INTEGRATING ENVIRONMENTAL MANAGEMENT (DESIGNS) IN THE DEVELOPMENT OF GEOTHERMAL ENERGY; CASES OF OLKARIA GEOTHERMAL PROJECT AND MENENGAI CRATER PROSPECT OF NAKURU DISTRICT, KENYA

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ABSTRACT

This study was conducted on the Menengai Crater geothermal prospect and its immediate vicinity and at Olkaria Geothermal Development Project. The overall objective was to propose a pro-active land-use design that puts into place clean geothermal production, reduced subsidence and earthquake effects, and conservation of wildlife on the two geothermal areas. The specific objectives were: to map the area around Menengai Crater indicating the current locations of geothermal wells; to generate an inventory of socio-economic parameters for future planning and monitoring change around the Menengai Crater geothermal prospect, to carry out a geothermal development impact evaluation on wildlife population census and density in Hell's Gate National Park (HGNP) and the effect on the adjoining ranches for the period running 1996-2001, to propose emergency contingency measures required in protecting human life, property and other natural resources in the event of subsidence and/or earthquake hazard(s) arising from geothermal development and finally to propose probable electricity conservation policies in major urban centers in Kenya.

Both primary and secondary methods of data collection were used. The primary methods were: photography and use of aerial photographs while pocket stereoscope was used to locate geological lineaments on aerial photographs. Observations through the use of binoculars were also undertaken. Data was also elicited through administration of questionnaires to 150 household respondents. Secondary methods of data collection included the extensive study of similar researches, plus relevant literature in journals, publications and government of Kenya documents. Both qualitative and quantitative methods of data analysis were used. Data was presented through generation of base maps, photography, pie chart tables, and explanations.

The findings established that environmental planning and management designs in relation to geothermal development in the Menengai and Nakuru town areas are inadequate. It was also noted that Kenya can, in future, rely more on sustainable geothermal energy (with more than 2000 MWs potential) than the unpredictable hydropower that is vulnerable to weather patterns and seasons. Conservation measures could save up to 350MWs and or thereabouts if undertaken at production, distribution and consumption stages.

The study recommends synoptic (comprehensive, holistic and scientific principles) environmental design for the Menengai geothermal prospect area and incremental (as the need arises) environmental design for the operational and the old Olkaria I and Olkaria II. Incremental design is useful for operational plants like the old Olkaria I that currently need new technologies, engineering feats and policies that are sustainable. Zero development design is proposed as an alternative approach in the conservation of electricity that guarantees inter-generational equity, conservation and steady state in geothermal development. Finally, relocation of people from fault lines, reinforcement of buildings for people whose lives are likely to be affected by the land-use change are recommended for Nakuru town