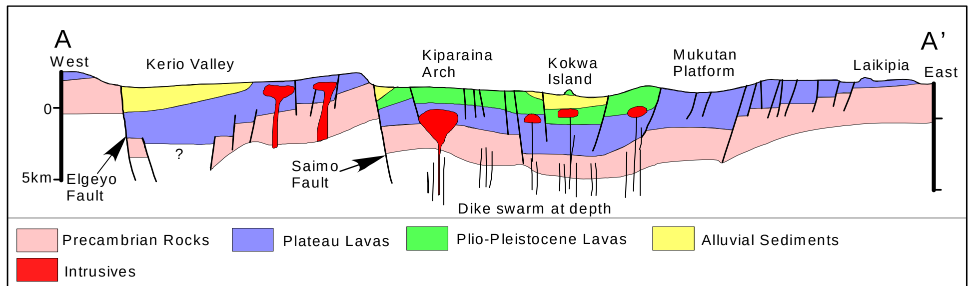
| | |
|---|---|
| Field Name | Lake Baringo |
| Country | Kenya |
| Province/Location | The area referred to as "Lake Baringo Geothermal Prospect" is located within the eastern floor of the Kenya Rift valley. It is bound by latitudes 0o30'N and 0o45'N and longitudes 35o59'E and 36o10'E. Lake Baringo is a prominent feature occupying most of the central part of the area.<br>The surface adjacent to the lake is flat to gentle N-S running grabens filled with fluvial and lacustrine deposits. N-S running sharp cliffs representing intense tectonism are also common as one moves away from the lake eastward. |
| Accesibility | The area has few all weather roads that include Marigat-Lake Baringo and part of the Nakuru-Kabarnet road. A system of secondary roads made of murram or earth form an extensive network serving the entire area except for some of the steepest hills, slopes and densely vegetated areas. The area is served by a network a fixed line telephone communication at most shopping centres and at several hotels within the area. GSM telephone communication can be accessed at some locations in the prospect area. |
| Resource Characteristics<br>Geology | Hydrothermal activity in the Lake Baringo prospects is manifested by extensive occurrence of fumaroles, hot spring, altered grounds and thermally anomalous groundwater boreholes. One of these boreholes, the Chepkoiyo borehole, which was drilled in April 2004, self discharged water at 98oC (local boiling point). The chemistry of the discharged fluids indicated possible input from a geothermal reservoir.<br>The geology of the area is dominated by intermediate lavas (trachytes and trachy-phonolites) in the west and east sectors of the prospect area and basalts in the north. The southern sector is, however, dominated by fluvial and alluvial deposits. |
| Volcanic activity (heat source) | Kenya Rift International Seismic Prospect (KRISP, 1987; Henry et al, 1990) studies indicate a thinned crust comprising of volcanic material in this part of the Kenya Rift where the prospect area is located. The heat source for this system is most likely dike swarms associated with the faults along which repeated fissure eruptions have taken place. |
| Geological Structrure | The structural pattern of the Lake Baringo area is complex due to interaction between the old and young fault systems in the area. The dominant structure in the prospect is the young N to NNE trending fault pattern that form a dense fault swarm restricted to the rift axis. Within the prospect, the faults dip west and east for those to the east and west of Lake Baringo, respectively. The main faults in the prospect have dips of up to 100 m. |
| (Past Geological Studies included) | Detail surface investigations of this prospect were carried out between June 2004 and August 2004. |
| Geochemistry | Gas geothermometers recorded temperatures of 168°C to 310°C calculated using $CO_2$, $H_2$ and solute Na/K/Ca. High radon counts and high $CO_2$ measured in the soil gas were observed around Loruk, the area west of Kampi ya Samaki, Rugus and southeast of Kiserian and could be indicative of enhanced permeability in these areas. |
| Work done so far | To the few sampling points that consisted of fumaroles and boreholes, soil gas and Radon-222 surveys were conducted throughout the prospect between June 2004 and August 2004. |
| Geophysics | A geophysical survey comprising of gravity, ground magnetics, MT and TEM methods was carried out between May and June, 2004 in order to investigate the thickness of the sedimentary basins and the anticipated underlying volcanics, identification of structures that could be possible conduits for geothermal fluids and presence of heat sources.<br>Schlumberger resistivity done by MOE in the late 1980s<br>A few gravity measurements done by universities in the early 1990s<br>Aeromagnetic data collected by the National Oil Corporation of Kenya in 1987<br>Micro-seismic monitoring to the south of Lake Baringo carried by the University of Leicester in the early 1990s |
| Gravity | **Gravity**: Gravity highs are seen on higher altitudes along the northern and eastern flanks of the area, i.e. Korosi and the S-E of Lake Baringo. Other high gravity areas are those associated with volcanics appearing on the surface to the west near Loruk and Kampi Ya Samaki. A gravity high is seen to the S-W of the lake and runs approximately N-S, passing through the Chepkoiyo well and coincident with the fault along Marigat-Loruk road. Incidentally, the geothermal manifestations appear on these volcanics. A trend of gravity lows is seen running in a NE-SW through the southern part of the lake. The lowest gravity signal was recorded south of Lake Baringo on fluvial sediments.<br>**Magnetics**: The highest magnetic signal was recorded at the southeastern slopes of Korosi, around Komolion, NNE of the survey area. The lowest values are seen on the sediments around the lake. The region around Chepkoiyo well has signals of moderate values. Generally, the magnetic signatures in the western sector trend in a N-S direction and tend to mimic that of low resistivity at 500 masl. |
| Resistivity | **TEM**: At the elevation of 500 masl, it is observed that these resistivities are in most areas lower than 20 ohm-m for all the depths investigated. A trend of low resistivity (<5 Ohm-m) is seen running in an N-S direction west of the lake passing through the Chepkoiyo well. The other such low resistivity trends in an NE-SW direction through the Chepkoiyo well, Ol Kokwa Island and Rugus hills to the NE. Slightly higher resistivities (8-20 Ohm-m) exist to the south, north, N-E and further west of the lake.<br>**MT**: Planar resistivity variations of MT data at sea level, 2000 mbsl and 5000 mbsl, respectively. At the near surface, these anomalies mimic those of TEM in most areas around the lake. Low resistivity anomalies exist to the west, NE and SE of the lake. The shapes of the low anomalies also tend to follow the topography due to sediment deposition. Similar information has also been derived from seismic experiments by Tongue et al.(1994). At deeper levels, the western low resistivity anomaly still persists, spreading out to the north and northeast. |




Generalized Litho-Stratigraphic Cross Section through Lake Baringo Geothermal Prospect

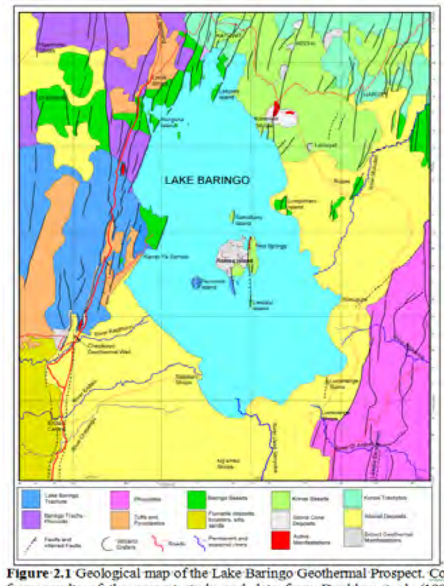



**Figure 2.1** Geological map of the Lake Baringo Geothermal Prospect. Compiled from results of the present study and data from Dunkley et al. (1993) and Hackman (1988).

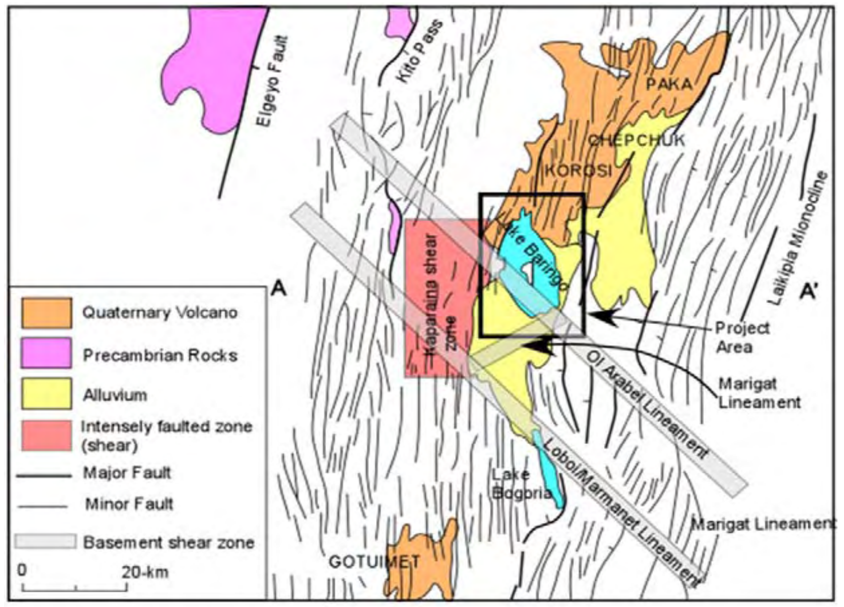
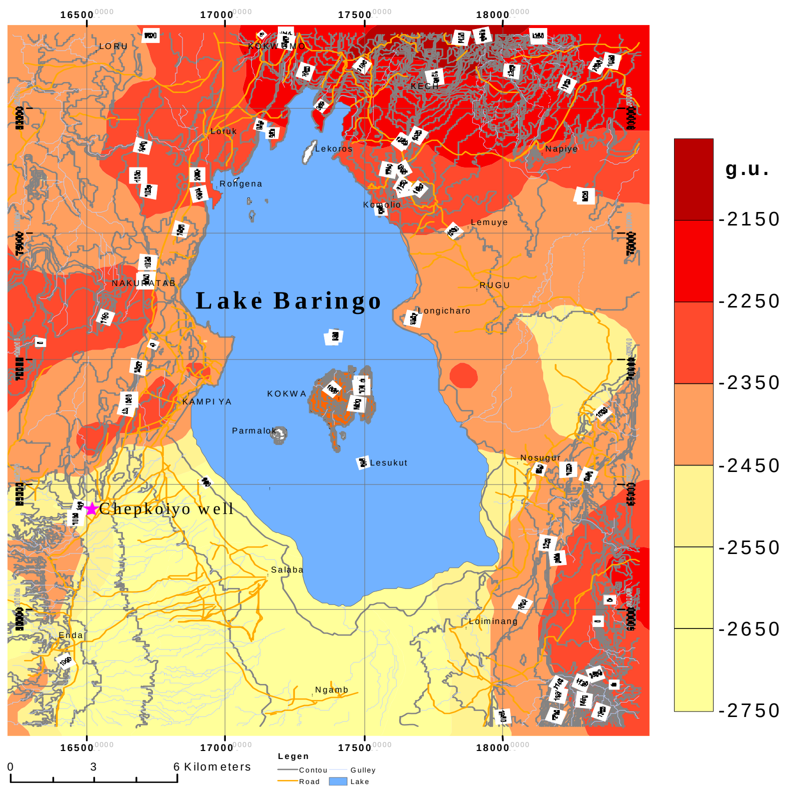
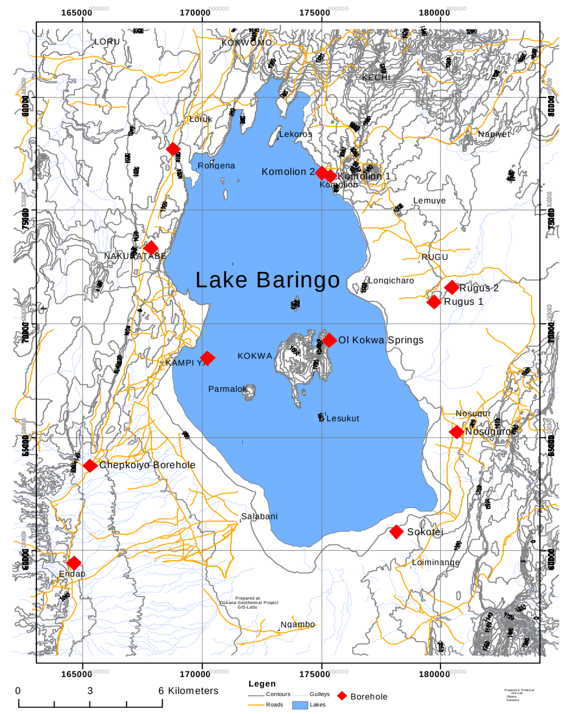



**Figure 2.2** Structural map of the area around Lake Baringo Geothermal Prospect. Major (Precambrian?) lineaments (Shear zones)

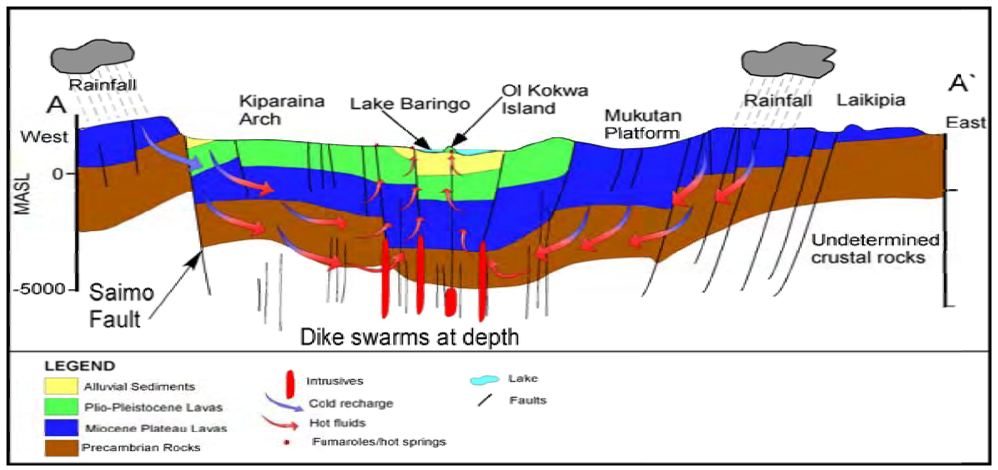



Bouguer Anomaly Distribution in the Lake Baringo Geothermal Prospect

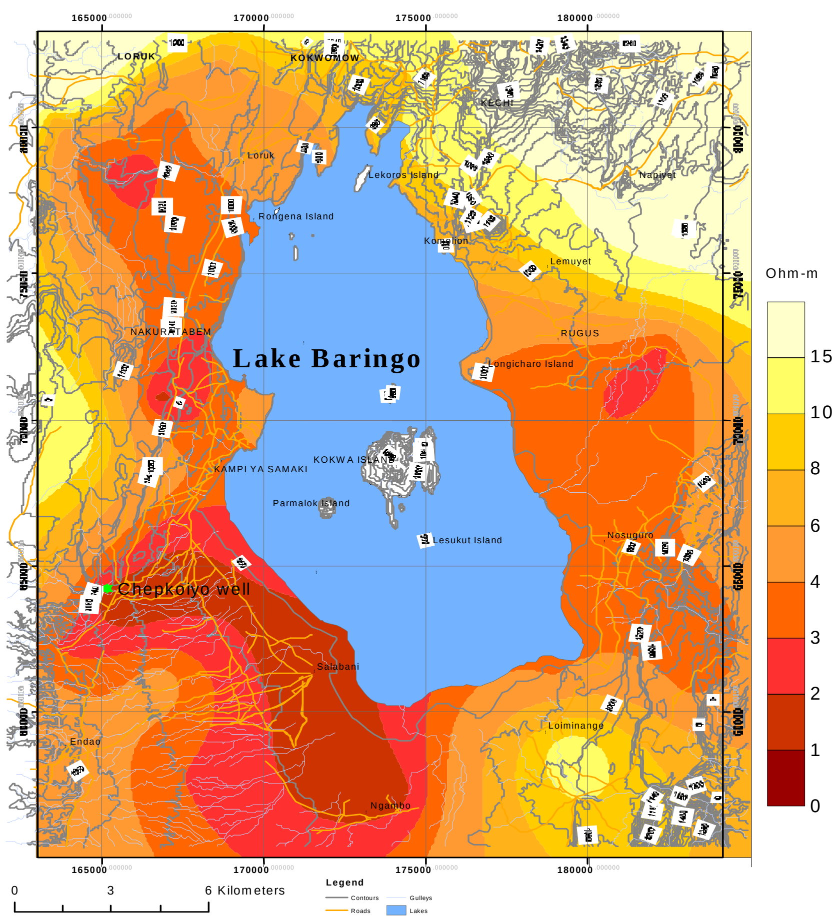



Shallow boreholes locations in the Lake Baringo Geothermal Prospect

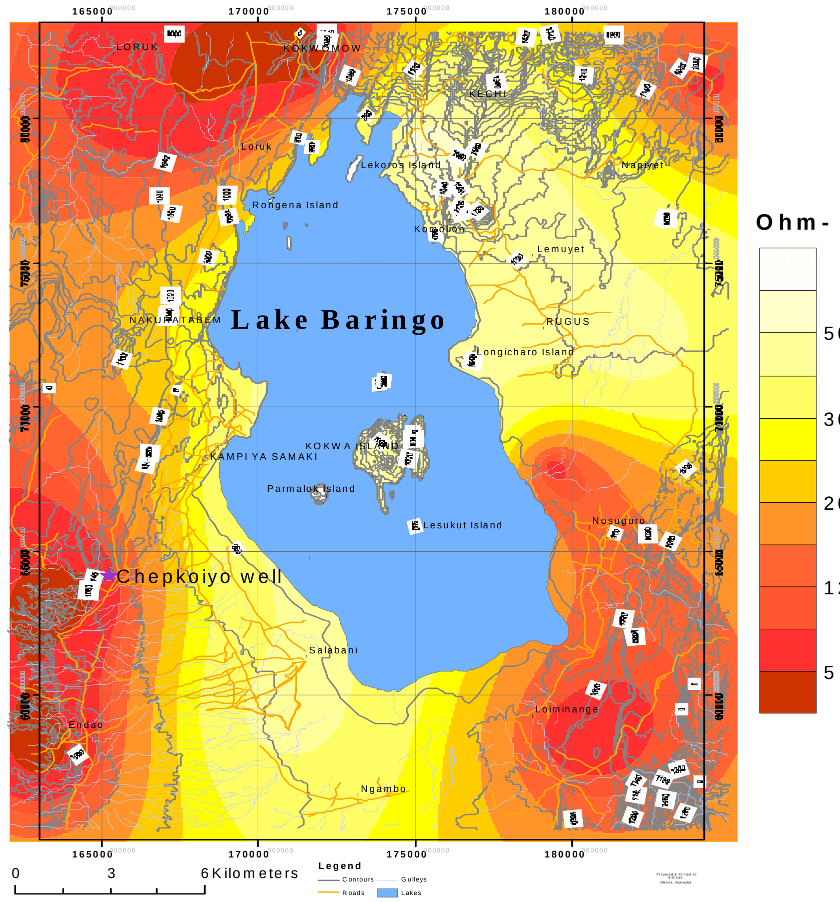
| | |
|---|---|
| Well Drilling | None |
| Temperature Survey | None |
| Well testing | None |
| Conceptual Model | • Geoscientific data indicate existence of a geothermal resource in Lake Baringo prospect, which is characterised by intermediate to high temperatures.<br>• The heat source for the geothermal systems are dyke swarms and shallow intrusive bodies associated with faults and the reservoir rocks are the Plio-Pleistocene lavas.<br>• Gas geothermometers recorded temperatures of 168°C to 310°C calculated using CO2, H2 and solute Na/K/Ca.<br>• High radon counts and high CO2 measured in the soil gas were observed around Loruk, the area west of Kampi ya Samaki, Rugus and southeast of Kiserian and could be indicative of enhanced permeability in these areas.<br>• Over 1049 MWt natural heat loss occurs in the Lake Baringo geothermal prospect. Out of this amount, 90% is lost along the main fault zones to the west of Kampi Ya Samaki and through Komolion and Ol Kokwa Island. |
| Present Status of Development | The results of the existing investigations clearly show that a geothermal system exists in the Lake Baringo prospect. The system's heat sources comprise of dyke swarms and small shallow magma bodies at faults that have intruded an already thinned crust. Subsurface permeability/reservoir host rocks are due to intensive fracturing due extensional rift tectonics. It is therefore expected type of systems are mainly deep 'circulatory systems' for the western central, and eastern parts. The northern parts (around Komolion, Kechii and surrounding areas) are probably outflows associated with systems within the Korosi volcano. The systems are therefore restricted mainly to fault zones and are discrete.<br><br>The following further work are neccessary:<br>1. The northern extent of the resource requires further investigation as preliminary studies indicate possible outflow of Korosi. The surface studies should also be extended northwards to include Korosi and Chepchuk prospects.<br>2. Additional MT and TEM soundings would be necessary to increase density of sounding locations and thus, improve the geothermal models. The S-E of the lake and at Ol Kokwa Island need further investigation area to confi<br>3. Seismic studies on focal mechanisms and swarm activity location determinations are needs to be done in the Lak<br>4. Mercury is one of the most volatile elements carried in geothermal steam from deep geothermal reservoirs and as<br>5. Down-hole temperature and pressure profiles of boreholes, which are accessible, needs to be carried out.<br>6. A full Environmental Impact Assessment study for the prospect area should be carried out before commencemen |
| Natrural/Social Environmental Condition | The area to the west of Lake Baringo along the 4 km wide N-S trending zone, comprising of faults and fractures, represented by deep conductive zone running through the Chepkoiyo well is a good candidate for direct utilization. The area is particularly suitable for the creation of a climatized environment, all year round, with optional temperature (heating and cooling), desired humidity conditions, and eventual addition of CO2 of geothermal origin, which stimulates the production of biomass in greenhouses. |
| Power Sector Situation | Small-unit generation of electricity, through medium-low temperature geothermal waters (90-160°C), is particularly suitable for a rural economy, especially when distributed in areas isolated from the national electricity network. The geothermal systems in Lake Bogoria prospect could be small and discrete and therefore small-scale utilization of the geothermal resource both for electricity generation (using direct or binary systems) and direct uses which include cooling and tourism are feasible. |
| Power Output Potential<br>Resource Potential<br><br>Restrictted by National Park<br>Restricted by Power Demand | 200MW (estimated): Surface exploration done. Detailed surface exploration planned for 2010. |
| Rank of Development Priority | B |
| Potential (Expected) Developer | |
| Proposed Geothermal Development Plan<br>Outline for Power Development | |
| Possible or Recommended Multi-purpose Geothermal Heat U | The island is also an ideal locality for direct uses because it is isolated from the mainland and construction of overhead or submarine power lines to supply the island is extremely expensive. The island is inhabited by over 1500 people, over 5000 livestock, has several schools, shopping centres and tourist hotels and therefore the demand for cheap energy source is high and ever increasing. |
| Scope for Power development | |
| CO2 emmission Reduction ('000 tonne/year) | |
| Proposed Geothermal Development Schedule | Other than exploratory drilling,<br>1. The northern extent of the resource requires further investigation as preliminary studies indicate possible outflow of Korosi. The surface studies should also be extended northwards to include Korosi and Chepchuk prospects.<br>2. Additional MT and TEM soundings would be necessary to increase density of sounding locations and thus, improve the geothermal models. The S-E of the lake and at Ol Kokwa Island need further investigation area to confirm, or otherwise, the existence of a geothermal resource.<br>3. Seismic studies on focal mechanisms and swarm activity location determinations are needs to be done in the Lake Baringo region to identify possible faults for drilling targets.<br>4. Mercury is one of the most volatile elements carried in geothermal steam from deep geothermal reservoirs and as such can be a powerful tracer element, more so when used in conjunction with both Rn-222 and CO2. It is recommended that in addition to Rn-222 and CO2 surveys, mercury measurements be conducted in the area and in all future exploration campaigns.<br>5. Down-hole temperature and pressure profiles of boreholes, which are accessible, needs to be carried out.<br>6. A full Environmental Impact Assessment study for the prospect area should be carried out before commencemen |



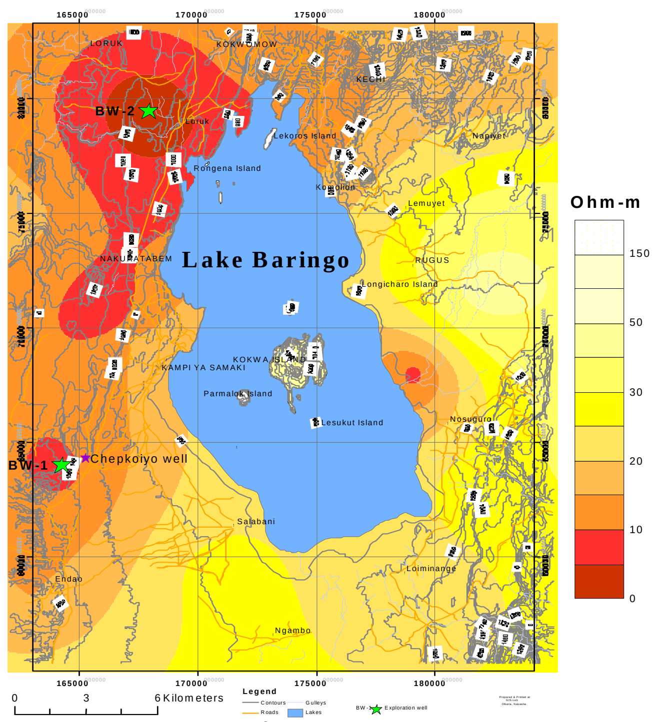

Simplified Geothermal Model of Lake Baringo Geothermal Prospect




Resistivity Distribution at 500masl from TEM measurements in the Lake Baringo Geothermal Prospect




Resistivity Distribution at sea level from MT measurementsin the Lake Baringo Geothermal Prospect

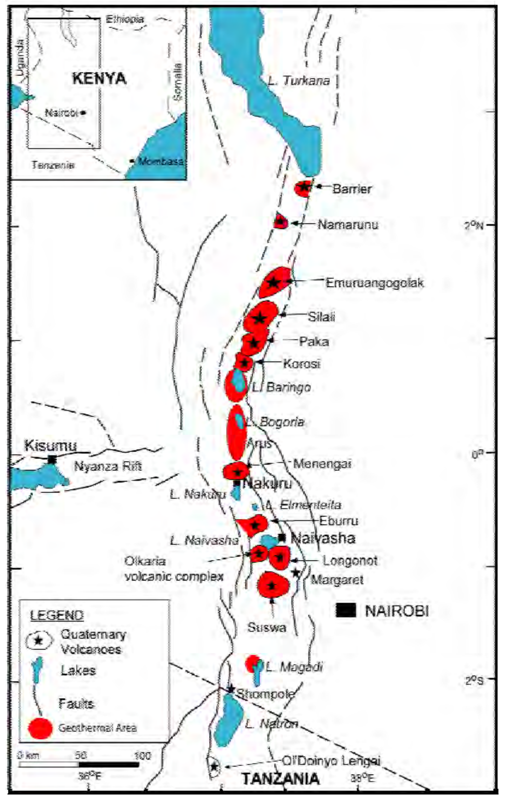



Proposed Location for Exploratory Wells (BW-1 and BW-2) in the Lake Baringo Geothermal Prospect

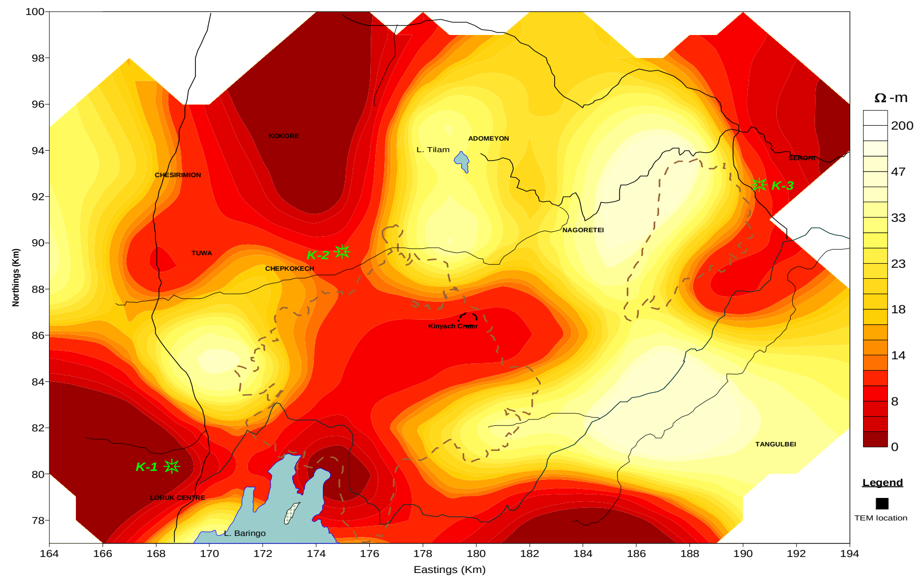
**Table 4.1 Chemical composition of water samples from Baringo boreholes**

| NAME | Temp | pH | Cond | TDS | $H_2S$ | $CO_2$ | $SO_4$ | Cl | F | Li | $SiO_2$ | B | Na | K | Ca | Mg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chebarsiat | 30.5 | 8.3 | 590 | 396 | 0.14 | 242 | 39 | 32 | 0.6 | 0 | 108 | 0.1 | 129 | 2.5 | 4 | 2 |
| Chepkerelionin | 28.4 | 7.8 | 770 | 505 | 0.07 | 385 | 6 | 46 | 0.5 | 0 | 62 | 0.1 | 85 | 2.3 | 72 | 50 |
| Koroto 1 | 27.1 | 7.4 | 790 | 539 | 0.03 | 502 | 23 | 21 | 0.5 | 0 | 55 | 0 | 64 | 2.5 | 101 | 119 |
| Koroto 2 | 29.3 | 7 | 940 | 626 | 0.03 | 787 | 2 | 17 | 0.5 | 0 | 54 | 0 | 56 | 1.3 | 132 | 64 |
| Rorobai | 32.1 | 7.5 | 850 | 566 | 0.07 | 490 | 42 | 21 | 1.4 | 0 | 35 | 0 | 156 | 8.2 | 47 | 31 |
| Endao | 29.3 | 7.2 | 640 | 425 | 0.11 | 424 | 17 | 19 | 1 | 0 | 36 | 0 | 88 | 8.7 | 67 | 19 |
| Marigat | 29.5 | 7.5 | 360 | 238 | 0.11 | 204 | 30 | 9 | 0.9 | 0 | 23 | 0.1 | 26 | 4.1 | 57 | 91 |
| Akorian | 30.3 | 7 | 520 | 341 | 0.17 | 246 | 17 | 21 | 3.0 | 0 | 34 | 0 | 77 | 9.3 | 68 | 20 |
| Kosile | 30.8 | 7.2 | 480 | 314 | 0.17 | 138 | 19 | 13 | 1.5 | 0 | 42 | 0 | 52 | 2.4 | 60 | 22 |
| Barsemoi | 29.3 | 7.3 | 820 | 551 | 0.07 | 510 | 5 | 21 | 0.8 | 0 | 92 | 0 | 101 | 2.6 | 106 | 48 |
| Chebarsiat 2 | 26.5 | 7.5 | 870 | 580 | 0.05 | 471 | 36 | 30 | 0.7 | 0 | 49 | 0.1 | 65 | 4.6 | 113 | 54 |
| Tibingar | 29.3 | 7.1 | 800 | 537 | 0.05 | 427 | 3 | 18 | 0.5 | 0 | 38 | 0.2 | 610 | 1.7 | 132 | 53 |
| Loruk | 47.5 | 8.2 | 1550 | 1027 | 0.26 | 436 | 341 | 159 | 15.6 | 0 | 88 | 0.6 | 342 | 17 | 12 | 24 |
| Chebarsiat 3 | 31.9 | 8.3 | 750 | 499 | 0.2 | 233 | 24 | 126 | 0.6 | 0 | 73 | 0 | 104 | 4.3 | 16 | 32 |
| Chepkoi | 37.9 | 7.8 | 710 | 454 | 0.05 | 268 | 32 | 42 | 4.4 | 0 | 88 | 0 | 141 | 5 | 21 | 24 |
| Yatoi | 34.9 | 8.3 | 780 | 507 | 0.11 | 391 | 21 | 16 | 0.9 | 0 | 60 | 0 | 168 | 10 | 8 | 167 |
| Komolion 1 | 31.1 | 7.8 | 1820 | 1209 | 0.02 | 682 | 19 | 101 | 4.9 | 0 | 46 | 0 | 441 | 27 | 37 | 58 |
| Komolion 2 | 30.9 | 7.6 | 540 | 366 | 0.03 | 781 | 161 | 10 | 4.7 | 0 | 29 | 0.4 | 85 | 18 | 30 | 24 |
| Lake Baringo | 30.3 | 9 | 680 | 461 | 0.1 | 242 | 17 | 53 | 5.9 | 0 | 59 | 0.1 | 139 | 13 | 42 | 35 |
| Rugus | 31.4 | 8.1 | 9460 | 4730 | 0.03 | 2057 | 2623 | 1095 | 35.0 | 0 | 28 | 0.9 | 2443 | 12 | 6 | 155 |
| Chemeron (Eu) | 37.5 | 7.6 | 800 | 399 | 0.2 | 120 | 20 | 102 | 16.1 | 0 | 45 | 0.1 | 142 | 1.9 | 26 | 37 |
| Lokodowiabet | 32.5 | 8.3 | 800 | 537 | 0.09 | 304 | 24 | 65 | 2.3 | 0 | 58 | 0 | 157 | 7.3 | 14 | 42 |
| Sokotei | 32.7 | 8.5 | 41200 | 30640 | 0.18 | 5346 | 17111 | 3813 | 24.5 | 0 | 5 | 0.6 | 9786 | 20 | 29 | 45 |
| Chepkoiyo well | 97 | 9.3 | 8430 | 5010 | 1.7 | 3245 | 175 | 329 | 57.4 | - | 318 | - | 2078 | 62 | 1.45 | - |

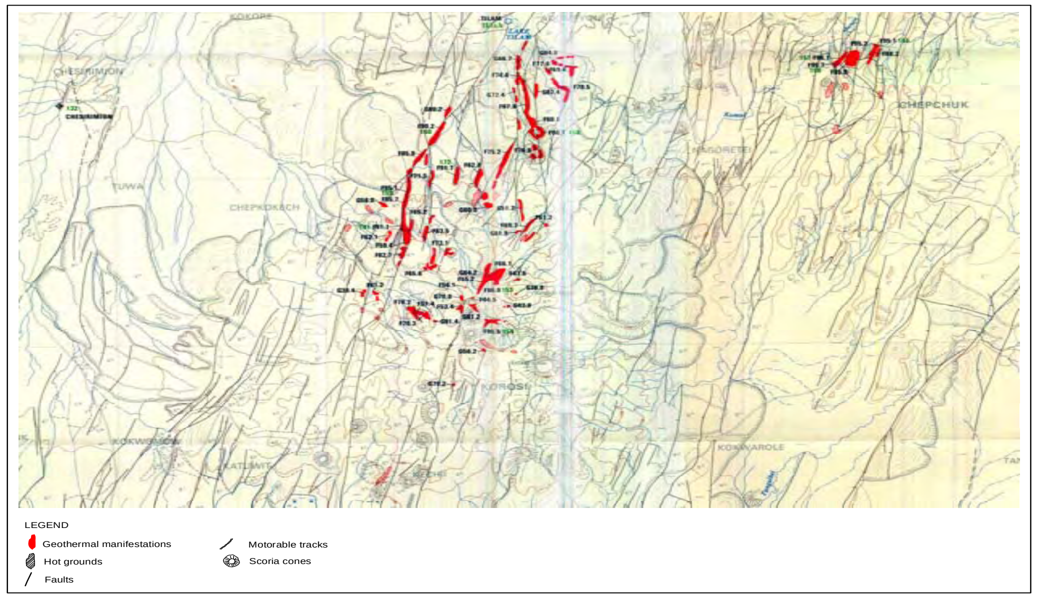
| | |
|---|---|
| Field Name | Korosi |
| Country | Kenya |
| Province/Location | Korosi - Chepchuk area is located in Baringo district of the Kenyan Rift Valley and is neighboring Lake Baringo to the south and Paka volcano to the north at approximately 00o 45'N, 36o05' E. The volcano occupies an area of about 260 km2 and rises to about 500 m above the surrounding floor of the inner trough of the rift valley, reaching a maximum height of 1446 masl on the summit cone of Kotang in the northeast. |
| Accessibility | An all weather Marigat-Loruk road provides access to the area. The road branches at Loruk with one branch continuing eastwards passing the eastern side of Korosi, Chepchuk and Paka through Tangulbei and Churo before joining the Nairobi-Maralal road. The other branch continues northwards and passes through Nginyang, Kapedo, and Lomelo. These two well-maintained murram roads provide access to the eastern and western sectors of the prospect area and from them a number of poorly defined and rough tracks that are impassable during the rainy seasons branch. A rough track extending in an E-W direction between Nginyang and Tangulbei provides access to the northern flanks of both Korosi and Chepchuk volcanoes.<br>The area is served by a network a fixed line telephone communication at most shopping centres within the area. GSM telephone communication can be accessed at some locations in the prospect area, though satellites phones can be accessed everywhere within the prospect area. |
| Resource Characteristics<br>Geology | The geology of Korosi is mainly dominated by the intermediate lavas (trachytes and trachy-andesite), which cover the central and eastern sectors of the prospect area and basalts dominating the south, north and western sectors. The southwestern plain is, however, dominated by fluvial and alluvial deposits whereas the air-fall pumice deposits dominate the western plains. |
| Volcanic activity (heat source) | Korosi is a multi vent complex composed predominantly of trachyte lavas, which have built up a low volcanic shield, upon which lesser amounts of basalt, mugearite and pyroclastic deposits have erupted.<br>The main faulting and basaltic activity was followed by the eruption of Upper Trachyte lavas, domes and pumice scoria cones, which are aligned along the NNE-trending faults. The majority of the lavas were erupted from the northern part of the summit area and flowed down to the northern flanks of the volcano. Radiometric dating of the Upper Trachyte lavas indicates an age of 104±2 ka.<br>Heat source is associated with shallow magmatic bodies under the volcano and intrusive dykes along NNE structures. The location of the prospect areas allow for recharge of waters from the wet rift flanks into the deep hot intrusives. The areas have extensive faulting which can allow upflow of hot geothermal fluids to shallow depths. |
| Geological Structrure | The structural development of the Korosi segment of the rift occurred between 5.3-1.6±0.01 Ma with the landscape as it is today having been formed during the last 100,000 yrs BP. The structural setup of the area is defined by dominant NNE and N trending fault swarm within the axial region. The dominant fault trend at Korosi is somewhat discordant with rift boundaries at that latitude which is more in NE trend. The fault zone defines a micro-graben within the axis of the rift; the boundaries of which are marked by the Nakaporon fault in the west and Nagoreti fault in the east. The latter fault also defines the western boundary of the Chepchuk volcanic edifice.<br>The Korosi volcanic massif is located entirely within the micro-graben marked by the Nakaporon and Nagoreti faults but with a bias to the west resulting in some of the Korosi volcanic products overflowing the walls of the east-dipping Nakaporon fault. The occurrence of cinder cones and other volcanic centres are controlled by the major N and NNE trending faults. |
| (Past Geological Studies included) | The detailed geological mapping to confirm the reported geological features, surface geology, structures, hydrothermal indicators and their distribution was already carried out in KenGen surface exploration study (2005-2006). |
| Geochemistry | Fumarole steam chemistry indicate reservoir temperatures in the range of 200- 280 oC for both Chepchuk and Korosi prospects calculated using gas based geothermometers (TH2S). The fumaroles with the highest calculated geothermometry temperatures are found around Chepchuk (209 – 282 oC) and around Korosi (244 – 259 oC). |
| Work done so far | Fumarole steam discharges, borehole waters and carbon dioxide in soil gas were sampled and analysed . The results have been used to estimate reservoir temperatures based on geothermometry in KenGen surface exploration study (2005-2006). |



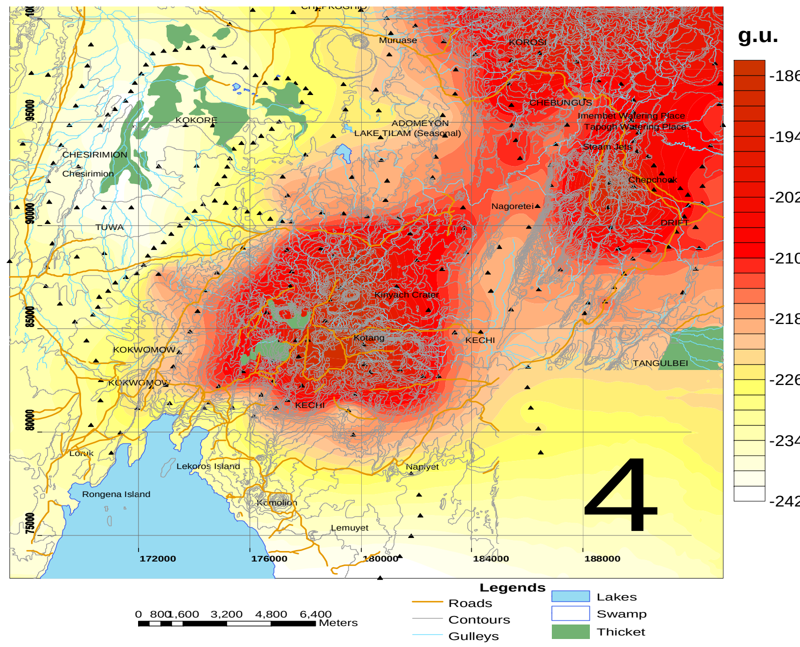

Location of Korosi Geothermal Prospect



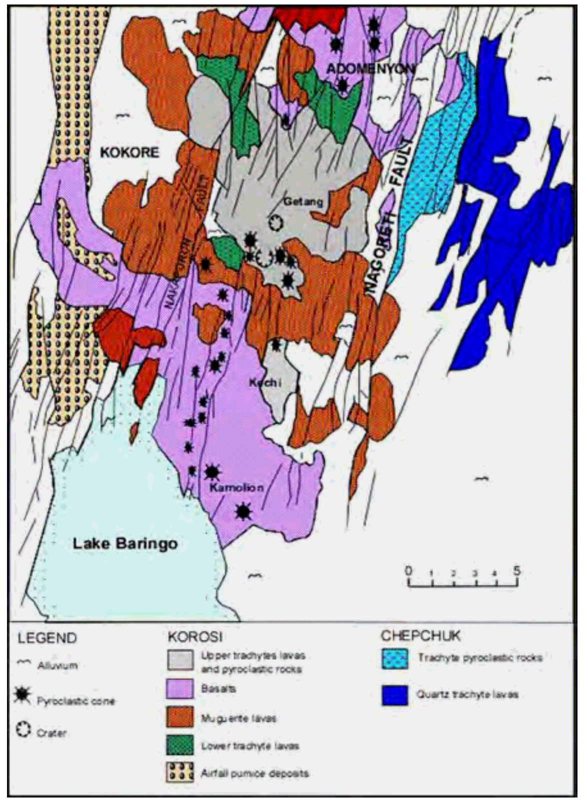

Location of the three proposed exploratory wells at Korosi--Chepchuk prospect superimposed on a TEM resistivity distribution at 450 masl map



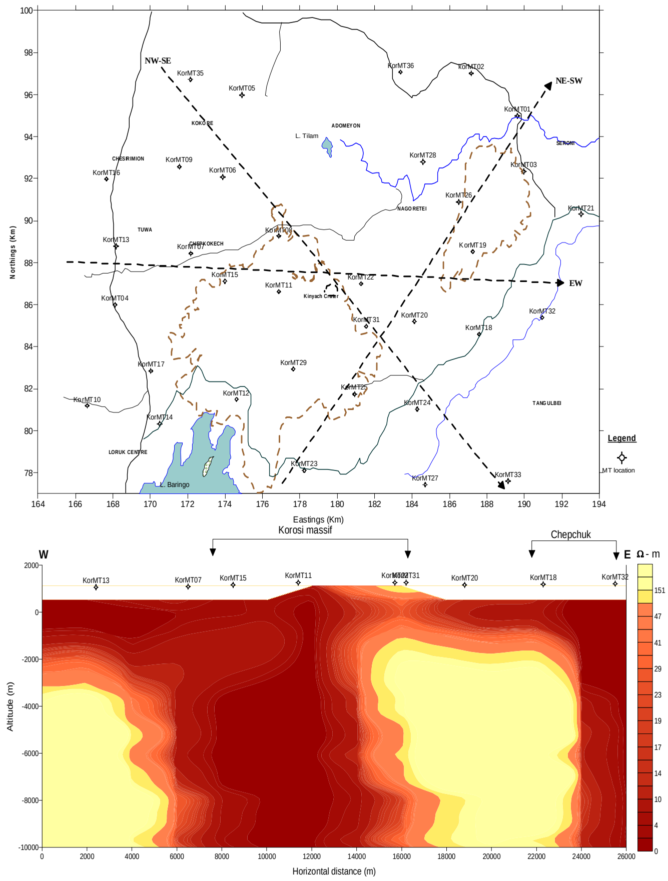

Structural map of the Koroshi Geothermal Prostect
indicating areas of high thermal manifestations



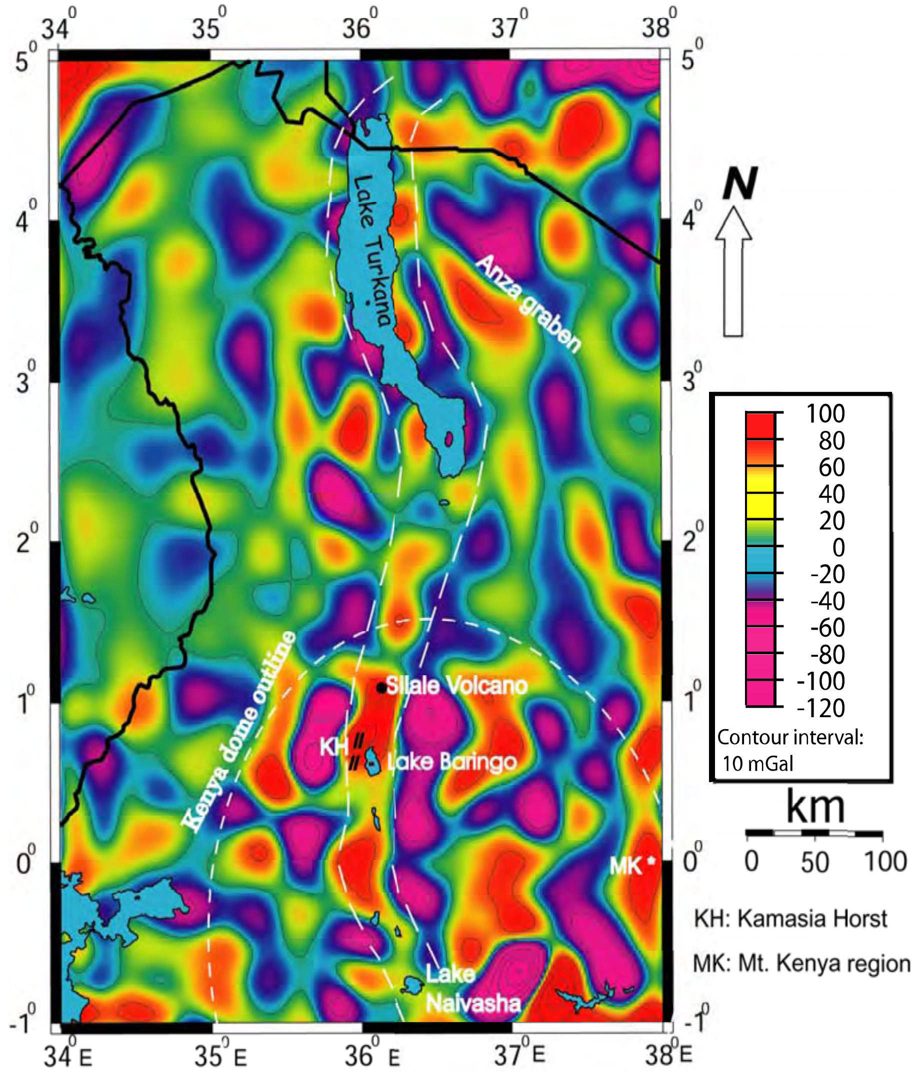

Bouguer Anomaly Distribution in the Korosi-Chepchuk area
The triangular symbols indicate the locations of the gravity stations.



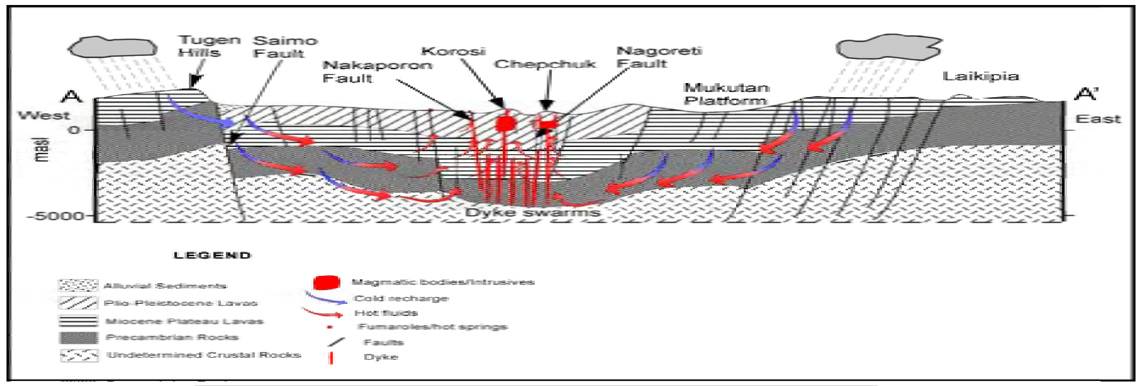
| | |
|---|---|
| Geophysics | Gravity and Ground Magnetic surveys, Transient-ElectroMagnetic (TEM) measurements, Magnetotelluric (MT) measurements and Micro-Seismic data collection were carried out in KenGen surface exploration study (2005-2006). 44 TEM soundings, 36 MT soundings, 280 Gravity stations and 280 Ground magnetic stations were covered. Results of these investigations have been used to infer the depth and extent of the possible heat source and geothermal reservoir and ti site the exploration wells. |
| Gravity/Magnetics | Aeromagnetic data exist over much of the Kenya rift valley. The data was collected by CCG for the National Oil Corporation of Kenya (NOCK, 1987).<br>These data were examined along with gravity anomalies and a qualitative interpretation carried out over the Korosi-Chepchuk prospects. Magnetic anomalies seen here were not different from those over those coinciding with volcanic centres at Suswa, Olkaria, Eburru and Menengai. These anomalies are interpreted as being caused by changes in the susceptibility of rocks due to demagnetization by heating above the Curie point. It is observed that, both from gravity and magnetic data that an anomalous area exists in the central part trending in a NE direction, connecting the volcanic centres of Korosi, Chepchuk and Paka. The gravity and magnetic signatures suggest shallow magmatic intrusions. These could be providing the heat source to possible geothermal reservoirs. The data shows that there could be a large resource in the western and north-western parts of the prospect. |
| Resistivity (MT/TEM) | From the resistivity results from TEM and MT suggest that the Korosi-Chepchuk prospect appears to host three large geothermal systems occupying the immediate NW of Lake Baringo (near Loruk centre), NW of Korosi massive and NE of Chepchuk volcano. Intersections of major structures such as Ol Arabel lineament with the NE-SW and N-S structures that run along the rift floor appear to play a significant role on resistivity distribution in this prospect. MT resistivity cross-sections show low resistivity anomalies at depth that could be related to heat sources. |
| Well Drilling | None |
| Temperature Survey | None |
| Well testing | None |
| Conceptual Model | Seismic studies done at the Kenyan North Rift in the early 1990s indicate that the crust thins north of Lake Baringo area and is estimated to be 20-25km thick. Observations from both geological and geophysical studies indicate that dense bodies exist under Korosi volcano. The bodies are expected to provide heat for the geothermal system under Korosi. Intrusions of magma along the NNE structures have also resulted in an emplacement of additional shallow heat sources. It is postulated that the geothermal system at Korosi is still active and that a reservoir exists under the massif with a bias towards the north.<br>Sources of hydrothermal fluids in the Korosi geothermal system are the groundwater from the eastern rift flanks and the Tugen Hills. The high hydraulic gradient between the high recharge areas and the floor allows for deep recharge into the geothermal reservoirs. The fluid flow is enhanced by the highly fractured Plio-Pleistocene lavas that are dominant in this part of the rift.<br>The reservoir rocks are postulated to be Plio-Pleistocene lavas and the associated pyroclastics. The cap rocks are envisaged to be the widespread Korosi tuffs and pyroclastics at depth, which are expected to provide for proper sealing. |
| Present Status of Development | ♦ A high temperature geothermal resource do exist in the Korosi and therefore deep wells (~2000 m), should be drilled in the prospect to confirm the characteristics and potential of the geothermal reservoir(s). The central northern portion of Korosi volcanic massif is proposed as the target area.<br>♦ The heat source for the geothermal resource at Korosi is associated with shallow magmatic bodies associated with the Upper Trachytes and to a less extent the intrusive dykes associated with the Young Basaltic magmatism.<br>♦ The reservoir rocks in the prospect are hypothesized to be either Loyamarok Trachy-phonolite or Baringo Trachyte together with associated volcanic rocks. |
| Natural/Social Environmental Condition | |
| Power Sector Situation | |
| Power Output Potential | |
| Resource Potential | 450MW (estimated): Reconnaissance and surface exploration done. Detailed surface exploration planned for 2010 and exploration drilling in 2011. |
| Restrictted by National Park | |
| Restricted by Power Demand | |
| Rank of Development Priority | B |
| Potential (Expected) Developer | |
| Proposed Geothermal Development Plan | |
| Outline for Power Development | |
| Possible or Recommended Multi-purpose Geothermal Heat Use | |
| Scope for Power development | |
| CO2 emmission Reduction ('000 tonne/year) | |
| Proposed Geothermal Development Schedule | |
| Location Map | |
| Other Figures | |



MT Profiles (upper) and E-W Resistivity Section (lower) across Korosi-Chepchuk Prospect

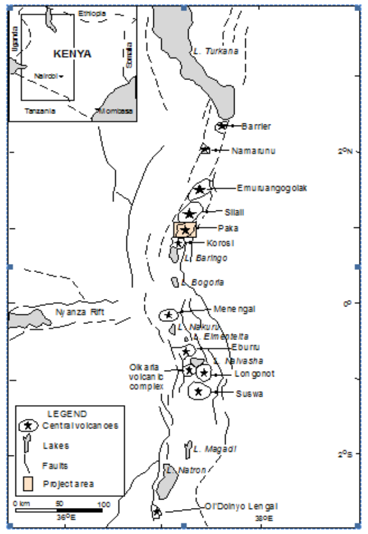


Band-pass filtered gravity map of the northern part of the Kenya rift. (Mariita, 2003)



The conceptualized geothermal model of Korosi and Cheptchuk Geothermal Prospects

| Field Name | Paka |
|---|---|
| Country | Kenya |
| Province/Location | Paka is situated approximately 25 km north of Lake Baringo at 00o 25' N and 36o 12' E. It is one of the promising prospects in the North Rift. The area covered by this survey extended about 400km2 around the volcano massif. |
| Accessibility/Communication | The prospect is accessed via Nakuru-Marigat road, and a drive through rough earth tracks through east of Nginyang, shopping centre. The road communication within the prospect area is very poor. |
| Resource Characteristics<br>Geology | Paka Volcano lies in the inner trough of the Kenya Rift. The volcano massif extends over an area of about 280 km2 and rises between 600-700 m above the rift floor. The central volcano (Paka) rising to a height of 1697masl is surrounded by plains to the north, south, west and east. At the summit well preserved caldera about 1.5km in diameter, which is filled with young basaltic flows.<br>Several craters dotting the massif are aligned in a NNE direction (plate 1). The volcano is cut on its central and eastern flanks by a swarm of NNE trending faults.<br>Paka is a small shield volcano constructed largely by trachyte lavas and pyroclastic deposits. Basalt, hawaiite, mugearite, lavas were erupted from a series of fissure and fault zones located on the lower northeastern and southern flanks. |
| Volcanic activity (heat source) | Volcanic activity commenced by 390 ka and continued to within 10 ka. Broadly contemporaneous trachytic and basaltic activity occurred on a number of small satellite centres peripheral to the main volcanic edifice. The oldest exposed rocks are the Lower Trachytes, which constructed an early volcanic shield. Subsequent fracturing of the shield by the NNE-trending faults was accompanied by eruption of the Lower Basalts from fissure sources on the eastern flanks of the volcano.<br>The magma chamber in Paka is still active as indicated by the eruptions of the young basalt lavas within the caldera and along fissures to the north of the volcano.<br>The main heat source for the geothermal system at Paka is possibly a trachyte or trachyte-basaltic body underlying the volcano.<br>Heat source; Existence of a centralized volcano with young eruptions implying still active and hot magma bodies at Paka. Young trachytic lavas implying a shallow (high viscosity) magma that has had sporadic infusion of basaltic material (post caldera basalts) in recent times ~ 10,000yrs ago. Pyroclastic eruptions at Paka also implies an evolved silicic magma body at very shallow depths (~ 6-10km)<br>From the geophysical study, two heat sources are estimated in the depth: one E-W trending below the caldera summ |
| Geological Structrure | The main structural features in the northern sector of the Kenya Rift where the prospect is located include; the eastern rift flank, the rift proper, the caldera, NW, NNE and N-S trending faults and fractures. The structure of Paka is dominated by a broad zone of normal faulting 7.5 km wide graben bound by the eastern and the western fault boundaries respectively. This zone shows a right stepping en echelon arrangement along the volcano and forms one of the regional fault pattern, which extends southwards to Chepchuk and northwards into the southern flanks of Silali. On the southern flanks of Paka, the general direction of the faults is N-S, but to the north of the summit, it shows arcuation into a NNE to a NE trend. |
| (Past Geological Studies included) | Detailed surface investigations in Paka were carried out between September 2006 and April 2007 period by a team of KenGen Scientist and Engineers. Detailed geological and hydro-geological surveys were carried out to determine the volcanological structure of the Paka and surrounding. |
| Geochemistry | In some of these areas maximum temperatures exceed the local boiling point with the maximum temperature recorded being slightly over 97oC. Occurrences of Sulphur were observed in the fumaroles in the Eastern crater and it is an indication that the faults deep seated, and tapping directly from the magma.<br>On the southern upper parts of the flanks patches of hot grounds, some of which are weak fumaroles are scattered, but follow a N-S linear trend. These areas show alteration to reddish and whitish kaolinite and alunite clays respectively.<br>To the northern part of the area, an isolated geothermal activity in form of warm grounds occurs in the crater at Murulen.<br>Geothermal activity on Paka is dispersed over a broad NNE-trending zone covering an area of 48 km2 extending from high Paka mountain southern flanks northwards across the summit area and over the northern flanks. The activity on the summit rim on the eastern side of the Paka Massif is extensive. Altered grounds are observed to the north of the Paka Volcano in the Nading area. |
| Work done so far | Sampling of water borehole, fumaroles and steaming grounds sampling, soil gas and radon surveys:<br>Geochemical analyses of fluids from natural outlets including fumaroles, a borehole water and soil gas was carried out to predict the possible physical qualities of possible geothermal reservoir at the subsurface. |




Location of Paka Geothermal Prospe

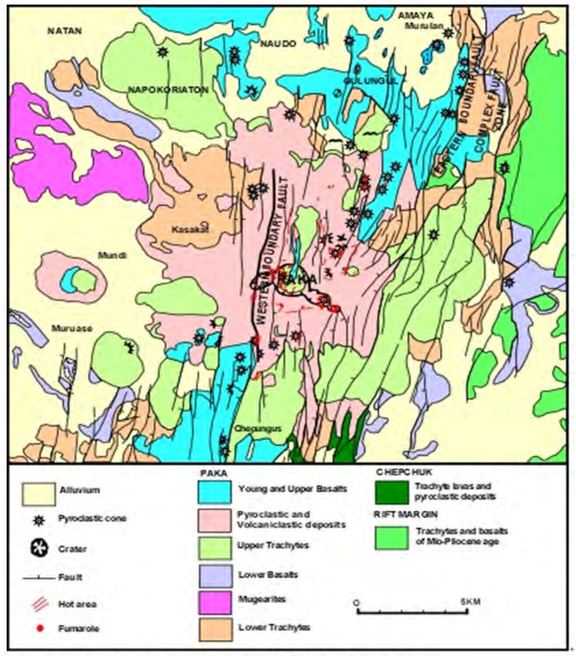



**Figure 2.1.** Geological map of Paka volcano.

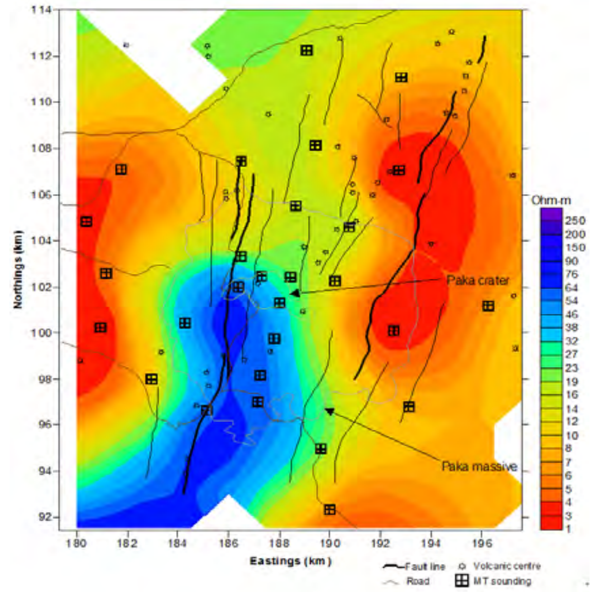



Figure 3.5: MT resistivity distribution at 1000 mbsl in Paka prospect

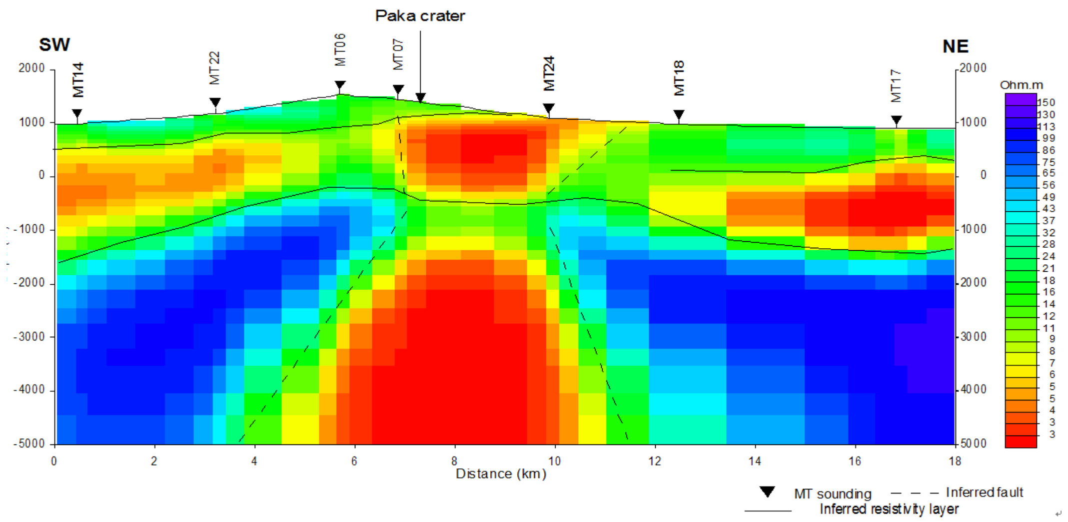


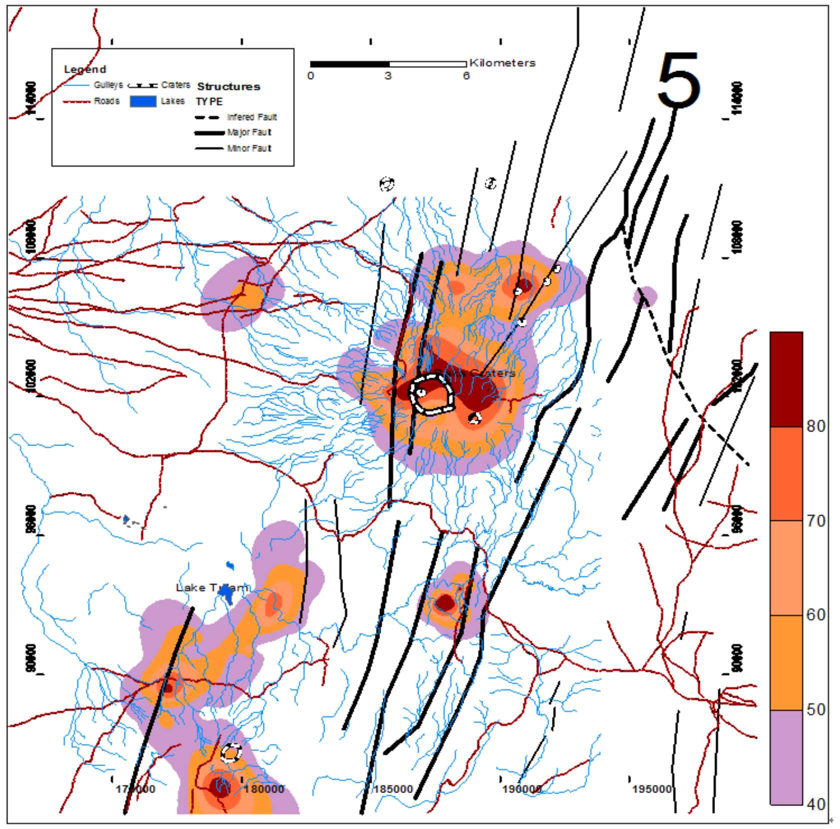

Figure 3.10: NE-SW 2D MT resistivity cros-section

| | |
|---|---|
| Geophysics | Geophysical methods including MT, TEM and gravity methods were employed to determine the subsurface structures that may control and contribute to existence of geothermal system. |
| Gravity | |
| Resistivity | A very conductive body directly below the Paka massif at depth of about 3km, which is a zone that has been intruded by magmatic material and could be one of the main heat sources for the geothermal activity in the prospect. This shows that a geothermal reservoir may exist on the Mt Paka peak area at a depth of one kilometer. Shallow (600masl) resistivity isomap show extensive low resistivity alluvial formation covering all valleys and lower slopes of the Paka massif. Thus major leakage from the geothermal system occur only on the volcano cone. |
| Well Drilling | The Paka geothermal prospect has very few boreholes drilled in the area. The boreholes were sampled simultaneously with steaming grounds and fumaroles. |
| Temperature Survey | An attempt was made to apply various geothermometry functions to the thermal waters that were sampled in this geothermal prospect. The Na-K geothermometry temperatures for the borehole waters yield very high temperatures. These range from 182 to 351 ゜C for the borehole water in Orus to those in Nginyang. |
| Well testing | None |
| Conceptual Model | A geothermal system at Paka driven by a heat source at depth and entered below the summit crater and extending to the east. A 4km wide graben structure running NNE across the volcano massif being a main structural control and possible permeability, thus reservoir control at the subsurface. Reservoir temperatures of between 180oC-300oC are expected based upon geothermometry.<br>Two heat sources at depth are offset to the east of the main massif and are controlled by a NW and a NNE deep structures. Consequently upflows and the main reservoirs are expected to be situated over the eastern and NNW of the main massif. The recharge is mainly from the eastern (Laikipia scarp) at depth. Some recharge also may be coming from south and west at depth. Ouflows are mainly on the volcano massif, especially in the summit craters and northwards along the NNE graben faults. This is due to enhanced vertical permeability due to fracturing of the capping formation. The capping formation is thick alluivial deposits composed of volcaniclastics and pyroclastics in the lowlands surrounding the Paka massif. |
| Present Status of Development | Deep exploratory drilling is recommended at Paka to confirm the geothermal reservoir and enable direct measurements into the subsurface, and determination of petro-physical state of the reservoir. |
| Natural/Social Environmental Condition | A base line environmental survey was undertaken to create an inventory of the present status and predict any possible environmental impact that development/utilization of the geothermal resource in the area might have. Paka volcano is the center of east Pokot community who survive mainly on livestock on the arid rocky country that cannot support other form of farming. Development of the geothermal resource at Paka would have a very positive socio-economic impact to the population of this area. |
| Power Sector Situation | |
| Power Output Potential | |
| Resource Potential | 500MW (estimated): Reconnaissance and surface exploration done. Deatailed exploration planned for 2010 and exploration drilling in 2011. |
| Restrictted by National Park | |
| Restricted by Power Demand | |
| Rank of Development Priority | B |
| Potential (Expected) Developer | |
| Proposed Geothermal Development Plan | |
| Outline for Power Development | |
| Possible or Recommended Multi-purpose Geothermal Heat Use | |
| Scope for Power development | |
| CO2 emmission Reduction ('000 tonne/year) | |
| Proposed Geothermal Development Schedule | It therefore recommended that the three localities (PW1, PW2 & PW3) should be drilled to depth of 2.5km to determine the detail petro-physical characteristics of the geothermal reservoirs in the prospect. |
| Location Map | |
| Other Figures | |

Table 4.3: Aqueous geothermometry temperatures from Paka geothermal prospect.

| Date | Site | Na-K (F, 1979) | Na-K (G, 1988) | Na-K-Ca (F & T, 1973) | Tqtz P&F 1982 |
|---|---|---|---|---|---|
| 22.11.2006 | Nginyang SDA | 348 | 351 | 266 | 126 |
| 14.11.2006 | Orus | 182 | 200 | 164 | 79 |
| 9.11.2006 | Dabalikow | 250 | 263 | 209 | 101 |
| 16.10.2006 | Kokwototo | 270 | 281 | 221 | 97 |
| 04.10.2006 | Chemolingot D.O's Office | 348 | 351 | 265 | 97 |

Figure 5.1 Temperature distribution at Paka (one metre depth)



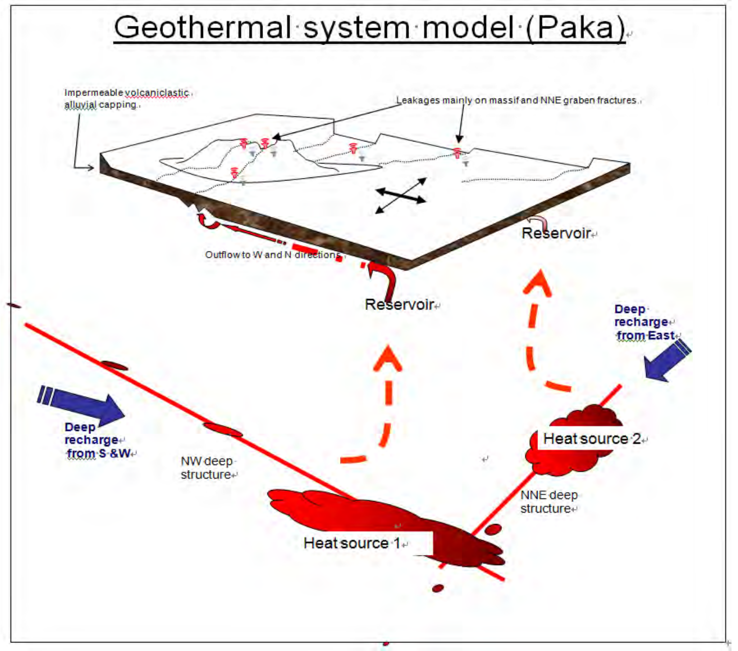
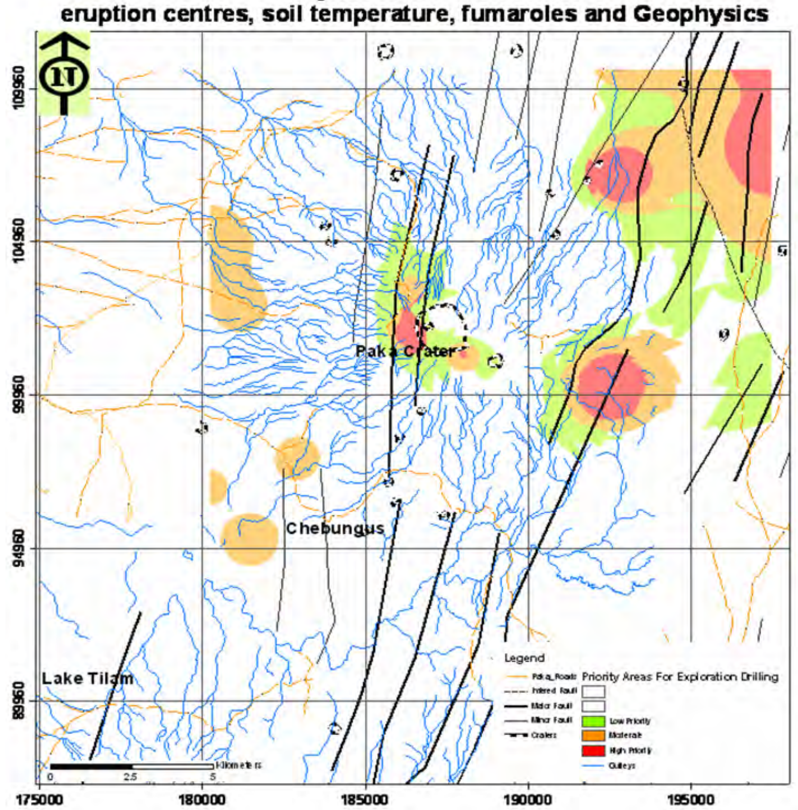




Figure 7.2 Conceptual model of the geothermal systems at Paka

Priority well sites - based on eruption centres, soil temperature, fumaroles and Geophysics



| | |
|---|---|
| Field Name | Silali |
| Country | Kenya |
| Province/Location | Silali Volcano is located in the northern Kenyan rift valley, 1°10'N, 36°12'E. |
| Accessibility | Since the area is not motorable, the planned survey will be carried out using a helicopter so as to access the caldera floor and other difficult areas. Already helicopter services have been procured. |
| Resource Characteristics<br>Geology | Silali is the largest Quaternary caldera volcano in the northern Gregory Rift and is composed predominantly of peralkaline trachytic lavas and pyroclastic deposits, and mildly alkaline to transitional basalts.<br>It contains a spectacular 8 x 5 km diameter summit caldera which formed 63,000 years ago. The steep caldera walls are up to 300 m high.<br>The summit of Silali volcano rises 800 m above the surrounding terrain. The floor of the surrounding plain slopes northward from an altitude of 800 m to 600 m towards Emuruangogolak.<br>The surface features in Silali are manifested to the western slopes of the volcano in form of hot springs at Kapedo while the eastern part is characterized by numerous fumaroles and widespread hot and altered grounds with surface temperatures ranging from 65-90 o C. The series of springs (Kapedo) to the western side discharge at temperatures of 45-55ºC with a combined estimated flow-rate of about 1,000 l/s, |
| Volcanic activity (heat source) | Detailed mapping combined with radiometric 40Ar/39Ar age determinations is used to constrain the evolutionary development of Silali. Activity commenced at c. 400–220 ka with the construction of a low relief lava shield whose summit area was subsequently modified by alternating periods of faulting, subsidence and infilling associated with two major periods of explosive activity. This activity ceased around 133–131 ka and was probably the result of fracturing and decompression of a high level magma chamber by regional extension and the injection of basaltic dykes below the volcano. Later eruptions (c. 120 ka) along the western flanks migrated eastward with time and culminated in the eruption of viscous trachyte lavas from a circumferential fissure zone. The emplacement of a basic dyke swarm to shallow crustal levels beneath Silali resulted in the formation a broad volcanic rift zone within which large volumes of fluid basalts were erupted to mantle the flanks of the volcano. This activity mainly pre-dated, but probably also overlapped with, incremental subsidence and asymmetric downsagging of the summit area and the pr |
| Geological Structrure/Geographical Features | Early eruptions of Silali volcano formed a 500 m high lava shield. Construction of the shield was followed by eruption of Kapedo tuffs from pyroclastic cones on the western flanks. Eruption of Kapedo tuffs was followed by major eruption of summit trachytes which cover most of the western slopes. Lava was erupted from a fault, rather than from a cone.<br>Eruption of Katenmening basalts from fissures covered all of the western slopes. This stage was followed by development of three cones at the base of the east facing summit scarp. Lava flows from the cones extended northwards. The final stages of Silali volcano evolution involved the emplacement of Black Hills mounds on the upper eastern flanks of the mountain.<br>Geothermal activity is present in the caldera and upper eastern flanks. Some eruptions may have occurred a few hundred years ago. |
| (Past Geological Studies included) | The reconnaissance survey in Silali was carried out late in 2009 and the inception report which includes the work program and logistics was prepared. |

The impressive 5 x 8 km summit caldera of Silali volcano is seen in an aerial view from the SE. Formation of the 300-m-deep caldera is related to the incremental eruption of basaltic and trachytic lava flows about 63,000 years ago. N-S-trending rift valley faults cutting across the volcano can be seen at the lower left. Some of the youthful parasitic cones on the caldera floor and flanks of Silali, the largest volcano of the northern Gregory Rift, may be little more than a few hundred years old.

| | |
|---|---|
| Geochemistry | Silali has some of the largest hot springs within the Kenya rift, indicating high likelihood of existence of a geothermal system under the volcano. It is estimated that Kapedo, which is one of the hot springs, associated with Silali, discharges 1000 liters per second of water at 50 to 55 ℃. This translates into about 100 MW from this region alone. Fluid chemistry, however, indicates that the fluids are not directly from the up flow but have undergone interaction with shallow ground waters. |
| Work done so far | Detailed geoscientific studies will be carried out in 2009-2010. |
| Geophysics | Detailed geoscientific studies will be carried out in 2009-2010. |
| Gravity/magnetic | The presence of a positive magnetic anomaly that is coincident with the dimensions of the caldera is further proof of the presence of a hot body under the caldera. High 3He/4He suggests the proximity of the fumaroles in Silali to a shallow magmatic body. Seismic studies indicate high activity in the east and south east of the caldera floor, which could be related to a geothermal system. |
| Resistivity | Detailed geoscientific studies will be carried out in 2009-2010. |
| Well Drilling | Exploration drilling is planned to be carried out in 2010-2011. |
| Temperature Survey | |
| Well testing | |
| Conceptual Model | The model for the system can be explained in terms of an up flow within the caldera with a resource area being probably more than 75 km2. The fluid then outflows mainly to the west and north through formational contacts and faults and fractures discharging on the surface at Kapedo springs and other manifestations in the area. The resource in the prospect is estimated equal to more than 300 MW for 25 years. |
| Present Status of Development | The Geo-scientific work to be carried out in Silali prospect will involve broadly the following:<br>• Geological mapping of the rock formations, structural mapping, hydrogeological and volcanological studies of the volcano,<br>• Geophysical measurements that shall include resistivity (MT and TEM)<br>• Geochemical sampling for fumarole steam, water points and soil gas survey,<br>• Heat loss measurements,<br>• GIS data acquisition<br>• Environmental baseline data collection |
| Natrural/Social Environmental Condition | |
| Power Sector Situation | |
| Power Output Potential<br>Resource Potential<br><br>Restrictted by National Park<br>Restricted by Power Demand | 800MW (estimated): Reconnaissance has been completed. Detailed Surface exploration to commence mid-2010 and exploration drilling planned for 2011.<br>Silali is one of the largest potential in the northern Kenya Rift. |
| Rank of Development Priority | B?　Silali is ranked highly among the prospects to be developed. From the result of the regional reconnaissance survey data available. The volcano is very promising. |
| Potential (Expected) Developer | |
| Proposed Geothermal Development Plan<br>Outline for Power Development | |
| Possible or Recommended Multi-purpose Geothermal Heat Use | |
| Scope for Power development | |
| CO2 emmission Reduction ('000 tonne/year) | |
| Proposed Geothermal Development Schedule | |
| | |
| Location Map | |
| Other Figures | |

Kapedo hot springs discharging 1,000 l/s of hot water at 55oC.

別冊資料-1-11　Emuruangogolak地域（ケニア）の地熱資源状況

| | |
|---|---|
| Field Name | Emuruangogolak |
| Country | Kenya |
| Province/Location | Emuruangogolak volcano is located 100 km south of Lake Turkana, at the narrowest part of the Baringo-Suguta trough. The rift valley at this latitude is about 125 km, wide. |
| | The volcano covers an area of about 600 sq km and rises to over 700 m above the rift floor. It has maximum E-W and N-S dimensions of 20 and 32 km respectively. |
| Resource Characteristics<br>Geology | The broad Emuruangogolak shield volcano is situated at a narrow constriction in the Gregory Rift and almost completely straddles it. A 5 x 3.5 km summit caldera formed about 38,000 years ago. Since then trachytic and basaltic lava flows were erupted on the northern and southern flanks and within the caldera. A NNE-SSW-trending chain of lake-filled basaltic maars extends along the floor of the rift from the lower flanks of the volcano. Young lava flows were also erupted from vents along rift valley faults. Well-preserved parasitic cones erupted along rift-parallel faults cutting the volcano abound; the latest eruption produced a trachytic lava flow dated from secular magnetic variation measurements at about the beginning of the 20th century. Fumarolic activity and hot steaming ground occurs along NNE-trending fissures within the caldera and along the lower NW flanks. |
| Volcanic activity (heat source) | Volcanic activity commenced about one million years ago. Hot ground and fumaroles are located along fissures within the caldera and lower NW flanks. Emuruangogolak has experienced two episodes of summit collapse which produced shallow nested calderas.<br>Parasitic pyroclastic cones situated on the upper western flanks of Emuruangogolak and represent Pre-caldera I Pyroclastic Activity.<br>The dimensions of the first caldera measure 9 × 7.5 km, slightly elongated along a north-west/south-east orientation. The caldera I wall is preserved as a 5 km section running south from Enambaba cone. On the eastern side of the volcano, the caldera I fault is difficult to identify. To the north caldera I rim is buried beneath eruption products from Enambaba and Nakot.<br>The second caldera measures 3.5 × 4.5 km and like the first, is elongated along a north-west/south-east direction. The maximum height of the caldera II wall of 75 m occurs on the south side. Basalt lava was erupted from the summit area soon after the second caldera collapse.<br>The most recent lava flow on Emuruangogolak is a trachyte block lava, erupted from a small cone lyin |
| Geological Structrure | |
| (Past Geological Studies included) | |
| Geochemistry | Geothermal manifestations, some of which are at boiling point, suggests the presence of a geothermal system which gas geothermometry indicates to be at temperatures of 200℃ to 350 ℃. Abundance of fumaroles at higher temperatures on the eastern half of the caldera floor may imply a better geothermal system in that segment. |
| Work done so far | |
| Geophysics | |
| Gravity | |
| Resistivity | |
| Well Drilling | |
| Temperature Survey | |
| Well testing | |
| Conceptual Model | It is anticipated that the recharge of the geothermal system is good as shown by the occurrence of ho springs on the eastern flanks of the volcano. It can be modeled that the geothermal fluid up flows within the caldera floor and immediate environs and largely outflows to the north and west. The geothermal prospect is capable of supporting more than 200 MW for 25 years. |
| Present Status of Development | |
| Natrural/Social Environmental Condition | |
| Power Sector Situation | |
| Power Output Potential<br>Resource Potential | 650MW (estimated): Reconnaissance planned for 2010 and detailed surface exploration in 2011. |
| Restrictted by National Park<br>Restricted by Power Demand | |
| Rank of Development Priority | |
| Potential (Expected) Developer | |
| Proposed Geothermal Development Plan<br>Outline for Power Development | |
| Possible or Recommended Multi-purpose Geothermal Heat Use | |
| Scope for Power development | |
| CO2 emmission Reduction ('000 tonne/year) | |
| Proposed Geothermal Development Schedule | |
| | |
| Location Map | |
| Other Figures | |

別冊資料-1-12　Namarunu地域（ケニア）の地熱資源状況

| | |
|---|---|
| Field Name | Namarunu |
| Country | Kenya |
| Province/Location | Namarunu is located south of the Barrier Volcano in northern Kenya. Hot springs are located at the volcano. |
| Location | |
| Resource Characteristics | |
| Geology | |
| Volcanic activity (heat source) | The largely Pliocene Namarunu trachytic shield volcano is topped by parasitic cones and lava flows of upper Pleistocene and Holocene age. Voluminous basaltic effusive and explosive activity took place during the early Holocene on the lower northern, eastern, and southern flanks along the axis of the East African Rift, producing fissure-controlled subaerial basaltic scoria cones and lava flows, and partially or completely sublacustral tuff cones, tuff rings, and pillow lavas. Fluid olivine basalts were also erupted from a breached scoria cone forming the summit of Namarunu. The youngest eruptions postdated the drying out of Lake Sugata about 3000 years ago. Some could be as recent as the historical eruptions at The Barrier volcano to the north (Dunkley et al., 1993). Hot springs are located on some of the young volcanic cones on the rift valley floor and on the eastern side of the rift along the base of the Tirr Tirr Plateau. |
| Geological Structrure | |
| (Past Geological Studies included) | |
| Geochemistry | Fumaroles at temperatures ranging from 30 to 100 ℃ occur at the foot of eastern and western fault scarps. Fluid geothermometry indicates a reservoir at temperatures of more than 200 ℃. The hottest springs occur along the eastern fault. Hydrological flow patterns indicate that recharge for the Namarunu prospect is largely from the east and south. The hot springs on the west are probably directly associated with a geothermal system in the south and south-east of Namarunu volcanic area. The area is capable of generating more than 20 MW using binary technology. |
| Work done so far | |
| Geophysics | |
| Gravity | |
| Resistivity | |
| Well Drilling | |
| Temperature Survey | |
| Well testing | |
| Conceptual Model | |
| Present Status of Development | |
| Natrural/Social Environmental Condition | |
| Power Sector Situation | |
| Power Output Potential<br>Resource Potential<br>Restrictted by National Park<br>Restricted by Power Demand | 400 MW (estimated): Reconnaissance and detailed exploration planned for 2011. |
| Rank of Development Priority | |
| Potential (Expected) Developer | |
| Proposed Geothermal Development Plan<br>Outline for Power Development | |
| Possible or Recommended Multi-purpose Geothermal Heat Use | |
| Scope for Power development | |
| CO2 emmission Reduction ('000 tonne/year) | |
| Proposed Geothermal Development Schedule | |
| | |
| Location Map | |
| Other Figures | |

別冊資料-1-13　Barrier地域（ケニア）の地熱資源状況

| | |
|---|---|
| Field Name | Barrier |
| Country | North Rift |
| Province/Location | The Barrier volcanic complex separates Lake Turkana from the broad Suguta Trough to the south, the site of a former lake. |
| Location | |
| Resource Characteristics | |
| Geology | The volcano is comprised of four overlapping shield volcanoes, with the youngest, Kakorinya, located over the axis of the East African Rift. Kalolenyang volcano lies west of Kakorinya, and Likaiu West and Likaiu East volcano are located to the ENE. A 3.8-km-wide summit caldera was formed at Kakorinya volcano about 92,000 years ago. Youthful-looking trachytic and phonolitic lava domes and flows erupted within the caldera and along its ring fracture fill much of the caldera floor. Early Holocene fissure-related scoria cones and lava flows dot the volcano's southern and northern flanks. Solfataric fields are located within the caldera and on the western and southern flanks of the volcano. Historical eruptions from Teleki's and Andrew's cones on the northern and southern flanks, respectively, have produced basaltic explosive activity and lava flows during the 19th and 20th centuries. |
| Volcanic activity (heat source) | The complex consists of three volcanoes of which Kakorinya is the most promising in terms of geothermal potential. Kakorinya is a silicic volcanic center whose caldera formation was accompanied by a collapse about 92,000 years ago, followed by resurgence activity about 58,000 years ago. A caldera association implies that the volcano developed shallow magma chamber whose heat could still drive a geothermal system. Recent basaltic activity at Teleki's volcano (100 years) is a strong indicator that new magma injections still occur, which could raise the local geothermal potential. |
| Geological Structrure | |
| (Past Geological Studies included) | |
| Geochemistry | Developing a geothermal model for the prospect is complicated by lack of geophysical data and conflicting geochemical information. Low $H_2$ and $CH_4$ in the fumaroles and springs indicate an indirect path between the discharges and the heat source suggesting that the potential for the area is low. In contrast, high gas geothermometric temperatures (218 to 328 ℃) suggest proximity to an up flow. |
| Work done so far | |
| Geophysics | |
| Gravity | |
| Resistivity | |
| Well Drilling | |
| Temperature Survey | |
| Well testing | |
| Conceptual Model | It is likely that a high temperature geothermal system exists under the Kakorinya volcano. Sulphur deposits that are indicative of shallow, degassing magmas occur within the caldera, further indicating that a large heat source exists under the volcano. Preliminary indications are that the resource is capable of generating more than 100 MW. |
| Present Status of Development | |
| Natrural/Social Environmental Condition | |
| Power Sector Situation | |
| Power Output Potential | |
| Resource Potential | 450MW (estimated): Reconnaissance planned for 2011 and detailed exploration for 2012. |
| Restrictted by National Park | |
| Restricted by Power Demand | |
| Rank of Development Priority | |
| Potential (Expected) Developer | |
| Proposed Geothermal Development Plan | |
| Outline for Power Development | |
| Possible or Recommended Multi-purpose Geothermal Heat Use | |
| Scope for Power development | |
| CO2 emmission Reduction ('000 tonne/year) | |
| Proposed Geothermal Development Schedule | |
| | |
| Location Map | |
| Other Figures | |