

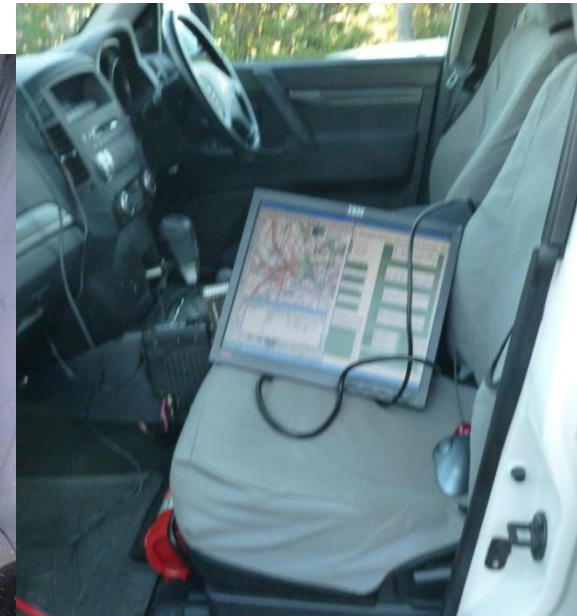
The Santos logo is displayed in white text on a blue rectangular background. The word "Santos" is written in a serif font.

Pilot study to establish CH<sub>4</sub> and CO<sub>2</sub> baseline levels,  
Gunnedah Basin, NSW

Joshua Gilroy, Santos Ltd.

# Summary equipment/vehicle setup

- CO2 and CH4 concentration and isotope data collected using Picarro 2201i Analyzer
- Locations logged using Garmin 60 GPS unit.
- All mounted in 4WD.
- Analyzer and GPS data logged continuously while driving.



# Summary equipment/vehicle setup

Summary of the instrument that was used for this survey

## PICARRO G2201-i CRDS Analyzer for Isotopic Carbon in CO<sub>2</sub> and CH<sub>4</sub>

Simultaneous Insights Into Complex Carbon Source/Sink Behavior of Two Species with One Analyzer

- World's only field-deployable analyzer capable of simultaneous  $\delta^{13}\text{C}$  measurements for both CO<sub>2</sub> and CH<sub>4</sub>
- Less hassle – Less calibration, less maintenance, no consumables
- Endures harsh environments – mountains, oceans, forests, and tundra

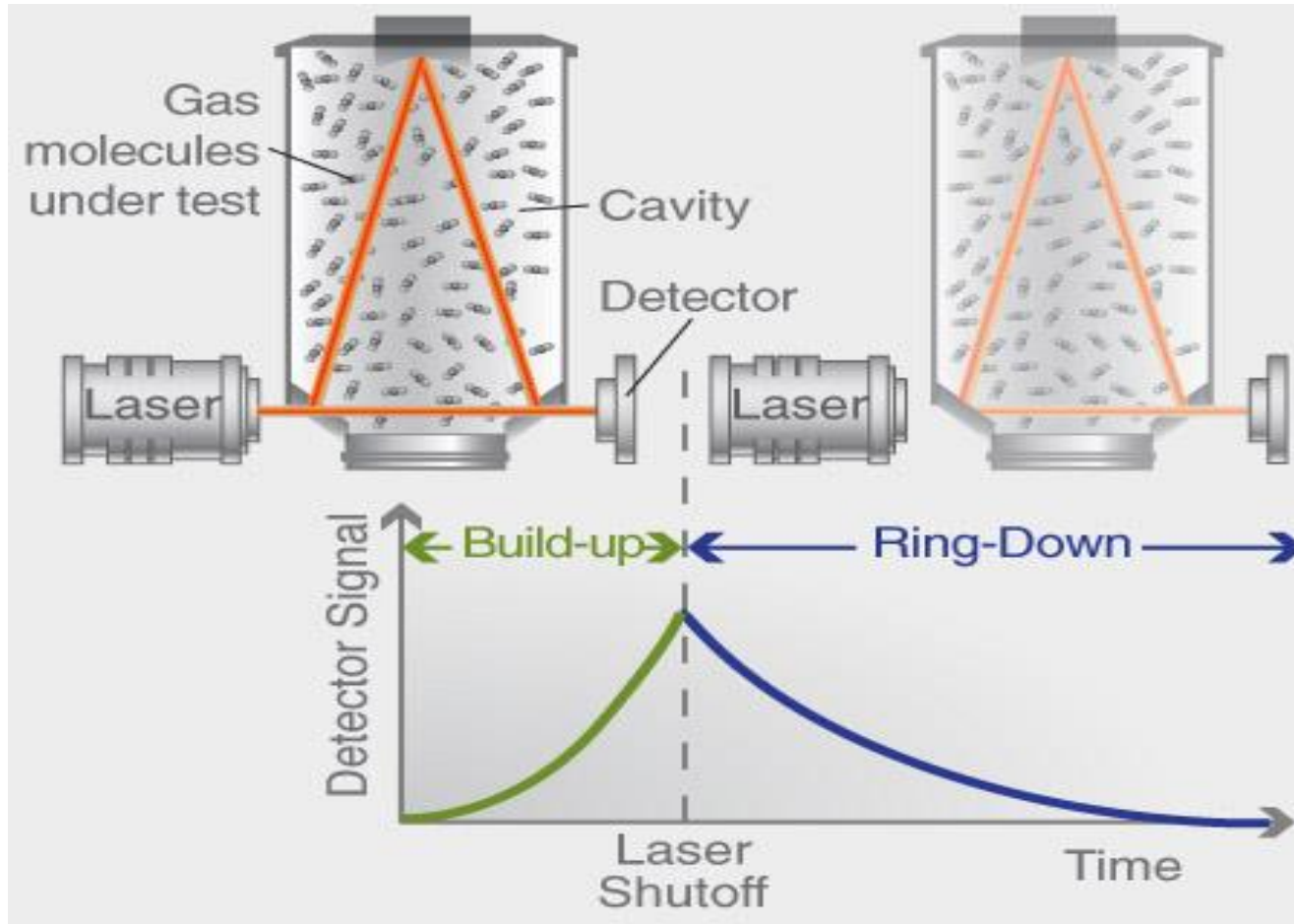
PICARRO

The World's Leading Instruments for Carbon and Water Cycle Measurements



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# How concentration is measured



# Methane concentrations

- Southern Cross University data from Tara had a CH<sub>4</sub> peak of 6.89ppm (Night, cool, thermal inversion)
- Same Picarro device used by Santos
- An historical study pre CSG near Tara examined CH<sub>4</sub> in soils, it found concentrations in the soils of 6.2ppm on average and a peak of 22.1ppm
- Lower explosive limit 50,000ppm
- Safety devices provide initial warning at 5,000ppm

# Purpose of pilot

- To establish baseline methane level data for future CSG work.
- To start to establish methane levels from other sources.
- To determine whether isotope information available from Picarro is able to characterise source signatures.

# Methodology overview

- Sampling from a vehicle
- Plastic tube from Picarro device to outside vehicle
- Deep cycle batteries and inverters provide necessary power, including when vehicle is not running
- Sampling at and near a suite of land uses to characterise the landscape
  - Current and future CSG sites
  - Agricultural sites
  - Industrial sites
  - Mining
  - Towns
- Sampling during different seasonal conditions (autumn and winter so far, summer planned)
- Sampling has been undertaken from south of Tamworth to the Pilliga

# Next steps in this program

- Repeat surveys
  - summer to quantify seasonal variability
  - autumn 2014, second autumn
- Trail variety meteorological instruments on vehicle
- Initial report prepared by July 2014