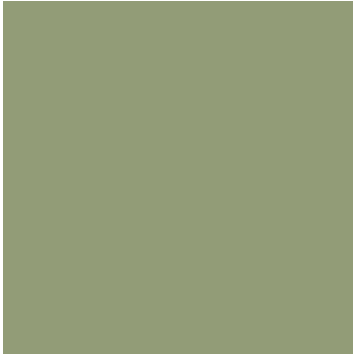


RECENT GEOTHERMAL ACTIVITY



Industry Update for Thorndon Cook – NZGW 2016

Akiira Lenders Engineer, Kenya

Engaged by Green Africa Power to provide Lenders Engineer services for the Akiira 70MW geothermal power project.

To date the work has involved reviews of exploration drilling results including review and comment on drill progress, costs, HSE, drill logs, PTS logs, and well testing results.





Olkaria 1-6 Silica Modelling, Kenya

- Preparation of well deliverability curves and SSI curves from raw data provided by KenGen, to be used by FCRS designer.
- Utilised in-house software package to calculate silica saturation index based on sample collection conditions, sample analysis and gas concentrations.
- SSI curves prepared for a range of design separation pressures to allow selection of FCRS separation pressure.
- Deliverability curves fitted where there was sufficient data to support this. Outputs used for design of FCRS piping network.

Imperial Valley Generic Power Development Study, USA

- Process engineering inputs to a wide ranging feasibility study conducted by Worley Parsons for a US client.
- Generic geothermal plant options, double- flash steam and binary plant options investigated.
- Adaptation of thermodynamic fluid properties for very high salinity brine found in the Imperial Valley.
- Inputs to study included;
 - conceptual design and layouts.
 - process design, PIDs & PFD.
 - heat balance & performance estimates.
 - report on suitability of materials for aggressive chemistry.
 - preliminary specifications & datasheets for major plant.
 - high level MTO for costing.

Lahendong 1 x 5MW EPC Bid Engineering, Indonesia

- Engaged by JFE Engineering to provide concept engineering design sufficient for pricing of the FCRS and power plant main equipment.
- Process Design:
 - Power plant cycle optimisation.
 - Process flow diagrams.
 - P&IDs for FCRS and GPP.
- Concept Design:
 - FCRS and GPP layout.
 - GPP elevations.
 - Calculations and equipment lists, foundation loadings
 - FCRS and GPP descriptions.
- Specifications and Data Sheets:
 - FCRS equipment, incl. piping classes, valves and vessels.
 - GPP equipment, incl. condenser, cooling tower, GRS and hotwell pumps.



Chevron Geothermal Assets DD, Indonesia

Engaged by Medco to undertake a wide ranging Technical Due Diligence of the Chevron geothermal assets in Indonesia and Philippines, including Salak, Darajat and Tiwi/MacBan.

The work included review of the geothermal resources, wells, steam field facilities and power plants.



Muara Laboh DD, Indonesia

Engaged by Thai Mott MacDonald Ltd to be part of the Lender Technical Advisory (LTA) team reviewing the 85 MWe project for the lenders led by Mizuho Bank.

TC scope included a high level review of the drilling and the EPC contracts, as well as the main technical and financial project documents including:

- Site visit.
- Project fatal flaws identification.
- Project revenue and cost review.
- Review of financial model inputs.
- Capability assessment.
- Steamfield design review.
- Review of steam and brine quality issues.
- Summary risk matrix.



A: Muara Laboh

B: Padang port

Karaha Commissioning Engineering, Indonesia

Engaged by Hawkins Singapore to undertake a variety of Engineering Tasks to support the Karaha 30MW project, including:

- Modelling of steam blow and preparation of steam blow procedure.
- Preparation of commissioning procedures for FCRS mechanical and electrical scope.
- Design of temporary pond pump reinjection.
- Design of temporary steam blow silencers.
- Preparation of Operation and Maintenance manuals.
- Delivery of operator training in Jakarta.
- Preparation of separator performance test procedure.
- Detailing setpoints and logic for alarm and control on the DCS I/O list.





Drilling Code Translation

Native French speaking TC staff were engaged by a French professional translator to support preparation of a French version of the African Union “**Code of Practice for Geothermal Drilling**” published by the African Union’s Regional Geothermal Coordination Unit for the 11 members of the African Union- Geothermal Risk Mitigation Facility (GRMF).

The African Union received sponsorship from the German Institute for Geosciences and Natural Resources (BGR) and the New Zealand government made the New Zealand Code of Practice (Standard NZS 2403:2015) available for inclusion into the African Union drilling code.

The French speaking AU - GRMF member States are Burundi, The Comoros, The Democratic Republic of the Congo and Djibouti.

Biliran Geothermal Development, Philippines

Engaged by Clermont Group as Director for the Orka Geothermal Investments Pte Ltd 40% shareholding in Biliran Geothermal Inc, Philippines. Services provided include:

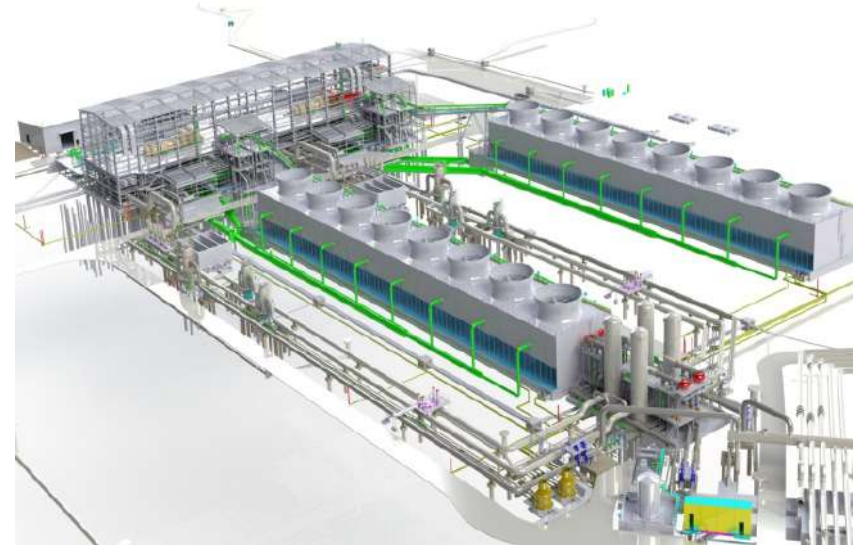
- Providing technical, commercial and strategic advice on the Project.
- Acting as the Company's shareholder representative.
- Acting as the Company's nominated-director on the board of BGI.
- Technical assistance for design of downhole NaOH dosing system.
- Technical and commercial advice for establishment of EPC power plant contract.
- Progress reporting for Clermont Group.



Te Mihi Pipe Stress Analysis, NZ

Engaged by Contact Energy Ltd to assist with relocating a number of services in 2 x 83MW Te Mihi Geothermal Power Plant so as to create a void for the installation of additional structural steel for stiffening the STG pedestal. analysis check performed to confirm that there are no issues with the proposed relocation route of gland steam piping.

Undertook a piping stress analysis of the modified gland steam piping system to ensure code compliance for the modified and interconnecting pipework and vessels.



Assisted with piping layout, piping stress analysis, connection nozzle load investigation, pipe support locations and loading.

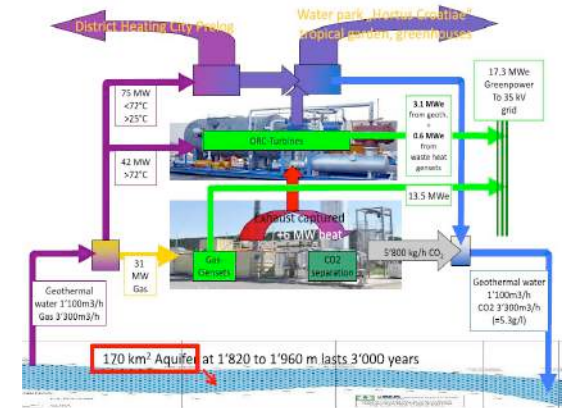
Draškovec 2 Due Diligence, Croatia

Engaged by Mott MacDonald (UK) to assist with Due Diligence of the Draškovec project which is located in the Pannonian Basin, a geological formation that extends under Hungary and Croatia.

The geothermal water under the Draškovec site is rich in natural gas. One cubic meter of geothermal water on the surface contains approximately 2 kg of methane, which translates into a volume gas/water ratio of 3:1.

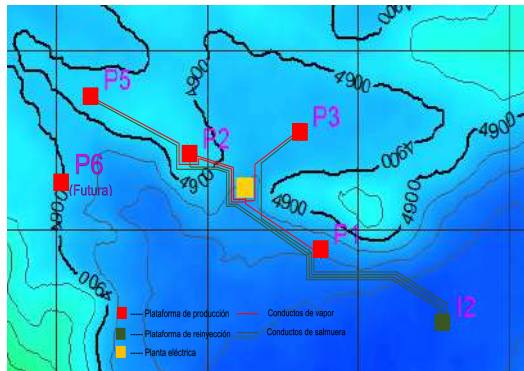


The pilot project, funded by EU, will generate electricity to the local grid via reciprocating gas engines and a binary plant extracting heat from the geothermal brine and the engine exhaust. The project will also include District Heating from geothermal.



Sol de Mañana – Bolivia – 50 MWe project

Engaged by TERANOV, a French company based in Guadeloupe (French West Indies), to prepare preliminary calculations and sizing of equipment for a 50 MWe Geothermal development at Sol de Mañana, a site near the Chilean border.



This project is located in the Bolivian altiplano, at 5,000 m elevation. Three of the five existing wells will be used for a well head Unit, that will provide electricity for 2 drilling rigs for the development. Westjtec and Nippon Koei are providing advice to the end client, ENDE, for the drilling program.

The study included heat balance and performances, preliminary sizing of main components, steamfield calculation sheets, lay out, plant emissions and Capex/Opex estimates.

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Thank you

