

CHINIOT IRON ORE DEPOSIT

INTRODUCTION

Punjab Mineral Development Corporation (PUNJMIN) carried out detailed exploration evaluation work during 1996-99 under a PC-II scheme at a total cost of Rs. 20.90 million.

The deposit was originally identified by Geological Survey of Pakistan (GSP) during 1989-93. Punjmin took over the project in 1995.

LOCATION

- The investigated area falls in survey of Pakistan topo sheet no.44 A/14 (latitude $31^{\circ} 41' 30''$ to $31^{\circ} 42'$ and longitude $73^{\circ} 58'$ to $73^{\circ} 59' 30''$), located south of Chiniot town, in Jhang District, Punjab Province, which is connected directly with major cities through road and railways network (fig-1)

GEOLOGY OF THE AREA

- Pre-Cambrian basement rocks are considered important source rocks for metalliferous ore deposits all over the world. The Sargodha - Chiniot - Shahkot - Sangla hill belt constitutes the northern outcrops of Indian shield of pre-Cambrian era.
- Kirana area spreading over Sargodha - Chiniot comprises two geomorphic features: scattered hills and flat alluvial plains.
- The scattered hills represent meta sedimentary rocks i.e. quartzite, slates, tuff etc, and igneous rocks i.e. rhyolite, andesite and sills/dykes of basaltic composition.
- The investigated area is part of alluvial plain, lying just south of the scattered hills of the Chiniot area, where basement rocks are present at depth.

PREVIOUS WORK

- An aeromagnetic survey was conducted by OGDC in the 1970's over pre-Cambrian shield area near Chiniot – Sargodha.
- Regional gravity and magnetic mapping was done by GSP in 1985-87, followed by drilling of five exploratory holes during 1989-93.
- Punjmin carried forward the exploration and evaluation process under an approved PC-II Scheme during 1996-99.

EXPLORATORY WORK BY PUNJMIN

- Punjmin has drilled a total of nine holes at the site. The details of the drilling is as under: (fig-2)

Organization	No of Holes	Core Drilling	Non-Coring (Meters)	Total (Meters)
GSP	5	729	604	1333
PUNJMIN	9	1085	1730	2815
TOTAL	14	1814	2334	4148

- Punjmin has sampled and analyzed 700 samples
- Logged nine bore holes (fig-3)
- Evaluated and interpreted technical data
- Punjmin has prepared pre-feasibility a study through local and foreign consultants and prepared TORs for completing a techno economic feasibility study to be conducted under a separate PC-II Scheme for assessing economic utilization potential of the deposit.

Chemical Composition (AV)

Elements	Smelting Grade Iron Ore (Fe ₂ O ₃ >85%)	High Grade Iron Ore (Fe ₂ O ₃ 70-85%)	Med Grade Iron Ore (Fe ₂ O ₃ 50-70%)	Low Grade Iron Ore (Fe ₂ O ₃ 30-50%)
Fe ₂ O ₃ (%)	86.74	75.25	55.50	39.63
SiO ₂ (%)	8.65	15.34	31.15	41.56
Al ₂ O ₃ (%)	2.95	2.81	5.95	7.96
S (%)	0.04	0.35	0.10	0.25
Grade wise Reserve	11.5 mt	7.9 mt	33.0 mt	57.4 mt

Mineralogical Composition (AV)

Hematite	36 - 80 %
Magnetite	5 - 35 %
Goethite (Limonite)	5 - 62 %
Pyrite/ Chalcopyrite	2 - 8 %
Quartz	3 - 48 %
K - Feldspar	2 - 5%
Carbonate	2 - 8 %

SUMMARISED FINDINGS

- Iron Ore Deposit and Composition Concealed iron ore body of limited aerial extension with steeply dipping ore beds under 71-178 meter thick alluvial cover contains low-high grade ore 30 > 85% Fe₂O₃ with variable contents of SiO₂ and Al₂O₃ and hematite, magnetite and goethite as principal minerals.
- Ore Body Dimension 700 x 200 SQ. meters
- Mineralized Zones
 - Hematite Zone
 - Magnetite Zone
 - Magnetite Sulphide Zone
- Nature and Origin of Mineralization Massive or Disseminated/Lean - Hydrothermal Origin.
- Type of Overburden
 - Alluvium i.e. sand, clay, gravel, rock fragments
 - basement rocks i.e. Andesitic and Rhyolitic Tuff
- Grade Wise Reserves
 - Smelting grade (>85% Fe₂O₃) - 11.513 mt.
 - High grade (70% to 85% Fe₂O₃) - 07.885 mt.
 - Med. grade (50% to 70% Fe₂O₃) - 33.056 mt.
 - Low grade (30% to 50% Fe₂O₃) - 57.376 mt.
- Mining Status Suitable for underground mining subject to feasibility study.
- Mine Size (Proposed) 1.8 million tonnes annual capacity.
- Beneficiation Low-med and High grade ores are amenable to upgradation using floatation and magnetic separation techniques, subject to pilot plant study.
- Possible Utilization
 - Smelting/High grade ore (0.4 mt.) can be fed to Pak Steel Mill for smelting.
 - High grade ore (0.1 mt.) can be fed to Pak Steel Mill after blending of 20% smelting grade ore.
 - Low-med grade ore (1.3 mt.) after beneficiation can be used in DRI-EAF based steel plant at site.
- Mine Site Plain area, located nearby Chiniot city, well connected with major cities through rail and roads. •
 Infrastructure Natural/sweet water source is available.
 - River Chenab passes nearby.
 - 132 kv grid station nearby.
 - Natural gas main pipeline passes nearby.

- Other raw materials available within distance of 100 kms. •
Economic Significance In situ resource value @ US\$
5/- tonne is estimated US\$ 466.50 million.
- Gross foreign exchange saving possible upto US\$
30.75 million.
 - Job opportunities for about 2000 persons.
 - Down-stream industries.