

Information required for Forest Clearance
(Available locations NRAH, TLAA, ELAJ & SUAD of UAS Block, A&AA Basin)

Following are the justifications and envisaged reserves for the available locations NRAH, TLAA, ELAJ and SUAD required for submission of the Forest clearance application:

- I. **NRAH:** The location NRAH is proposed to be drilled upto 2150(TVDSS)m targeting Upper Bokabil as primary, Mid Bokabil and Basement as secondary objectives. The location aims at establishing prospectivity Bokabil along with basement in Khoraghat-Nambar area. Recent hydrocarbon finds in Basement in West Khoraghat area has warranted a focussed exploration of fractured basement.

Location	Objective	Area (Sq.Km)			Pay Thickness(m)			Porosity			1/FVF	IOIP (MMt)		
		p-10	Mean	p-90	p-10	Mean	p-90	Max	ML	Min		p-10	Mean	p-90
RNR-14	Up. Bokabil (P)	2.43	1.82	1.31	15	18	20	21	25	30	0.74	3.79	2.78	1.92
	Mid. Bokabil(S)	1.71	1.37	1.05	10	10	12	20	25	31	0.75	1.86	1.43	1.04
	Basement (S)	0.43	0.35	0.29	30	40	60	2	2	2	0.88	0.33	0.23	0.15

Location	Objective	IL / XL	TD (m)	Expected Vol (MMTOE)	POS	Risk money (\$ @ Rs60) \$MM	IRR %, (\$ 53)	NPV @ 14% US \$ MN
RKH-21	Sylhet	940/ 1172	3190	0.77(P) +0.82(S)	32	6.7	12.13	-1.19
RKH-22	Sylhet	926/ 1112	3020	0.35(P) +1.08+0.62 (S)	32	6.39	24.53	5.28
RKH-23	Up. Bokabil	900/ 1010	2180	1.69 (P)	33	4	32.92	5.05
RNR-14	Up. Bokabil	790/ 1040	2150	2.78 (P)	33	7.39	38.82	11.18
RWK-8	Basement	828/ 1018	2120	0.92 (P)	30	4.5	26.89	4.03


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II. **TLAA:** The location TLAA (proposed as RTL-5) is proposed to be drilled upto 2900(TVDSS)m targeting Mid Bokabil as primary and Sylhet as secondary objectives. The location was proposed on a three way-cum fault closure against a west hading normal fault at Mid. Bokabil & Sylhet top level and is to probe hydrocarbon potential of KS-2 Mid Bokabil pay sand equiv and Sylhet play. The fault block containing the location TLAA is defined by two structural elements – (a) The fault block is bounded by a well define low at NW direction. (b) A visible development of structural inversion from Tura to Tipam level exhibited by RTL-5 block against the west hading normal fault. It is envisaged that H/C migration to this block might have completed a little earlier than KS-2 block (NW of location). A separate hydro dynamic condition may be governing this TLAA block than that of the KS-2 fault block (a prolific Mid Bokabil producer). Therefore the location TLAA being at the eastern most locale and proximate to Naga thrust, deserved to be critically investigated on its own merit. The location would also address the HC potential of Sylhet Fm as (secondary) objective.

PEL/PML: KASOMARIGAON PML						
PROSPECT: RTL-5 (PRIMARY)				PROSPECT: RTL-5 (SECONDARY)		
Play	MID BOKABIL			SYLHET		
	Min	M. Likely	Max	Min	M. Likely	Max
Area (Sq. km)	0.67	1	1.6	0.9	1.14	1.86
Net Pay (m)	18	20	22	6	10	12
Porosity (%)	20	22	24	8	15	22
Sp.GR	0.87	0.87	0.87	0.88	0.88	0.88
So (%)	44	46	48	35	37	40
FVF	1.2	1.2	1.2	1.13	1.14	1.15
RF (%)	8	10	14	9	10	11


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RTL-5	PRIMARY	PROBABILITY	IOIP (MMt)	Reserves(MMt)	Reserves (MMb)	Area (Sq Km)
	(MID.BOKABIL)	P-90	1.23	0.13	0.9	0.84
		Mean	1.6	0.17	1.23	1.09
		P-10	2.01	0.22	1.6	1.36
RTL-5	SECONDARY	PROBABILITY	IOIP (Mmt)	RES (Mmt)	RES (MMb)	Area (Sq Km)
	(SYLHET)	P-90	0.37	0.04	0.26	1.12
		Mean	0.56	0.06	0.4	1.39
		P-10	0.77	0.08	0.55	1.65



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III. **ELAJ:** The location ELAJ (proposed as G-EL-B) is proposed to be drilled upto 2300(TVDSS)m targeting Sylhet as primary and Kopili and Basement as secondary objectives. G-EL-B is proposed as vertical well on a fault closure in East Lakhbari Extn. PML to probe hydrocarbon potential of Sylhet, Basement & Kopili towards south-east of EL-1 Structure with a target depth of 2300mMD. The closure is against the east heading fault and the eastern limit of the structure is bounded by another east heading fault. The structure forms a horst block bounded by normal faults in north and south direction. G-EL-B has got good basement exploration component. Detailed Automatic Fault extraction study brings out areas of considerable fracture density favourable for basement exploration. With multiple target bodies, calibration of target sands with producing wells, impedance response, and good aerial extent of individual bodies points towards a very high confidence of success with lower risk

Sr. No.	Location	Objective	Area (Sq.Km)			Pay Thickness (m)			IOIP (MMt)		
			Min	Most Likely	Max	Min	Most Likely	Max	P90	Mean	P10
1	GEL-B	Sylhet (P)	0.48	0.52	0.56	12	15	20	0.52	0.62	0.73
		Basement(S)	0.42	0.45	0.48	15	20	25	0.02	0.03	0.05
		Kopili (S)	0.49	0.51	0.53	16	18	20	0.69	0.76	0.83


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Input Parameters

Prospect :	G-EL-B		
Target Depth	2300m		
Primary (Sythet)			
Play			
Parameter	Minimum	Most likely	Maximum
Area Sqkm	0.45	0.52	0.60
Net pay (m)	12.00	15.00	20.00
Porosity %	16.00	18.0	20.0
Oil saturation %	47	53	55
Sp Gr.		0.93	
FVF		1.14	
RF %	15	20	25
Secondary 1 (Basement)			
Play			
Parameter	Minimum	Most likely	Maximum
Area Sqkm	0.40	0.45	0.50
Net pay (m)	15.00	20.00	25.00
Porosity %	1.00	2.5	4.0
Oil saturation %	100	100	100
Sp Gr.		0.83	
FVF		1.14	
RF %	15	20	22
Secondary 2 (Lower Kopilli)			
Play			
Parameter	Minimum	Most likely	Maximum
Area Sqkm	0.48	0.50	0.55
Net pay (m)	16	18	20
Porosity %	22	24	26
Oil saturation %	47	53	55
Sp Gr.		0.85	
FVF		1.27	
RF %	20	22	24

Reserves

PROSPECT	G-EL-B				
TD	2300m				
Play depth	1930m				
	Probability	IOIP (MMt)	RES (MMt)	RES : MMbbl	Area (Sq. km)
Primary (Sythet)	P-90	0.52	0.10	0.67	0.45
	Mean	0.62	0.12	0.84	0.52
	P-10	0.73	0.15	1.03	0.56
Play Depth	2000m				
	Probability	IOIP (MMt)	RES (MMt)	RES : MMbbl	Area (Sq. km)
Secondary 1 (Basement)	P-90	0.11	0.02	0.16	0.42
	Mean	0.16	0.03	0.25	0.45
	P-10	0.22	0.05	0.34	0.48
Play Depth	1860m				
	Probability	IOIP (MMt)	RES (MMt)	RES : MMbbl	Area (Sq. km)
Secondary 2 (Lower Kopilli)	P-90	0.69	0.15	1.12	0.49
	Mean	0.76	0.17	1.24	0.51
	P-10	0.83	0.18	1.37	0.53
	Total	1.55	0.32	2.33	


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Technical Assumptions & Input Parameters

		G-EL-B
PROSPECT		Onshore
WATER DEPTH (M)		Syhet (Primary)
PLAY		
HC TYPE (OIL / GAS)		Oil
PLAY TOP (M)		1030 - Syhet (Primary)
AERIAL EXTENT (SQ.KM)		0.52
OIIIP(Total) - MMT (Mean)		0.62
ULT. RES(Total) - MMT/MMBBL (Mean)		0.12/0.34
DISCOVERY PROBABILITY (%)		30
PRODUCTION PROFILE		
PEAK WELL FLOW/ DAY (MEBL)		0.566
PLATEAU RATE (FIELD) / DAY (MBBL)		0.566
YEARS TO PLATEAU		0
PLATEAU		1
FIELD PRODUCING LIFE		7
EXPLRN: APPRAISAL / ENGINEERING		
NO. OF EXPL + APPRAISAL WELLS		1
NO. OF PRODUCERS		1 (exploratory well converted to producer)
DVLPMT. SCENARIO		Wellpad group to existing main production facility
PIPELINE LENGTH (Km)		3.4
REMARKS		Primary pay is considered for TE analysis

Economic Indicators and Estimated Expenditures

		G-EL-B
Prospects		Oil
Hydrocarbon Type		
Price Scenario	\$ / Bbl	65
Total Reserves	MMBbl	0.84
Estimated Expenditure		
Operating Expenses	MM \$	3.74
Exploration Capital	MM \$	5.44
Development Capital	MM \$	2.94
Other Capital	MM \$	0.00
Life Cycle Cost	MM \$	12.12
Unit Operating Expenses	\$ / Bbl	4.45
Unit Exploration Capital	\$ / Bbl	6.48
Unit Development Capital	\$ / Bbl	3.50
Unit Other Capital	\$ / Bbl	0.00
Unit Life Cycle Cost	\$ / Bbl	14.43
Producing Life	Years	7
Project Life	Years	9
Economic Indicators		
After Tax Rate Of Return	%	39.90
NPV@ 0%	MM \$	15.27
NPV@ 5%	MM \$	10.33
NPV@ 8%	MM \$	8.17
NPV@ 10%	MM \$	6.97
NPV@ 12%	MM \$	5.94
EMV@0%	MM \$	2.10
EMV@5%	MM \$	0.85
Risk Money	MM \$	3.54 (after IT rebate of MM \$ 1.9)
Discovery Probability (Pg)	%	30
Remarks :		Economic analysis has been carried out considering prevailing APM terms like: CESS on oil @ 20% cum cess basis, NCD Rs 50/ton, Royalty @ 20% of well head value with 18% GST and Corporate IT @ 34.94 % Risk money is exploratory well cost MM \$ 3.54 (after IT rebate of MM \$ 1.9)


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Sensitivity :

Prospect		G-EL-B						
SENSITIVITY ON OIL PRICE								
Variation		-30%	-20%	-10%	0	10%	20%	30%
Variation in Price	\$/Bbl	45.5	52	58.5	65	71.5	78	84.5
NPV @ 10%	MM\$	3.02	4.34	5.66	6.97	8.28	9.59	10.9
NPV @ 12%	MM\$	2.37	3.57	4.76	5.94	7.12	8.3	9.48
IRR	%	24.3	29.84	35.06	39.9	44.37	48.74	52.92
SENSITIVITY ON CAPEX								
Variation in CAPEX		-30%	-20%	-10%	0	10%	20%	30%
NPV @ 10%	MM\$	8.42	7.94	7.46	6.97	6.49	6	5.51
NPV @ 12%	MM\$	7.35	6.88	6.41	5.94	5.47	5	4.51
IRR	%	56.6	49.93	44.53	39.9	35.9	32.45	29.27
SENSITIVITY ON OPEX								
Variation in OPEX		-30%	-20%	-10%	0	10%	20%	30%
NPV @ 10%	MM\$	7.36	7.23	7.1	6.97	6.84	6.72	6.59
NPV @ 12%	MM\$	6.29	6.17	6.06	5.94	5.83	5.71	5.6
IRR	%	41.09	40.7	40.3	39.9	39.49	39.08	38.67


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IV. **SUAD:** The location ELAJ (proposed as G-SU-A) is proposed to be drilled upto 2830(TVDSS)m as a deviated well in the east of SU-2 in a separate fault block to probe a unexplored structural high at MFS (Close to Mid Bokabil), Lower Bokabil and Barail level. The structural closure is against the west heading fault and close to Naga thrust. For primary objective at Mid Bokabil level, Relative Acoustic Impedance and SpecD at 35 Hz, w.r.t. +40 ms window from Mid Bokabil top Horizon indicate similar facies response as compared to SU-2 Mid Bokabil pay equivalent zone. The proposed location will encounter channel features within the Lower Bokabil and Barail also. This will open a new area for exploration in South Assam Shelf, as this fault block east to Suphayam area has not been explored so far. Taking facies and structure into consideration, area and thickness of the individual bodies have been calculated for techno-economic analysis .The proposed location has got good aerial extent, thick reservoir bodies and good reservoir facies for primary and secondary objects which in turn will accrete good reserves. With multiple target bodies, calibration of target sands with producing wells, low impedance response, good aerial extent of individual bodies, better reservoir facies points towards a very high confidence of success with lower risk.

Basin:	A & AA		
Block :	SAS/ Golaghat Extn. IIA ML		
Prospect :	G-SU-A (Oil) - T.D -2900 m		
Play : Primary	Mid. Bokabil - Close to MFS (2340 m)		
	Min	M. Likely	Max
Area (Sq. km)	0.95	1.03	1.10
Net Pay (m)	18	20	22
Porosity (%)	12	15	16
S0 (%)	35	40	45
Sp Gr	0.87	0.88	0.91
FVF	1.20	1.21	1.22


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Basin:	A & AA				
Block :	SAS/ Golaghat Extn. IIA ML				
Prospect :	G-SU-A (Oil) - T.D -2900 m				
Play	Probability	IOIP (MMt)	RES (MMt)	RES : MMb bl	Area (Sq. km)
Primary: Mid. Bokabil - Close to MFS (2340 m)	P-90	0.76	0.15	1.06	0.98
	Mean	0.86	0.17	1.22	1.03
	P-10	0.97	0.20	1.39	1.07
				POS	0.28
Play	Probability	IOIP (MMt)	RES (MMt)	RES : MMb bl	Area (Sq. km)
Secondary 1: Barail (2720 m)	P-90	0.29	0.05	0.39	0.48
	Mean	0.36	0.06	0.47	0.52
	P-10	0.42	0.08	0.56	0.56
				POS	0.24
Play	Probability	IOIP (MMt)	RES (MMt)	RES : MMb bl	Area (Sq. km)
Secondary 2: Within Lr. Bokabil (2635 m)	P-90	0.63	0.13	0.89	0.88
	Mean	0.74	0.15	1.05	0.93
	P-10	0.85	0.17	1.22	0.99
				POS	0.24
	Total	1.96	0.39	2.75	


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RF (%)	18	20	22
Play : Secondary 1			
Barail (2720 m)			
	Min	M. Likely	Max
Area (Sq. km)	0.45	0.50	0.60
Net Pay (m)	10	12	14
Porosity (%)	14	20	22
S0 (%)	40	45	50
Sp Gr	0.84	0.86	0.87
FVF	1.24	1.25	1.26
RF (%)	16	18	20
Play : Secondary 2			
Within Lr. Bokabil(2635 m)			
	Min	M. Likely	Max
Area (Sq. km)	0.85	0.90	1.05
Net Pay (m)	11	14	16
Porosity (%)	15	18	20
S0 (%)	40	45	50
Sp Gr	0.87	0.88	0.91
FVF	1.2	1.21	1.22
RF (%)	18	20	22


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SENSITIVITY ANALYSIS

Basin :	A & AA							
Block :	SAS - Golaghat Extn. IIA ML							
Prospect :	G-SU-A							
SENSITIVITY ON OIL PRICE								
Variation		-30%	-20%	-10%	0	10%	20%	30%
Variation in Price	\$/Bbl	37.1	42.4	47.7	53	58.3	63.6	68.9
NPV @ 12%	MM\$	8.91	11.85	14.78	17.72	20.63	23.53	26.44
NPV @ 14%	MM\$	7.23	9.87	12.52	15.16	17.78	20.39	23
IRR	%	62.7	55.67	49.96	45.18	40.95	37.33	34.23
SENSITIVITY ON CAPEX								
Variation in CAPEX		-30%	-20%	-10%	0	10%	20%	30%
NPV @ 12%	MM\$	20.57	19.62	18.67	17.72	16.74	15.76	14.78
NPV @ 14%	MM\$	17.96	17.03	16.1	15.16	14.19	13.23	12.26
IRR	%	40.32	34.62	30.06	26.32	23.22	20.56	18.26
SENSITIVITY ON OPEX								
Variation in OPEX		-30%	-20%	-10%	0	10%	20%	30%
NPV @ 12%	MM\$	18.25	18.07	17.89	17.72	17.54	17.37	17.19
NPV @ 14%	MM\$	15.62	15.47	15.31	15.16	15.01	14.85	14.7
IRR	%	45.84	45.62	45.4	45.18	44.96	44.74	44.51


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