matrix, i/p calcareous cement, moderately cemented, fair visible porosity.
Pyrite and Glauconite: In traces.

1305 – 1345 m

Limestone* (50 – 60 %)*: White, dirty white, yellowish, off white, moderately hard, compact, brittle, microcrystalline, in places bands of calcite.
***Shale* (40 – 50 %):** Gray**,** light gray to dark gray, greenish gray, firm to moderately hard, compact, fissile, platy, flat, flaky, elongated, feebly calcareous.
***Clay/Claystone* (10 – 20 %):** Gray to light gray, light grayish white, in places brownish gray, soft, amorphous, soluble, fairly sticky, plastic, feebly calcareous, sandy/silty.
Sandstone, Pyrite and Glauconite: In traces.

SANU FORMATION: (1345 m – 2115 m)

Sanu Formation is the lower most part of the Tertiary sequence. It is overlain by Khuiala Formation and unconformably overlies Parh Formation of Cretaceous. This formation starts from the depth 1345 m and extend upto 2115 m. The thickness of the formation in this well is 770 m. The upper part of the formation consists of clay (Shaly) and limestone/marl at places, the lower part consist dominantly of fine to coarse grained sandstone with minor thin interbeds of Clay/ Claystone and limestone. This formation is further divided into four sub formations on the basis of their lithology type.

Clay/Shale: This member is dominated by shales/ claystone from depth 1345 m to 1410 m. It is having the thickness of 65m.
Pertographically the shale of this member is generally gray to dark gray, greenish gray to bluish gray, light brown to brown, moderately hard, compact and brittle, sub blocky to blocky, sub platy, sub fissile to fissile, feebly calcareous and occasionally pyretic.

D_2 Sandstone: This member is dominated by sandstone. The thickness of this part of Sanu Formation is 25 m, which starts from 1410 m and continues up to 1435 m.
Petro-graphically, the sandstone is color less, transparent to translucent, loose to friable, fine to medium, in places coarse, occasionally very coarse grains, sub angular to sub rounded, sub spherical, moderately sorted, unconsolidated, calcareous to siliceous cement.

Shale/Clay: This part of Sanu Formation is having big patch of Shale/Claystone with intercalations of Limestone. It starts from 1435 m to 1713 m with the thickness of 278 m.
The shale of this member is generally gray to dark gray, greenish gray, light brown to brown, moderately hard, compact, brittle, sub blocky to blocky, sub platy, sub flaky, sub fissile, non-calcareous to feebly calcareous, occasionally silty, glauconitic, pyritic, fossil of forams.

D_6 Sandstone: This member is the lower most part of Sanu Formation. This member unconformably overlies the Parh Formation of Upper Cretaceous age. The thickness is about 402 m and ranges from 1713 m to 2115 m. This member shows dominance of sandstone with inter-beds of shale/claystone. Minor intercalations of siltstone are also present within this member.
The sandstone of this member is white to dirty white, yellowish brown, light brown to brown, moderately hard to hard, fine to medium grained, sub angular to sub rounded, poorly to moderately sorted, feebly calcareous, argillaceous matrix, sandstones with calcareous silty clay.

Lithological Description (Sanu Formation):

1345 – 1375 m

***Clay/Claystone* (40 – 50 %):** Dominantly dark gray, light gray to light grayish white, in places brownish gray, soft, amorphous, washable, soluble, fairly sticky, plastic, feebly calcareous.
***Shale* (30 – 40 %**):Gray, light gray to dark gray, greenish gray, firm to moderately hard, compact, fissile, platy, flaky, platy, elongated, in places sub blocky to blocky, feebly calcareous.
***Limestone* (10 – 20 %):** White, dirty white, yellowish, off white, moderately hard, compact, in parts brittle, microcrystalline.
***Sandstone* (Tr. – 10 %):** Dominantly colour less, brownish white, yellowish brown, white to dirty white, transparent to translucent, light brownish white, moderately hard, fine to medium grain, in parts coarse grain, sub angular to sub rounded, sub spherical, argillaceous matrix, calcareous cement, fair visible porosity, moderately cemented.
Pyrite and Glauconite: In traces.

1375 – 1385 m

***Shale* (60 – 70 %):** Dominantly light gray to gray, brownish gray, in places greenish gray, moderately hard, in parts firm, compact, fissile, dominantly flaky, platy, elongated, in places sub blocky to blocky, feebly calcareous.
***Clay/Claystone* (20 – 30 %):** Dominantly dark gray to light gray, light grayish white, in places greenish gray, soft, amorphous, washable, sandy/ silty, feebly calcareous, in places grading towards marl.
***Coal* (Tr. – 10%):** Dominantly black, dark brownish black, mod hard, vitreous to sub vitreous, blocky to sub-blocky, amorphous.
***Limestone* (Tr. – 10 %):** Dominantly white to dirty white to milky white, brittle, compact, moderately hard, in places friable, microcrystalline, argillaceous, fossiliferous, crystals of calcite present.
Pyrite, Glauconite: In traces

1385 – 1410 m

***Shale* (40 – 50 %):** Dominantly light gray to gray, brownish gray, greenish gray, in parts blackish gray, moderately hard, firm, compact, fissile, flaky, platy, sub blocky to blocky, elongated, non calcareous to feebly calcareous.
***Siltstone* (20 – 30%):** Light brownish white, brown, light yellowish brown, light brownish yellow, cream, in places light grayish brown, moderately hard to hard, compact, non calcareous, occasionally in places grading to very fine sandstones.
***Sandstone* (10 – 20 %):** White to dirty white, colour less, clear, light brownish white, in places light yellowish white, transparent to translucent, friable to moderately hard, in parts unconsolidated, medium to fine grain, in parts coarse grain and very fine grain, sub angular to sub rounded, sub spherical, moderately sorted, argillaceous matrix, calcareous cement, in places pyretic, weak to moderate cement, fair to poor visible porosity.
***Clay/ Claystone* (Tr. – 10 %):** Dominantly dark gray to light gray to light grayish white, in places greenish gray, soft, amorphous, washable, sandy/ silty, feebly calcareous.
Pyrite and Limestone: In traces.

1410 – 1430 m

***Sandstone* (70 – 80 %):** Colour less, clear, transparent to translucent, white, milky white, light brownish white, in places light yellowish white, generally loose, in parts consolidated, friable to moderately hard, medium grain, in places coarse grain, sub rounded, sub

spherical to spherical, moderately sorted, argillaceous matrix, calcareous cement, fair visible porosity, occasionally poor, pin point to speckled, light yellowish fluorescence and faint to mild white crushed cut, rare slow streaming yellowish white to white cut.
***Shale* (20 – 30 %):** Dominantly light gray to gray, brownish gray, in places greenish gray, dominantly fissile, dominantly moderately hard, firm, compact, dominantly flaky, platy, elongated, in places sub blocky to blocky, feebly calcareous.
***Siltstone* (10%):** Light brownish yellow, yellowish brown, dirty white, cream, brown, in places light grayish brown, hard, compact, non-calcareous.
Pyrite, Glauconite and Limestone: In traces.

1430 – 1435 m

***Sandstone* (50 %):** Colour less, clear, transparent to translucent, white, milky white, light brownish white, in places light yellowish white, generally loose, in parts consolidated, friable to moderately hard, medium grained, in places coarse grained, sub rounded, sub spherical to spherical, moderately sorted, argillaceous matrix, calcareous cement, in places pyretic, fair visible porosity. No fluorescence and no solvent cut.
***Clay/Claystone* (30 %):** Gray, dark gray, brownish to brownish gray, soft to firm, amorphous, washable, feebly calcareous.
***Shale* (20 %):** Gray, dark gray, light gray, in places blackish gray, moderately hard, compact, fissile, flaky, sub blocky to blocky, non-calcareous to feebly calcareous, silty.
Pyrite and Limestone: In traces.

1435 – 1440 m

***Clay/Claystone* (60 – 70 %):** Gray, brownish gray, dark brown, dark gray, soft, amorphous, washable, sticky and feebly calcareous.
***Sandstone* (30 %):** Colour less, clear, transparent to translucent, white, friable to moderately hard, medium grained, in places coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted, argillaceous matrix, calcareous cement, in places pyretic, generally loose, in parts consolidated, fair visible porosity. No fluorescence and no solvent cut.
Pyrite and Glauconite: In traces.

1440 – 1455 m

***Shale* (60 – 70 %):** Dark gray, gray, brownish gray, moderately hard, compact, fissile, flaky, sub blocky to blocky, in parts platy, elongated, calcareous to feebly calcareous, in places non calcareous.
***Clay/Claystone* (20 %):** Brownish, brownish gray, white to grayish white, soft, in places moderately hard, amorphous, washable, feebly calcareous.
***Sandstone* (10 – 20 %):** Colour less, clear, transparent to translucent, white, friable to moderately hard, medium grained, in places coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted, argillaceous matrix, calcareous cement, in places pyretic, generally loose, in parts consolidated, fair visible porosity, no fluorescence and no solvent cut.

Pyrite and Siltstone: In traces.

1455 – 1470 m

***Shale* (70 – 80 %):** Dark gray, gray, brownish gray, moderately hard, compact, fissile, flaky, sub blocky to blocky, in parts platy, elongated, calcareous to feebly calcareous, in places non calcareous.

***Clay/Claystone* (20 – 30 %):** Brownish, brownish gray, white to grayish white, soft, in places moderately hard, amorphous, washable, feebly calcareous.
Sandstone, Siltstone and Pyrite: In traces.

1470 – 1475 m

***Shale* (50 %):** Dark gray, gray, brownish gray, moderately hard, compact, fissile, flaky, sub blocky to blocky, in parts platy, elongated, calcareous to feebly calcareous, in places non calcareous.
***Clay/Claystone* (50 %):** Gray, dark gray, brownish white, brownish, brownish gray, in parts white, soft, in places moderately hard, amorphous, washable, in parts plastic, feebly calcareous.
Sandstone, Siltstone and Pyrite: In traces.

1475 – 1515 m

***Clay/Claystone* (80 – 90 %):** Gray, dark gray, black, brownish black, brownish gray, in parts white, soft, in parts moderately hard, amorphous to sub blocky, sticky, washable, feebly calcareous to calcareous.
***Siltstone* (Tr – 20 %):** Gray, dark gray, brownish black, hard to moderately hard, compact and non calcareous.
***Shale* (Tr – 10 %):** Gray, brownish gray, dark gray, moderately hard, compact, fissile, flaky, blocky, feebly calcareous.
***Marl, Limestone*:** In traces.

1515 – 1535 m

***Shale* (40 – 60 %):** Gray, dark gray, light gray, greenish gray, brownish gray, moderately hard, compact, fissile, flaky, blocky, feebly calcareous to non calcareous.
***Clay/Claystone* (40 – 50 %):** Gray, light gray, dark gray, brownish, moderately hard, in parts soft, amorphous to sub blocky, feebly calcareous, in parts washable and sticky.
***Siltstone* (Tr – 10 %):** Brown, light brown, dark gray to dark brownish gray, compact, hard to moderately hard, calcareous
***Pyrite*:** In traces.

1535 – 1550 m

***Shale* (70 – 90 %):** Gray, dark gray, light gray, greenish gray, brownish gray, moderately hard, compact, fissile, flaky, platy, blocky, non calcareous, fossiliferous.
***Clay/Claystone* (10 – 30 %):** Gray, dark gray, light gray to gray, brownish, soft, in places firm, amorphous, washable, non calcareous.
***Limestone, Siltstone*:** In traces.

1550 – 1555 m

***Shale* (50 %):** Gray, dark gray, light gray, greenish gray, brownish gray, moderately hard, compact, fissile, flaky, platy, blocky, non calcareous, fossiliferous.
***Clay/Claystone* (50 %):** Gray, dark gray, light gray to gray, brownish, soft, in places firm, amorphous, washable, non calcareous.
Siltstone: In Traces.

1555 – 1575 m

***Clay/Claystone* (60 – 70 %):** Dark gray, blackish gray, brownish black, in parts light gray, occasionally whitish gray, soft to firm, in parts moderately hard, amorphous, in parts sub blocky, in parts soluble, plastic, feebly to moderately calcareous.
***Shale* (30 – 40 %):** Gray, dark gray, light gray, brownish gray, moderately hard, brittle, fissile, sub fissile, flaky, in place platy.
Siltstone & Limestone: In traces

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1575 – 1585 m

***Shale* (50 – 60 %):** Dark gray to gray, blackish gray, in place light gray, moderately hard to hard, compact, brittle, sub fissile, sub blocky, sub platy, in place elongated, sub flaky, feebly calcareous to calcareous, in place sandy/silty, in place micaceous, in place pyritic.
***Clay/Claystone* (40 – 50 %):** Dominantly dark gray, blackish gray, dark blackish brown, in places light gray, whitish gray, firm to moderately hard, in place soft, non-sticky, sub blocky to blocky, washable, soluble, feebly calcareous to calcareous, in place sandy, in places silty.
Limestone, Siltstone, Pyrite and Glauconite: In traces.

1585 – 1605 m

***Clay/Claystone* (70 – 80 %):** Gray, dark gray, blackish, brownish black, blackish gray, dirty white, off white, soft to firm, amorphous, sub blocky to blocky, plastic, soluble, washable, sticky, in parts grading towards marl, slightly calcareous to highly calcareous,
***Shale* (20 – 30 %):** Dark gray to gray, blackish gray, in place light gray, moderately hard, compact, brittle, sub fissile, sub blocky, sub platy, in place elongated, sub flaky to flaky, moderately calcareous, in place sandy/silty, in place micaceous, in place pyritic.
Limestone, Siltstone: In traces.

1605 – 1645 m

***Clay/Claystone* (60 – 70 %):** Gray, dark gray, blackish, brownish black, blackish gray, blocky to sub blocky, hard, in place soft, washable, in place sticky, grading towards siltstone, moderately calcareous to calcareous, sub angular to sub rounded, smooth surface, smooth edged, compact.
***Shale* (20 %):** Dark gray to gray, blackish gray, in place light gray, moderately hard to hard, compact, brittle, platy, elongated, flaky, fissile, non calcareous.
Limestone: In Traces.

1645 – 1675 m

***Clay/Claystone* (60 – 70 %):** Dark gray, gray, blackish gray, brownish gray, in parts white, soft to moderately hard, amorphous, blocky to sub blocky, in place washable, feebly sticky, feebly calcareous to calcareous, in plaes grading toward marl.
***Shale* (20 – 30 %):** Gray, dark gray, greenish gray, blocky, platy, flaky, soft to moderately hard, sometimes hard also, fissile, brittle, calcareous, fossiliferous.
***Siltstone* (Tr – 20 %):** Gray, dark gray, blackish, hard, compact, fine grained, traces to mica, in place thin bands of calcite, smooth, black dissemination, non calcareous.
***Limestone* (Tr – 10 %):** White, dirty white, grayish, microcrystalline, in place, fossiliferous, calcareous, in place soft and sticky.

1675 – 1712 m

***Clay/Claystone* (80%):** Gray, light gray, dark gray, bluish gray, greenish gray, blocky to sub blocky, soft to moderately hard, in place washable, feebly sticky to sticky, in place soluble, grading toward marl, feebly calcareous to calcareous, in place traces of calcite veins found, in place associated with glauconite, in place grading towards siltstone.
***Shale* (20%):** Gray, dark gray, greenish gray, blackish gray, firm to moderately hard, occasionally hard and brittle, fissile, blocky, platy, flaky, calcareous, fossiliferous, in places silty.

Glauconite, Pyrite, Limestone: In traces, in places glauconite in abundance
Sandstone and Siltstone: In traces.

1712 – 1724 m ***Sandstone*** **(50 – 60%):** White, off white to dirty white,grayish, grayish white, transparent to translucent, friable, in places loose, fine grained, sub angular to sub rounded, sub spherical, moderately to well sorted, argillaceous matrix, in places calacreous cement, poorly to moderately cemented, no flaouroscence and no solvent cut.
Shale **(20 – 30 %):** Gray, blackish gray, dark gray, brownish, moderately hard, brittle, fissile, flaky, platy, calcareous.
Clay/Claystone **(10 – 20 %):** Gray, dark gray, blackish gray, in place brown; soft to moderately hard; amorphous to blocky; in place soluble, in place sticky; calcareous; in places glauconitic; in places silty.
Pyrite and Limestone: In traces

1724 – 1728 m ***Sandstone*** **(50 – 60%):** Dominantly colourless, off white, dirty white, yellowish white, gray, transparent to translucent; moderately hard, compact; very fine to fine grained; sub rounded to sub angular, moderately to well sorted, argillaceous matrix, in places calcareous cement, moderately cemented, no fluorescence and no solvent cut.
Shale **(20 – 30 %):** Gray, dark gray, blackish to blackish gray, brownish, moderately hard, brittle, fissile, flaky, platy.
Clay/Claystone **(20 %):** Gray, light gray, dark gray, blackish gray, blocky to sub blocky, soft to moderately hard, in place soluble and sticky, feebly calcareous to calcareous, in parts glauconitic.
Glauconite: In abundance.
Limestone: In traces

1728 – 1732 m ***Sandstone*** **(70 %):** Dominantly colourless, off white, dirty white, yellowish white, gray, transparent to translucent; moderately hard, compact; very fine to fine grained; sub rounded to sub angular, moderately to well sorted, argillaceous matrix, in places calcareous cement, moderately cemented, no fluorescence and no solvent cut.
Shale **(10 %):** Gray, dark gray, blackish to blackish gray, brownish, moderately hard, brittle, fissile, flaky, platy.
Clay/claystone **(20 %):** Gray, light gray, dark gray, blackish gray, blocky to sub blocky, soft to moderately hard, in place soluble and sticky, feebly calcareous to calcareous, occasionally glauconitic.
Pyrite and Glauconite: In traces.

1732 – 1734 m ***Clay/Claystone*** **(60 %):** Gray, light gray, dark gray, blackish gray, blocky to sub blocky, soft to moderately hard, in place soluble and sticky, feebly calcareous to calcareous, occasionally glauconitic.
Shale **(20 %):** Gray, dark gray, blackish to blackish gray, brownish, moderately hard, brittle, fissile, flaky, platy.
Sandstone **(20 %):** Dominantly colourless, off white, dirty white, yellowish white, gray, transparent to translucent; moderately hard, compact; very fine to fine grained; sub rounded to sub angular, moderately to well sorted, argillaceous matrix, in places calcareous cement, moderately cemented, no fluorescence and no solvent cut.

1734 – 1740 m ***Sandstone*** **(70 – 80 %):** Dominantly yellowish brown, colourless, brown, reddish brown, off white, dirty white, transparent to

translucent; moderately hard, fine grained, sub rounded to sub angular, moderately sorted, argillaceous matrix, pyretic, moderately cemented, no fluorescence and no solvent cut.
***Clay/Claystone* (20 – 30 %):** Gray, light gray, blackish, blackish gray, brownish, soft to moderately hard; amorphous,blocky to sub blocky; in place soluble, sticky; feebly calcareous; occasionally glauconitic.
Shale, Limestone, Pyrite and Glauconite: In traces.

1740 – 1750 m

***Sandstone* (60 – 70%):** Brownish, yellowish brownish, colourless, reddish, reddish brown, translucent; friable to moderately hard, fine to medium grained, sub angular to sub rounded, moderately to well sorted, argillaceous matrix, calcareous cement, glauconitic inclusion, no fluorescence and no solvent cut.
***Shale* (20 – 30 %):** Gray, dark gray, greenish gray, in place brownish gray, moderately hard to hard, compact, fissile to sub fissile, blocky to sub blocky, flaky, feebly calcareous, occasionally glauconite.
***Clay/Claystone* (10%):** Gray, light gray, blackish, blackish gray, brownish, soft to moderately hard, amorphous, blocky to sub blocky; in place soluble and washable, sticky; feebly calcareous, glauconitic.

1750 – 1798 m

***Sandstone* (80 – 90%):** Brownish, yellowish brown, colourless, transparent to translucent, reddish, reddish brown, friable to moderately hard; medium to fine grained, sub angular to sub rounded, moderately to well sorted; argillaceous matrix, calcareous cement, in places pyretic; generally loose, in places dirty, no fluoresecence and no solvent cut.
***Clay/Claystone* (10 – 20 %):** Gray, light gray, blackish, blackish gray, brownish, soft to moderately hard, amorphous to sub blocky; in place washable, soluble, sticky; feebly calcareous, occasionally glauconitic.
***Shale* (Tr – 10 %):** Gray, dark gray, greenish gray, in place brownish gray, moderately hard to hard, compact, fissile to sub fissile, blocky to sub blocky, flaky, feebly calcareous.
Glauconite and Pyrite: In traces.

1798 – 1810 m

***Sandstone* (60 – 70 %):** Dirty white, grayish white, in parts light brownish, light grayish, white, light yellowish, yellowish brownish, colourless, transparent to translucent, reddish, reddish brown; moderately hard to hard; very fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, feebly calcareous, in parts pyretic cement, moderate to well cemented; poor visible porosity; dirty, silty; glauconitic inclusion, no fluorescence and no solvent cut.
***Clay/Claystone* (20 – 30 %):** Dark gray, brownish gray, medium gray to gray, white, light grayish, soft, amorphous, washable, sticky, non-calcareous, in places slightly to feebly calcareous.
***Shale* (10 – 20 %):** Medium gray to gray, greenish gray, moderately hard, compact, brittle, fissile, platy, flaky, blocky, non calcareous, in parts slightly calcareous.
Glauconite and Pyrite: In traces

1810 – 1826 m

***Sandstone* (50 – 60%):** Dirty white, grayish white, brownish white, in parts light brownish, light grayish, light yellowish, white; moderately hard to hard; very fine to medium grained, in parts coarse

grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, feebly calcareous, in parts pyretic cement, moderate to well cemented; poor visible porosity; dirty, silty; no fluorescence and no solvent cut.
Clay/Claystone **(30 – 40 %):** Dark gray, brownish gray, greenish gray, medium gray to gray, white, light grayish, soft, in parts moderately hard to firm, amorphous to sub blocky; in parts washable, sticky; non-calcareous, in parts slightly to feebly calcareous.
Shale **(10 – 20 %):** Medium gray to gray, greenish gray, moderately hard, compact, brittle, fissile, platy, flaky, blocky, non calcareous, occasionally slightly calcareous.
Pyrite, Glauconite and Limestone: In traces

1826 – 1834 m

Sandstone **(60 – 70%):** Dirty white, grayish white, brownish white, in parts light grayish; moderately hard to hard; very fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, feebly calcareous, in parts pyretic cement, moderate to well cemented; poor visible porosity; dirty, silty; no fluorescence and no solvent cut.
Clay/Claystone **(20 – 30 %):** Dark gray, brownish gray, white, dirty white, soft to moderately hard, amorphous, sub blocky to blocky, in parts washable, soluble, sticky; non calcareous to feebly calcareous, occasionally highly calcareous.
Shale **(10 – 20 %):** Dark gray, brownish gray, greenish gray, moderately hard, compact, brittle, fissile, flaky, platy, non-calcareous.
Glauconite, Pyrite: In traces

1834 – 1836 m

Sandstone **(50 – 60%):** Dirty white, grayish white, brownish white, in parts light grayish; moderately hard to hard; very fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, feebly calcareous, in parts pyretic cement, moderate to well cemented; poor visible porosity; dirty, silty; no fluorescence and no solvent cut.
Clay/Claystone **(30 – 40 %):** Dark gray, brownish gray, white, dirty white, soft to moderately hard, amorphous, sub blocky to blocky, in parts washable, soluble, sticky; non calcareous to feebly calcareous, occasionally highly calcareous.
Shale **(10 – 20 %):** Dark gray, brownish gray, greenish gray, moderately hard, compact, brittle, fissile, flaky, platy, non-calcareous.
Glauconite and Pyrite: In traces

1836 – 1838 m

Sandstone **(50 %):** Dirty white, grayish white, brownish white, in parts light grayish; moderately hard to hard; medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, feebly calcareous, in parts pyretic, moderate to well cemented; poor visible porosity; no fluorescence and no solvent cut.
Shale **(30 %):** Dark gray, light gray, greenish gray; moderately hard, brittle, fissile, flaky, blocky, non calcareous to feebly calcareous.
Clay/Claystone **(20 %):** Light gray, whitish gray, white, grayish; soft to moderately hard; amorphous to sub blocky, in parts washable, sticky; occasionally banded; non calcareous to feebly calcareous.
Glauconite: In traces.

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1838 – 1846 m

***Shale* (40 – 50 %):** Dirty white, grayish white, brownish white, in parts light grayish; moderately hard to hard; medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, feebly calcareous, in parts pyretic, moderate to well cemented; poor visible porosity; no fluorescence and no solvent cut.

***Sandstone* (40 – 50 %):** Dark gray, light gray, greenish gray; moderately hard, brittle, fissile, flaky, blocky, non calcareous to feebly calcareous.

***Clay/Claystone* (10 %):** Light gray, whitish gray, white, grayish; soft to moderately hard; amorphous to sub blocky, in parts washable, sticky; occasionally banded; non calcareous to feebly calcareous.

Siltstone and Pyrite: In traces.

1846 – 1852 m

***Sandstone* (50 – 70%):** Dirty white, white, grayish white, in parts brownish white, light grayish; moderately hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, feebly calcareous, in parts pyretic, moderately cemented; no fluorescence and no solvent cut.

***Shale* (20 – 30 %):** Dark gray, greenish gray, light gray; moderately hard, compact, fissile, flaky, blocky, non calcareous, in parts calcareous.

***Clay/Claystone* (20 – 30 %):** Gray, dark gray, whitish gray, white, light gray, soft to moderately hard, amorphous to sub blocky; in parts washable, soluble, sticky; non calcareous.

Pyrite: In traces

1852 – 1862 m

***Clay/Claystone* (60 – 70 %):** Gray, dark gray, whitish gray, white to dirty white, off white, light gray, soft to moderately hard, amorphous to sub blocky; in parts washable, soluble, sticky, plastic; non calcareous to feebly calcareous.

***Sandstone* (20 – 30%):** Dirty white, white, grayish white, in parts brownish white, light grayish; moderately hard, occasionally hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts feebly calcareous to calcareous, in parts pyretic, moderately cemented; occasionally silty; no fluorescence and no solvent cut.

***Shale* (10 %):** Dark gray, greenish gray, light gray, blackish gray; moderately hard, compact; fissile; flaky, blocky, platy; non calcareous, in parts calcareous.

Pyrite: In traces

1862 – 1868 m

***Clay/Claystone* (80 %):** Gray, dark gray, whitish gray, white to dirty white, off white, light gray, soft to moderately hard, amorphous to sub blocky; in places banded; in parts washable, soluble, sticky, plastic; non calcareous to feebly calcareous.

***Sandstone* (10 %):** Dirty white, white, grayish white, in parts brownish white; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally silty; no fluorescence and no solvent cut.

***Shale* (10 %):** Dark gray, gray, blackish to blackish gray; moderately hard, brittle, fissile, flaky, platy, non calcareous, in parts calcareous.

Glauconite and pyrite: In traces

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1868 – 1870 m

***Sandstone* (50 %):** Dirty white, white, grayish white, in parts brownish white; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; no fluorescence and no solvent cut.

***Clay/Claystone* (40 %):** Gray, dark gray, whitish gray, white to dirty white, off white, light gray, soft to moderately hard, amorphous to sub blocky; in places banded; in parts washable, soluble, sticky, plastic; non calcareous to feebly calcareous.

***Shale* (10 %):** Dark gray, gray, blackish to blackish gray; moderately hard, brittle, fissile, flaky, platy, non calcareous, in parts calcareous.

Pyrite: In traces.

1870 – 1888 m

***Clay/Claystone* (70 – 80 %):** Dominantly brownish, reddish brown, light brownish, grayish to dark grayish, white to dirty white; moderately hard, in parts soft; amorphous, sub blocky to blocky; in parts washable, soluble, sticky; feebly calcareous to non calcareous; in parts silty.

***Sandstone* (10 – 20 %):** Dirty white, white, grayish white, in parts brownish; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts feebly calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

***Shale* (10 – 20 %):** Gray, dark gray, black to blackish gray; moderately hard, brittle, fissile, flaky, platy, non calcareous.

Pyrite: In traces

1888 – 1890 m

***Sandstone* (50%):** Dirty white, white, grayish white, in parts brownish; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts feebly calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

***Clay/Claystone* (50%):** Dominantly brownish, reddish brown, light brownish, grayish to dark grayish, white to dirty white; moderately hard, in parts soft; amorphous, sub blocky to blocky; in parts washable, soluble, sticky; feebly calcareous to non calcareous; in parts silty.

***Shale*:** In traces.

1890 – 1896 m

***Clay/Claystone* (50 – 60 %):** Dominantly brownish, reddish brown, light brownish, grayish to dark grayish, white to dirty white; moderately hard, in parts soft; amorphous, sub blocky to blocky; in parts washable, soluble, sticky; feebly calcareous to non calcareous; in parts silty.

***Sandstone* (40 – 50 %):** Dirty white, white, gray, grayish white, in parts brownish; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

***Shale and Pyrite*:** In traces

1896 – 1902 m

***Sandstone* (50 – 60 %):** Gray, dirty white, white, grayish white, in parts brownish; moderately hard, in parts hard; fine to medium

grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

Clay/Claystone **(40 – 50 %):** Dominantly brownish, reddish brown, light brownish, grayish to dark grayish, white to dirty white; moderately hard, in parts soft; amorphous, sub blocky to blocky; in parts washable, soluble, sticky; feebly calcareous to non calcareous.

Shale**:** In traces

1902 – 1904 m

Clay/Claystone **(60 %):** Dominantly brownish, reddish brown, light brownish, grayish to dark grayish, white to dirty white; moderately hard, in parts soft; amorphous, sub blocky to blocky; in parts washable, soluble, sticky; feebly calcareous to non calcareous.

Sandstone **(40 %):** Gray, dirty white, white, grayish white, in parts brownish; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

Shale**:** In traces.

1904 – 1906 m

Sandstone **(60 %):** Gray, dirty white, white, grayish white, in parts brownish; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

Clay/Claystone **(40 %):** Dominantly brownish, reddish brown, light brownish, grayish to dark grayish, white to dirty white; moderately hard, in parts soft; amorphous, sub blocky to blocky; in parts washable, soluble, sticky; feebly calcareous to non calcareous.

Shale and Glauconite**:** In traces

1906 – 1912 m

Clay/Claystone **(70 – 80 %):** Dominantly brownish, light brownish, dark brownish, reddish brown, brownish gray, white to dirty white; soft to firm; amorphous; washable, fairly sticky; non calcareous, in places feebly calcareous.

Sandstone **(30 – 40 %):** Dirty white, white, grayish white, colorless, transparent to translucent; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

Shale: In traces

1912 – 1914 m

Clay/Claystone **(60 %):** Dominantly brownish, light brownish, dark brownish, reddish brown, brownish gray, white to dirty white; soft to firm; amorphous; washable, fairly sticky; non calcareous, in places feebly calcareous.

Sandstone **(40 %):** Dirty white, white, grayish white, colorless, transparent to translucent; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.

Shale and Glauconite**:** In traces

1914 – 1916 m

***Sandstone* (60 %):** Dirty white, white, grayish white, colorless, transparent to translucent; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.
***Clay/Claystone* (40 %):** Dominantly brownish, light brownish, dark brownish, reddish brown, brownish gray, white to dirty white; soft to firm; amorphous; washable, fairly sticky; non calcareous, in places feebly calcareous.
***Shale and Glauconite*:** In traces

1916 – 1918 m

***Clay/Claystone* (60 %):** Dominantly brownish, light brownish, dark brownish, reddish brown, brownish gray, white to dirty white; soft to firm; amorphous; washable, fairly sticky; non calcareous, in places feebly calcareous.
***Sandstone* (40 %):** Dirty white, white, grayish white, colorless, transparent to translucent; moderately hard, in parts hard; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.
***Shale*:** In traces

1918 – 1926 m

***Clay/Claystone* (80 %):** Dominantly brownish, light brownish, dark brownish, reddish brown, brownish gray, white to dirty white; soft to firm; amorphous; washable, fairly sticky; non calcareous, in places feebly calcareous.
***Sandstone* (20 %):** Dirty white, white, grayish white, colorless, transparent to translucent; moderately hard; very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, poor to moderately sorted; argillaceous matrix, in parts calcareous, in parts pyretic, moderately cemented; occasionally in places silty; no fluorescence and no solvent cut.
***Shale and Pyrite*:** In traces.

1926 – 1950 m

***Clay/Claystone* (90 – 100 %):** Dominantly brownish, light brownish, dark brownish, reddish brown, brownish gray, in places white to dirty white; soft to firm; amorphous; washable, fairly sticky; non calcareous, occasionally in places feebly calcareous.
***Sandstone* (Tr. – 10 %):** Dirty white, white, grayish white, colorless, transparent to translucent; moderately hard, occasionally friable; very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts feebly calcareous, moderately cemented; no fluorescence and no solvent cut.
***Shale, Glauconite and Pyrite*:** In traces.

1950 – 1952 m

***Clay/Claystone* (80 %):** Dominantly brownish, light brownish, dark brownish, reddish brown, brownish gray, in places white to dirty white, grayish white; soft to firm; amorphous; washable, fairly sticky; non calcareous, occasionally in places feebly calcareous.
***Sandstone* (20 %):** Dirty white, white, grayish white, colorless, transparent to translucent; friable to moderately hard; fine to medium

grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts feebly calcareous, moderately cemented; no fluorescence and no solvent cut.
***Shale*:** In traces.

1952 – 1956 m

***Sandstone* (60 %):** Light brownish to brownish, white to dirty white, colorless, transparent to translucent; loose to friable; very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in parts calcareous cement, weak cement, dominantly loose, in parts consolidated; negligible to poor visible porosity, no fluorescence and no solvent cut.
***Clay/Claystone* (40 %):** Brownish to reddish brown, light brown, brownish gray, dirty white, grayish white, light grayish; soft to firm; amorphous to sub blocky, non calcareous, occasionally feebly calcareous; in parts washable, sticky.
Shale and Pyrite: In traces.

1956 –1962 m

***Sandstone* (70 %):** Light grayish, grayish white, color less, transparent to translucent, clear, dirty white to white, friable to moderately hard, very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic, weakly cemented, dominantally loose, in parts consolidated, in parts dirty, occasionally glauconitic inclusion, no fluorescence, no solvent cut.
***Clay/Claystone* (30 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, soft to firm, in parts moderately hard, amorphous to sub blocky, in parts washable, non calcareous, in parts feebly calcareous.
***Shale & Pyrite*:** In traces.

1962 –1968 m

***Clay/Claystone* (60 – 80 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, soft to firm, in parts moderately hard, amorphous to sub blocky, in parts washable, non calcareous, in parts feebly calcareous.
***Sandstone* (20 – 40 %):** Light grayish, grayish white, color less, transparent to translucent, clear, dirty white to white, friable to moderately hard, very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic, weakly cemented, dominantally loose, in parts consolidated, in parts dirty, occasionally glauconitic inclusion, no fluorescence, no solvent cut.

1968 – 2000 m

***Clay/Claystone* (90 – 100 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, grayish white, soft to firm, in parts moderately hard, amorphous to sub blocky, washable, non calcareous, in parts feebly calcareous.
***Sandstone* (Tr – 10 %):** Light grayish, grayish white, color less, transparent to translucent, clear, dirty white to white, friable to moderately hard, very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic, weakly cemented, dominantally loose, in parts consolidated, in parts

dirty, occasionally glauconitic inclusion, no fluorescence, no solvent cut.

2000 – 2004 m

Clay/Claystone **(70 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, grayish white, soft to firm, in parts moderately hard, amorphous to sub blocky, washable, non calcareous, in parts feebly calcareous.
Shale **(20 %):** Gray to dark gray, light gray, greenish gray, moderately hard, compact, sub fissile to fissile, flaky, blocky, sub platy to platy, feebly calcareous to non calcareous.
Sandstone **(Tr – 10 %):** Light brownish, light yellowish brown, color less, transparent to translucent, dirty white to white, light gray to gray, friable to moderately hard, fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, loose, no fluorescence, no solvent cut.

2004 – 2006 m

Clay/Claystone **(70 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, grayish white, soft to firm, in parts moderately hard, amorphous to sub blocky, washable, non calcareous, in parts feebly calcareous.
Sandstone **(10 %):** Light brownish, light yellowish brown, color less, transparent to translucent, dirty white to white, light gray to gray, friable to moderately hard, fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, loose, no fluorescence, no solvent cut.
Shale: In traces.

2006 – 2010 m

Sandstone **(50 – 60 %):** Light brownish, light yellowish brown, color less, transparent to translucent, dirty white to white, light gray to gray, friable to moderately hard, occasionally hard, fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical, poorly sorted, argillaceous matrix, siliceous cement, occasionally calcareous, weakly to moderately cemented, dominantly loose, in parts consolidated, in parts dirty, no fluorescence, no solvent cut.
Clay/Claystone **(40 – 50 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, grayish white, soft to firm, in parts moderately hard, amorphous to sub blocky, non calcareous, in parts feebly calcareous.
Shale: In traces

2010 – 2018 m

Clay/Claystone **(70 – 80 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, grayish white, soft to firm, in parts moderately hard to hard, amorphous to sub blocky, non calcareous, in parts feebly calcareous.
Sandstone **(20 – 30 %):** Color less, transparent to translucent, dirty white to white, light gray to gray, light brownish, light yellowish brown; friable to moderately hard, fine to very fine, in parts medium grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted, argillaceous matrix, siliceous cement, occasionally calcareous, weakly to moderately cemented, dominantly loose, in parts consolidated, in parts dirty, no fluorescence, no solvent cut.
Shale: In traces

2018 – 2024 m

Sandstone **(70 – 80 %):** Color less, transparent to translucent, dirty white to white, light gray to gray, light brownish, light yellowish

brown; friable to moderately hard, fine to very fine, in parts medium grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted, argillaceous matrix, siliceous cement, occasionally calcareous, weakly to moderately cemented, dominantly loose, in parts consolidated, in parts dirty, no fluorescence, no solvent cut.
***Clay/Claystone* (20 – 30 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, grayish white, soft to firm, in parts moderately hard to hard, amorphous to sub blocky, non calcareous, in parts feebly calcareous.
Shale and Pyrite: In traces.

2024 – 2026 m

***Sandstone* (60 %):** Color less, transparent to translucent, dirty white to white, light gray to gray, light brownish, light yellowish brown; friable to moderately hard, fine to very fine, in parts medium grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted, argillaceous matrix, siliceous cement, occasionally calcareous, weakly to moderately cemented, dominantly loose, in parts consolidated, in parts dirty, no fluorescence, no solvent cut.
***Clay/Claystone* (40 %):** Brown to light brown, redish brown, brownish gray, light gray to gray, dirty white to white, grayish white, soft to firm, in parts moderately hard to hard, amorphous to sub blocky, non calcareous, in parts feebly calcareous.
Shale and Pyrite: In traces.

2026 – 2034 m

***Sandstone* (80 – 90 %):** Colourless, brownish white, reddish white, light gray to gray, reddish brown, transparent to translucent, white to dirty white; friable to moderately hard; very fine to fine grained, in place medium grained, sub rounded, sub spherical, poor to, moderately sorted, argillaceous matrix, occasionally calcareous and pyretic; dominantly loose, in place consolidated, weak to moderate cement; occasionally glauconitic; no fluorescence, no solvent cut.
***Clay/Claystone* (10 – 20 %):** Dark brown, light brown to brownish, reddish brown, dirty white, browninsh white, in places white, soft to firm; amorphous to sub blocky, non sticky, washable, non-calcareous, occasionally slightly calcareous.
Shale: In traces.

2034 – 2050 m

***Sandstone* (50 – 60 %):** Colourless, grayish white, dirty white, brownish white, white to dirty white, reddish brown, reddish white, transparent to translucent; friable to moderately hard; very fine to fine grained, in parts medium grained, sub rounded to sub angular, sub spherical, poor to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic; dominantly loose, in place consolidated; no fluorescence, no solvent cut.
***Clay/Claystone* (40 – 50 %):** Dark brown, light brown to brownish, reddish brown, dirty white to white, browninsh white, in places white, soft to firm; amorphous to sub blocky, non sticky, in parts sticky, washable; non-calcareous, occasionally slightly calcareous.
Shale and Glauconite: In traces.

2050 – 2056 m

***Sandstone* (60 – 70 %):** Brownish, reddish brown, white to dirty white, brownish white, grayish, white, transparent to translucent; friable to moderately hard; very fine to fine grained, in parts medium grained, sub rounded to sub angular, sub spherical, poorly sorted,

argillaceous matrix, occasionally calcareous and pyretic; dominantly loose, in place consolidated; no fluorescence, no solvent cut.
Clay/Claystone **(30 – 40 %):** White, dirty white, grayish, soft, amorphous to sub blocky, non calcareous; washable, in place sticky.

2056 – 2058 m ***Sandstone*** **(80 %):** Brownish, reddish brown, white to dirty white, brownish white, grayish, white, transparent to translucent; friable to moderately hard; very fine to fine grained, in parts medium grained, sub rounded to sub angular, sub spherical, poor to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic; dominantly loose, in place consolidated; no fluorescence, no solvent cut.
Clay/Claystone **(20 %):** White, dirty white, grayish, soft, sub blocky, amorphous, non calcareous, washable, in place sticky.

2058 – 2060 m ***Clay/Claystone*** **(70 %):** White, dirty white, grayish, soft, amorphous to sub blocky, non-calcareous to feebly calcareous; washable; in place sticky.
Sandstone **(30 %):** Brownish, reddish brown, white to dirty white, brownish white, grayish, white, transparent to translucent; friable to moderately hard; very fine to fine grained, in parts medium grained, sub rounded to sub angular, sub spherical, poor to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic; dominantly loose, in place consolidated; no fluorescence, no solvent cut.

2060 – 2062 m ***Clay/Claystone*** **(90 %):** Brown, light brown, dark brown, in place white, gray; soft; amorphous, feebly calcareous to non calcareous, washable.
Sandstone **(10%):** Brownish, reddish brown, white to dirty white, brownish white, grayish, white, transparent to translucent; friable to moderately hard; very fine to fine grained, in parts medium grained, sub rounded to sub angular, sub spherical, poor to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic; dominantly loose, in place consolidated.

2062 – 2064 m ***Clay/Claystone*** **(90 %):** Brown, light brown, dark brown, in place white, gray; soft; amorphous, feebly calcareous to non calcareous, washable.
Sandstone **(30%):** Brownish, reddish brown, white to dirty white, brownish white, grayish, white, transparent to translucent; friable to moderately hard; very fine to fine grained, in parts medium grained, sub rounded to sub angular, sub spherical, poor to moderately sorted, argillaceous matrix, occasionally calcareous and pyretic; dominantly loose, in place consolidated; no fluorescence, no solvent cut.

2064 – 2066 m ***Sandstone*** **(70 %):** Coloureless, white to dirty white, transparent to translucent, light grayish to grayish, light yellowish brown, light brownish; loose; very fine, fine to medium grained, sub angular to sub rounded, sub spherical, poorly sorted, in place glauconitic, poorly cemented, no fluorescence, no solvent cut.
Clay/Claystone **(30 %):** Light brownish to brownish, light brownish gray, gray to light gray, dirty white; soft to firm, amorphous, in parts washable, non-calcareous to very feebly calcareous.

2066 – 2070 m ***Sandstone*** **(80 – 90 %):** Coloureless, clear, transparent to translucent, light grayish, grayish, white, light yellowish brown, light brownish,

light greenish, loose, medium to fine grained, sub angular to sub rounded, sub spherical, moderately sorted, poorly cemented, dominantly loose, rarely consolidate, no fluorescence, no solvent cut.
Clay/Claystone **(10 – 20 %):** Light brownish to brownish, light brownish gray, gray to light gray, dirty white; soft to firm, occasionally moderately hard; amorphous, in parts washable, non-calcareous to very feebly calcareous.
Glauconite: In Traces.

2070 – 2074 m

Sandstone **(60 – 70 %):** Coloureless, clear, transparent to translucent, light grayish, grayish, white, light yellowish brown, light brownish, light greenish, loose, medium to fine grained, sub angular to sub rounded, sub spherical, moderately sorted, poorly cemented, dominantly loose, rarely consolidate, no fluorescence, no solvent cut.
Clay/Claystone **(30 – 40 %):** Light brownish to brownish, light brownish gray, gray to light gray, dirty white; soft to firm, occasionally moderately hard; amorphous, in parts washable, non-calcareous to very feebly calcareous.

2074 – 2080 m

Clay/Claystone **(60 – 70 %):** Brown, light brown, dark brown, gray, light gray, greenish gray, white, dirty white; soft tofirm; amorphous to sub blocky; occasionally banded; washable; feebly calcareous to non-calcareous, occasionally slightly calcareous.
Sandstone **(30 – 40 %):** Colourless, transparent to translucent, light gray, grayish white, light yellowish brown, in parts light greenish, loose, in parts consolidated; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, no fluorescence, no solvent cut.

2080 – 2082 m

Sandstone **(70%):** Colourless, transparent to translucent, light gray, grayish white, light yellowish brown, in parts light greenish, loose, in parts consolidated; fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, no fluorescence, no solvent cut.
Clay/Claystone **(30%):** Brown, light brown, dark brown, gray, light gray, greenish gray, white, dirty white; soft tofirm; amorphous to sub blocky; occasionally banded; washable; feebly calcareous to non-calcareous, occasionally slightly calcareous.

2082 – 2086 m

Sandstone **(50 – 60 %):** Colourless, clear, transparent to translucent, light grayish, white, light yellowish brown, brownish, light greenish, loose, fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, no fluorescence, no solvent cut.
Clay/Claystone **(40 – 50 %):** Gray, light gray, greenish gray, in parts white, brownish white, brownish; soft, in parts moderately hard; amorphous to sub blocky; washable; occasionally banded; feebly calcareous.
Glauconite: In traces.

2086 – 2092 m

Clay/Claystone **(60 – 70 %):** Gray, light gray, greenish gray, in parts white, brownish white, brownish; soft, in parts moderately hard; amorphous to sub blocky; washable; occasionally banded; feebly calcareous.
Sandstone **(30 – 40 %):** Colourless, clear, transparent to translucent, light grayish, white, light yellowish brown, brownish, light greenish,

loose, fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, no fluorescence, no solvent cut.
Glauconite and Calcite: In traces.

2092 – 2094 m ***Clay/Claystone*** **(80 %):** Brown, dark brown, light brown, white, gray, yellowish white, dirty white; soft, in parts moderately hard; amorphous, sub blocky to blocky; washable; feebly calcareous.
Sandstone **(20 %):** Colourless, clear, transparent to translucent, light grayish, white, light yellowish brown, brownish, light greenish, loose, fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, no fluorescence, no solvent cut.

2094 – 2096 m ***Sandstone*** **(90%):** Colourless, clear, transparent to translucent, light grayish, white, light yellowish brown, brownish, light greenish, loose, fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, no fluorescence, no solvent cut.
Clay/Claystone **(10%):** Brown, dark brown, light brown, white, gray, yellowish white, dirty white; soft, in parts moderately hard; amorphous, sub blocky to blocky; washable; feebly calcareous.

2096– 2098 m ***Clay/Claystone*** **(50%):** Brown, dark brown, light brown, white, gray, yellowish white, dirty white; soft, in parts moderately hard; amorphous, sub blocky to blocky; washable; feebly calcareous.
Sandstone **(50%):** Colourless, clear, transparent to translucent, light grayish, white, light yellowish brown, brownish, light greenish, loose, fine to medium grained, sub angular to sub rounded, sub spherical, moderately sorted, no fluorescence, no solvent cut.

2098 – 2114 m ***Clay/Claystone*** **(70 – 80 %):** Brown, light brown, dark brown, gray, light gray, greenish gray, white, dirty white, in places variegated; soft to firm; amorphous to sub blocky; in washable, plastic, sticky, feebly calcareous to non-calcareous.
Sandstone **(20 – 30 %):** Colourless, clear, transparent to translucent, light gray, white, light yellowish brown, brownish, light greenish, loose, fine to medium grained, sub rounded to sub angular, sub spherical, moderately sorted; dominantly loose, in place consolidated, no fluorescence, no solvent cut.
Pyrite, Shale and Glauconite: In traces.

Gas Peaks (Sanu Formation):

Depth (m)	Type	Total Gas (ppm)	C1 (ppm)	C2 (ppm)	C3 (ppm)	iC4 (ppm)	nC4 (ppm)	iC5 (ppm)	nC5 (ppm)
1357	FG	3900	2091	17	4	8	0	0	0
1369	TG	7600	3407	21	5	12	2	2	0
1383	FG	5400	3087	40	21	26	3	4	0
1430	FG	11700	5139	58	23	0	4	3	1
1437	FG	8500	3494	42	19	0	4	4	1
1535	TripGas	8100	3750	28	5	5	4	0	1
1574	FG	3900	1187	7	0	0	0	0	0
1670	FG	5900	2137	17	0	0	0	0	0
1647	FG	6200	2004	15	0	0	0	0	0
1716	FG	12900	6323	45	1	1	0	0	0

1722	FG	11800	5488	38	1	1	0	0	0
1528	Trip gas	6600	2588	16	1	1.5	1	0	0
1725	FG	6200	2631	20					
1732	Short Trip Gas	4800	1494	15					
1756	FG	10200	4934	30					
1764	FG	5900	2425	15					
1792	FG	4200	1278	10					
1803	FG	2900	637	8					
1831	FG	2500	757	8					
1869	FG	5200	2133	29	1				
1879	FG	3300	984	6					
1912	FG	15900	3120	22					
1952	FG	17700	6072						
1960	FG	17700	5868						
1971	FG	15000	4605						
2000	FG	8700	2147						
2019	FG	11200	4037						
2028	FG	12700	4846	2	0	1	0		
2033	FG	9400	2147						
2041	FG	11200	4040						
2056	FG	14700	5631						
2067	FG	13700	5366						
2070	FG	14700	5258						
2095	FG	17300	4516						
2113	FG	12500	2546						

MESOZOIC SEQUENCE

Unconformity between the Paleocene (Sanu) and the Aptian to the upper part of Cretaceous (Parh Formation) has been taken the upper boundary of Mesozoic.

The formations penetrated in this well of Mesozoic Sequence consist of Parh Formation (Upper Cretaceous), Goru (Upper Cretaceous) Pariwar Formation (Lower Cretaceous).

PARH FORMATION: (2115 m – 2480 m)

The cretaceous sediments unconformably underlying the Sanu formation is represented by Parh formation. The upper boundary is fixed at 2115 m the first appearance of marl below the Tertiary/Cretaceous unconformity. The lower boundary is marked at 2480 m with the increase in less calcareous argillaceous sequence and the total thicknes is 365 m.

Lithological Description (Parh Formation):

2114 – 2122 m

***Clay/Claystone* (50 – 60 %):** Gray to medium gray, brownish to reddish brown, brownish gray, in parts grayish white, dirty white, occasionally variegated, light greenish gray, moderately hard to hard, in place firm, sub blocky to blocky, calcareous to slightly calcareous.

***Marl* (30 – 40 %):** Light brownish, light yellowish brown, light yellowish, in places occasionally white; moderately hard, in parts firm, sub blocky to blocky, in parts plastic, highly calcareous.

Sandstone **(10 %):** Colourless, clear, transparent to translucent, light gray, white, light yellowish brown, brownish, light greenish, loose, fine to medium grained, sub rounded to sub angular, sub spherical, moderately sorted; dominantly loose, in place consolidated, no fluorescence, no solvent cut.

2122 – 2128 m

Marl **(70 – 80 %):** Light brownish, light yellowish brown, light yellowish, in places occasionally white; moderately hard, in parts firm, sub blocky to blocky, in parts plastic, highly calcareous.
Clay/Claystone **(20 – 30 %):** Gray to medium gray, brownish to reddish brown, brownish gray, in parts grayish white, dirty white, occasionally variegated, light greenish gray, moderately hard to hard, in place firm, sub blocky to blocky, calcareous to slightly calcareous.
Sandstone **(Tr. – 10 %):** Colourless, clear, transparent to translucent, light gray, white, light yellowish brown, brownish, light greenish, loose, fine to medium grained, sub rounded to sub angular, sub spherical, moderately sorted; dominantly loose, in place consolidated, no fluorescence, no solvent cut.
Pyrite: In traces.

2128 – 2134 m

Marl **(90 %):** Dirty white, off white, light gray, light brownish, yellowish brown, moderately hard, in place firm, sub blocky to blocky, in place plastic, highly calcareous.
Clay/Claystone **(10 %):** Gray, medium gray, brownish to reddish brown, brownish gray, in parts grayish white, moderately hard to hard, in place firm, sub blocky to blocky, feebly calcareous to calcareous.
Siltstone, Sandstone and Glauconite: In traces.

2134 – 2144 m

Marl **(90 %):** Light gray to gray, grayish white, in parts dirty white to white, moderately hard, in parts firm, sub blocky to blocky, in places plastic; highly calcareous.
Clay/Claystone **(10 %):** Brownish gray to brownish, dark gray, medium gray to gray; reddish brown, light gray, grayish white; moderately hard to hard; sub blocky to blocky; feebly calcareous to slightly calcareous; occasionally silty.
Quartz and Glauconite: In traces.
Remarks: Mica added in mud system.

2144 – 2148m

Marl **(50%):** White, grayish white, light gray, in place dirty white to white, moderately hard, in place firm, sub blocky to blocky, highly calcareous.
Clay/Claystone **(50 %):** Brown, brownish gray, dark brown, dark gray, moderately hard, sub blocky to blocky, silty, calcareous.
Quartz and Glauconite: In traces.
Remarks**:** Sample contaminated during reaming.

2148 – 2160 m

Marl **(80 – 90 %):** White, grayish white to light grayish white, light gray, dirty white, in place white, moderately hard to soft, in place firm, sub blocky to blocky, highly calcareous.
Clay/Claystone **(10 – 20 %):** Brownish, brownish gray, gray, dark gray, moderately hard to hard, sub blocky to blocky, in place silty, slightly calcareous to calcareous.
Quartz: In traces.

2160 – 2206 m

***Marl* (90 – 100 %):** Grayish white, light grayish, dirty white, in place white, moderately hard to soft, in place firm, sub blocky to blocky, highly calcareous.
***Clay/Claystone* (Tr – 10 %):** Brown, brownish gray, gray, dark gray, moderately hard to hard, sub blocky to blocky, in place silty, slightly calcareous.
Quartz, Claystone and Glauconite: In traces.
Remarks: Mica added in mud system.

2206 – 2228 m

***Marl* (100 %):** White, grayish white, light gray, dirty white, moderately hard, in parts soft to firm, sub blocky to blocky, highly calcareous.
Quartz, Claystone: In traces.

2228 – 2248 m

***Marl* (100 %):** Grayish white, light gray, dirty white, in place white, moderately hard to soft, in parts firm, sub blocky to blocky, highly calcareous.
Glauconite, Quartz, Claystone: In Traces.
***Remarks*:** Lignite in the mud system

2248– 2270 m

***Marl* (100 %):** Grayish white, light gray, dirty white, white, dominantly soft, in parts moderately hard to firm, sub blocky to blocky, highly calcareous.
Claystone: In traces.

2270 – 2302 m

***Marl* (100 %):** Grayish white, light gray, dirty white, in place white, soft to moderately hard, in place firm, sub blocky to blocky, highly calcareous.
Claystone and Quartz: In Traces.

2302 – 2330 m

***Marl* (100 %):** White, grayish white, light gray, dirty white, in place milky white, soft to moderately hard, in parts firm; sub blocky to blocky, calcareous to highly calcareous.
Claystone, Quartz, Pyrite and Glauconite: In traces.

2330 – 2352 m

***Marl* (100 %):** White, grayish white, light gray, dirty white, in place white, moderately hard to soft, in place firm, sub blocky to blocky, calcareous to highly calcareous.
Claystone, Quartz, Pyrite: In traces.

2352 – 2356 m

***Marl* (100 %):** Dirty white, grayish white, gray, light gray, soft to firm, amorphous, sub blocky to blocky; sticky, soluble, washable; highly calcareous.
Claystone, Quartz, Pyrite: In traces.

2356 – 2364 m

***Marl* (80 %):** Dirty white, grayish white, gray, light gray, soft to firm, amorphous, sub blocky to blocky; sticky, soluble, washable; highly calcareous.
***Claystone* (20 %):** Gray, dark gray, light gray; soft, in place moderately hard; blocky to sub blocky; washable, sticky, soluble, calcareous.

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2364 – 2366 m

***Marl* (70 %):** Dirty white, grayish white, gray, light gray, soft to firm, amorphous, sub blocky to blocky; sticky, soluble, washable; highly calcareous.
***Claystone* (30 %):** Gray, dark gray, light gray; soft, in place moderately hard; blocky to sub blocky, occasionally elongated, platy;; washable, sticky, soluble, calcareous.

2366 – 2372 m

***Marl* (80 – 90 %):** White, dirty white, grayish white, light gray, soft to moderately hard, in parts firm, amorphous, sub blocky to blocky, highly calcareous.
***Claystone* (10 – 20 %):** Light gray, dark gray, gray; soft, in place moderately hard; amorphous to sub blocky, occasionally elongated, platy; washable, sticky, soluble, calcareous.
Quartz: In traces.

2372 – 2374 m

***Marl* (100%):** White, dirty white, grayish white, light gray, soft to moderately hard, firm, sub blocky to blocky, highly calcareous.
***Claystone and Quartz*:** In traces.

2374 – 2376 m

***Marl* (100%):** White, dirty white, grayish white, light gray, soft to moderately hard, in parts firm, amorphous, sub blocky to blocky; highly calcareous.
Claystone: In traces.

2376 – 2384 m

***Marl* (90 – 100 %):** Light gray to gray, grayish white, in place dirty white to off white, soft to firm, in place moderately hard, amorphous to sub blocky, in place blocky; highly calcareous.
***Claystone* (Tr. – 10 %):** Gray, light gray, firm to moderately hard, sub blocky, calcareous.
Quartz: In traces.

2384 – 2386 m

***Marl* (100 %):** Gray, light gray, grayish white, white, in parts dirty white, off white, soft to firm, in place moderately hard, amorphous, sub blocky to blocky, highly calcareous.
Claystone: In traces.

2386 – 2392 m

***Marl* (80 – 90 %):** Gray, light gray, grayish white, white, in parts dirty white, off white, soft to firm, in place moderately hard, amorphous, sub blocky to blocky, highly calcareous.
***Claystone* (10 – 20 %):** Gray, light gray, firm to moderately hard, sub blocky, calcareous.
Quartz: In traces.
***Remarks*:** Mica added in the mud system.

2392 – 2398 m

***Marl* (90 %):** Gray, light gray, whitish gray, white, dirty white, off white, soft to firm, in places moderately hard to hard; amorphous, sub blocky to blocky, highly calcareous.
***Claystone* (10%):** Gray, light gray, soft, firm to moderately hard; sub blocky to blocky, occasionally in places elongated, platy; in parts washable; calcareous.
Quartz and Glauconite: In traces.

2398 – 2406 m

***Marl* (90 %):** Gray, light gray, whitish gray, white, dirty white, off white; soft to firm, in place moderately hard to hard; amorphous, sub blocky to blocky, highly calcareous.

***Claystone* (10 %):** Gray, light gray; firm to moderately hard; blocky to sub blocky, occasionally in places elongated and platy; in parts soluble, sticky, washable; calcareous.
Quartz and Glauconite: In traces.

2406 – 2412 m

***Marl* (70 – 80 %):** Gray, light gray, whitish gray, white, dirty white, off white; soft to firm, in place moderately hard to hard; amorphous, sub blocky to blocky, highly calcareous.
***Claystone* (20 – 30 %):** Gray, light gray; in parts reddish brown, brown, light brown, firm to moderately hard; blocky to sub blocky, occasionally in places elongated and platy; in parts soluble, sticky, washable; calcareous.
Quartz: In traces.
***Remarks*:** Sample contaminated by reaming.

2412 – 2430 m

***Marl* (90 – 100 %):** Gray, light gray, grayish white, white, in place dirty white, off white; soft to firm, in place moderately hard; amorphous, sub blocky to blocky; highly calcareous.
***Claystone* (Tr – 10 %):** Gray, dark gray, light gray, reddish brown, brown, light brown, firm, moderately hard to hard, in parts soft, plastic; sub blocky to blocky; in parts washable, soluble, sticky; calcareous.
Quartz: In traces.

2430 – 2450 m

***Marl* (100 %):** Gray, light gray, whitish gray, white, in parts dirty white, off white; soft, firm to moderately hard; amorphous, sub blocky to blocky; highly calcareous.
Quartz, Pyrite and Claystone: In traces.

2450 – 2474 m

Marl (100 %): Gray, light gray, whitish gray, in parts white, dirty white, off white; soft, in parts firm to moderately hard; amorphous, sub blocky to blocky; highly calcareous.
Quartz, Pyrite and Claystone: In traces.

2474 – 2480 m

***Marl* (90 – 100 %):** Gray, light gray, whitish gray, in parts white, dirty white, off white; soft, in parts firm to moderately hard; amorphous, sub blocky to blocky; highly calcareous.
***Claystone* (Tr – 10 %):** Gray, dark gray, light gray; firm to moderately hard, in place plastic; sub blocky to blocky; in parts washable, soluble, sticky; calcareous.

Gas Peaks (Parh Formation):

Depth (m)	Type	Total Gas (ppm)	C1 (ppm)	C2 (ppm)	C3 (ppm)	iC4 (ppm)	nC4 (ppm)	iC5 (ppm)	nC5 (ppm)
2120	Trip Gas	19500	5343	5	2	1			
2145	Trip Gas	19000	532						
2251	FG	8900	848	0	12	18	7		
2265	FG	9300	1935	0	66	52	18		
2270	FG	9400	1889	0	65	55	20		
2289	FG	10200	2432	0	114	94	33		
2298	FG	10500	2107	0	89	81	30		

2308	FG	1400	2115	0	87	72	29	0	0
2326	Short Trip Gas	22300	1867	0	41	34	0	0	0
2339	FG	7900	1333	0	53	34	15	0	0
2341	FG	7400	1229	0	50	34	15	0	0
2347	FG	10600	2372	0	120	72	32	0	0
2376	FG	7200	847	0	38	32	23	0	0
2379	FG	7200	1194	0	71	45	31	0	0
2380	FG	6800	1005	0	56	38	27	0	0
2382	FG	6500	935	0	52	34	25	0	0
2386	Trip Gas	22000	3915	0	35	24	15	0	0
2387	FG	10100	1010	0	9	10	7	0	0
2389	FG	10500	602	0	10	11	9	0	0
2398	FG	11200	467	0	8	8	7	0	0
2402	FG	10200	489	0	8	8	7	0	0
2407	Trip Gas	14800	3696	47	14	7	4	2	1
2416	FG	9990	1129	62	39	17	13	4	2
2457	Short Trip Gas	29400	1572	83	64	33	30	0	12
2462	FG	12200	1254	74	56	28	26	13	8
2471	FG	13700	1542	109	100	44	41	19	12
2476	FG	12600	1365	90	73	30	12	12	8

GORU FORMATION (2480 m – 3038 m)

Goru Formation conformably underlies the Parh Formation. The upper boundary is marked by the claystone/shale, below thick marl sequence and the lower boundary is marked by highly glauconitic claystone/shale at the top of Pariwar formation. The thickness of Goru Formation is 558 m, starting from 2480m and extends upto 3038 m.The Goru Formation has been divided into two sub-formations, the Upper Goru and the Lower Goru. The upper boundary of Lower Goru is marked at the at the top of highly glauconitic claystone/shale and the claystone/shale of lower Goru is glauconitic.

Lithological Description (Goru Formation):

2480 – 2488 m

***Marl* (70 %):** Gray, light gray, whitish gray, in place white, dirty white, off white, soft, in parts firm to moderately hard; amorphous, sub blocky to blocky; highly calcareous.

***Clay/Claystone* (10 – 20 %):** Gray, dark gray, light gray, firm to moderately hard, amorphous, sub blocky to blocky, occasionally flaky; in parts plastic, soluble, sticky; calcareous.

***Shale* (10 – 20 %):** Gray, dark gray, blackish gray, black, moderately hard, brittle, fissile, elongated, platy, flaky, feebly calcalareous.

2488 – 2508 m

***Marl* (50 – 60 %):** Gray, light gray, whitish gray, in place white, dirty white, off white, soft to firm, in parts moderately hard; amorphous, sub blocky to blocky; highly calcareous.

Claystone **(30 – 40 %):** Gray, dark gray, light gray; firm to moderately hard, in place soft and washable, plastic; blocky, feebly calcareous.
Shale **(Tr – 10 %):** Blackish gray, dark gray, gray, black, moderately hard, brittle, fissile, elongated, platy, flaky, feebly calcareous to non calcareous.
Limestone**:** In Traces.

2508 – 2510 m

Claystone **(60 %):** Gray, dark gray, light gray, firm to moderately hard, in parts soft and washable, plastic, blocky, feebly calcareous.
Marl **(30 %):** Gray, light gray, whitish gray, in place white, dirty white, off white, soft to firm, in parts moderately hard; amorphous, sub blocky to blocky; highly calcareous.
Shale **(10 %):** Blackish gray, dark gray, gray, black, moderately hard, brittle, fissile, elongated, platy, flaky, feebly calcareous to non calcareous.
Sandstone**:** In traces.

2510– 2514 m

Marl **(40 %):** Gray, light gray, whitish gray, in place white, dirty white, off white, soft to firm, in partso moderately hard; amorphous, sub blocky to blocky; highly calcareous.
Claystone **(20 %):** Gray, dark gray, light gray, firm to moderately hard, in parts soft, plastic and washable; blocky, feebly calcareous.
Shale **(20 %):** Blackish gray, dark gray, gray, black, moderately hard, brittle, fissile, elongated, platy, flaky, feebly calcareous to non calcareous.
Sandstone **(20 %):** Gray, dark gray, dirty white, friable to moderately hard, very fine to fine grained, sub angular to sub rounded, poorly sorted, calcareous matrix, in place calcareous, consolidated, no fluorescence and no solvent cut.

2514 – 2516 m

Sandstone **(30 %):** Gray, dark gray, blackish gray, dirty white, moderately hard, very fine to fine grained, sub angular to sub rounded, poorly sorted; calcareous matrix, in place non calcareous; consolidated, no fluorescence and no solvent cut.
Marl **(30 %):** Gray, light gray, whitish gray, in place white, dirty white, off white, soft to firm, in place moderately hard, amorphous to blocky, highly calcareous.
Claystone **(30 %):** Gray, whitish gray, light gray, in place white, firm to moderately hard, in parts soft, plastic and washable.
Shale **(10 %):** Blackish gray, dark gray, black, moderately hard, brittle, fissile, elongated, platy, non calcareous.

2516 – 2522 m

Marl **(40 – 50 %):** Gray, light gray, whitish gray, in place white, dirty white, off white, soft to firm, in place moderately hard, amorphous to blocky, highly calcareous.
Claystone **(40 – 50 %):** Gray, whitish gray, light gray, in place white, firm to moderately hard, in parts soft, plastic and washable.
Sandstone **(Tr – 10 %):** Gray, dark gray, blackish gray, dirty white, moderately hard, very fine to fine grained, sub angular to sub rounded, poorly sorted; calcareous matrix, in place non calcareous, consolidated, no fluorescence and no solvent cut.
Shale **(Tr – 10 %):** Blackish gray, dark gray, black, moderately hard, brittle, fissile, elongated, platy, non calcareous.

2522 – 2528 m

***Marl* (50 %):** Gray, light gray, whitish gray, in place white, dirty white, off white, soft to firm, in place moderately hard, amorphous to blocky, highly calcareous.
***Claystone* (50 %):** Gray, whitish gray, light gray, in place white, firm to moderately hard, in parts soft, plastic and washable.
***Sandstone*:** In traces.

2528 – 2532 m

***Claystone* (50 – 60 %):** Gray, light gray, white; moderately hard, in parts soft; amorphous; in parts washable, plastic; feebly calcareous, grading towards shale.
***Marl* (40 – 50 %):** Gray, dark gray, blackish gray, dirty white, in parts white, off white, moderately hard, in parts soft; amorphous, blocky to sub blocky; calcareous.
***Quartz*:** In Traces.

2532 – 2540 m

***Claystone* (60 – 70 %):** Medium gray to gray, in place greenish gray to olive gray; moderately hard, in place firm; sub blocky to blocky, platy, in place amorphous; earthy; calcareous, moderately compact and grading towards shale; occasionally silty; rarely pyretic.
***Marl* (30 – 40 %):** Grayish white to light gray, in parts dirty white to off white; soft to firm; amorphous; earthy, highly calcareous.

2540 – 2542 m

***Claystone* (80 %):** Medium gray to gray, in place greenish gray to olive gray; moderately hard, in place firm; sub blocky to blocky, platy, in place amorphous; earthy; calcareous, moderately compact and grading towards shale; occasionally silty; rarely pyretic.
***Marl* (20 %):** Grayish white to light gray, in place dirty white to off white; soft to firm; amorphous; earthy and highly calcareous.

2542 – 2554 m

***Claystone* (60 – 70 %):** Medium gray, gray, greenish gray, light gray, moderately hard, in place firm, sub blocky to blocky, platy, in place amorphous, calcareous.
***Marl* (30 – 40 %):** Light gray, grayish white, in place dirty white, off white, soft to firm, amorphous, highly calcareous.

2554 – 2562 m

***Claystone* (50 – 60 %):** Medium gray to gray, in place greenish gray, light gray, firm to moderately hard, sub blocky to blocky, platy, in place amorphous, calcareous, grading towards shale, in parts silty, occasionally pyretic.
***Marl* (40 – 50 %):** Light gray, grayish white, in place dirty white, off white, soft to firm, amorphous, highly calcareous, fairly sticky, occasionally fossiliferous.

2562 – 2574 m

***Claystone* (60 – 70 %):** Gray, light gray, medium gray, greenish gray, firm to moderately hard; sub blocky to blocky, platy, in place amorphous, calcareous, grading towards shale.
***Marl* (30 – 40 %):** Light gray, white, grayish white, in parts dirty white, off white; soft to firm; amorphous; highly calcareous.
***Pyrite and Quartz*:** In traces.

2574 – 2576 m

***Claystone* (50 %):** Gray, light gray, medium gray, greenish gray, firm to moderately hard; sub blocky to blocky, platy, in place amorphous, calcareous, grading towards shale.
***Marl* (50 %):** Light gray, white, grayish white, in parts dirty white, off white; soft to firm; amorphous; highly calcareous.

2576 – 2582 m

Claystone **(70 %):** Medium gray to dark gray, gray, light gray, greenish gray, firm to moderately hard; sub blocky to blocky, platy, in place amorphous, calcareous, grading towards shale.
Marl **(30 %):** Light gray, white, grayish white, in parts dirty white, off white; soft to firm; amorphous; highly calcareous.

2582 – 2586 m

Claystone **(70 – 80 %):** Gray, medium gray, light gray, dark gray, greenish gray; moderately hard, in parts firm; sub blocky to blocky, in parts amorphous; calcareous.
Marl **(20 – 30 %):** Light gray, white, grayish white, in parts dirty white; soft to firm; amorphous, highly calcareous.

2586 – 2598 m

Claystone **(50 – 60 %):** Gray, medium gray, light gray, dark gray, greenish gray; moderately hard, in parts firm; sub blocky to blocky, in parts amorphous; calcareous; grading towards shale, in place silty.
Marl **(20 %):** Light gray, white, grayish white, in parts dirty white, off white; soft to firm; amorphous; highly calcareous.
Shale **(20 – 30 %):** Dark gray to medium gray; moderately hard, moderately compact, brittle; sub fissile to fissile; flaky, platy, calcareous; occasionally pyretic, in places silty.

2598 – 2612 m

Claystone **(50 – 60 %):** Gray, medium gray, light gray, dark gray, greenish gray; moderately hard, in parts firm; sub blocky to blocky, in parts amorphous; calcareous; grading towards shale, in place silty.
Shale **(30 – 40 %):** Dark gray to medium gray; moderately hard, moderately compact, brittle; sub fissile to fissile; flaky, platy, calcareous; occasionally pyretic, in places silty.
Marl **(10 – 20 %):** Light gray, white, grayish white, in parts dirty white, off white; soft to firm; amorphous; highly calcareous.

2612 – 2634 m

Claystone **(50 – 60 %):** Gray, medium gray, light gray, dark gray, greenish gray; moderately hard, in parts firm; sub blocky to blocky, in parts amorphous; calcareous; grading towards shale; in place silty.
Shale **(30 – 50 %):** Dark gray to medium gray, moderately hard, moderately compact, brittle, sub fissile to fissile, flaky to highly flaky, platy to highly platy, calcareous, occasionally pyretic, in place silty.
Marl **(Tr – 10 %):** Light gray, white, grayish white, in place dirty white, soft, firm, amorphous, highly calcareous.

2634 – 2646 m

Shale **(50 – 60 %):** Dark gray to medium gray, moderately hard, moderately compact, moderately brittle, sub fissile to fissile, flaky, calcareous, occasionally pyretic, in place silty.
Claystone **(40 – 50 %):** Gray, medium gray, light gray, dark gray, greenish gray, moderately hard, in parts firm, sub blocky to blocky, in place amorphous, calcareous.
Marl and Sandstone**:** In traces.

2646 – 2650 m

Shale **(40 – 50 %):** Dark gray, medium gray, moderately hard, moderately compact, moderately brittle, sub fissile, flaky, platy, calcareous, occasionally pyretic, in place silty.
Claystone **(40 %):** Gray, medium gray, light gray, dark gray, greenish gray, moderately hard, in parts firm, sub blocky to blocky, in

parts amorphous, calcareous, grading towards shale and in place siltstone.
***Sandstone* (10 – 20 %):** Gray, dirty white, light gray, in place white, very fine to fine grained, sub angular to sub rounded; poorly sorted, calcareous matrix, consolidated, no fluorescence and no solvent cut.
***Marl*:** In Traces.

2650 – 2660 m

***Claystone* (50 %):** Gray, medium gray, light gray, dark gray, greenish gray, moderately hard, in parts firm, sub blocky to blocky, in parts amorphous, calcareous, grading towards shale and in place siltstone.
***Shale* (40 %):** Dark gray, medium gray, moderately hard, moderately compact, moderately brittle, sub fissile, flaky, platy, calcareous, occasionally pyretic, in place silty.
***Sandstone* (10 %):** Gray, dirty white, light gray, in place white, very fine to fine grained, sub angular to sub rounded; poorly sorted, calcareous matrix, consolidated, no fluorescence and no solvent cut.
***Marl*:** In Traces.

2660 – 2674 m

***Shale* (50 – 60 %):** Medium gray , greenish gray, in parts dark gray to blackish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, smooth, flaky, platy, moderately calcareous to calcareous, occasionally pyretic, in place silty.
***Claystone* (40 – 50 %):** Gray to medium gray, grayish white, in parts dark gray; soft to firm; amorphous to sub blocky; in parts fairly washable to washable and sticky; calcareous; in parts/places marly.

2674 – 2678 m

***Shale* (50 %):** Medium gray , greenish gray, in parts dark gray to blackish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, smooth, flaky, platy, moderately calcareous to calcareous, occasionally pyretic, in place silty.
***Claystone* (40 %):** Gray to medium gray, grayish white, in parts dark gray; soft to firm; amorphous to sub blocky; in parts fairly washable and sticky; calcareous, in parts/places marly.
***Sandstone* (10 %):** Gray, dirty white, white, very fine to fine grained, poorly sorted, consolidated, calcareous matrix, no fluorescence and no solvent cut.
***Marl*:** In traces.

2678 – 2694 m

***Shale* (50 – 60 %):** Greenish gray, medium gray, in parts dark gray, blackish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, flaky, platy, moderately calcareous to calcareous, occasionally pyretic, in place silty.
***Claystone* (40 – 50 %):** Gray to medium gray, in parts dark gray, grayish white; soft to firm; amorphous to sub blocky; in parts washable to fairly washable, sticky, soluble; calcareous.
***Marl* (Tr – 10 %):** Light gray, white, grayish white, in parts dirty white; soft to firm; amorphous; highly calcareous.
***Sandstone*:** In traces.

2694 – 2696 m

***Shale* (60 %):** Greenish gray, medium gray to gray, occasionally dark gray to blackish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, flaky, platy, in parts sub blocky to blocky, smooth, moderately calcareous to calcareous, occasionally pyretic, in place silty.

***Clay/Claystone* (40 %):** Gray to medium gray, grayish white, in parts dark gray, soft to firm, amorphous, in parts sub blocky, fairly washable and sticky, calcareous, in parts marly.
***Sandstone and Quartz*:** In traces.

2696 – 2700 m

***Claystone* (50 – 60 %):** Gray to medium gray, grayish white, in parts dark gray, soft to firm, amorphous, in parts sub blocky, fairly washable and sticky, calcareous, in parts marly.
***Shale* (30 %):** Greenish gray, medium gray to gray, occasionally dark gray to blackish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, flaky, platy, in parts sub blocky to blocky, smooth, moderately calcareous to calcareous, occasionally pyretic, in place silty/sandy.
***Marl* (10 – 20 %):** Grayish white to light gray, gray; soft; amorphous; earthy; highly calcareous.
Pyrite: rare
***Quartz*:** In traces.

2700 – 2702 m

***Claystone* (50 %):** Gray to medium gray, grayish white, in parts dark gray, soft to firm, amorphous, in parts sub blocky, fairly washable to washable, sticky, calcareous, in parts marly.
***Shale* (50 %):** Greenish gray, medium gray to gray, occasionally dark gray to blackish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, flaky, platy, in parts sub blocky to blocky, smooth, moderately calcareous to calcareous, in place silty, occasionally pyretic dissemination.
***Pyrite and Quartz*:** Quartz in traces, rare pyrite.

2702 – 2710 m

***Claystone* (50 – 60 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft; amorphous, earthy, washable, sticky, calcareous, marly.
***Shale* (40 – 50 %):** Greenish gray, gray to medium gray, occasionally dark gray; moderately hard, moderately compact, brittle; sub fissile to fissile; flaky, platy, in parts sub blocky; smooth; moderately calcareous to calcareous; in place silty, rarely/occasionally pyretic dissemination.
***Quartz*:** In traces.

2710 – 2714 m

***Shale* (50 – 60 %):** Gray to medium gray, greenish gray, dark gray; moderately hard, moderately compact, in parts brittle; sub fissile to fissile; flaky, platy, sub blocky to blocky; smooth; in place silty, trace pyretic dissemination, calcareous to moderately calcareous.
***Claystone* (40 – 50 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft, in parts firm; amorphous; earthy; washable, sticky; calcareous; marly.

2714 – 2724 m

***Shale* (50 – 60 %):** Gray to medium gray, greenish gray, dark gray; moderately hard, moderately compact, in parts brittle; sub fissile to fissile; flaky, platy, sub blocky to blocky; smooth; in place silty, trace pyretic dissemination, calcareous to moderately calcareous.
***Claystone* (30 – 40 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft, in parts firm; amorphous; earthy; washable, sticky; calcareous; marly.
***Sandstone* (Tr – 10 %):** White to dirty white, light grayish to grayish; moderately hard; very fine grained, sub angular to sub

rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cemented, moderately cemented; negligible visible porosity; grading towards siltstone, occasionally pyretic, glauconitic.

2724 – 2730 m

***Shale* (60 %):** Gray to medium gray, greenish gray, dark gray, moderately hard, moderately compact, in place brittle, sub fissile to fissile, flaky, platy, sub blocky to blocky, smooth, in place silty, traces of pyretic dissemination, calcareous to moderately calcareous.
***Claystone* (30 %):** Gray, light gray to medium gray, grayish white, in parts dirty white, occasionally dark gray; soft, in parts firm; amorphous; earthy; in parts washable, sticky; calcareous, marly.
***Siltstone* (10 %):** Grayish to light grayish, grayish white, dirty white; moderately hard, compact; pyretic, calcareous, in place grading towards very fine sandstone.
***Marl and Sandstone/Sand*:** In traces.

2730 – 2740 m

***Shale* (50 – 60 %):** Gray, medium gray, greenish gray, dark gray; moderately hard, moderately compact, in parts brittle; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty, trace pyretic dissemination; calcareous to moderately calcareous.
***Claystone* (30%):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft; amorphous; in parts washable, sticky; calcareous; marly.
***Siltstone* (10 – 20 %):** Grayish to light grayish, grayish white, dirty white; moderately hard, compact; pyretic; calcareous; in place grading towards very fine sandstone.
***Sandstone/Sand*:** In traces.

2740 – 2744 m

***Siltstone* (40 %):** Grayish to light grayish, grayish white, dirty white, moderately hard to hard, compact, calcareous and grading towards sandstone.
***Sandstone* (40 %):** Grayish white, in place colourless, transparent to translucent, friable to compact, very fine to fine grained, moderately sorted, calcareous, loose, consolidated, no fluorescence and no solvent cut.
***Claystone* (10 %):** Gray, light gray, medium gray; soft; amorphous, in parts washable, sticky, calcareous.
***Shale* (10 %):** Gray, medium gray; compact, in parts brittle, sub fissile to fissile; flaky, platy.

2744 – 2746 m

***Sandstone* (50 %):** Grayish white, in place colourless, transparent to translucent, friable to compact, very fine to fine grained, moderately sorted, calcareous, loose, consolidated, no fluorescence and no solvent cut.
***Siltstone* (30 %):** Grayish to light grayish, grayish white, dirty white, moderately hard to hard, compact, pyretic; calcareous and grading towards sandstone.
***Claystone* (10 %):** Gray, light gray, medium gray; soft; amorphous, in parts washable, sticky, calcareous, pyretic.
***Shale* (10%):** Gray, medium gray; compact, in parts brittle, sub fissile to fissile; flaky, platy.

2746-2748 m

***Sandstone* (30 %):** Grayish white, in place colourless, transparent to translucent, friable to compact, very fine to fine grained, moderately

sorted, calcareous, loose, consolidated, no fluorescence and no solvent cut.
***Siltstone* (30 %):** Grayish to light grayish, grayish white, dirty white, moderately hard to hard, compact, pyretic; calcareous and grading towards sandstone.
***Shale* (30 %):** Gray, medium gray; compact, in parts brittle; sub fissile to fissile; flaky, platy.
***Claystone* (10 %):** Gray, light gray, medium gray; soft; amorphous, in parts washable, sticky, calcareous, pyretic.

2748 – 2752 m

***Shale* (50 – 60 %):** Gray, medium gray; compact, in parts brittle; sub fissile to fissile; flaky, platy.
***Siltstone* (10 – 20 %):** Grayish to light grayish, grayish white, dirty white, moderately hard to hard, compact, pyretic; calcareous and grading towards sandstone.
***Claystone* (10 – 20 %):** Gray, light gray, medium gray; soft; amorphous, in parts washable, sticky, calcareous, pyretic, marly.
***Sandstone* (10 – 20 %):** Grayish white, in place colourless, transparent to translucent, friable to compact, very fine to fine grained, moderately sorted, calcareous, loose, consolidated, no fluorescence and no solvent cut.

2752 – 2754 m

***Shale* (60 %):** Gray, medium gray; compact, in parts brittle; sub fissile to fissile; flaky, platy.
***Claystone* (30 %):** Gray, light gray, medium gray; soft; amorphous, in parts washable, sticky, calcareous, pyretic, marly.
***Siltstone* (10 %):** Grayish to light grayish, grayish white, dirty white, moderately hard to hard, compact, pyretic; calcareous and grading towards sandstone.
***Sandstone*:** In traces.

2754 – 2764 m

***Shale* (50 – 60 %):** Gray to medium gray, greenish gray, dark gray; moderately hard, moderately compact, in parts brittle; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty; trace pyretic dissemination; moderately calcareous.
***Claystone* (30 – 40 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft; amorphous; in parts washable, sticky, in place soluble; marly.
***Siltstone* (10 – 20 %):** Grayish to light grayish, grayish white, dirty white; moderately hard, compact; pyretic; calcareous to non calcareous; in place grading towards sandstone, occasionally glauconitic inclusion.
***Quartz/Sand*:** In traces.

2764 – 2766 m

***Shale* (60 %):** Gray to medium gray, greenish gray, dark gray; moderately hard, moderately compact, in parts brittle; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty; trace pyretic dissemination; moderately calcareous.
***Claystone* (40 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft; amorphous; in parts washable, sticky, in place soluble; marly.
***Siltstone*:** In traces.

2766 – 2770 m

***Shale* (50 %):** Gray to medium gray, greenish gray, dark gray; moderately hard, moderately compact, in place brittle; sub fissile to

fissile; flaky, platy, sub blocky to blocky; in place silty, trace pyrite dissemination; moderately calcareous.
***Claystone* (40 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft; amorphous; in parts washable, sticky, in place soluble; marly.
***Siltstone* (10 %):** Grayish to light grayish, grayish white, dirty white; moderately hard, compact; pyretic; calcareous to non calcareous; in place grading towards sandstone.

2770 – 2780 m

***Shale* (50 – 60 %):** Gray to medium gray, greenish gray, dark gray; moderately hard, moderately compact, in place brittle; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty, trace pyrite dissemination; moderately calcareous.
***Claystone* (40 – 50 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft; amorphous, in parts washable, sticky, in place soluble; marly; occasionally silty and glauconitic.
***Siltstone, Sandstone and Marl*:** In traces.

2780 – 2784 m

***Shale* (50 – 60 %):** Gray to medium gray, greenish gray, dark gray; moderately hard, moderately compact, in parts brittle; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty; pyretic; moderately calcareous.
***Claystone* (30 %):** Gray, light gray to medium gray, grayish white, occasionally dark gray; soft; amorphous; in parts washable, sticky, in place soluble; marly.
***Marl* (10 %):** Gray, light gray, dirty white, yellowish white; soft; washable; highly calcareous.
***Sandstone* (Tr – 10 %):** Colourless, transparent to translucent, friable, very fine to fine grained, moderately sorted, calcareous, loose, unconsolidated, no fluorescence and no solvent cut.

2784 – 2788 m

***Shale* (50 – 60 %):** Medium gray to gray, greenish gray, dark gray; moderately hard, moderately compact, in parts brittle; sub fissile to fissile; flaky, platy, sub blocky; moderately calcareous; pyretic; in place silty.
***Clay/Claystone* (30 – 40 %):** Grayish white to light gray, dirty white to white, gray to medium gray; soft to firm; amorphous to sub blocky; in parts sticky and washable; moderately calcareous.
***Sandstone* (10 %):** White to dirty white, light gray to gray; moderately hard; very fine grained, moderately sorted; argillaceous matrix; calcareous cement; consolidated; negligble visible porosity; grading towards siltstone.

2788 – 2792 m

***Shale* (70 %):** Medium gray to dark gray, blackish gray, in parts greenish gray; moderately hard; moderately compact to compact; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty, moderately calcareous, in places pyretic.
***Claystone* (20 – 30 %):** Grayish white to light gray, dirty white to white, gray to medium gray, in parts dark gray; soft to firm; amorphous to sub blocky; in parts sticky and washable; moderately calcareous.
***Sandstone* (Tr – 10 %):** White to dirty white, light gray to gray; moderately hard; very fine grained, moderately sorted; argillaceous matrix; calcareous cement; consolidated; negligble visible porosity; grading towards siltstone.

***Pyrite*:** In traces.

2792 – 2796 m ***Shale* (60 %):** Medium gray to dark gray, blackish gray, in parts greenish gray; moderately hard; moderately compact to compact; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty, moderately calcareous, in places pyretic.
***Claystone* (40 %):** Medium gray to dark gray, gray, in parts light gray to grayish white; soft to firm; amorphous, in place sub blocky; in parts sticky and washable; moderately calcareous to calcareous.
***Pyrite*:** Rare.

2796 – 2804 m ***Shale* (50 – 60 %):** Medium gray to dark gray, blackish gray, in parts greenish gray; moderately hard; moderately compact to compact; sub fissile to fissile; flaky, platy, sub blocky to blocky; in place silty, moderately calcareous, in places pyretic.
***Claystone* (30 – 40 %):** Dirty white, grayish white, white to off white, light gray to gray, in parts medium gray; firm, in parts soft; sub blocky to amorphous; calcareous.
***Siltstone* (10 – 20 %):** Light gray to grayish white, dirty white, gray to medium gray; moderately hard to hard; moderately compact; calcareous; occasionally pyretic; fine grained glauconitic inclusion, in place grading to very fine sandstone.

2804 – 2814 m ***Shale* (50 – 60 %):** Medium gray to dark gray, in parts blackish gray, occasionally greenish gray; moderately hard; moderately compact; brittle; sub fissile to fissile; smooth; flaky, platy, sub blocky; moderately calcareous; in place silty; occasionally pyretic.
***Claystone* (40 – 50 %):** Medium gray to dark gray, light gray to gray, in parts grayish white to dirty white; soft to firm; amorphous to sub blocky; in parts washable and sticky; moderately calcareous to calcareous.
***Siltstone* (Tr – 10 %):** Light gray to gray, dirty white to white; moderately hard; moderately compact; calcareous; in place grading to very fine sandstone.

2814 – 2816 m ***Shale* (60 %):** Medium gray to dark gray, in parts blackish gray, occasionally greenish gray; moderately hard; moderately compact; brittle; sub fissile to fissile; smooth; flaky, platy, sub blocky; moderately calcareous; in place silty; occasionally pyretic.
***Claystone* (30 %):** Medium gray to dark gray, light gray to gray, in parts grayish white to dirty white; soft to firm; amorphous to sub blocky; in parts washable and sticky; moderately calcareous to calcareous.
***Sandstone* (10 %):** White to dirty white, in parts light gray to gray; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; consolidated; negligible visible porosity; in place grading to siltstone; fine glauconitic inclusion.

2816 – 2820 m ***Shale* (60 %):** Medium gray to dark gray, in parts blackish gray, occasionally greenish gray; moderately hard; moderately compact; brittle; sub fissile to fissile; smooth; flaky, platy, sub blocky; moderately calcareous; in place silty; occasionally pyretic.

***Claystone* (30 %):** Gray to medium gray, dark gray, dirty white to grayish white; soft to firm; amorphous, in parts sub blocky; in parts washable and sticky; calcareous; in parts marly.
***Sandstone* (10 %):** White to dirty white, in parts light gray to gray; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; consolidated; negligible visible porosity; in place grading to siltstone; fine glauconitic inclusion.

2820 – 2822 m

***Shale* (60 %):** Medium gray to dark gray, in parts blackish gray, occasionally greenish gray; moderately hard; moderately compact; brittle; sub fissile to fissile; smooth; flaky, platy, sub blocky; moderately calcareous; in place silty; occasionally pyretic.
***Claystone* (20 %):** Gray to medium gray, dark gray, dirty white to grayish white; soft to firm; amorphous, in parts sub blocky; in parts washable and sticky; calcareous; in parts marly.
***Marl* (10 %):** Dirty white to white; firm; amorphous to sub blocky; highly calcareous.
***Sandstone* (10 %):** White to dirty white, in parts light gray to gray; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; consolidated; negligible visible porosity; in place grading to siltstone; fine glauconitic inclusion.

2822 – 2830 m

***Shale* (50 %):** Medium gray to dark gray, in place blackish gray, occasionally greenish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, smooth, flaky, platy, sub blocky, moderately calcareous, in place silty, occasionally pyretic.
***Claystone* (30 – 40 %):** Gray to medium gray, dark gray, dirty white to grayish white; soft to firm; amorphous, in parts sub blocky; in parts washable and sticky; calcareous; in parts marly.
***Marl* (10 %):** Dirty white to white; firm; amorphous to sub blocky; highly calcareous.
***Sandstone* (Tr – 10 %):** White to dirty white, in parts light gray to gray; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; consolidated; negligible visible porosity; in place grading to siltstone; fine glauconitic inclusion, occasionally free Quartz present.

2830 – 2842 m

***Shale* (50 – 60 %):** Medium gray to dark gray, in place blackish gray, occasionally greenish gray, moderately hard, moderately compact, brittle, sub fissile to fissile, smooth, flaky, platy, sub blocky, moderately calcareous, in place silty, occasionally pyretic.
***Claystone* (40 %):** Gray to medium gray, dark gray, dirty white to grayish white; soft to firm; amorphous, in parts sub blocky; in parts washable and sticky; calcareous; in parts marly.
***Marl* (Tr – 10 %):** Dirty white to white; firm; amorphous to sub blocky; highly calcareous.
***Sandstone*:** In Traces.

2842 – 2848 m

***Shale* (40 – 50 %):** Dark gray to medium gray, blackish gray; moderately hard; moderately compact; brittle; sub fissile to fissile; flaky, sub platy to platy, sub blocky; smooth; calcareous to moderately calcareous; in place silty; occasionally pyretic.

***Claystone* (30 – 40 %):** Medium gray to dark gray, gray, in parts light gray to grayish white; soft to firm; amorphous, in place sub blocky; in place washable; calcareous; pyretic; silty.
***Marl* (20 – 30 %):** Dirty white, grayish white, off white; firm, in place soft; amorphous to sub blocky; highly calcareous.

2848 – 2858 m

***Shale* (60 %):** Dark gray to medium gray, blackish gray; moderately hard; moderately compact; brittle; sub fissile to fissile; flaky, sub platy to platy, sub blocky; smooth; calcareous to moderately calcareous; in place silty; occasionally pyretic.
***Claystone* (30 – 40 %):** Medium gray to dark gray, gray, in parts light gray to grayish white; soft to firm; amorphous, in place sub blocky; in place washable; calcareous; pyretic; silty.
***Marl* (Tr – 10 %):** Dirty white, grayish white, off white; firm, in place soft; amorphous to sub blocky; highly calcareous.

2858 – 2864 m

***Shale* (50 %):** Dark gray to medium gray, blackish gray, occasionally greenish gray; moderately hard; moderately compact to compact; brittle; sub fissile to fissile; smooth; flaky, platy, in parts blocky to sub blocky; calcareous to moderately calcareous; in place silty; trace pyretic dissemination.
***Claystone* (40 – 50 %):** Gray, light to medium gray, grayish white to dirty white, occasionally dark gray; soft to firm; amorphous, in place sub blocky; calcareous to moderately calcareous; in place marly, in parts washable and sticky.
***Siltstone* (Tr – 10 %):** Dirty white to grayish white, gray to medium gray; moderately hard; compact; calcareous; occasionally pyretic.
***Pyrite and Quartz*:** In Traces.

2864 – 2866 m

***Shale* (60 %):** Dark gray to medium gray, blackish gray, occasionally greenish gray; moderately hard; moderately compact to compact; brittle; sub fissile to fissile; smooth; flaky, platy, in parts blocky to sub blocky; calcareous to moderately calcareous; in place silty; trace pyretic dissemination.
***Claystone* (40 %):** Gray, light to medium gray, grayish white to dirty white, occasionally dark gray; soft to firm; amorphous, in place sub blocky; calcareous to moderately calcareous; in place marly, in parts washable and sticky.
***Siltstone*:** In traces.

2866 – 2874 m

***Shale* (50 %):** Dark gray to medium gray, blackish gray, occasionally greenish gray; moderately hard; moderately compact to compact; brittle; sub fissile to fissile; smooth; flaky, platy, in parts blocky to sub blocky; calcareous to moderately calcareous; in place silty; pyretic dissemination.
***Claystone* (30 – 40 %):** Gray, light to medium gray, grayish white to dirty white, occasionally dark gray; soft to firm; amorphous, in place sub blocky; calcareous to moderately calcareous; in place marly, in parts washable and sticky, occasionally pyretic.
***Marl* (Tr – 10 %):** Gray, light gray, dirty white, yellowish brown, dark yellow; soft; amorphous; washable, sticky; highly calcareous.
***Siltstone* (Tr – 10 %):** Dirty white to grayish white, gray to medium gray, moderately hard, compact, calcareous, occasionally pyretic, in place grading towards very fine sandstone.

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2874 – 2876 m

***Shale* (40 %):** Dark gray to medium gray, greenish gray, blackish gray; moderately hard; moderately compact to compact; brittle; sub fissile to fissile; smooth; flaky, platy, in place blocky to sub blocky; calcareous to moderately calcareous; in place silty.
***Claystone* (40 %):** Gray, light to medium gray, grayish white to dirty white, occasionally dark gray; soft to firm; amorphous, in place sub blocky; calcareous to moderately calcareous; in place marly, in parts washable and sticky; occasionally pyretic.
***Siltstone* (10 %):** Dirty white to grayish white, gray to medium gray; moderately hard; compact; calcareous; occasionally pyretic, grading to very fine Sandstone.
***Marl* (10 %):** Yellowish brown, dark yellow; soft; amorphous; highly calcareous

2876 – 2878 m

***Shale* (50 %):** Dark gray to medium gray, greenish gray, blackish gray; moderately hard; moderately compact to compact; brittle; sub fissile to fissile; smooth; flaky, platy, in place blocky to sub blocky; calcareous to moderately calcareous; in place silty.
***Claystone* (40 %):** Reddish brown, dark brown, reddish, gray, light to medium gray, grayish white to dirty white, occasionally dark gray; soft to firm; amorphous, in parts sub blocky; calcareous, in parts marly, washable and sticky; occasionally pyretic.
***Siltstone* (10 %):** Dirty white to grayish white, gray to medium gray; moderately hard; compact; calcareous; occasionally pyretic, grading to very fine Sandstone.

2878 – 2880 m

***Shale* (40 %):** Medium gray to dark gray, blackish gray, occasionally greenish gray; moderately hard; moderately compact to compact; in parts brittle; sub fissile to fissile; smooth; flaky, platy, sub blocky to blocky; moderately calcareous; in place silty.
***Claystone* (30 %):** Reddish brown, dark brown, reddish, gray, light to medium gray, grayish white to dirty white, occasionally dark gray; soft to firm; amorphous, in parts sub blocky; calcareous, in parts marly, washable and sticky; occasionally pyretic.
***Siltstone* (30 %):** Dirty white to white, grayish white, light gray to gray; moderately hard to hard; compact; tight; calcareous; micro micaceous; pyretic; in place grading to very fine Sandstone.

2880 – 2882 m

***Shale* (40 %):** Medium gray to dark gray, in parts greenish gray, moderately hard to hard; compact; massive, sub fissile to fissile; flaky, sub blocky to blocky, platy; moderately calcareous; in place silty, trace pyretic dissemination.
***Claystone* (20 – 40 %):** Medium gray to gray, light gray, grayish white, dirty white, in parts dark gray; firm, in parts soft; sub blocky to amorphous; in parts washable; calcareous.
***Siltstone* (20 %):** Dirty white to white, grayish white, light gray to gray; moderately hard to hard; compact; moderately calcareous to calcareous; micro micaceous; pyretic; in place grading to very fine Sandstone.

2882 – 2888 m

***Shale* (40 %):** Medium gray to dark gray, in parts greenish gray, moderately hard to hard; compact; massive, sub fissile to fissile; flaky, sub blocky to blocky, platy; moderately calcareous; in place silty, trace pyretic dissemination.

***Claystone* (20 – 30 %):** Medium gray to gray, light gray, grayish white, dirty white, in parts dark gray; firm, in parts soft; sub blocky to amorphous; in parts washable; calcareous.
***Siltstone* (20 – 30 %):** Dirty white to white, grayish white, light gray to gray; moderately hard to hard; compact; moderately calcareous to calcareous; micro micaceous; pyretic; in place grading to very fine Sandstone.
***Sandstone* (10 %):** White to dirty white, occasionally colourless, transparent to translucent; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; pyretic; tight; in place grading to Siltstone; loose, medium grained Quartz present.

2888 – 2890 m

***Siltstone* (40 %):** White to dirty white, grayish white, light gray to gray; moderately hard to hard; compact; moderately calcareous to calcareous, micro micaceous, occasionally pyretic.
***Claystone* (30%):** White to dirty white, light grayish white, grayish white, gray; firm, in parts soft; sub blocky to amorphous; in parts washable; calcareous.
***Shale* (20 %):** Medium gray to dark gray, in parts greenish gray, moderately hard to hard; compact; massive, sub fissile to fissile; flaky, sub blocky to blocky, platy; moderately calcareous; in place silty, trace pyretic dissemination.
***Sandstone* (10 %):** White to dirty white, occasionally colourless, transparent to translucent; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; pyretic; tight; in place grading to Siltstone; loose, medium grained Quartz present.

2890 – 2892 m

***Claystone* (60 %):** Gray, dark gray, yellowish, dark yellow, dirty white; firm, in parts soft; sub blocky to amorphous; in place washable; moderately calcareous.
***Shale* (20 %):** Medium gray to dark gray, in parts greenish gray, dark gray; moderately hard; compact; massive, sub fissile to fissile; flaky, sub blocky to blocky, platy; moderately calcareous; in place silty, occasionally pyretic.
***Siltstone* (20 %):** Dirty white to white, grayish white, light gray to gray; moderately hard; compact; moderately calcareous; micro micaceous; occasionally pyretic; in places grading to very fine Sandstone.
***Sand*:** In traces.

2892 – 2896 m

***Siltstone* (50 %):** White to dirty white, grayish white, light gray to gray; moderately hard to hard; compact; micro micaceous; calcareous; occasionally pyretic, in place grading to very fine Sandstone.
***Claystone* (30 %):** White to dirty white, grayish white, light gray to gray, medium gray, occasionally light brown; firm to moderately hard, in parts soft; amorphous to sub blocky; calcareous to moderately calcareous; occasionally silty.
***Shale* (10 %):** Medium gray to dark gray; moderately hard; compact; massive, sub fissile; sub blocky to blocky, flaky, platy; moderately calcareous.
***Sandstone* (10 %):** White to dirty white, off white, colourless; moderately hard; very fine grained, sub angular to sub rounded, sub

spherical, moderately sorted; argillaceous matrix, calcareous cement, tight, grading to Siltstone.
***Remarks*:** Abundant metal cuttings.

2896 – 2898 m

***Claystone* (50 %):** Dominantly gray to dark gray, grayish white, white to dirty white, light gray, medium gray, occasionally light brown; soft, in parts firm to moderately hard; amorphous to sub blocky; calcareous to moderately calcareous, occasionally silty.
***Siltstone* (30 %):** White to dirty white, grayish white, light gray to gray; moderately hard to hard; compact; micro micaceous; calcareous; occasionally pyretic, in place grading to very fine Sandstone.
***Shale* (10 %):** Medium gray to dark gray; moderately hard; compact; massive, sub fissile; sub blocky to blocky, flaky, platy; moderately calcareous.
***Sandstone* (10 %):** White to dirty white, off white, colourless; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement, tight, grading to Siltstone.

2898 – 2902 m

***Claystone* (40 – 50 %):** Medium gray to gray, white to dirty white, light gray, medium gray, in parts light brown, reddish browm; firm to moderately hard, in parts soft; amorphous to sub blocky; calcareous to moderately calcareous; occasionally silty.
***Siltstone* (40 %):** White to dirty white, grayish white, light gray to gray; moderately hard to hard; compact; micro micaceous; calcareous; occasionally pyretic; in place grading to very fine Sandstone.
***Shale* (10 %):** Medium gray to dark gray; moderately hard; compact; massive, sub fissile; sub blocky to blocky, flaky, platy; calcareous.
***Sandstone* (Tr – 10 %):** White to dirty white, off white, colourless; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement.

2902 – 2906 m

***Siltstone* (40 %):** White to dirty white, occasionally colourless, clear, light gray to gray, grayish white; moderately hard to hard; compact; micro micaceous; occasionally glauconitic inclusion; calcareous to moderately calcareous.
***Claystone* (20 – 30 %):** White to dirty white, grayish white, gray, medium gray to light gray; firm to moderately hard, in parts soft; amorphous to sub blocky; calcareous.
***Sandstone* (20 %):** White to dirty white, grayish white; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; tight; consolidated; micro micaceous; negligible visible porosity; grading to Siltstone.
***Shale* (10 – 20 %):** Medium gray to gray, light gray; moderately hard; compact; massive to sub fissile; smooth; sub blocky to blocky, flaky, in parts platy; in places micaceous, moderately calcareous to non calcareous.
***Remarks*:** Abundant metal cuttings.

2906 – 2908 m

***Siltstone* (50 %):** White to dirty white, grayish white, occasionally light gray to gray; moderately hard to hard; compact; micro

micaceous, moderately calcareous to slightly calcareous, rare inclusion of Glauconite; grading to very fine Sandstone.
***Claystone* (20 %):** White to dirty white, grayish white, gray, medium gray to light gray; firm to moderately hard, in parts soft; amorphous to sub blocky; calcareous.
***Shale* (20 %):** Medium gray to gray, light gray; moderately hard; sub fissile to fissile; smooth; platy, flaky; micro micaceous; non calcareous to slightly calcareous.
***Sandstone* (10 %):** White to dirty white, grayish white; moderately hard; very fine grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, calcareous cement; tight; consolidated; micro micaceous; negligible visible porosity; grading to Siltstone.
***Remarks*:** Abundant metal cuttings.

2908 – 2912 m

***Shale* (50 – 60 %):** Light gray to gray, medium gray, in place blackish gray; moderately hard; fissile to sub fissile; smooth; platy, flaky; non calcareous to slightly calcareous, micro micaceous.
***Siltstone* (20 – 30 %):** White to dirty white, grayish white, occasionally light gray to gray; moderately hard to hard; compact; micro micaceous, moderately calcareous to slightly calcareous, rare inclusion of Glauconite; grading to very fine Sandstone.
***Claystone* (20 %):** White to dirty white, grayish white, gray, medium gray to light gray; firm to moderately hard, in parts soft; amorphous to sub blocky; calcareous.
***Remarks*:** Abundant metal cuttings.

2912 – 2918 m

***Shale* (70 %):** Light gray to gray, medium gray to gray, in place blackish gray; moderately hard; fissile to sub fissile; smooth; platy, flaky; non calcareous to slightly calcareous, micro micaceous.
***Claystone* (20 %):** White to dirty white, grayish white, gray, medium gray to light gray; firm to moderately hard, in parts soft; amorphous to sub blocky; calcareous.
***Siltstone* (10 %):** White to dirty white, grayish white, occasionally light gray to gray; moderately hard to hard; compact; micro micaceous, moderately calcareous to slightly calcareous, rare inclusion of Glauconite; grading to very fine Sandstone.
***Remarks*:** Abundant metal cuttings.

2918 – 2920 m

***Shale* (60 %):** Gray to light gray, medium gray to dark gray; moderately hard; compact; brittle; massive to sub fissile; platy, flaky; micro micaceous; non calcareous to moderately calcareous; in place silty.
***Claystone* (30 %):** Gray to dark gray, white to dirty white, grayish white; moderately hard, in parts soft; blocky to sub blocky, in parts amorphous; in parts washable and sticky; moderately calcareous to calcareous.
***Siltstone* (10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; calcareous to moderately calcareous.
***Remarks*:** Abundant metal cuttings.

2920 – 2928 m

***Shale* (40 – 50 %):** Gray to light gray, medium gray to dark gray; moderately hard; compact; brittle; massive to sub fissile; platy, flaky;

micro micaceous; non calcareous to moderately calcareous; in place silty.
***Claystone* (30 %):** Gray to dark gray, white to dirty white, grayish white, in place yellowish white, in place reddish brown; moderately hard, in parts soft; blocky to sub blocky, in parts amorphous; in parts washable and sticky; moderately calcareous to highly calcareous (Marl).
***Siltstone* (20 – 30 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; calcareous to moderately calcareous.
***Remarks*:** Abundant to trace metal cuttings.

2928 – 2930 m

***Shale* (50 %):** Gray to dark gray, light gray, medium gray, moderately hard, compact, massive to sub fissile, brittle, platy, flaky to sub flaky, moderately micaceous, non calcareous to moderately calcareous, in place silty.
***Claystone* (40 %):** Gray to dark gray, white to dirty white, grayish white, in place yellowish white, in place reddish brown; moderately hard, in parts soft; blocky to sub blocky, in parts amorphous; in parts washable and sticky; moderately calcareous to highly calcareous (Marl).
***Siltstone* (10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; calcareous to moderately calcareous.
***Remarks*:** In traces metal cuttings.

2930 – 2944 m

***Shale* (60 %):** Gray to light gray, medium gray to dark gray; moderately hard; compact; brittle; massive to sub fissile; platy, flaky; micro micaceous; non calcareous to moderately calcareous; in place silty.
***Claystone* (30 %):** Gray to dark gray, white to dirty white, grayish white, occasionally yellowish white; moderately hard, in parts soft; blocky to sub blocky, in parts amorphous; in parts washable and sticky; calcareous, occasionally marly.
***Siltstone* (10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; calcareous to moderately calcareous; grading to very fine Sandstone.
***Remarks*:** In traces metal cuttings.

2944 – 2956 m

***Shale* (50 – 60 %):** Light gray to gray, medium gray to dark gray, in parts blackish gray; moderately hard; fissile to sub fissile; smooth; platy, flaky; micro micaceous; non calcareous to slightly calcareous.
***Claystone* (40 – 50 %):** White to dirty white, grayish white, gray, medium gray, light gray, firm to moderately hard, in place soft, amorphous to sub blocky; calcareous.
***Siltstone* (Tr – 10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; calcareous to moderately calcareous; grading to very fine Sandstone.
***Quartz*:** In traces.
***Remarks*:** In traces metal cuttings.

2956 – 2974 m

***Shale* (50 – 60 %):** Light gray to gray, medium gray to dark gray, in parts blackish gray; moderately hard; fissile to sub fissile; platy, flaky; non calcareous to slightly calcareous; silty; micro micaceous.
***Claystone* (30 – 50 %):** Grayish white, dirty white, gray to medium gray, dark gray, in parts reddish brown, light gray; firm to moderately hard, in parts soft; amorphous to sub blocky; calcareous; silty.
***Siltstone* (Tr – 10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; non calcareous to moderately calcareous.
***Remarks*:** In traces metal cuttings.

2974 – 2982 m

***Shale* (60 %):** Light gray to gray, medium gray to dark gray, in parts blackish gray; moderately hard; fissile to sub fissile; smooth; flaky, platy; non calcareous to slightly calcareous; micro micaceous; in parts silty; glauconitic; pyretic.
***Claystone* (30 – 40 %):** Gray to dark gray, dirty white, light gray, in parts reddish brown; firm to moderately hard, in parts soft; amorphous to sub blocky; in parts washable; slightly calcareous to moderately calcareous; occasionally silty; glauconitic; pyretic.
***Siltstone* (Tr – 10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; non calcareous to moderately calcareous.
***Remarks*:** Trace metal cuttings.

2982 – 2988 m

***Shale* (50 %):** Light gray to gray, medium gray to dark gray, in parts blackish gray; moderately hard; fissile to sub fissile; smooth; flaky, platy; non calcareous to slightly calcareous; micro micaceous; in parts silty; glauconitic; pyretic.
***Claystone* (30 %):** Gray to dark gray, dirty white, light gray, in parts reddish brown; firm to moderately hard, in parts soft; amorphous to sub blocky; in parts washable; slightly calcareous to moderately calcareous; in parts silty; glauconitic; pyretic; micro micaceous.
***Siltstone* (10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; non calcareous to moderately calcareous.
***Marl* (10 %):** White to dirty white, yellowish white, moderately hard, in parts soft; blocky to sub blocky; highly calcareous.

2988 – 2990 m

***Shale* (50 %):** Light gray to gray, medium gray to dark gray, in parts blackish gray; moderately hard; fissile to sub fissile; smooth; flaky, platy; non calcareous to slightly calcareous; micro micaceous; in parts silty; glauconitic; pyretic.
***Claystone* (40 %):** Gray to dark gray, dirty white, light gray, in parts reddish brown; firm to moderately hard, in parts soft; amorphous to sub blocky; in parts washable; slightly calcareous to moderately calcareous; silty; micro micaceous.
***Siltstone* (10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; moderately calcareous.

2990 – 2992 m

***Shale* (70 %):** Light gray to gray, medium gray to dark gray, in parts blackish gray; moderately hard; fissile to sub fissile; smooth; flaky, platy; non calcareous to slightly calcareous; micro micaceous; in parts silty; glauconitic; pyretic.

***Claystone* (20 %):** Gray to dark gray, dirty white, light gray, in parts reddish brown; firm to moderately hard, in parts soft; amorphous to sub blocky; in parts washable; slightly calcareous to moderately calcareous; silty; micro micaceous.
***Siltstone* (10 %):** White to dirty white, occasionally colourless, light gray, gray, grayish white; moderately hard to hard; compact; micro micaceous; moderately calcareous.

2992 – 3014 m

***Shale* (70 – 80 %):** Dark gray to blackish gray, in parts occasionally medium gray; moderately hard; compact; sub fissile, in parts fissile; occasionally massive; flaky to sub flaky, sub blocky, platy; occasionally smooth; in places silty, micro micaceous to micaceous, occasionally glauconitic, slightly to feebly calcareous, in parts moderately calcareous; occasionally pyretic dissemination.
***Claystone* (10 – 30 %):** Dark gray to gray, blackish gray, in parts dirty white; soft to firm; amorphous; moderately calcareous to slightly calcareous, in parts feebly calcareous; rare glauconitic inclusion.
***Siltstone* (Tr – 10 %):** Dirty white, grayish white, light gray, gray to dark gray, occasionally colorless; moderately hard to hard; compact, micro micaceous, moderately calcareous; in places grading to very fine Sandstone.
***Pyrite/Sandstone*:** In traces
***Remarks*:** minor to trace metal cuttings.

3014 – 3018 m

***Shale* (70 – 80 %):** Dark gray to blackish gray, medium gray; moderately hard; compact; sub fissile to fissile; generally smooth, flaky, platy, sub blocky, highly glauconitic, occasionally pyretic, micro micaceous; in places silty; feebly to slightly calcareous.
***Claystone* (20 – 30 %):** Dark gray to gray, blackish gray, in parts dirty white; soft to firm; amorphous; moderately calcareous to slightly calcareous, in parts feebly calcareous.
***Pyrite and Sandstone*:** In traces.
***Glauconite*:** Abundant

3018 – 3020 m

***Shale* (60 %):** Dark gray to blackish gray, medium gray to gray; moderately hard; compact; sub fissile to fissile; smooth, flaky, platy, sub blocky, highly glauconitic, occasionally pyretic, micaceous; silty; feebly to slightly calcareous.
***Claystone* (40 %):** Dark gray to gray, blackish gray, in parts dirty white; soft to firm; amorphous; moderately calcareous to slightly calcareous, in parts feebly calcareous; occasionally glauconitic.
***Pyrite*:** In traces.
***Glauconite*:** Abundant

3020 – 3022 m

***Shale* (60 %):** Dark gray to blackish gray, medium gray to gray; moderately hard; compact; sub fissile to fissile; smooth, flaky, platy, sub blocky, highly glauconitic, occasionally pyretic, micaceous; silty; feebly to slightly calcareous.
***Claystone* (20 %):** Dark gray to gray, blackish gray, in parts dirty white; soft to firm; amorphous; moderately calcareous to slightly calcareous, in parts feebly calcareous; occasionally glauconitic.
***Marl* (20 %):** White to dirty white, grayish white; firm to moderately hard; amorphous to sub blocky; highly calcareous.
***Glauconite*:** Abundant

3022 – 3028 m

***Shale* (70 – 80 %):** Medium gray to dark gray, blackish gray; moderately hard; compact; sub fissile; in parts fissile; flaky, sub blocky, sub platy to platy; highly glauconitic; slightly calcareous; micaceous to micro micaceous, pyretic, silty, in parts smooth, in place greenish appearance of sample.
***Claystone* (20 – 30 %):** Medium gray to dark gray, gray, grayish white to dirty white; soft to firm; amorphous; in parts glauconitic, slightly to moderately calcareous.
***Pyrite and Siltstone*:** In Traces.
***Glauconite*:** Abundant
***Remarks*:** Traces metal cuttings.

3028 – 3038 m

***Shale* (60 – 70 %):** Medium gray to dark gray, blackish gray; moderately hard; compact; sub fissile; in parts fissile; flaky, sub blocky, sub platy to platy; occasionally glauconitic; slightly calcareous; micaceous; pyretic; silty; in parts smooth.
***Claystone* (20 – 30 %):** Medium gray to dark gray, gray, grayish white to dirty white; soft to firm; amorphous; in parts occasionally glauconitic, slightly to moderately calcareous.
***Siltstone* (10%):** Dirty white, grayish white, white; moderately hard; compact; moderately micaceous; slightly calcareous; in place grading to very fine Sandstone.
***Pyrite and Sandstone*:** In traces.
***Glauconite*:** Abundant
***Remarks*:** Traces of metal cuttings.

Gas Peaks (Goru Formation):

Depth (m)	Type	Total Gas (ppm)	C1 (ppm)	C2 (ppm)	C3 (ppm)	iC4 (ppm)	nC4 (ppm)	iC5 (ppm)	nC5 (ppm)
2482	FG	14300	1990	125	107	40	38	0	11
2486	FG	15600	3033	198	163	50	48	17	10
2508	FG	17300	3564	238	205	58	64	22	12
2530	FG	22400	4152	367	396	121	144	50	28
2556	Short Trip Gas	15000	1458	151	164	56	85	29	20
2588	FG	15500	3070	337	402	106	165	53	0
2597	FG	18800	4086	466	569	147	231	73	0
2606	FG	17700	3541	399	513	146	232	77	53
2617	FG	20800	4583	537	692	200	308	107	0
2634	FG	20300	4542	500	616	183	280	100	70
2636	FG	25200	6051	666	776	230	336	126	0
2644	FG	18600	3270	367	451	162	238	104	73
2648	FG	17900	3410	371	402	135	194	71	62
2661	Short Trip Gas	18000	2395	139	126	55	82	48	36
2663	FG	12200	1551	146	136	54	72	41	31
2676	FG	10500	1595	145	120	37	46	24	18
2682	FG	11130	1799	152	128	42	49	26	19

2685	FG	11700	2027	172	136	40	47	0	16
2688	FG	12400	2064	185	152	47	53	26	18
2691	FG	11900	1653	135	118	41	49	28	22
2694	FG	12100	1856	154	127	42	49	25	19
2694	Trip Gas	17300	2926	145	84	24	30	0	11
2706	FG	11200	1895	130	95	31	35	15	12
2714	FG	11120	1760	145	103	31	33	14	11
2724	FG	13900	2208	191	139	39	42	14	13
2741	FG	13900	1721	180	155	49	53	22	0
2749	FG	13500	1704	192	171	54	57	0	14
2759	FG	13900	2104	240	208	60	65	26	16
2762	FG	14200	2076	240	208	60	65	26	17
2782	FG	11140	1072	117	94	29	33	11	10
2784	FG	10900	868	83	66	24	30	0	10
2788	FG	19600	3565	469	410	99	117	41	26
2796	FG	14100	1386	161	130	37	48	0	14
2800	FG	14400	1901	236	169	39	55	18	13
2802	FG	12700	1073	136	104	28	40	16	10
2811	FG	11600	1273	165	103	21	32	0	8
2814	Trip Gas	24900	5544	453	366	92	135	20	34
2815	FG	14200	1893	160	114	28	47	19	12
2835	FG	22600	4517	706	493	80	153	46	0
2844	FG	17300	1490	232	151	28	60	0	7
2857	FG		1647	216	168	29	66	0	0
2858	Trip Gas	22400	4602	302	199	36	73	20	15
2863	FG	13600	1874	180	149	28	62	8	13
2867	FG	8200	592	76	65	15	38	0	10
2876	Trip Gas	10900	2190	107	45	6	4	0	4
2879	Trip Gas	16500	2999	158	75	10	24	1	5
2881	FG	4300	333	31	10	1	5	0	0
2883	FG	4300	337	35	13	2	8	5	0
2884	Trip Gas	11200	975	31	8	1	3	0	0
2887	Trip Gas	10300	1716	69	19	2	2	6	1
2890	Trip Gas	4100	203	16					
2892	Trip Gas	11100	148	10	0	0	0	6	0
2902	Trip Gas	600	415	24	0	0	0	4	0
2939	FG		1647	187	79	6	20	8	2
2950	FG	3600	1799	0	110	9	28	0	3
2955	FG	4100	2460	278	112	8	24	0	2
2959	FG	5900	3298	0	208	17	48	14	5
2968	FG	6000	2359	0	118	8	27	0	3
2978	FG	8000	3387	0	171	13	40	0	4
2988	FG	7400	2891	0	152	13	38	0	4
2994	FG	5300	3169	0	127	10	30	0	4
3007	FG	8100	3649	449	183	19	52	13	8
3026	FG	10200	4695	473	157	16	14	13	9

PARIWAR FORMATION (3038 m – 3311.79+m)

The Pariwar Formation belongs to Lower Cretaceous age which conformably overlies Baisakhi-Bedesir Formation of Upper Jurassic. The Pariwar Formation is dominated with Sandstone with interbedded shale and clay/claystone. It has been indicated in the previous studies that Pariwar Formation has fair source potential to yield gas with minor oil. Pariwar Formation faced a regressional facies during their sediment accommodation which is known from their micropaleontological studies and indicates a marginal and stable shelf depositional environment.

Lithological Description (Pariwar Formation)

3038 – 3044 m

Sandstone **(40 %):** Dirty white, grayish white, white, off white, in parts colourless, translucent; loose to friable; fine to medium grained, in parts very fine grained, occasionally coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; occasionally pyretic.
Shale **(20 – 30 %):** Medium gray to dark gray, blackish gray; moderately hard; compact; sub fissile; in parts fissile; flaky, sub blocky, sub platy to platy; occasionally glauconitic; slightly calcareous; micaceous; pyretic; silty; in parts smooth.
Claystone **(20 – 30 %):** Dominantly white to dirty white, in parts medium gray, gray, dark gray, grayish white; soft to firm; amorphous to sub blocky; in place glauconitic; calcareous.
Siltstone **(10 %):** Dirty white, grayish white, white; moderately hard; compact; moderately micaceous; slightly calcareous; in place grading to very fine Sandstone.
Pyrite**:** In traces.

3044 – 3046 m

Sandstone **(50%):** Dirty white, grayish white, white, off white, in parts colourless, translucent; loose to friable; fine to medium grained, in parts very fine grained, occasionally coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; occasionally pyretic, no fluorescence and no solvent cut.
Claystone **(40 %):** Grayish white, dirty white to white; soft to firm; amorphous to sub blocky; calcareous.
Shale **(10 %):** Medium gray to dark gray, blackish gray; moderately hard; compact; sub fissile; in parts fissile; flaky, sub blocky, sub platy to platy; occasionally glauconitic; slightly calcareous; micaceous; pyretic; silty; in parts smooth;
Siltstone**:** In traces.

3046 – 3050 m

Sandstone **(40 %):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; fine to medium grained, in parts very fine and coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; no fluorescence and no solvent cut.
Claystone **(30 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

***Shale* (20 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous.
***Siltstone* (10 %):** Dirty white to white, grayish white; moderately hard; compact; calcareous; dirty; tight.

3050 – 3052 m

***Claystone* (40%):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.
***Sandstone* (30%):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; no fluorescence and no solvent cut.
***Shale* (20 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous.
***Siltstone* (10%):** Dirty white to white, grayish white; moderately hard; compact; calcareous; dirty; tight.

3052 – 3054 m

***Shale* (40%):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous.
***Claystone* (30%):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.
***Siltstone* (20%):** Dirty white to white, grayish white; moderately hard; compact; calcareous; dirty; tight.
***Sandstone* (10%):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; no fluorescence and no solvent cut.

3054 – 3056 m

***Shale* (50 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous.
***Claystone* (30 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.
***Siltstone* (20 %):** Dirty white to white, grayish white; moderately hard; compact; calcareous; dirty; tight.
***Sandstone*:** In traces.

3056 – 3060 m

***Shale* (40 – 50 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (30 – 40 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.
***Siltstone* (20%):** Dirty white to white, grayish white; moderately hard; compact; calcareous; dirty; tight.

3060 – 3062 m

***Sandstone* (40 %):** White to dirty white, grayish white, off white, in place colourless; friable; fine to medium grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; no fluorescence and no solvent cut.

***Shale* (30 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (30 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3062 – 3064 m ***Sandstone* (60 %):** White to dirty white, grayish white, off white, in place colourless; friable; fine to medium grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; glauconitic inclusion; no fluorescence and no solvent cut.
***Shale* (20%):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (20%):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3064 – 3066 m ***Sandstone* (80%):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; fine to medium grained; in parts very fine to coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; glauconitic; no fluorescence and no solvent cut.
***Shale* (10%):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (10%):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3066 – 3068 m ***Sandstone* (60 %):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; fine to medium grained; in parts very fine to coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; glauconitic; no fluorescence and no solvent cut.
***Shale* (20 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (20 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3068 – 3070 m ***Sandstone* (40 %):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; fine to medium grained; in parts very fine to coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; glauconitic; no fluorescence and no solvent cut.
***Shale* (40 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (20%):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3070 – 3078 m ***Sandstone* (60 %):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; fine to medium

grained; in parts very fine to coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; glauconitic; no fluorescence and no solvent cut.
***Shale* (20 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (10 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.
***Siltstone* (10%):** Dirty white to white, grayish white; moderately hard; compact; calcareous; dirty; tight.

3078 – 3086 m

***Sandstone* (50 %):** White to dirty white, grayish white, off white, in parts occasionally colourless; loose to friable; fine to medium grained; in parts very fine to coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, poorly cemented; dirty; glauconitic; no fluorescence, in places speckled, dull yellowish fluorescence and no solvent cut.
***Shale* (30 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (10 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.
***Siltstone* (10%):** Dirty white to white, grayish white; moderately hard; compact; calcareous; dirty; tight.

3086 – 3102 m

***Sandstone* (60 – 70 %):** White to dirty white, grayish white, off white, in parts colourless and transparent; loose to friable; fine to medium grained, in parts very fine and coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cemented; pin point to speckled, dull yellowish, dull brownish fluorescence and no solvent cut.
***Shale* (20 – 30 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (10 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.
***Siltstone*:** In traces.

3102 – 3106 m

***Sandstone* (70 – 80 %):** White to dirty white, grayish white, off white, in parts colourless and transparent; loose to friable; fine to medium grained, in parts very fine grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cemented; pin point to speckled, dull; light brownish to brownish, yellowish fluorescence and no solvent cut.
***Shale* (10 – 20 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (10%):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3106 – 3114 m

***Sandstone* (60 %):** White to dirty white, grayish white, off white, in parts colourless and transparent; loose to friable; fine to medium grained, in parts very fine grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cemented;

poor, pin point to speckled, dull; light brownish to brownish, yellowish fluorescence and no solvent cut.
***Shale* (20 – 30 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (10 – 20 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3114 – 3116 m

***Sandstone* (60 %):** White to dirty white, grayish white, off white, in parts colourless and transparent; loose to friable; fine to medium grained, in parts very fine and coarse grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cemented; poor, pin point to speckled, dull; light brownish to brownish, yellowish fluorescence and no solvent cut.
***Shale* (20 – 30 %):** Medium gray to dark gray, light gray; moderately hard; compact; fissile; platy, flaky; smooth; feebly calcareous; occasionally glauconitic; micro micaceous; silty.
***Clay/Claystone* (10 – 20 %):** White to dirty white, grayish white, in parts light gray; soft to firm; amorphous to sub blocky; calcareous; silty.

3114 – 3118 m

***Sandstone* (50 %):** Dirty white, grayish white, light gray to gray; moderately hard; very fine to fine grained, in parts medium grained, sub angular to sub rounded, sub spherical, poorly sorted; argillaceous matrix, calcareous cement, occasionally pyretic, moderately cemented; negligible to poor visible porosity; tight; silty; dirty; micro micaceous, occasionally glauconitic inclusion; poor, speckled, dull brownish fluorescence and no solvent cut.
***Shale* (30 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky, platy to sub platy; non calcareous.
***Clay/Claystone* (20%):** Dirty white to grayish white, light gray to medium gray; firm to soft, occasionally moderately hard; amorphous to sub blocky; slightly calcareous; in parts silty.
***Pyrite*:** In traces.

3118 – 3126 m

***Sandstone* (60 – 70 %):** Grayish white, light gray to gray, dirty white; moderately hard to hard; compact; very fine to fine grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted; argillaceous matrix, calcareous cement; pyretic; in place glauconitic inclusion; negligible to poor visible porosity; dirty; tight; silty/shaly, grading towards siltstone; trace, pin-point, dotty, faint to dull brownish and light yellowish fluorescence and solvent cut.
***Shale* (20 – 30 %):** Blackish gray to dark gray; moderately hard; compact; sub fissile; flaky to sub flaky; sub platy to platy; micro micaceous; trace pyretic dissemination; non calcareous to very feebly calcareous.
***Clay/Claystone* (10 %):** Gray to medium gray, light gray, grayish white, dirty white; firm; amorphous to sub blocky; slightly calcareous.
***Siltstone* (Tr – 10 %):** Light gray to gray, dirty white; moderately hard to hard; compact; feebly calcareous to slightly calcareous; pyretic; tight.
***Pyrite*:** In traces.

3126 – 3130 m

***Sandstone* (40 – 50 %):** Grayish white, light gray to gray, dirty white; moderately hard to hard, occasionally friable; compact; very fine to fine grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted; argillaceous matrix, calcareous cement; pyretic; in place glauconitic inclusion; negligible to poor visible porosity; dirty; tight; silty/shaly, grading towards siltstone; fair, dotty, faint to dull brownish and light yellowish fluorescence and solvent cut.
***Shale* (30 – 40 %):** Blackish gray to dark gray; moderately hard; compact; sub fissile; flaky to sub flaky; sub platy to platy; micro micaceous; trace pyretic dissemination; non calcareous to very feebly calcareous.
***Clay/Claystone* (20%):** Gray to medium gray, light gray, grayish white, dirty white; firm; amorphous to sub blocky; micro micaceous; glauconitic, occasionally in places marly, slightly calcareous, pyretic.
***Pyrite*:** In traces.

3130 – 3136 m

***Shale* (50 – 60 %):** Blackish gray to dark gray; moderately hard; compact; sub fissile; flaky to sub flaky; sub platy to platy; micro micaceous; trace pyretic dissemination; non calcareous to very feebly calcareous; silty.
***Sandstone* (20 – 30 %):** Grayish white, light gray to gray, dirty white; moderately hard to hard, occasionally friable; compact; very fine to fine grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted; argillaceous matrix, calcareous cement; pyretic; in place glauconitic inclusion; negligible to poor visible porosity; dirty; tight; silty/shaly, grading towards siltstone; poor, speckled to dotty, faint to dull brownish and light yellowish fluorescence and solvent cut.
***Claystone* (20 %):** Gray to medium gray, light gray, grayish white, dirty white; firm; amorphous to sub blocky; micro micaceous; glauconitic, occasionally in places marly, slightly calcareous, pyretic.
***Pyrite*:** In traces.

3136 – 3140 m

***Shale* (40 – 50 %):** Blackish gray to dark gray; moderately hard; compact; sub fissile; flaky to sub flaky; sub platy to platy; micro micaceous; trace pyretic dissemination; non calcareous to very feebly calcareous; silty.
***Sandstone* (30 – 40 %):** Grayish white, light gray to gray, dirty white; moderately hard to hard, occasionally friable; compact; very fine to fine grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted; argillaceous matrix, calcareous cement; pyretic; in place glauconitic inclusion; negligible to poor visible porosity; dirty; tight; silty, grading towards siltstone; poor, speckled to dotty, faint to dull brownish and light yellowish fluorescence and solvent cut.
***Claystone* (20 %):** Gray to medium gray, light gray, grayish white, dirty white; firm; amorphous to sub blocky; micro micaceous; glauconitic, occasionally in places marly, slightly calcareous, pyretic.

3140 – 3150 m

***Shale* (50 – 60 %):** Blackish gray to dark gray; moderately hard; compact; sub fissile; flaky to sub flaky; sub platy to platy; micro micaceous; trace pyretic dissemination; non calcareous to very feebly calcareous; silty.
***Sandstone* (20 – 30 %):** Grayish white, light gray to gray, dirty white; moderately hard to hard; compact; very fine to fine grained,

sub angular to sub rounded, sub spherical, poorly to moderately sorted; argillaceous matrix, calcareous cement; pyretic; silty, grading towards siltstone; poor, speckled to dotty, faint to dull brownish and light yellowish fluorescence and solvent cut.
Claystone **(20 %):** Gray to medium gray, light gray, grayish white, dirty white; firm; amorphous to sub blocky; micro micaceous; glauconitic, occasionally in places marly, slightly calcareous, pyretic.

3150 – 3152 m

Sandstone **(50 %):** Grayish white, dirty white, light gray to gray, colourless, clear, transparent to translucent; loose to friable; in parts moderately hard to hard, very fine to fine grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted; argillaceous matrix, calcareous; grading towards siltstone; dull brownish/yellowish fluorescence and no solvent cut.
Shale **(30 %):** Blackish gray to dark gray; moderately hard; compact; sub fissile; flaky to sub flaky; sub platy to platy; micro micaceous; trace pyretic dissemination; non calcareous to very feebly calcareous; silty.
Claystone **(20 %):** Gray to medium gray, light gray, grayish white, dirty white; firm; amorphous to sub blocky; micro micaceous; glauconitic, occasionally in places marly, slightly calcareous, pyretic.

3152 – 3154 m

Sandstone **(70 %):** Color less, transparent to translucent, grayish white, dirty white, light gray to gray; loose, moderately hard to hard; very fine to fine grained, sub angular to sub rounded, sub spherical, poorly to moderately sorted; argillaceous matrix, calcareous; grading towards siltstone; poor, speckled, dull brownish/yellowish fluorescence and no solvent cut.
Shale **(20 %):** Blackish gray to dark gray; moderately hard; compact; sub fissile; flaky to sub flaky; sub platy to platy; micro micaceous; trace pyretic dissemination; non calcareous to very feebly calcareous; silty.
Claystone **(10 %):** Gray to medium gray, light gray, grayish white, dirty white; firm; amorphous to sub blocky; micro micaceous; glauconitic, slightly calcareous, pyretic.

3154 – 3156 m

Sandstone **(80 %):** Colourless, clear, white to dirty white, yellowish white; loose; fine to coarse grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, generally clean; trace, dotty, speckled, dull brownish yellow/yellowish fluorescence and no solvent cut.
Shale **(10 %):** Blackish gray, blackish to dark gray; moderately hard; compact; sub fissile to fissile; sub flaky, sub platy to platy; micro micaceous, non calcareous to very feebly calcareous.
Claystone **(10 %):** Gray to medium gray, dark gray, blackish gray; firm; amorphous to sub blocky; silty; moderately calcareous to slightly calcareous, micro micaceous.

3156 – 3160 m

Sandstone **(50 – 60 %):** Colourless, clear, transparent to translucent, white to dirty white, yellowish white; loose to friable; fine to coarse grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, generally clean; in places pyretic; fair visible porosity; trace, dotty, speckled, dull brownish yellow/yellowish fluorescence and no solvent cut.

***Shale* (30 – 40 %):** Blackish gray, blackish to dark gray; moderately hard; compact; sub fissile to fissile; sub flaky, sub platy to platy; micro micaceous, non calcareous to very feebly calcareous.
***Claystone* (10 %):** Gray to medium gray, dark gray, blackish gray; firm; amorphous to sub blocky; silty; moderately calcareous to slightly calcareous, micro micaceous.

3160 – 3166 m ***Sandstone* (90 %):** Colourless, clear, transparent to translucent, white to dirty white, yellowish white; loose to friable; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical, moderately sorted; argillaceous matrix, in places calcareous, generally clean; in places pyretic; fair visible porosity; poor, dotty, speckled, dull brownish yellow/yellowish fluorescence and no solvent cut.
***Shale* (10%):** Blackish gray, blackish to dark gray; moderately hard; compact; sub fissile to fissile; sub flaky, sub platy to platy; micro micaceous, non calcareous to very feebly calcareous.
***Claystone*:** In traces.

3166 – 3168 m ***Sandstone* (70 %):** White, colourless, clear, transparent to translucent, dirty white; moderately hard; fine to medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in parts calcareous and pyretic cement, moderately cemented; fair visible porosity, inclusion of fine glauconitic, in parts clean; minor, speckled, dull brownish fluorescence and no solvent cut.
***Shale* (20 %):** Blackish gray, blackish to dark gray; moderately hard; compact; sub fissile to fissile; sub flaky, sub platy to platy; micro micaceous, non calcareous to very feebly calcareous; in parts silty.
***Claystone* (10 %):** Gray to medium gray, dark gray, blackish gray; firm; amorphous to sub blocky; silty; moderately calcareous to slightly calcareous, micro micaceous.

3168 – 3170 m ***Sandstone* (60 %):** White, colourless, clear, dirty white, transparent to translucent, light grayish; moderately hard; fine to medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in parts calcareous and pyretic cement, moderately cemented; fair visible porosity, in places inclusion of fine glauconitic, occasionally dirty, and tight; traces, speckled, dull brownish fluorescence and no solvent cut.
***Shale* (20 %):** Dark gray to blackish gray, medium gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky; non calcareous, occasionally very feebly calcareous; in place silty; occasionally pyretic.
***Claystone* (20%):** Dark gray to medium gray, grayish white to dirty white, light gray; firm to soft; amorphous to sub blocky; feebly calcareous.

3170 – 3172 m ***Sandstone* (70 %):** Colourless, clear, white to dirty white, transparent to translucent, light gray; moderately hard, in parts friable; medium to fine grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in parts calcareous and pyretic cement, moderately cemented; fair visible porosity, in places fine inclusion of glauconitic; trace to minor,

speckled, dull brownish to brownish yellow fluorescence and no solvent cut.
***Shale* (20 %):** Dark gray to blackish gray, medium gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky; non calcareous, occasionally very feebly calcareous; in place silty; occasionally pyretic.
***Claystone* (20 %):** Dark gray to medium gray, grayish white to dirty white, light gray; firm to soft; amorphous to sub blocky; feebly calcareous.

3172 – 3176 m

***Sandstone* (50 – 60 %):** Dirty white to white, light gray, colourless, clear; moderately hard, in parts friable; medium to fine grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in parts calcareous and pyretic cement, moderately cemented; fair visible porosity, in place dirty and silty; in places fine inclusion of glauconitic; trace to minor, speckled, dull brownish to brownish yellow fluorescence and no solvent cut.
***Shale* (10 – 20 %):** Dark gray to blackish gray, medium gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky; non calcareous, occasionally very feebly calcareous; in place silty; occasionally pyretic.
***Claystone* (10 – 20 %):** Dark gray to medium gray, grayish white to dirty white, light gray; firm to soft; amorphous to sub blocky; feebly calcareous.
***Siltstone* (10 – 20 %):** Dirty white, grayish white, light gray; moderately hard; compact; feebly calcareous.
***Pyrite*:** In traces (Sand embedded in Pyrite).

3176 – 3180 m

***Sandstone* (50 – 60 %):** Grayish to grayish white, dirty white, in parts white, colourless, clear; moderately hard, in parts friable; medium to fine grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in parts calcareous and pyretic cement, moderately cemented; fair visible porosity, in place dirty and silty; in places fine inclusion of glauconitic; trace, dotty to speckled, dull brownish fluorescence and no solvent cut.
***Claystone* (20 – 30 %):** Grayish white, light gray, medium gray to dark gray, in parts dirty white to white; firm to soft; amorphous to sub blocky; moderately calcareous.
***Shale* (10 %):** Dark gray to blackish gray, medium gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky; non calcareous, occasionally very feebly calcareous; in place silty; occasionally pyretic.
***Siltstone* (10 %):** Dirty white, grayish white, light gray; moderately hard; compact; feebly calcareous.
***Pyrite*:** In traces.

3180 – 3186 m

***Sandstone* (60 – 70 %):** Dirty white, grayish white, white, light gray, colourless, clear, transparent to translucent; moderately hard; fine to medium grained, in parts very fine grained, sub angular to sub rounded, sub spherical to spherical, poorly to moderately sorted; argillaceous matrix, siliceous cement, in parts pyretic and occasionally calcareous cement, moderately cemented; in parts tight; poor visible porosity; silty, in place grading to siltstone; rare, traces to minor, speckled, dull brownish fluorescence/NC.

***Claystone* (20 %):** Grayish white, light gray, medium gray to dark gray, in parts dirty white to white; firm to soft; amorphous to sub blocky; moderately calcareous.
***Shale* (10 – 20 %):** Dark gray to blackish gray, medium gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky; non calcareous, occasionally very feebly calcareous; in place silty; occasionally pyretic; micro micaceous; in parts smooth.
***Pyrite*:** In Traces.

3186 – 3198 m

***Sandstone* (60 – 70 %):** White to dirty white, grayish white, colourless, clear, transparent to translucent; moderately hard; fine to medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in parts calcareous and pyretic cement, moderately cemented; in parts tight; dirty; poor to fair visible porosity; trace to minor, dotty to speckled, faint to dull brownish to yellowish brown fluorescence and no solvent cut.
***Claystone* (20%):** Dirty white to white, grayish white, light gray to gray, medium gray to dark gray; firm to soft; amorphous to sub blocky; moderately calcareous to slightly calcareous.
***Shale* (10 – 20 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous to micaceous; in place silty.
***Pyrite*:** In traces.

3198 – 3204 m

***Sandstone* (70 – 80 %):** White, colourless, clear, transparent to translucent, dirty white; moderately hard, in place friable; dominantly medium grained, in parts fine grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous cement, in parts pyretic, moderately cemented; clean; fair visible porosity; trace, speckled to dotty, dull brownish fluorescence and no solvent cut.
***Claystone* (10 – 20 %):** Dirty white to white, grayish white, light gray to gray, medium gray to dark gray; firm to soft; amorphous to sub blocky; moderately calcareous to slightly calcareous.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous to micaceous; in place silty.

3204 – 3206 m

***Sandstone* (50 %):** White, colourless, clear, transparent to translucent, dirty white; moderately hard, in place friable; dominantly medium grained, in parts fine grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous cement, in parts pyretic, moderately cemented; clean; poor visible porosity; tight; occasional, dull brownish fluorescence and no solvent cut.
***Shale* (30 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous to micaceous; in place silty.
***Claystone* (20 %):** Dirty white to white, grayish white, light gray to gray, medium gray to dark gray; firm to soft; amorphous to sub blocky; moderately calcareous to slightly calcareous.
***Pyrite*:** In traces.

3206 – 3208 m

Sandstone **(70 %):** White, colourless, clear, transparent to translucent, dirty white; moderately hard, in place friable; fine to medium grained, occasionally coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous cement, pyretic, moderately cemented; clean; poor visible porosity; tight; occasional, dull brownish fluorescence and no solvent cut.
Shale **(20 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous to micaceous; in place silty.
Claystone **(10 %):** Dirty white to white, grayish white, light gray to gray, medium gray to dark gray; firm to soft; amorphous to sub blocky; moderately calcareous to slightly calcareous.
Pyrite**:** In traces.

3208 – 3212 m

Sandstone **(50 %):** White, colourless, clear, transparent to translucent, dirty white; moderately hard, in place friable; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous cement, in places pyretic and calcareous cement, moderately cemented; clean; poor to fair visible porosity; occasionally glauconitic; occasional, dotty to speckled, dull brownish to yellowish fluorescence and no solvent cut.
Shale **(30 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous to micaceous; in place silty; in places pyretic.
Claystone **(20 %):** Dirty white to white, grayish white, light gray to gray, medium gray to dark gray; firm to soft; amorphous to sub blocky; moderately calcareous to slightly calcareous, micro micaceous; in parts pyretic.
Pyrite**:** In traces.

3214 – 3216 m

Sandstone **(60 – 70 %):** White to dirty white, grayish white, colourless, clear, transparent to translucent; moderately hard; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in place pyretic and calcareous cement, moderately cemented; glauconitic, poor to fair visible porosity; speckled, dotty, faint to dull brownish/ yellowish brown fluorescence and no solvent cut.
Shale **(20 – 30 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous, in place silty and pyretic.
Claystone **(10 %):** Dirty white to white, grayish white, light gray to gray, medium gray to dark gray; firm to soft; micro micaceous, slightly to moderately calcareous, in places pyritic.
Pyrite**:** In traces.

3216 – 3222 m

Sandstone **(70 – 80 %):** White to dirty white, gray to grayish white, colourless, clear, transparent to translucent, occasionally dark gray; moderately hard; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in place pyretic and calcareous cement, moderately cemented; glauconitic, poor to fair visible

porosity; speckled, dotty, faint to dull brownish/ yellowish brown fluorescence and no solvent cut.
***Shale* (10 – 20 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous, in place silty and pyretic.
***Claystone* (10 %):** Dirty white to white, grayish white, light gray to gray, medium gray to dark gray; firm to soft; micro micaceous, slightly to moderately calcareous, in places pyritic.
***Pyrite*:** In traces.

3222 – 3224 m

***Sandstone* (60 %):** Gray, white to dirty white, dark gray, colourless, clear, transparent to translucent; moderately hard; fine to medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in place pyretic, and calcareous cement, moderately cemented; poor to fair visible porosity; traces, speckled, faint to dull brownish to yellowish brown fluorescence and no solvent cut.
***Shale* (30 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous, in place pyretic, and silty.
***Claystone* (10%):** Dirty white to white, grayish white, light gray to gray, dark gray; firm to soft; micro micaceous; in place pyretic; silty; moderately calcareous.

3224 – 3228 m

***Sandstone* (70 – 80 %):** Gray to dark gray, dirty white, white, colourless, clear, transparent to translucent; moderately hard; fine to medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in place pyretic, and calcareous cement, moderately cemented; poor to fair visible porosity; occasionally glauconitic; traces, speckled, faint to dull brownish to yellowish brown fluorescence and no solvent cut.
***Claystone* (10 – 20 %):** Dirty white to white, grayish white, light gray to gray, dark gray; firm to soft; micro micaceous; in place pyretic; silty; moderately calcareous; occasionally glauconitic.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous, in place pyretic, and silty.
***Pyrite*:** In traces.

3228 – 3234 m

***Sandstone* (60 – 70 %):** Gray to dark gray, dirty white, white, colourless, clear, transparent to translucent; moderately hard; fine to medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in place pyretic, and calcareous cement, moderately cemented; poor to fair visible porosity; occasionally glauconitic; traces, speckled, faint to dull brownish to yellowish brown fluorescence and no solvent cut.
***Claystone* (20 – 30 %):** Dirty white to white, grayish white, light gray to gray, dark gray; firm to soft; micro micaceous; in place pyretic; silty; moderately calcareous; occasionally glauconitic.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy; micro micaceous, in place pyretic, and silty.
***Pyrite*:** In traces.

3234 – 3246 m ***Sandstone*** **(60 – 70 %):** Dirty white, grayish white, light grayish, white, colourless, clear, transparent to translucent; moderately hard; compact; in parts loose; fine to medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, in place pyretic and calcareous; moderately cemented; poor visible porosity; traces, speckled to spotted, faint, brownish fluorescence and no solvent cut.
Shale **(20 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub platy to platy, sub blocky, non calcareous to very feebly calcareous, occasionally pyretic and silty.
Claystone **(10 %):** Light gray to gray, medium gray, dirty white to grayish white, white, yellowish white; firm to soft; amorphous to sub blocky; moderately to slightly calcareous.
Pyrite**:** In traces.

3246 – 3248 m ***Sandstone*** **(80 %):** White to dirty white, colourless, clear, transparent to translucent; moderately hard; compact, in parts loose; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, poor visible porosity; fair, spotted pale brownish to yellowish fluorescence and no solvent cut.
Claystone **(20 %):** Gray to dark gray, white to dirty white, in parts yellowish white; firm to soft; amorphous to sub blocky; moderately to slightly calcareous.
Shale**:** In traces.

3248 – 3250 m ***Sandstone*** **(50 %):** White to dirty white, colourless, clear, transparent to translucent; moderately hard; compact, in parts loose; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, poor visible porosity; fair, spotted pale brownish to yellowish fluorescence and no solvent cut.
Claystone **(50 %):** Light gray to gray, medium gray, dirty white to grayish white, white, yellowish white; firm to soft; amorphous to sub blocky; moderately to slightly calcareous.
Shale**:** In traces.

3250 – 3252 m ***Claystone*** **(80 %):** Gray to dark gray, blackish; firm to soft; amorphous to sub blocky; moderately to slightly calcareous.
Sandstone **(10 %):** White to dirty white, colourless, clear, transparent to translucent; moderately hard; compact, in parts loose; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, poor visible porosity.
Shale **(10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub platy to platy, sub blocky, non calcareous to very feebly calcareous, occasionally pyretic and silty.

3252 – 3254 m ***Claystone*** **(50 %):** Gray to dark gray, blackish; firm to soft; amorphous to sub blocky; moderately to slightly calcareous.
Sandstone **(40 %):** White to dirty white, colourless, clear, transparent to translucent; moderately hard; compact, in parts loose; fine to medium grained, in parts coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, poor visible porosity.

***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub platy to platy, sub blocky, non calcareous to very feebly calcareous, occasionally pyretic and silty.

3254 – 3256 m

***Sandstone* (70 %):** Light grayish to grayish white, colourless, clear, transparent to translucent, dirty white; moderately hard, in place hard; compact; consolidated; very fine to fine grained, in parts medium to coarse grained, sub angular to sub rounded, occasionally angular, sub spherical to spherical, poorly sorted; argillaceous matrix, siliceous, calcareous and pyretic cement; moderately to well cemented; poor visible porosity; in places grading to Siltstone; occasionally glauconitic; traces, faint brownish fluorescence and no solvent cut.
***Claystone* (20 %):** Gray to dark gray, blackish; firm to soft; amorphous to sub blocky; moderately to slightly calcareous.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, sub platy to platy, sub blocky, non calcareous to very feebly calcareous, occasionally pyretic and silty.
***Pyrite*:** In traces (Sand embedded in Pyrite).

3256 – 3260 m

***Sandstone* (50 – 60 %):** Light gray to grayish white, colourless, clear, transparent to translucent, dirty white; moderately hard, in parts hard; very fine to fine grained, in parts medium grained, occasionally coarse grained, sub angular to sub rounded, sub spherical to spherical, poorly sorted; argillaceous matrix, siliceous cemented, in parts calcareous and pyretic cement, moderately to well cemented; poor visible porosity; silty; in parts dirty; traces, brownish yellow fluorescence and no solvent cut.
***Claystone* (30 – 40 %):** Gray to medium gray, light gray to grayish white, dirty white; firm to soft; amorphous, in parts sub blocky; moderately to slightly calcareous.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; smooth; flaky to sub flaky, sub platy to platy, sub blocky; non calcareous; traces pyretic dissemination.
***Pyrite*:** In traces.

3260 – 3274 m

***Sandstone* (70 – 80 %):** Colourless, clear, transparent to translucent, in parts white to dirty white, grayish white; clear, transparent to translucent; moderately hard to friable; dominantly medium grain, in parts fine and coarse grained, sub angular to sub rounded, occasionally rounded, sub spherical to spherical, moderately to well sorted; clean, argillaceous matrix, siliceous to calcareous cement; in places pyretic; moderately cemented; fair visible porosity, rare to traces, speckled, faint to dull brownish fluorescence and no solvent cut.
***Claystone* (10 – 20 %):** Gray to medium gray, light gray to grayish white, dirty white; firm to soft; amorphous, in parts sub blocky; moderately to slightly calcareous.
***Shale* (10%):** Dark gray to blackish gray; moderately hard; compact; sub fissile; smooth; flaky to sub flaky, sub platy to platy, sub blocky; non calcareous; traces pyretic dissemination.
***Pyrite*:** In traces.

3274 – 3276 m

***Sandstone* (60 %):** Colourless, clear, transparent to translucent, in parts white to dirty white, grayish white; clear, transparent to translucent; moderately hard to friable; fine to medium grain,

occasionally coarse grained, sub angular to sub rounded, occasionally rounded, sub spherical to spherical, moderately sorted; clean, argillaceous matrix, siliceous to calcareous cement; in places pyretic; moderately cemented; fair visible porosity, rare to traces, speckled, faint to dull brownish fluorescence and no solvent cut.
Claystone **(30 %):** Gray to medium gray, light gray to grayish white, dirty white; firm to soft; amorphous, in parts sub blocky; moderately to slightly calcareous.
Shale **(10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; smooth; flaky to sub flaky, sub platy to platy, sub blocky; non calcareous; traces pyretic dissemination.
Pyrite**:** In traces.

3276 – 3280 m

Sandstone **(60 %):** Grayish white to dirty white, colourless, clear, transparent to translucent, light gray to gray; moderately hard; compact; fine to medium grained, occasionally coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous and calcareous cement, in places pyretic, moderately to well cemented; poor to fair visible porosity; in place dirty, tight, no fluorescence and no solvent cut.
Claystone **(20 – 30 %):** Light gray to gray, grayish white to dirty white, medium gray; firm to soft; amorphous to sub blocky; moderately to slightly calcareous; occasionally pyretic.
Shale **(10 – 20 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy, sub blocky; non calcareous; in place silty; micaceous; occasionally pyretic.
Pyrite**:** In traces.

3280 – 3290 m

Sandstone **(80 – 90 %):** Dominantly white, colourless, clear, transparent to translucent, in parts dirty white, grayish white; moderately hard; consolidated; dominantly medium grained, in place fine and coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous to calcareous cemented, in parts pyretic; generally clean; occasionally silty; fair visible porosity; rare,traces to occasional, speckled, faint to dull brownish fluorescence and no solvent cut.
Claystone **(10 %):** Light gray to gray, grayish white to dirty white, medium gray; firm to soft; amorphous to sub blocky; moderately to slightly calcareous; occasionally pyretic.
Shale **(Tr – 10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy, sub blocky; non calcareous; in place silty; micaceous; occasionally pyretic.
Pyrite**:** In traces.

3290 – 3292 m

Sandstone **(40 %):** Dominantly white, colourless, clear, transparent to translucent, in parts dirty white, grayish white; moderately hard; consolidated; dominantly medium grained, in place fine and coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous to calcareous cemented, in parts pyretic; generally clean; occasionally silty; fair visible porosity; occasional, spotted, dull brownish fluorescence and no solvent cut.
Claystone **(40 %):** Dark gray to blackish gray, light gray to dark gray, grayish white to dirty white, medium gray, firm, amorphous to sub blocky, moderately to slightly calcareous, occasionally pyretic.

***Shale* (20 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy, sub blocky; non calcareous; silty; micaceous; occasionally pyretic.
***Pyrite*:** In Traces.

3292 – 3296 m

***Claystone* (70 – 80 %):** Dark gray to blackish gray, blackish, in parts light gray to medium gray, grayish white to dirty white; firm to soft; amorphous to sub blocky; moderately to slightly calcareous; occasionally pyretic.
***Sandstone* (10 – 20 %):** Dominantly white, colourless, clear, transparent to translucent, in parts dirty white, grayish white; moderately hard; consolidated; dominantly medium grained, in place fine and coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous to calcareous cemented, in parts pyretic; generally clean; occasionally silty; fair visible porosity; no fluorescence and no solvent cut.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy, sub blocky; non calcareous; silty; micaceous; occasionally pyretic.
***Pyrite*:** In traces.

3296 – 3298 m

***Sandstone* (50 %):** Grayish white, dirty white, light gray, gray, colourless, clear, transparent to translucent; dominantly medium grained, in place fine and coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous to calcareous cemented, in parts pyretic; generally clean; occasionally silty; fair visible porosity; no fluorescence and no solvent cut.
***Claystone* (40 %):** Dark gray to blackish gray, blackish, in parts light gray to medium gray, grayish white to dirty white; firm to soft; amorphous to sub blocky; moderately to slightly calcareous; occasionally pyretic.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy, sub blocky; non calcareous; silty; micaceous; occasionally pyretic.

3298 – 3300 m

***Claystone* (80 %):** Dark gray to blackish gray, blackish, in parts light gray to medium gray, grayish white to dirty white; firm to soft; amorphous to sub blocky; moderately to slightly calcareous; occasionally pyretic.
***Sandstone* (10 %):** Grayish white, dirty white, light gray, gray, colourless, clear, transparent to translucent; dominantly medium grained, in place fine and coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately well sorted; argillaceous matrix, siliceous to calcareous cemented, in parts pyretic; generally clean; occasionally silty; fair visible porosity; no fluorescence and no solvent cut.
***Shale* (10 %):** Dark gray to blackish gray; moderately hard; compact; sub fissile; flaky to sub flaky, platy to sub platy, sub blocky; non calcareous; silty; micaceous; occasionally pyretic.

3300 – 3304 m

***Sandstone* (50 – 60 %):** White to dirty white, colourless, clear, transparent to translucent, light gray to grayish white; moderately hard, in parts hard; medium grained, in parts fine and coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately

sorted; argillaceous matrix, in parts clean, siliceous to pyretic cement, occasionally calcareous, moderately cemented; poor visible porosity; occasionally dirty and silty; no fluorescence and no solvent cut.
Claystone **(20 – 30 %):** White to dirty white, grayish white, gray to medium gray; firm, in parts moderately hard, occasionally soft; sub blocky, in parts amorphous; in parts silty; feebly calcareous.
Shale **(20%):** Dark gray to blackish gray, occasionally light gray; moderately hard to hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky, platy to sub platy; micaceous; silty; in parts smooth, trace pyretic dissemination, non calcareous.
Pyrite**:** In traces.

3304 – 3306 m

Sandstone **(70 %):** White, colourless, clear, transparent to translucent, dirty white; moderately hard, in place hard; fine to medium grained, occasionally coarse grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous to pyretic cemented, moderately to well cemented; in parts clean; poor visible porosity; tight; trace, speckled, dull brownish fluorescence and no solvent cut.
Claystone **(20 %):** White to dirty white, grayish white, gray to medium gray; firm, in parts moderately hard, occasionally soft; sub blocky, in parts amorphous; in parts silty; feebly calcareous.
Shale **(10 %):** Dark gray to blackish gray, occasionally light gray; moderately hard to hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky, platy to sub platy; micaceous; silty; in parts smooth, trace pyretic dissemination, non calcareous.
Pyrite**:** In traces.

3306 – 3310 m

Sandstone **(90 %):** White, colourless, clear, in parts dirty white, light grayish white; moderately hard; very fine to fine grained, occasionally medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, moderately to well cemented; generally clean, poor visible porosity; rare, speckled, brownish yellow to dull brownish fluorescence and no solvent cut.
Shale **(10 %):** Dark gray to blackish gray, occasionally light gray; moderately hard to hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky, platy to sub platy; micaceous; silty; in parts smooth, trace pyretic dissemination, non calcareous.
Pyrite**:** In traces.

3310 – 3311.79 m

Sandstone **(60 %):** White, colourless, clear, in parts dirty white, light grayish white; moderately hard; very fine to fine grained, occasionally medium grained, sub angular to sub rounded, sub spherical to spherical, moderately sorted; argillaceous matrix, siliceous cement, moderately to well cemented; generally clean, poor visible porosity; rare, speckled, brownish yellow to dull brownish fluorescence and no solvent cut.
Shale **(30 %):** Dark gray to blackish gray, occasionally light gray; moderately hard to hard; compact; sub fissile; flaky to sub flaky, sub blocky to blocky, platy to sub platy; micaceous; silty; in parts smooth, trace pyretic dissemination, non calcareous.
Claystone **(10 %):** White to dirty white, grayish white, gray to medium gray; firm, in parts moderately hard, occasionally soft; sub blocky, in parts amorphous; in parts silty; feebly calcareous.

***Pyrite*:** In traces.

Gas Peaks (Pariwar Formation):

Depth (m)	Type	Total Gas (ppm)	C1 (ppm)	C2 (ppm)	C3 (ppm)	iC4 (ppm)	nC4 (ppm)	iC5 (ppm)	nC5 (ppm)
3052	Short TG	6400	3232	286	81	8	23	12	2
3067	FG	10200	6055	480	136	11	29	11	5
3080	FG	10700	7677	500	175	20	38	15	7
3082	FG	11500	7933	612	237	27	54	0	8
3083	FG	22900	15554	1317	463	42	91	25	13
3094	FG	17700	12452	819	285	26	58	17	10
3102	FG	16800	10735	901	354	30	77	0	14
3109	Trip Gas	19000	16602	571	96	4	21	7	3
3111	FG	5300	3445	328	99	10	25	9	4
3113	FG	4400	2545	299	97	10	25	9	4
3114	Trip Gas	14200	12309	477	64	3	8	4	1
3115	FG	1800	1156	115	30	3	10	6	1
3117	Trip Gas	3600	2904	115	10	1	3	5	0
3128	FG	5200	3455	322	121	12	29	9	3
3142	FG	8800	5811	499	220	23	46	13	5
3154	FG	32900	30388	945	165	19	30	13	5
3156	FG	38100	36053	1087	187	21	32	0	4
3162	FG		107142	3279	523	62	69	28	0
3163	FG		81800	2402	367	42	48	0	7
3165	FG		95812	2741	425	48	54	23	9
3166	FG		97745	2899	431	49	54	0	8
2781 (Bit Depth)	Trip Gas		106987	3381	451	50	41	0	3
3167	Trip Gas	9999900	988693	50695	11204	2502	2061	1009	418
3168	FG	29000	16821	545	79	12	15	13	5
3172	FG	130433	113742	4375	1422	315	315	161	70
3175	FG	63386	58160	1744	386	65	80	0	0
3179	FG	53648	50144	1280	215	28	38	0	7
3181	FG	37400	31442	1001	275	65	85	57	25
3183	FG	22400	15710	570	199	58	77	56	0
3186	FG	40900	35681	1052	253	56	76	53	0
3187	FG	19300	12734	454	115	26	40	34	12
3190	FG	27800	20534	637	138	30	44	0	14
3193	FG	73565	67905	1904	339	62	78	55	0
3194	FG	32600	25405	763	160	31	55	42	0
3199	FG	19400	13796	414	59	12	21	23	10
3201	FG	28800	22681	674	90	12	19	0	8
3202	FG	24300	17979	538	73	9	17	24	7
3205	Trip Gas	11400	7666	181	9	1	2	5	0
3208	FG	5700	2115	69	6	1	3	5	1
3213	FG	34800	31032	785	97	10	11	6	1

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3214	FG	16700	12750	318	35	4	5	6	1
3215	FG	12100	8595	215	21	2	3	6	0
3219	FG	9600	6189	173	20	2	4	5	0
3224	FG	11500	8012	208	23	2	4	6	1
3226	FG	8000	4419	140	18	2	4	6	1
3228	FG	10200	6583	198	26	3	6	8	1
3229	FG	9700	6102	187	24	3	6	8	1
3230	FG	8100	4699	139	14	0	4	7	0
3233	FG	16100	11700	317	36	4	7	9	1
3235	FG	10500	6341	187	16	2	4	8	1
3236	Trip Gas	14300	11121	252	20	1	2	3	0
3240	FG	15400	12197	288	21	2	3	3	0
3242	FG	14800	11567	271	19	0	3	4	0
3247	FG	9400	6432	154	9	1	2	4	0
3248	FG	7500	4781	121	6	1	2	4	0
3250	FG	6700	4013	118	9	1	3	6	0
3261	FG	12600	8991	259	22	2	4	7	1
3271	FG	14900	11302	401	53	6	11	8	1
3275	FG	8500	5143	186	20	3	7	7	0
3277	FG	10400	6720	233	29	4	9	9	2
3280	FG	21700	16576	532	77	9	17	10	3
3282	FG	20500	15300	481	71	8	16	0	4
3283	FG	13500	6241	230	32	5	12	9	3
3284	FG	17700	11295	357	42	5	11	0	2
3285	FG	25800	16638	532	71	8	15	9	3
3289	FG	30100	24892	747	114	12	21	0	4
3290	FG	20500	15375	527	72	8	15	9	3
3295	FG	21000	16020	471	68	9	16	9	3
3296	FG	14400	9484	294	40	6	12	6	3
3301	Trip Gas	16200	11334	246	23	2	3	5	1
3302	Trip Gas	17000	11192	289	21	1	3	4	1
3311.79	Pump off Gas	10900	2060	71	83	58	0	2	0