



## Hydrocarbons emissions from Cerro Prieto Geothermal Power Plant, Mexico

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One of the most important environmental issues related to the use of geothermal fluids to generate electricity is the emission of non-condensable gases to the atmosphere. Mexico has one of the largest geothermal plants in the world. The facility is located at Cerro Prieto, Baja California, roughly 30 km south of Mexicali and the international boundary between Mexico and United States. The Cerro Prieto power plant has 13 units grouped on four individual powerhouses. Gas samples from 9 units of the four powerhouses were collected during 4 campaigns conducted in May-July, 2010, February, 2012, December, 2012, and May, 2013. Gas samples from the stacks were collected in 1000 ml Pyrex round flasks with Teflon stopcocks, and analyzed by gas chromatography–mass spectrometry. Methane was the most abundant aliphatic hydrocarbon, with a concentration that ranged from less than 1% up to 3.5% of the total gas mixture. Normal alkanes represented the second most abundant species, and displayed a decreasing abundance with increasing carbon number in the homologous series. Isoalkanes were also present as isobutane and isopentane. Cycloalkanes occurring as cyclopentane and cyclohexane, were detected only at trace level. Unsaturated hydrocarbons (alkenes and alkynes) were not detected. Benzene was detected at levels ranging from less than 1% up to 3.4% of the total gas mixture. Other aromatic hydrocarbons detected were toluene, and xylenes, and were present at lower concentrations (<0.5%). The results obtained in this study are consistent with previous analysis conducted in geothermal fluids at Cerro Prieto (Nehring and Fausto, 1979, and Des Marais et al., 1988). The lack of unsaturated hydrocarbons in the gas emissions suggest that their origin must be related to the cracking of sedimentary organics at low temperatures. The temperature of the Cerro Prieto aquifer has been estimated using the Na- K- Ca index , and it is calculated to be in the range from 523 to 623 K (Mañón et al., 1979).

### References

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