Degana tungsten project—present plant practice and future scenario

M R JAKHU and S RAY
Hindustan Zinc Ltd, Yashad Bhavan, Udaipur 313 001, India

Abstract. Experiments/testworks were carried out on Degana tungsten ore by various R & D organizations to recover the strategic mineral wolframite. Process flowsheet developed after tests on the dump ore assaying 0.151% WO₃ is being tried on a very small scale till the 150 tpd pilot beneficiation plant is commissioned. Tungsten bearing granite samples were also found amenable to physical beneficiation. Hence 168 Mt granitic resources analysing 0.08% WO₃ has ushered a hope for large scale exploitation subject to detailed exploration. By-product recovery of lithium, caesium, rubidium and some other trace elements, if feasible, will be of added advantage.

Keywords. Degana tungsten; present practice; future scenario.

1. Introduction

Degana Tungsten Project in Nagaur District (Rajasthan) is located midway between Jaipur and Jodhpur, and about 82 km from Ajmer by road. Since discovery in 1912, it was sporadically exploited by various agencies with peak operation during the world wars. The Directorate of Mines and Geology (DMG), Rajasthan, started its operation after the Indo-China war in 1962. The operation continued subsequently by Rajasthan State Industrial and Mining Development Corporation (RSIMDC), Rajasthan State Mineral Development Corporation Ltd. (RSMDC) and Rajasthan State Tungsten Development Corporation Ltd. (RSTDC) by selective underground vein mining with concentration by manual sorting and panning. Due to low tenor and limited reserve, production from underground operation was limited and the beneficiation process was made exclusively manual. The activities were handed over to Hindustan Zinc Limited (HZL) w.e.f. 4.6.1991 with a view to large scale operation for strategic importance.

This paper deals with the activities of HZL towards tungsten development in Degana.

2. Geology/mineralogy/characteristics

Tungsten mineralization has been reported in: (1) granite vein lode, (2) eluvial deposit and (3) dissemination in phyllites.

Four decades of mining of wolframite was confined to underground mining on narrow 2 to 22 cm wide quartz wolframite veins in granite ground mass. Though beneficiation of eluvial and quartz vein type ore may be economically viable, known resources cannot sustain any large scale operation and underground exploitation will be cost prohibitive.

Though numerous thin quartz veins contain tungsten mineral (Bhatnagar 1991), their exploitation by underground method of mining is cost prohibitive. Exploration by RSTDC has indicated that the poorly mineralised granitic ground mass with their mineralised veins may make up the grade for open pit large scale exploitation. Four deep boreholes by the Mineral Development Board (MDB) and detailed surface
mapping by the Indian Bureau of Mines (IBM), Nagpur have given further indication of potential ore deposits mineable by open cast. Orebody modelling conceptualized by HZL (Bhatnagar 1991) on stockwork (an admixture of all types of granites and a hybrid rock at the central part of the hill) (figure 1) suggest possibilities of 12–15 Mt of ore with about 0.13% WO₃. Accordingly exploration — (i) underground by HZL and (ii) surface