

IRON, LATERITE, BAUXITE AND OCHRE DEPOSITS OF PAKISTAN: EMPHASIS ON FEASIBLE DILBAND AND LOW GRADE FORT MUNRO IRONSTONES

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Abstract

For the sustainable development of Pakistan, there is an urgent need to utilize indigenous deposits of iron, laterite, bauxite and ochre, which will reduce the cost of import. Iron, laterite, bauxite and ochre deposits are mainly located along disconformities in the Foreland basin. These deposits also contain many resistant minerals like rutile, zircon, ilmenite, etc in laterite and alluvium placer. Laterite is reported from Ziarat-Sanjawi area (Balochistan), Kathwai, Daud Khel and Zaluch Nala of Salt Range, Moza Mungiwali, Gakkar, Pind Trer and several localities in Kalachitta Range, Mazari Tang and Marai Bala in Kohat district, Samana range 16 km from Hangu; Langrial area 32 km south of Abbottabad and Kalabagh area. The intra Tertiary disconformity in Muzaffarabad, Dhaman Jhal-Niazpur, Kotli Tehsil areas like Salhun, Nikial, Khander-Karela, Shiester, Giain, Dandili, Kamroti and Sangar Marg show lateritic and bauxitic deposits. The disconformity in the Eocene Sohna Formation has limonite and ochre at Lakhra, Meting and Makli hills of Sindh. Malkani in 2010 mentioned Vitakri Formation (latest Cretaceous to Cretaceous-Paleogene (K/Pg) boundary) in Sulaiman foldbelt which is significant for ochre and lateritic materials. Significant deposits of ochre occur in Reshian region of Azad Kashmir and Uchhali, Kutki, and Pirkahar of Salt Range. Small deposits occur in the southern part of the Kirthar Range near Jhal Dhand, Sohna Dhand and Noriabad. The lateritic beds found at Katha Nasral area of Punjab, in Dadu and Thatta districts of Sind, in Ziarat and Vitakri areas of Balochistan contains ochre, which is being used locally for paint making and other industries. The possible low grade but large deposits of ochre/iron from Chitarwata, Vihowa, Rakhi Gaj, Vitakri, Domanda and Drazinda formations of Sulaiman Foldbelt seems to be significant. Recently Malkani and Mahmood in 2016 reported micaceous hematite from Muzaffarabad and limonite/ochre from Reshian valley of Hattian Bala District, Azad Kashmir. Katha-Pail bauxite-laterite-clay bed (1-7m thick) occurs at the (K-Pg) boundary between Wargal or Amb formation and Hangu Formation. Chhoi-Akhori deposits occur in a 20-25km long belt in the Kalachitta hills. It occurs at K-Pg boundary between Lumshiwai and Hangu formations and lower down between the Jurassic limestone and the Triassic Kingriali formation. The upper horizon comprises of upper 3m thick oolitic or pisolitic laterite and lower 4m thick bauxitic material. The bauxite contains 32-76% Al₂O₃, 2.5-43% SiO₂, 0.25-12% Fe₂O₃, and 2.2-4.2% TiO₂. The lower lateritic horizon at the base of Datta Formation is more widely distributed and contains alumina clays, claystones and alumina. Muzaffarabad -Kotli deposits occur in between the Cambrian limestone of Sirban Formation of Abbottabad Group and overlying shales of Eocene Patala Formation. Aluminous rocks may be associated with red beds of Vitakri, Domanda and Drazinda formations and Vihowa group. Dammer Nissar iron deposits are 32 km south of Drosh in Chitral district. The magnetite deposits (lenticular and irregular in shape) of metasomatic nature occur in garnet epidote metavolcanosedimentary rocks intruded by granodiorite found close to Karakoram Suture/Shyok Suture. Langrial iron deposit is lateritic hosted within limestone of K-Pg boundary (Hangu Formation) or may be lateral extension of

Chichali iron. The ore is 6-7 m thick consisting of oolitic, lateritic or ferruginous sandy materials. The ore is 45 km long. Mineralogically the deposit is divided into three classes like chamositic-limonitic type, hematite-limonitic type and lateritic type. Kalabagh iron deposits are 300 million tons occur in Cretaceous Chichali Formation comprised of glauconitic sandstone and shale. This belt is exposed from Makerwal to Kalabagh and Sakesar in Salt Range. Pezu iron deposits are located 2.5km SE of Pezu village. It is low grade lateritic iron ore occurs in the Chichali Formation. Nizampur iron deposits (100 m.tonnes) is of sedimentary type hematitic iron 25-35 % and is found at the base of Datta Formation. Pachin Koh-Chigendik iron deposits are located 88 km and Chigendik 40 km NW of Nokundi town. It is comprised of magnetite and hematite. It is volcanogenic in nature and occurs as intercalations with andesites of Sinjrani volcanics. Chilghazi iron deposits are located 52 km NW of Dalbandin town. Dilband iron deposits is 70km from National Highway and 100 km from Kolpur railway station. The ore is found in Dilband Formation of J/K boundary time with low to gentle dips. The iron horizon is 1-7 m thick with an average value of 2 m. Mineralogically it consists of hematite with calcite, quartz and chlorite. It contains 35-48% iron. The estimated reserves are 200 million tons. Chemical analyses of iron ore represents Fe 45.7-48.03%, FeO 2.30-2.95%, SiO₂ 13.7- 14.6%, CaO 2.23-2.4%, MgO 1.6-2.2%, MnO 0.09-0.11%, Al₂O₃ 5.30-6.04%, TiO₂ 20.32-0.35%, P 0.24-0.34%, Cu 0.01-0.012%, S 0.12-0.19%, Zn 0.07%, Loi 4.5-7.45% (Abbas et al, 1998). Presently this ironstone extension upto Zahri area in the South and Regwash in the east are observed. According to present research by Malkani et al. in 2016 the estimated deposits are about 500 million ton or 0.5 billion ton. Recently Malkani in 2010 and Malkani and Mahmood in 2016 reported Fort Munro iron deposits in Paleocene Girdu (Gorge beds) member of Rakhi Gaj Formation of Sangiali Group. This iron is found in the Fort Munro and its vicinity areas like Khar, Top Girdu, Mian Ghundi, Rakhi Gaj, Bawata, Kingri, Badhi, Chitri, etc. This low grade deposits extends upto Mughal Kot and Shirani areas of D.I.Khan district. It is found in the territory of D.G.Khan, Rajan Pur, Musa Khel, Dera Bugti, Barkhan, D.I.Khan districts. It is widely exposed on the both limbs of Fort Munro anticlinorium, Kingri, Pekal, Aram and Badhi-Dhaola anticlines. This ironstone deposits are very large but low grade (Fe₂ O₃ 14-21%). It's testing for steel, cement and other industries should be make, and it may prove worthy. The extensive iron beds thickness varies from 2 to 50 m. Its reserves seem to be 400 million tons from surface exposure to easily mineable depth 200 m. The Fort Munro iron deposits seems to be feasible due to availability of huge but low garde raw materials, peacefull and favourable locations on metalled road and near to D.G.Khan railway station. It is located in the centre of Pakistan and ideal location for all provinces. The Rhodo and Satta Post deposits (Taunsa area, District D.G. Khan) of iron bearing red/chocolate shale found by present author in the upper part of Domanda Formation is being mined for the D.G. Khan (Zinda Pir) Cement Industry. This chocolate colour mud/clay/shale is about 30-50 m thick. Its estimated deposits may be more than 200 million tons upto easily mineable 200 m depth in the Rajan Pur, D.G. Khan, Barkhan, Musa Khel and D.I. Khan districts of eastern Sulaiman fold and thrust belt.