

**#AN028 ADC2250 measures CO<sub>2</sub> fluxes from waste rock piles in uranium mine management studies**



The effective management and rehabilitation of waste rock piles, has both serious economic and environmental implications for the mining industry. Research groups have therefore been given the task of developing new and efficient remediation technologies and techniques.

The ADC2250 has been used to measure CO<sub>2</sub> fluxes from waste rock piles in uranium mines in Saskatchewan, Canada. These studies have included assessing the effects of heavy rain events on CO<sub>2</sub> fluxes and the spatial and temporal variations over a two year time period, between 2000-2002.

The occurrence of CO<sub>2</sub> flux, caused by microbial respiration, from waste rock piles is well documented. It is known that the vast majority of the CO<sub>2</sub> produced permeates to the atmosphere, whilst only 2-4% generally feeds to the water table. However, little research has been conducted on the affects of soil water on these CO<sub>2</sub> fluxes in waste rock compared to those in agricultural fields and forests.

The ADC2250 was used with sealed chambers with collars that had been manually driven into the waste rock. The chambers were scrubbed of CO<sub>2</sub> and the rise in CO<sub>2</sub> concentration was measured over a time period of up to 8 minutes. Measurements were made every 1 second and averaged every 10 seconds. Each plot was repeated up to 8 times to obtain a soil flux rate.

The research showed that heavy rain events only had a short term impact on CO<sub>2</sub> fluxes. Immediately after a heavy rain event, ground water levels rose and CO<sub>2</sub> fluxes were seen to fall by up to 62%. However, over the next 5-6 days, ground water levels recovered and CO<sub>2</sub> fluxes returned to their pre-rain event levels.

The long-term spatial and temporal studies showed a very uniform distribution of CO<sub>2</sub> fluxes, indicating that there is a very uniform migration of CO<sub>2</sub> up through the waste rock piles.

It is hoped that the information gained from these studies will prove an important tool in the development of a long-term management plan for mine waste rock piles.

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