ANNEXURE I

UPDATED SALIENT FEATURES OF KAMENG HEP – 600 MW (4X150 MW)

Name of the Project	Kameng Hydroelectric Project
Installed Capacity	4X150 MW
Type of Development	Run of River
Location	West Kameng District, Arunachal Pradesh
Latitude and Longitude	**Bichom Dam**: Lat - 27º18'02.97"N, Long - 92º37'21.83"E **Tenga Dam**: Lat - 27º13'25.12"N, Long - 92º39'28.09"E **Power House**: Lat - 27º09'53.54"N, Long - 92º40'57.40"E (As per Google Earth)
River	Bichom and Tenga River
Hydrology	
At 90% dependable year	1976 -77
Annual Inflow (cum)	4534.52
Catchment Area (sq.km)	2277(Bichom) & 1019(Tenga)
Reservoir	
Maximum Water Level (m)	771.49m (Bichom Dam), 771.67m (Tenga Dam)
Full Reservoir Level (m)	770 (Bichom Dam), 770 (Tenga Dam)
Minimum Drawdown Level (m)	764.5 (Bichom Dam), 763 (Tenga Dam)
Gross/Live Storage (MCM)	25.03 / 5.718 (Bichom Dam), - / 0.50 (Tenga Dam)
Dam	
Type	Concrete Gravity Dam
Length / Height (m)	264.15 / 69(Bichom Dam), 103 / 24.5(Tenga Dam)
Top Level (m)	773m (Bichom Dam), 773m (Tenga Dam)
Deepest Foundation Level (m)	704m (Bichom Dam), 748.60m (Tenga Dam)
Average River Bed Level (m)	706m (Bichom Dam), 756m (Tenga Dam)
Design Flood (Cumec)	9216 (Bichom Dam), 3862 (Tenga Dam)
Spillway	
Bichom Dam	Ogee shaped concrete spillway having 6 nos. Radial gates of size 9m x 11.8m and crest level at EL. 735m
Tenga Dam	Flat apron type concrete spillway having 2 nos. Radial gates of size 14m x 14m and crest level at EL. 756m
Intake	
Gate No & Size (m)	2 & 5.82(W) x 6.7(H) for Bichom Dam; 1 & 2.75(W) x 2.25(H) (at Tenga intake) and 1 & 1.8(W) x 2.0(H) (at Drop Shaft) for Tenga Dam
Head Race Tunnel	
Shape & Type	Modified Horse Shoe, Concrete Lining
Length & Diameter	14.5278 km and 6.7m
Design Discharge (Cumec)	140
Invert Level at Intake (m)	750m
Slope	1 in 1000
Velocity (m/s)	4 m/s
Surge Shaft	
Type	Restricted Orifice type Surge Shaft located at the end of low pressure tunnel
Diameter (m) / Depth (m)	25/60 (Surge Shaft) & 3.75/10 (Orifice)
Penstock/ High Pressure Tunnel	
Type	Combination of Underground- Over Ground- Underground Steel Lined Pressure Tunnel
Number	1 no. of 5.3m diameter of length 601.1m taking off from Surge Shaft, bifurcating into 3.75m diameter (at Valve House) of length 1415.813m & 1415.497m and then each

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	bifurcating into 2.65m diameter of length 52.15m each into feed units
Power House	
Type	Surface
Size	120m x 37.3m
Turbine	Francis
TG Efficiency	92.98 %
Installed Capacity	4 x 150 MW
Net Head	492.75m
Average Tail Water Level	234.637m
Tail Race Channel / Tunnel	
Type & Shape	Open Channel
Length / Width (m)	50 / 70
GENERATING PLANT AND MACHINERY	
EOT crane	
Make	FAFECO, Baroda
No, Capacity (T), Span (m)	2, 190 / 35, 17.75
Main Inlet Valve	
Make	BHEL
No. / Type / Dia (m)	- / Spherical / 2.0
Turbine	
Rated Output (MW)	153.83
Net Rated Head (m)	501.22
Net Max. /Mini. Head (m)	531.5 / 501.22
Runner Inlet/Outlet Dia (m)	3.1 / 2.046
Efficiency at full load (%)	95.46
Specific Speed (rpm)	72.49
Design Discharge(Cumec/ unit)	32.94
Generator	
Make	BHEL
No & Type	-/ semi Umbrella type
Rated Output (MW)	150.75
Rated Voltage (KV)	13.8
Rated Stator Current (A)	1128
PF	0.9(lagging)
Efficiency at full load (%)	98.93
Excitation System	Static, Synchronous
Generator Transformer	
Make	BHEL
No & Type	12+ 1(spare) & Oil immersed, ODWF, Outdoor
Rating (MVA), Type	63, Single Phase
Voltage Ratio (KV)	13.8 / 400 / √3
Switchyard	
Switching Scheme	Double Main and transfer Bus
Bus Reactor	1 No., 80 MVAR
Number of Bays	10 (4 Nos. GT Bays, 1 No. BC Bay, 1 No. Transfer Bay, 2 Nos. line bays, 1 No. Bus Reactor Bay and 1 No. 400/132kV ICT Bay)
Misc. Aspects	
Date of CCEA approval	**02/12/2004**
Scheduled Completion Time as per CCEA	5 Years from date of CCEA
Original (As per CCEA)	Dec' 09

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Estimated Cost (Rs Crore) as per CCEA	2496.90
Civil Cost (Rs Crore)	1678.59
E & M Cost (Rs Crore)	569.22
Tariff (Paisa / kWh) as per CCEA approved cost	148 (First year); 123 (Levelised)
Proposed RCE at Dec'14 PL	**Rs 6476.34 Crs**
Tariff (Paisa / kWh) as per proposed RCE	484 (First year); 441 (Levelised)
Revised (as per proposed RCE) Unit wise commissioning date	April 16 May 16 June 16 June 16 Unit I Unit II Unit III Unit IV
Design Energy (MU)	3353
Average Energy	-
Generated /annum (MU)	-
Firm Power (MW)	163