

Geoelectrical Exploration for Heavy Oil in the Tsimiroro Block in Madagascar

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Following Canada and Venezuela, Madagascar contains the third largest oil sand deposits in the world. These oil sand deposits are in sandstone beds directly onlapping onto the African basement. In close proximity to these bitumen deposits are large areas of heavy oil (14° to 16° API) in a block held with a 100% interest by Madagascar Oil. The Block is approximately 6,600 km² in area, and to date, approximately 80% of all drilled wells have showed intersections of oil up to 60 m in thickness. In 2008, in a small cyclic steam pilot using three wells, 2,000 barrels of oil were produced from the Amboloando formation of Triassic age – the first oil production in the history of Madagascar. From June 2010 to the present (September 2010), Madagascar Oil has been conducting 2-D resistivity (also known as electrical resistivity tomography or ERT) surveys over their Tsimiroro pilot area as well as exploration areas on the same concession Block. The objectives of the ERT survey are to 1. Delineate heavy oil deposits, both in area and in depth; 2. Establish the continuity to surface of faulting imaged at depth by previously shot seismic surveys 3. To explore for other heavy oil deposits that may exist stratigraphically below the main reservoir; 4. To delineate shale caprock; and 5. To establish baseline information for future 4-D steam monitoring. This is the first exploration program of its kind outside of North America. This paper will introduce this little known area of heavy oil, the history of exploration in Madagascar, the methodology of the geoelectrical exploration program, the results of the program, and the results of follow-up drilling and coring.