



Bill of Quantity

No.	Description	Items	CAT	CS	IT	Unit Cost	Quan.	Unit	Total	Remarks
1	Pipe system	Modification of suction piping	P	2	5	300,000.00	1	lot	300,000.00	New suction line with option for long radius elbow and additional provision for straight pipe to facilitate more developed flow profile(See conceptual design)
2	Pipe system	Replace pipe/refurbish heavily deteriorated pipes	P	2	1	250,000.00	1	lot	250,000.00	Pipe replacement or restoration: extensive rust removal and recoating of pipes, new material for pressure reducing valve handle to avoid galvanic corrosion
3	Pipe system	Addition of straight coupling along discharge side	P	2	6	250,000.00	1	lot	250,000.00	Provide a coupling for pipe internal inspection. Useful for determining extent of pipe scaling although quite a tedious task (see conceptual design)
4	Instrumentation and Monitoring	Installation of pressure gauge near pump flange	M	2	6	10,000.00	6	pc	60,000.00	For increased accuracy in measuring head
5	Instrumentation and Monitoring	Installation of UFM for Pumps 3 and 2	M	2	6	120,000.00	2	pc	240,000.00	Basic simulation show flow is relatively develop and flow meters can gain confident measurements
6	Instrumentation and Monitoring	Addition/upgrade to Key Software modules	M	2	5	100,000.00	1	lot	100,000.00	Will log average pump efficiency, individual and total production volumes (as determined by thermodynamic device), pump energy usage and real time pump curve data
7	Instrumentation and Monitoring	Upgrade to vibration analyzer	M	2	5	100,000.00	1	lot	100,000.00	Will provide continuous monitoring of pump vibration activity and generate time based graphs of FFT and 3D spectrum
8	Pump efficiency	Replacement of existing wear rings with non metallic wear rings	M	2	5	150,000.00	6	pc	900,000.00	Clearance can be reduced to up to 50% which in turn can lead up to 5% efficiency gain
9	Lighting	lights under over sidewalk overhang	F	2	5	5,000.00	3	pc	15,000.00	For convenience rather than carrying portable lights
10	Instrumentation and Monitoring	Control panel check-up	E	2	1	-	-	-	-	Check up to resolve minor nuisances such as units, readings and displays
11	Reservoir	Check up and reinforment of reservoir walls	S	2	1	-	-	-	-	Walls were continued for height extension of reservoir however cracks were observed on the merging portion of the extension
12	Pump efficiency	Anti-friction coatng	M	-	5	100,000.00	8	pcs	800,000.00	Further increases efficiency
14	Lubrication method	Upgrade to automatic lubricators (eg. Single point lubricant dispensers)	M	-	5	30,000.00	6	pcs	180,000.00	Avoids under and over-lubrication problems
15	Condition Monitoring	Regular Vibration Analysis	M	2	7	3,000.00	-	per point	160,000.00	To improve data pool and help closely monitor mechanical health via vibration analysis. (Price computed is based on perpetual basis of 15% rate)
Total									3,355,000.00	