

10.0 GOLD EXTRACTION PLANT FOR GADAG GOLD FIELD

10.1 The (-) 200 mm size ROM ore from the mine is received over 200 mm grizzly in 300 t capacity coarse ore bin. The oversize boulders retained on the grizzly are manually broken to (-) 200 mm size for crushing in Jaw Crusher. The ROM ore in the coarse ore bin is then fed to the jaw crusher with the help of trough feeder where it is crushed and reduced to - 25 mm size. This is followed by fine crushing in two cone crushers in closed circuit with a vibrating screen where it is crushed to (-) 8mm size.

10.2 The crushed (-) 8mm size product is stored in a Mill Fine Ore Bin of 500 t capacity. Two Ball Mills in close circuit with two sets of battery of cyclones receive the fine ore from fine ore bin with the help of vibratory feeder for grinding, where it gets reduced to (-) 200 mesh size. The underflows of cyclones containing coarse ore is again sent back to the ball mills for regrinding in close circuit.

10.3 The overflow of hydro-cyclones containing about 80%, (-) 200 mesh size solids is pumped into 18m x 300 mm High Rate Thickner for dewatering. In the thickner, the clean water gets separated and collected in clear water tank and fine ore slurry / pulp with 50% solids is collected in a separate tank. The clear water is again pumped back to the ball mills in close circuit.

10.4 The fine ore slurry / pulp with 50% solids is pumped into eight agitator tanks placed in series and each of 6m x 6m size where it is mechanically agitated. The first agitator tank is used for addition of milk of lime to maintain pH at + 10.5. The next two tanks are used as pre-aeration agitator tanks wherein compressed air is injected and tanks are mechanically stirred in order to oxidize all the sulphide ions available in the slurry. A solution of sodium cyanide and sodium hydroxide is added in the fourth tank as leachant. Another dose of cyanide is added in the sixth tank to maintain the free cyanide content of the discharge of eighth tank at 0.1 ppm. The pulp freely flows by overflow from one tank to the other.

10.5 The gold bearing pregnant pulp is then passed through 6 Nos. Carbon in Pulp (CIP) contactors, each of 0.57 cu.m. capacity. Carbon contactors adsorb gold from the liquor phase. The depleted pulp is then wet screened which separates the second minor stream of tailings (10%) called Barren Slurry. This is subjected to thickening to recover clear water which is pumped up to overhead tank in the circuit for reuse.

10.6 Bleaching powder is added into the dewatered tailings slurry separated in the thickner for neutralizing cyanide content to 0.1 ppm and is then disposed off on the tailings dump.

10.7 The loaded carbon in the CIP contactors is periodically stripped with hot alkaline solution of cyanide at 95° C (sodium cyanide and sodium hydroxide) to get barren carbon. The stripped carbon is acid washed and then reactivated in a rotating kiln at 700 ° C. The reactivated carbon is screened to remove - 12 mesh fines and reused in CIP contactors.

Contd...





The hot gold bearing liquor obtained from loaded carbon is then circulated through electrolytic cells wherein steel wool is used as cathodes and punched stainless steel plates as anodes. The gold gets deposited on the steel wool along with silver and minor amount of copper (from chalcopyrite). The steel wool is removed periodically to be acid treated, filtered, dried and smelted with fluxes and refined in smelter to obtain Bullion.

10.8 The flowsheet for Gold Extraction Plant for Gadag Gold Field is given in **Figure No. 4.**

Contd...



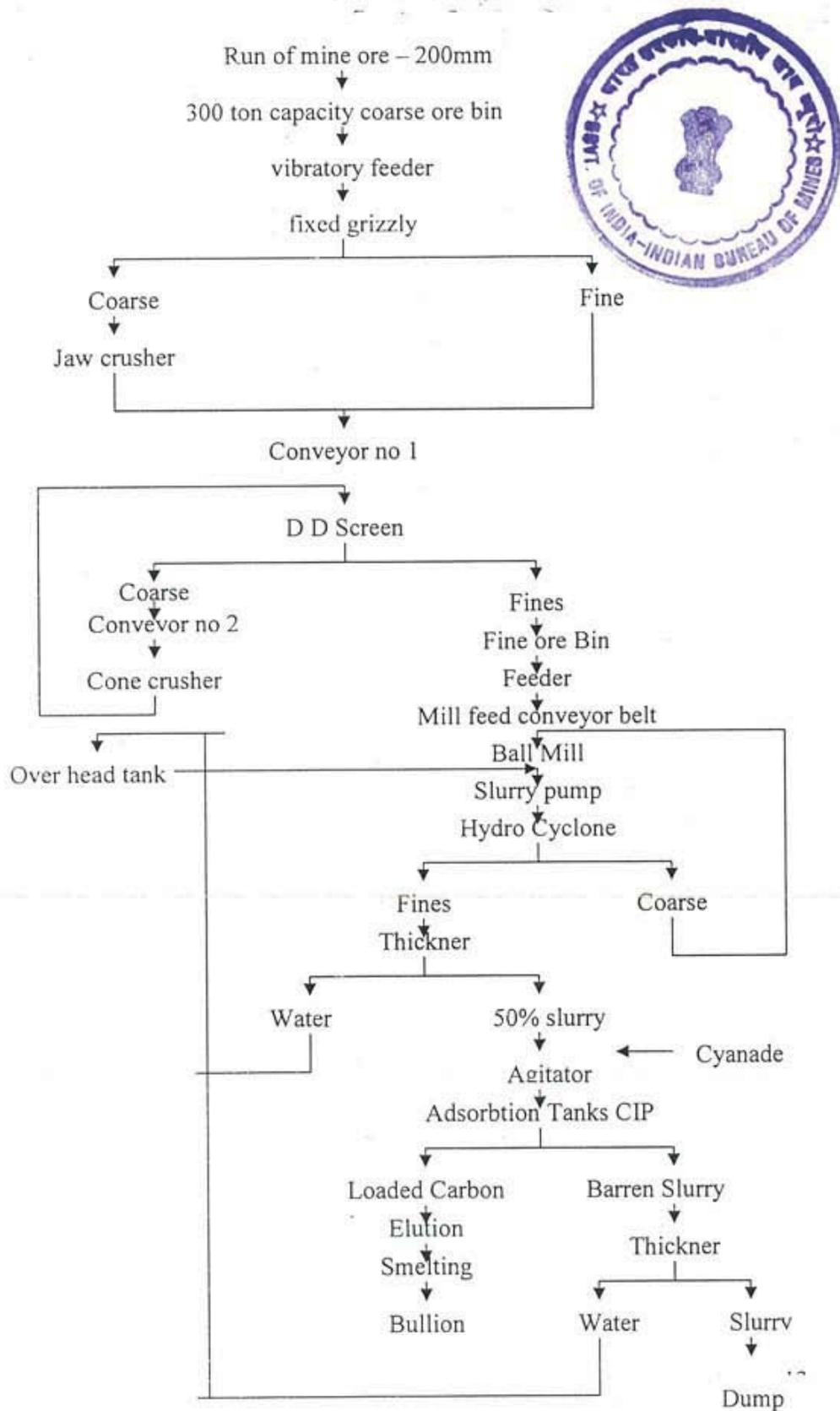


Fig 4 : Flowsheet for gold extraction plant.

