

Geological field trip to Vastan lignite mine and adjoining areas on 15th February 2025

The Society of Petroleum Geophysicists (SPG) and Association of Petroleum Geologists (APG) Vadodara Chapter jointly organized one day geological field trip to study the outcrops in the Vastan Lignite Mine and adjoining areas on 15th February 2025. In the area stratigraphic sequences from Deccan Trap to Early Eocene marked by the development of lignite-rich sediments and extensive fossil-bearing limestone is exposed. The idea behind the trip was to visualize the scale of workstation seismic sections in geological outcrops, study the different litho-stratigraphic divisions and experience the vertical and lateral lithologic variations.

The journey commenced from Gaveshana Bhawan at 7 AM and was flagged off by Mr. Priya Ranjan Mishra, ED Basin Manager, WON Basin, ONGC, Vadodara and Prof. Atul Vasant Joshi, Head, Department of Geology, MS University, Vadodara. A total of 56 participants which included senior officers of the WON Basin, Major Janeshwar Prasad, GGM (Chemistry) Head RGL, Mr. K Baskaran, CGM-HGS, President- SPG, Vadodara Chapter, Mr. Harsh Vardhan Dave, CGM(Geology)-Retired, Secretary, APG Vadodara Chapter, Mrs. Amanjot Kaur, GM (Geology), Block Manger-Block-III and Mr. Prasad Kulkarni, GM (Geology)-Head BMG and G & G fraternity from ONGC, Vadodara and life members of SPG and APG actively participated in the field trip.



(Flag off by ED-BM, Mr. Priya Ranjan Mishra, who is also Vice-President APG Vadodara Chapter)

Vastan lignite and limestone mine

The first stop in the trip was at the Vastan open cast mine, operated by Gujarat Industries Power Company Limited (GIPCL). The Company has a diversified power

generation portfolio comprising Thermal (Lignite and Gas) and Renewable (Wind and Solar) Power Plants. GIPCL also operates captive lignite and limestone

mines to meet the fuel requirement of the 500 MW Surat lignite power plant. It is approximately 50 km away from Surat and 40 km from Ankleshwar (Dist. Bharuch). The site can be approached from N.H. 8 connecting Bombay-Ahmedabad via Kim.

Vastan lignite mine is divided in two pits namely Vastan north pit and Vastan south pit. Vastan north pit is already exhausted and presently GIPCL is

operating Vastan lignite mine-south Pit. The thickness of the lignite seams varies from 1-2 m in the south pit to up to 11m in the north pit. The seams suddenly pinch out in eastern end and forms the boundary of the basin for the lignite deposition. The general dip of the seams is $3-4^\circ$ towards west. Overall lignite basin is controlled by a reverse fault, the present part falling under the upthrown portion compared to southern side of Tapi river.



(Lignite seams at Vastan mine)



(Interaction with Prof. Joshi and Hemant Shukla)

The focus at the mine site was to understand the disposition of the lignite coal seams in the southeastern boundary of the Cambay Basin and its relations to coal seams of early Eocene sequence in the northern part of Cambay Basin. In the mine area the sedimentary deposits consist primarily of sand, clay and lignite seams underlain by Deccan Volcanics. The basin is structurally influenced by faults particularly those associated with the Tapi River.

Mr. Hemang T. Shukla, DGM (Geology), GIPCL gave a comprehensive overview of the mine's geological

features, including its daily coal extraction, energy production process and mining methods. This was followed by an informative session with Prof. Joshi, who discussed the region's stratigraphy, highlighting its geological significance and its role in understanding ancient ecosystems and environmental changes. Prof. Joshi thoroughly explained all doubts of participants, providing insightful geological explanations that enhanced the participants' understanding.



(Panoramic view of Vastan lignite coal mine)



(Observing lignite sample collected from mine)

Visit to the limestone formation site

After studying the outcrops in the coal mine, the group proceeded to observe the excavated benches of limestone. Limestone occurs along with shales and

sandstone lenses. The extracted limestone, though low grade, is suitable for use in thermal power plant for desulphurization.



(Limestone mining site at Vastan showing benches)



(Ongoing discussions in the field)



(The field trip participants at GIPCL township)

Deccan Trap

The outcrops of Deccan Trap rest either over Precambrian or over the Cretaceous sedimentary rocks (Lameta and Baghs) in the study area. The entire terrain to the south of Narmada River, comprising uplands of Rajpipla and Vyara is occupied by Trappean rocks. The area is hilly and shows an undulating topography characterized by E-W trending rows that rise 20-30m

above the general ground level. Exposures of Deccan Trap were observed near Netrang Village. The trap is predominantly tholeiitic in nature. Besides tholeiitic basalts and dolerites, felsites, trachytes, diorites and obsidian also occur and beds of scoriaceous breccias are occasionally met with. The other varieties of traps such as amygdaloidal, porphyritic, etc. occur.



(Outcrops of the Deccan basalt)

At the end of the trip, Mr. Priya Ranjan Mishra, presented a token of appreciation to Prof. Atul Vasant

Joshi, acknowledging his guidance and contribution to the learning experience. The trip has provided valuable

exposure to the geological information of the area and bridging the gap between academia and industry.

The organizers acknowledged Mr. Priya Ranjan Misra for encouraging and facilitating the tour. The

reconnaissance and planning were done by the executive bodies of SPG and APG, Vadodara chapter for this field excursion.



(A token of appreciation being presented to Prof. Atul Joshi by Mr. P. R. Mishra)



(Group photo for the 2025 geological field trip)