

**Name: Michael S. Krahrmer**

*Position: Senior Geologist*

*Technical Expertise: Master of Science, Washington State University, Pullman WA.*

*Thirty-two years of exploration and production experience in the resource industry.*

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## **EXPERIENCE SUMMARY**

### **2019-present Senior Geologist, Geologica**

- Providing on-going support as a Senior Consulting Geologist for CalEnergy Operating Corporation, for production and rework drilling cycle of the Salton Sea Geothermal Field.
- Senior Wellsite Geologist for exploration slimhole drilling at Bwengwa River Geothermal Project in Zambia.

### **2008-2018 Terrane Apps – Sole Proprietor**

- Staffed the Senior Geologist position for CalEnergy Operating Corporation through Geologica, for production and rework drilling cycle of the Salton Sea Geothermal Field from 2017 to 2018.
- Staffed the Senior Geologist position for Sarulla Operations Limited through the Geothermal Resource Group, during the production drilling phase of the Silangkitang Geothermal Field and the Namora I Langit Geothermal Field in North Sumatra from 2016 to 2017.
- Staffed the Senior Geologist position for the American Samoa Power Authority through Geologica during the drilling of two core holes as part of an evaluation of the geothermal resources of American Samoa in 2015.
- Wellsite Geologist on KANCAH-3 well for PT Tangkuban Parahu Geothermal Power in West Bandung, West Java in 2014.
- Senior Geologist on the RMI 56-5 well on the McGregor Range, Fort Bliss, New Mexico in 2013.
- Wellsite Geologist on LOCH-1 well on the Lochinvar Prospect, Zambia in 2013.
- Senior Geologist at Lightning Dock, New Mexico from 2011 to 2012 on four production and injection wells.
- Wellsite Geologist on the ISO-2 well at Canby, California in 2011.
- Conducted reconnaissance field work for Indonesian Power on the Tangkuban Parahu, West Java prospect during 2010.
- Staffed the Senior Geologist position for Coso Operating Company LLC during the implementation of the East Flank and West Flank production drilling programs at the Coso Geothermal Field, California in 2009 and 2010 which involved drilling 24 new production and injection wells including forks and re-drills. Field verified magnetotelluric sites for the Coso West Flank MT survey sites during the summer of 2010.
- Conducted reconnaissance field work for West Indies Power on the islands of Nevis and Dominica in 2008-2009.
- Wellsite Geologist for Davenport Energy during the drilling of two deep test wells on the Newberry Volcano, Oregon in 2008 and the logging of seven shallow temperature gradient wells in 2011.

### **2002-2008 Geologist, Epoch Well Services**

- Conducted stratigraphic identification, formation evaluation, well control monitoring and drill parameter optimization for the following projects:
  - 2008: Two exploration geothermal wells at Newberry Caldera, Oregon for Davenport Power.
  - 2007: Louis N Cook #1 a Devon Energy east Texas Bossier Shale test.



- 2006: Three reentries and sidetracks of production wells on the Magnolia platform, a ConocoPhillips and Devon partnership in +4,000' of water in the Gulf of Mexico.
- 2004-2006: 22 production and exploration wells completed in the tight gas fluvial reservoirs of the Piceance basin, Colorado for ExxonMobil.
- 2002-2004: Multiple successful discovery deep-water oil wells in the Gulf of Mexico drilled by the ship Glomar Explorer for Chevron and BHP Billiton.
- 2002-2008: Approximately 20 oil and gas wells in Tuscaloosa, Alabama; Turnagain Bay, Alaska; Elk Hills, California; and Weatherford, Texas.

**1998-2002      *Geologist, Horizon Well Logging***

- Conducted stratigraphic identification, formation evaluation and drill parameter archiving for an array of projects including and not limited to:
  - The completion of 34 oil and gas wells in California, Nevada, and Oregon.
  - The completion of 8 geothermal wells in Imperial Valley, California; Coso Wash, California; and Olkaria, Kenya.

**1994-1998      *Geological Superintendent, Caithness Corporation***

- Supervised and contributed to the development and implementation of the exploration plan for the 540 km<sup>2</sup> Karaha geothermal concession in West Java, Indonesia working through the Caithness subsidiary Karaha Bodas Company L.L.C.
- Oversaw and managed the implementation of geologic and resource requirement during the drilling of 20 coreholes and 10 production wells.
- Supervised, reviewed and evaluated geological, geochemical, and geophysical survey data collected for the Karaha concession from both in-house and contracted sources.
- Identified exploration and thermal gradient well targets for management approval accompanied by a prognosis to the Drilling Department.
- Supervised, evaluated and assisted in the collection of well field data during wireline surveys, production tests, injection tests, and production field interference tests.
- Oversaw adherence to Indonesian environmental regulations and reported quarterly to the Indonesian geothermal regulatory agency Pertamina.

**1992-1994      *Teaching Assistant, Washington State University***

- Instructed Economic Geology Lab (GEOL 470) Fall 1994 and Fall 1993. Teaching Assistant for Honors Introductory Geology, Spring 1994. Substitute Geology 101 lecturer during Spring of 1994.

**1991-1992      *CAD Draftsman, California Energy Company, Inc.***

- Oversaw conversion of hand drafted civil, mechanical, and electrical geothermal plant plans into Computer Aided Drafting files.
- Updated documentation for modifications made to the Coso Geothermal Project.

**1991              *Geologist, Tecton Geologic, Inc.***

- Supervised the implementation and debugging of a new generation of software and hardware geared towards the continuous recording of engineering and formation evaluation parameters during the drilling of geothermal production wells.
- Conducted formation evaluation of production geothermal wells in the Coso Geothermal Field, CA.

**1989-1991      *Geologic Technician, CE Exploration***

- Supervised operation and maintenance of Geographical Information Systems (GIS) for geothermal exploration targets in the Pacific Northwest.
- Reviewed the hydro-geologic setting and conducted reconnaissance mapping to determine the geothermal potential of Mount Adams, Washington; Mount Jefferson, Oregon; and Newberry Caldera, Oregon.
- Coordinated the collection and analysis of soil gas surveys for geothermal exploration targets in the Pacific Northwest.
- Oversaw formation evaluation of temperature gradient wells in the Pacific Northwest.



- Assisted in assembly of preliminary data packets for Mount Shasta, California; Medicine Lake, California; Crater Lake, Oregon; Bend Highlands, Oregon; and Mount Baker, Washington.

**1987-1989      *Geologist, Exploration Logging, R.F. Smith Corporation***

- Monitored and evaluated wildcat and step out geothermal wells throughout the western United States and Japan.
- Supervised implementation of computer-generated formation evaluation well logs.
- Operation and maintenance of Analog Datalogger systems, a continuously monitoring data collection system for various drilling parameters and the well gas sampling instruments.

**1986-1987      *Geologist, Columbia Geoscience***

- Interpreted and curated core for several deep temperature gradient holes.
- Oversaw collection and interpretation of temperature logs.
- Conducted identification of secondary mineral assemblages as a means to understanding the mechanics of a hydrothermal system.

**EXPERTISE**

Well site Expertise: From exploration to implementation.

**EDUCATION**

1995              Master of Science, Washington State University, Pullman WA.

1986              Bachelor of Science, University of Oregon, Eugene OR.

**PROFESSIONAL MEMBERSHIPS**

Geothermal Resource Council

American Association of Petroleum Geologists

**SAFETY TRAINING**

WellCAP, H<sub>2</sub>S Safety, First Aid, Fall Protection, LOTO and Offshore Water Survival.

**REPRESENTATIVE PROJECT EXPERIENCE**

**Selected Geothermal Resource Development Projects**

**Sarulla Operations Limited:**

*Staffed the Senior Geologist position for Sarulla Operations Limited through the Geothermal Resource Group, during the production drilling phase of the Silangkitang Geothermal Field and the Namora I Langit Geothermal Field in North Sumatra from 2016 to 2017.*

**Tangkuban Parahu Geothermal Power**

*Wellsite Geologist on KANCAH-3 well for PT Tangkuban Parahu Geothermal Power in West Bandung, West Java in 2014.*

*Conducted reconnaissance field work for Indonesian Power on the Tangkuban Parahu, West Java prospect during 2010.*

**Caithness Corporation: Karaha Bodas Company: 1994-1998**

- *Supervised and contributed to the development and implementation of the exploration plan for the 540 km<sup>2</sup> Karaha geothermal concession in West Java, Indonesia working through the Caithness subsidiary Karaha Bodas Company L.L.C.*
- *Oversaw and managed the implementation of geologic and resource requirement during the drilling of 20 coreholes and 10 production wells.*
- *Supervised, reviewed and evaluated geological, geochemical, and geophysical survey data collected for the Karaha concession from both in-house and contracted sources.*



- *Identified exploration and thermal gradient well targets for management approval accompanied by a prognosis to the Drilling Department.*
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