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Approaching Subsurface to Assess Lignite Deposits by Gravity Survey in Bikaner District, Rajasthan, India

Sharma S.S¹, Yadav K.N.S², Sahay M.N³

¹ Dy. GM , MECL, Seminary Hills, Nagpur, Maharashtra, 440006, India, ssstrivedi@mecl.gov.in

² Senior Manager, MECL, Seminary Hills, Nagpur, Maharashtra, 440006, India, knsyadav@mecl.gov.in

³ Senior Manager, MECL, Seminary Hills, Nagpur, Maharashtra, 440006, India, mnsahay@mecl.gov.in

The occurrences of lignite within 50 meters to 300 meters depth have been reported from various parts of Western Rajasthan in the 70,000 Sq. Km. area of Tertiary Formation. The evidence of lignite deposits were mainly obtained from dug wells or tube wells drilled for ground water. The Tertiary area is mainly covered with a blanket of windblown sand and is devoid of any geological exposures indicative of the presence of sub-surface lignite deposit. The regional drilling has been the only exploration tool for further search of lignite deposit in the area. This approach often faced serious setback in respect of availability of target areas.

In order to look into an indirect method for the search of lignite deposit in Western Rajasthan, emphasis was put for detail studies of physical properties of rocks of Tertiary Formation to choose suitable geophysical method to unravel the sub-surface lignite deposits. The studies of physical properties of rocks of Tertiary Formations revealed that the densities of the majority members of Tertiary Formation are 2.0 – 2.2 gm/cc as against the lignite density of 1.2 – 1.6 gm/cc. In Gravity surveys, the density contrast of the sub-surface formations play the major role in locating the lignite deposits under earth.

The gravity survey has been carried out systematically in Kakra-Sindhu block, Bikaner district, Rajasthan over an area of 350 Sq. Km on 200 m × 200m grid. The findings of gravity survey in Kakra-Sindhu block showed existence of a shallow lignite basin. The occurrence of shallow lignite basin interpreted by gravity survey in Kakra block was confirmed by drilling boreholes at the locations proposed in survey report where lignite occurrence within 150 m depth was established.

The Gravity data were found very useful in delineation of low anomaly zones. Further, analysis of gravity data along with geological concept has helped to demarcate nearly 100 Sq. Km. area to be potential for lignite deposit in this block. The findings of the gravity survey in Kakra-Sindhu block are discussed in the paper.

References :

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- (2)MECL (1987): Final Report on detailed gravity surveys conducted in Gurha East and West blocks, District: Bikaner, Rajasthan.

