



## GEOLOGICAL AND GEOPHYSICAL SURVEY OF THE SUMSUM DAM AND INTERLINKED MAMBILLA HYDROELECTRIC POWER PROJECT SITES, MAMBILLA PLATEAU, TARABA STATE, NORTH CENTRAL NIGERIA

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### ABSTRACT

Geological and geophysical investigations have been carried out at the Sunsum Dam and interlinked project sites of the Mambilla hydroelectric power project in Taraba State, northcentral Nigeria. Geologically, the area is underlain by coarse grained hornblende biotite granite, granodiorites and gneisses. The coarse grained nature of the rocks promoted deep weathering with 15-20 m thick overburden embedded with rounded boulders resulting from spheroidal weathering. Geological evidences suggest that the granites have intruded into the Nigerian migmatite-gneisses complex. The lineament trends in the area are mainly NE-SW and NW-SE joints with felsic mineralized veins and faults. There are also minor N-S and E-W fractures cutting across some of the rocks. The geophysical survey employed was the resistivity technique using profiling and vertical electrical sounding (VES). Results show basically five geoelectric units representing 3 distinct geological layers. They are top soil and reddish brown laterites, followed by silty fine-grained sand and gravels with thickness of 1-4 m with apparent resistivity values of 300-1900 ohm-m, the next layer is of sandy clay weathered basement layer of varying thickness ranging from 2-36 m with apparent resistivity values of 400-4,500 ohm-m. The zone of the transition to the bedrock and often fractured at its base especially the points when overburden is relatively thicker. The last zone is the fresh rock that has apparent resistivity values often greater than 2000 ohm-m. The geological and geophysical assessments have highlighted the nature of the bedrock and the effect of tectonism and volcanism on them, the thickness of the overburden and its characteristics. The results will assist in the final recommendation for the enforcement of the concrete preparation for (the adequate) damming and foundations of the engineering structures and facilities to be put in place.

**Keywords:** Hydroelectric power; geoelectric sections; mambilla; tectonism; volcanism; dam

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