

## Gas sampling at Hellisheiði and Nesjavellir geothermal power plant

The collection of gas samples from discharging wells involves separation of steam and water phases with the aid of a Webre separator and a cooling device. The separator is connected to a steam line and kept open for about 10min to rinse the separator and then closed for recording of pressure using a pressure gauge which is connected to the separator. Then the flow through the separator is restored prior to sampling. Two outlets exist on the separator, one for water sampling, and another for steam/gas sampling.

To ensure that only steam is obtained through steam outlet, the water outlet of the separator is opened until steam exits there with the water. However the steam outlet is opened just enough to maintain a controlled flow into the steam sampling bottle. A sampling bottle immersed in water is then connected directly to the steam outlet. Steam condenses in the immersed bottle, there  $\text{CO}_2$  and  $\text{H}_2\text{S}$  dissolve in  $\text{NaOH}$  whereas other less abundant gases ( $\text{H}_2$ ,  $\text{CH}_4$ ,  $\text{N}_2$ ,  $\text{NH}_3$ ,  $\text{CO}$ ,  $\text{He}$ ,  $\text{Ar}$  and  $\text{Ne}$ ) fill up the head space of the bulb. These gases in the headspace were analysed using gas chromatography technique whilst  $\text{CO}_2$  and  $\text{H}_2\text{S}$  were analysed by titration methods, the concentration of  $\text{H}_2\text{S}$  was determined by titration with  $\alpha\text{Hg}(\text{CH}_3\text{COO})_2$  solution using dithizone indicator. The endpoint is recorded when the colour changes from the yellow colour of dithizone in an alkaline solution to pale pink colour of  $\text{Hg}$ -dithizone.  $\text{CO}_2$  is analysed by using potentiometer titration method. A knowledge of the concentration of these gases in the steam enables the power plant operators to monitor the response of the geothermal reservoir to power and heat production.

