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Uranium Mineralisation in Infratrappeans from Cretaceous Bagh Group, Alirajpur and Dhar Districts, Madhya Pradesh

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Abstract

Uranium mineralisation is reported from Nimar sandstone and impure limestone of Cretaceous Bagh Group, which occurs intermittently over a length of 12km along ENE- WSW structural grain sympathetic to Narmada-Son lineament. Neoproterozoic Godhra granite and Palaeoproterozoic Aravalli meta-sediments constitute the basement for fluvial to marginal marine sediments of Bagh Group, which are partly covered by Lametas and Deccan trap. Basement rocks show alterations in the top part with high Th/U ratio (Aravalli meta-sediments: 6.66-54.5, mean 24.75, n=9, Godhra granite: 5.62-18.33, mean 9.52, n=9). Uranium mineralisation is reported from calcareous and cherty brecciated sandstone and coralline limestone of Bagh Group, which are close to Deccan trap cover and some occurrences are associated with fractures/faults. Individual uranium occurrences (0.010-0.075% U_3O_8, av. 0.028%, n=55) are of 20 to 500m strike length with 5 to 90m width, and are confined to the upper part of Bagh Group, whereas mixed (U+Th) horizons (0.011-0.038% U_3O_8, av. 0.019%, 0.006-0.032% ThO_2, av. 0.013%, n=6) are in the lower part of Bagh Group (gritty and coarse grained Nimar Sandstone). Depth persistency of these uraniferous occurrences (0.023-0.041% U_3O_8, av. 0.032%, n=3) is indicated by dug well dump samples at Mogra and Kherli. Uraniferous samples have indicated 69-91% leachability.

High Th/U ratio in altered basement rocks, close to the unconformity, indicates migration of uranium. The distribution of uranium occurrences within immature sediments with negligible thorium, close to Deccan Trap cover, indicates that the mineralisation is sandstone type and impervious Deccan basalt have provided thermal gradient for remobilization of uranium, acted as trap and helped in the enrichment process. The association of some of the uranium occurrences with fractures, sympathetic to major lineaments, such as Barwani-Jaisalmer and Narmada-Son lineaments indicates their role in mineralisation process. The significant dimension of uraniferous horizon with high leachability (91%) points towards its economic significance and makes the area potential for subsurface exploration for sandstone type of uranium mineralisation.

Keywords: Infratrappeans, Uranium mineralisation, Bagh Group, Godhra granite, Aravalli, Dhar and Alirajpur districts, Madhya Pradesh.