



Introduction

Ore reserves for Gudem & Katamrajkonda sub-group were estimated by GSI using conventional isocore method, area of influence method and triangle method. Total geological reserve estimated by GSI for both the Gudem & Katamrajkonda is of the order of 81.04 Mt.

Problem

Block-wise ore reserves & quality of Bauxite as estimated by GSI for Gudem & Katamrajkonda Sub-group is given in table 1

Block - Wise reserves & quality of Bauxite for Gudem & Katamrajkonda Sub-group

Block	Reserve Estimated by GSI (Mt)	Average quality (%)			
		Al ₂ O ₃	SiO ₂	Fe ₂ O ₃	TiO ₂
Gudem Sub-group					
Block 1	12.21	46.76	3.11	21.52	2.47
Block 4	23.20	49.48	0.95	19.39	1.82
Block 5	3.00	46.96	2.12	22.70	1.88
Total Reserve of Gudem Block 1, 4 & 5 : 38.41 Mt					
Katamrajkonda Sub-group					
Block 1	29.83	46.76	2.63	23.05	1.85
Block 2	12.80	49.90	1.77	19.46	1.61
Total Reserve of Katamrajkonda Block : 42.63 Mt					

MINING LOSSES

Considering the ore to be left at the barrier of 7.5 m at lease boundary as per regulation no. 111 (3)[2] of Metalliferous Mines Regulation, 1961 & ore in pit slopes, 10% ore loss has been considered for planning purpose.



MINEABLE RESERVES

The reserves estimated by GSI have not been categorized as proved, indicated, probable reserves. Entire reserves reported by GSI have been considered as proved reserves for this study. Total geological reserve of all the blocks under study excluding block 2, 3 & 6 of Gudem Sub-group is around 81.04 Mt

WORKING REGIME

The working regime of the mine has been envisaged as below.

Total working days/year	:	300 Days
Total working shifts/day	:	3 Shifts
Working hours/shift	:	8 Hours
Effective working hours/shift	:	6 Hours

PROPOSED MINING METHOD

Mine has been proposed to be developed with 10 m benches. Drilling shall be done by 165 mm diameter blast hole drills in staggered pattern with 4.5 - 5.0 m burden & 5.0 – 5.5 m spacing. Blasted material will be loaded into 85 t dumpers by hydraulic shovels having 5.5 cu. m bucket capacity. Finally Dumpers shall carry the materials to primary crushing plant for further processing. Benches shall be inter-connected by ramps laid at a gradient of 1 in 14. Haul roads for transportation of ROM from mine face to primary crushing plant shall be constructed at a gradient of 1 in 16 as per statute. Height of overburden benches may vary depending upon the thickness of waste. It is proposed to develop overburden benches of 4 - 5 m height

UNIT MINING OPERATION

Major unit mining operations are discussed as follows.

A. Drilling

Drilling in all the areas has been proposed to be done by 165 mm diameter drills in staggered pattern to achieve optimum fragmentation. Total annual excavation requirement of 4.62 Mt will require around 102667 m of drilling annually

B. Blasting

Average burden & spacing shall be around 4.5 m & 5 m respectively. Stemming length shall be kept at 3.5 – 4 m. To keep the blasting inventory to a minimum level blast holes shall be preferably charged by SME/SMS explosives or cartridge slurry explosives depending upon rock characteristics.



To keep the ground vibration & air overpressure within permissible limit preferably NONEL (“Raydet or Excel”) shall be used for initiation of explosive charge. Average charge/hole will be around 158 kg. Weekly explosive consumption for the mining complex will be around 30 t. Detailed blasting studies are required to be undertaken for determining the optimum blast parameters for cost effective and safe blasting.

C.Loading & Transportation

Blasted material will be loaded into 85 t dumpers by hydraulic shovels having 5.5 cu. m bucket capacity. Finally Dumpers shall carry the materials to primary crushing plant for further processing

PRODUCTION PLAN

Year-wise production plan for first five years of mining operation is given below.

Year-wise production plan for first five years

Sl. No.	Year	ROM, Mt	Waste, Mt	Total, Mt
1	1 st year	1.26	0.13	1.39
2	2 nd year	2.52	0.25	2.77
3	3 rd year	3.78	0.38	4.16
4	4 th year	4.2	0.42	4.62
5	5 th year	4.2	0.42	4.62

MAJOR MINING EQUIPMENTS

Type of Equipment	Capacity	Fleet, (Nos.)
Major HEMM		
Diesel powered hydraulic shovel	5.5 m ³	5
Dumper	85 t	8
Dumper	35 t	3
Drill	165 mm	5
Wagon drills with compressor	115 mm	1



Pay Loader	3 cu. m	1
Back hoe	4 cu. m	1
Crawler Mounted Dozer	574 kW	1
Crawler Mounted Dozer	310 kW	2
Motor Grader	145 HP	1
Auxiliary Equipment		
Water Sprinkler	28 kl	2
Water tanker	12 kl	1
Rock Breaker	Medium duty	1
Tyre handler (For handling 24.00 x 49 – 48 PR tyres)		1
Diesel browser	12 kl	1
Maintenance van with facility for storage of lubricants, water, oils and grease.		2
Service trucks	9 t	2
Explosive van	9	1
Crane	9 t	1
Pumps	200 HP	1
Portable tower lights	6 Bulbs x 400 W	6
Tractors		2
Vibratory compactor		1
Bus		2
Ambulance		1+1
Car		



MANPOWER REQUIREMENT

The tentative manpower requirement envisaged for 4.2 Mt ROM productions from the mines is given below.

Manpower Requirement

Sl. No.	Category	Nos.
1.	Executive	51
2.	Non-executive	252
	Total	303

The value assigned to new property is generally the difference between the total present value, based on discount of all future earnings, and the value assigned to physical assets, working capital, and other costs, that are necessary to get the property into operation. A detailed field examination is necessary to ascertain any adverse physical conditions that may be met and corrected before the final decision on methods of mining and milling, the installation of various surface buildings and facilities, and on the transportation needed to extract and prepare a marketable product. Thus, the valuation of a partly developed mineral property is basically an estimate of potential net income from future exploitation of known ore reserves even though mine facilities, plant, or other surface facilities do not exist. Engineering skill and experienced judgment are required because nearly all factors must be estimated. Adequate contingency allowances must be provided.

Question

The following steps are basically the blue print (To be presented in your presentation with calculations)

1. Calculate the ore reserves and indicate grade or quality under the following classifications: (This requires a preliminary estimate of costs and determination of mine cut-off grade.)

(a) Measurable ore

2. Estimate recoverable ore, taking into consideration such factors as mine dilution, mine losses, and cost of making ore available.

3. From study of flow sheets and metallurgical tests, calculate the treatment losses or metallurgical recovery.



4. Estimate rate of production as determined from the mine potential, and the sales possibilities, as well as limitations, such as availability of power and water.
5. Divide reserves by annual production to obtain life of property or operations.
6. Using recovery and treatment factors, calculate total yield of saleable Product, Calculate the "smelter settlement value" of the ore or concentrate, or saleable products.
7. Estimate average sales price per annum and total average sales volume and total annual gross revenue.
8. Estimate cost of sales (per ton basis), labour, materials and supplies, and overhead.
9. Estimate selling (marketing), administrative, and central office costs.
10. Subtract cost of sales from sales income to get gross profit.

