

Combabula site familiarisation visit

Task 3 Report

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Executive summary

This report describes a site familiarisation visit to a property in Combabula, QLD. This activity was part of a study of the potential impacts of hydraulic fracturing on air, soil and water quality in the vicinity of coal seam gas well sites. The study is to be conducted at two locations in the Surat Basin, Queensland and will involve the collection of samples of surface waters, groundwater, fluids from the hydraulic fracturing (HF) operations, produced water and soils. The majority of the sampling activities will be conducted between August 2017 and early 2018. Sampling locations and the timing of sampling will be finalised through consultation with Origin Energy (the gas field operators) during the next stage of project development.

The visit involved visiting the Reedy Creek integrated operations centre (IOC) and making arrangements for access to laboratory facilities for use in sample processing. A site inspection of the property was then undertaken. The locations visited included various well pads, the air quality monitoring station and a general tour of the property. This information will be used to identify sampling sites on the property and also help assist field work logistics and planning.

1 Background

Over the next 18 months, CSIRO is undertaking a detailed study of the impacts of hydraulic fracturing on air, soil and water quality at two locations in the Surat Basin, QLD. The study is split into two phases.

Phase 1 involves scoping of the study and development of study plans (e.g. sampling program design and sample analysis). Phase 2 involves execution of the study. The air study is being conducted by CSIRO Oceans & Atmosphere and the water/soil study is being conducted by CSIRO Land & Water. The aims of the water and soil study are as follows:

(i) To quantify the impacts of HF operations on the concentrations of contaminants in nearby surface waters, groundwater and soils.

(ii) To assess the concentrations of HF chemicals and geogenic contaminants in flowback and produced waters resulting from CSG HF operations.

(iii) To check compliance of contaminant concentrations in the collected water and soil samples with relevant Australian water and soil quality guidelines.

(iv) To conduct a laboratory assessment of various spill scenarios involving spillage of hydraulic fracturing chemicals and flowback waters onto various soils types representative of the Surat Basin.

Two study sites have been identified in the Surat Basin at Condabri and Combabula. A site familiarisation visit to Condabri was conducted in April 2017. This report describes a similar visit to the Combabula field site.

2 Study Area

The Condabri and Combabula are both established gas fields sites within the Surat Basin Queensland operated by Origin Energy. The general location of the study sites is shown in Figures 1 and 2. The Combabula site is a farmland property located approximately 100 km northwest of Miles (26°16'46" S, 149°33'22"E). The property has over 30 drilled wells, grid spaced at ~ 600 – 700 m intervals (Figure 3). Twenty three of the wells are scheduled to undergo some form of wellbore stimulation in July and August 2017 after which they will be brought on-line and connected to the gas and water pipeline network (Origin Energy, personal communication). The wells in this area are serviced by a network of pipelines and vents, which connect to the nearby Reedy Creek central Gas Processing Facility.



Figure 1. Map of the Surat basin

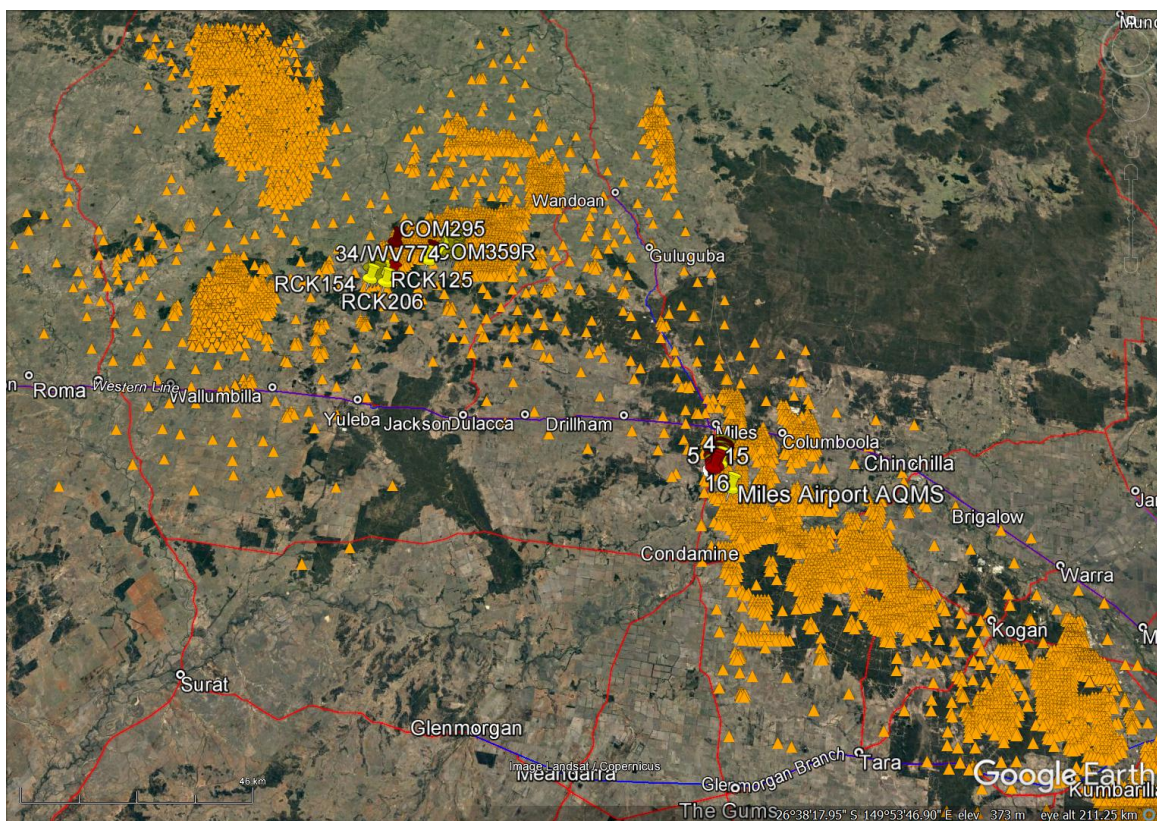


Figure 2. Local map showing CSG wells (orange triangles) in the vicinity of the two study sites (denoted by the red pins).

3 Visit details

Dr Simon Apte and Dr Mike Williams (both CSIRO Land & Water) visiting Reedy Creek IOC and the Combabula field site on the afternoon of Thursday 20 July. The visit was hosted by Gavin Bryant, the site chemist based at Reedy Creek.

3.1 Reedy Creek IOC and laboratory

A general orientation tour was provided followed by an inspection of the laboratory. The laboratory was clean and well equipped and will make an excellent base for sampling campaigns and sample processing (e.g. filtrations and solid phase extractions). Space in a nearby container has also been arranged to allow storage of CSIRO equipment.

3.2 Access to the Combabula field site

The drive from Reedy Creek IOC to the Combabula property takes about 30 minutes along sealed roads that are in good condition. The one hour round trip time will need to be taken into account when planning daily sampling activities.

3.3 Field site inspection

Access to the property is via a well-marked gate. There are various tracks that run through the property which were explored in order to get an overall appreciation of the site. The location of the CSIRO O&A remote air quality monitoring station was also visited.

The property is predominantly flat, semi-arid open grassland with stands of native tree vegetation (Figure 4). An ephemeral creek runs through the property.

The ephemeral creek flow and lack of general lack of surface water are likely to affect the feasibility of taking many surface water samples. Given this practical limitation, surface water sampling at this site will be largely restricted to farm dams. Additional creek samples may be taken opportunistically, if there is sufficient water flow.

Registered water bores, for use as potable water sources, watering livestock and irrigation are present at the Combabula study site. Based on information supplied by Origin Energy it is apparent that the bores at Condabri and Combabula are shallow and do not intersect any of the coal seams which are found at much deeper depths. Access to the bores was not possible during the familiarisation visit. However, based on historical groundwater quality data provided by Origin Energy, two bores selected for sampling during and after HF operations at this site.

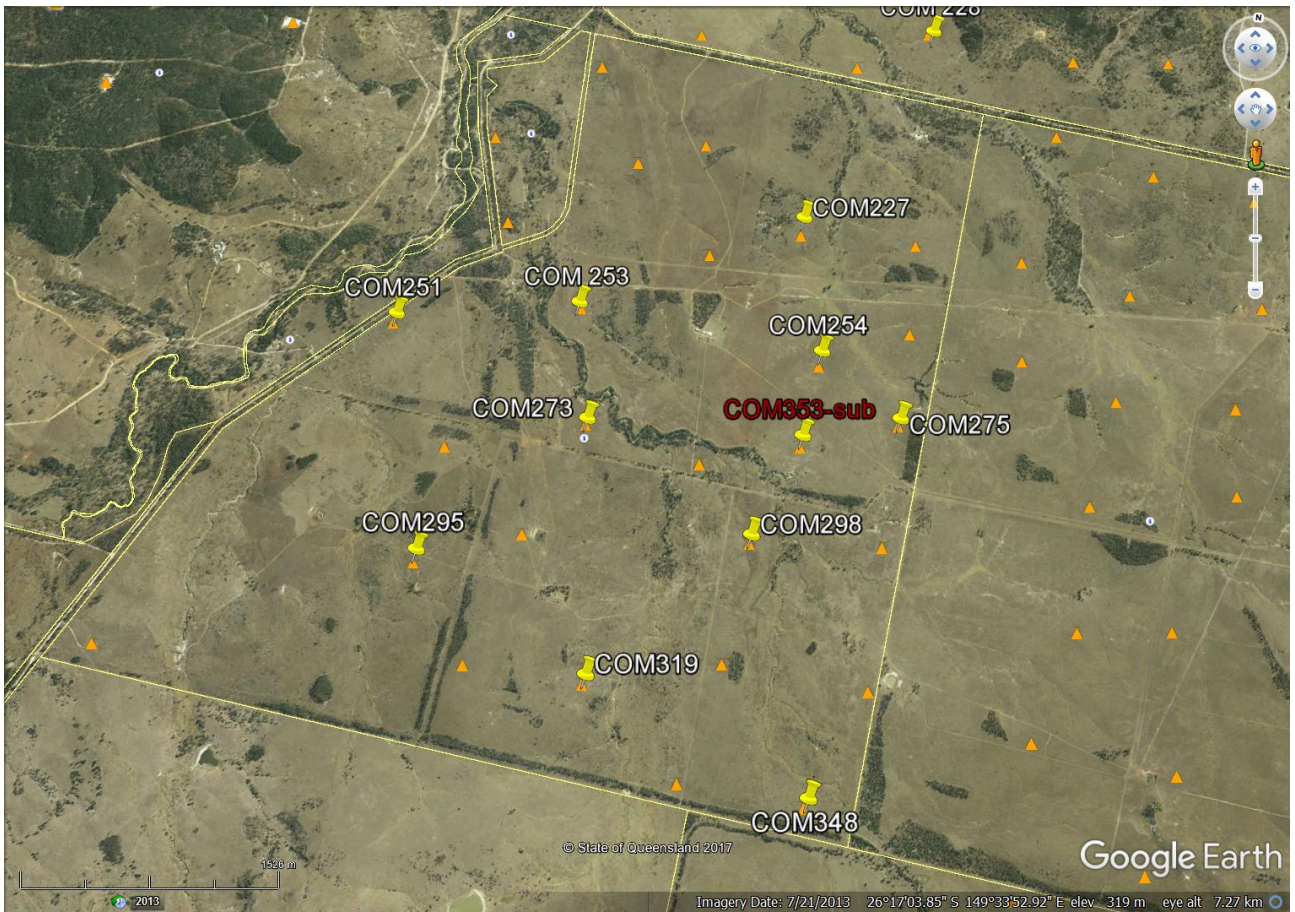


Figure 3. Map showing the location of the Combabula field site. The orange triangles denote the CSG wells.



Figure 4. Photographs of the Combabula property

4 Conclusions and future activities

The site visit confirmed the general suitability of the Combabula study site. However, given the absence of flowing surface water at the Combabula site, increased emphasis will be given to sampling Dogwood Creek which flows through the Condabri site. The Creek flows permanently with sampling access points both upstream and downstream of hydraulic fracturing activities.

Hydraulic fracturing operations at the Combabula site are planned to occur in from mid to late August to late September 2017. It should be noted however, that the schedule is subject to variation as the operations progress. This situation requires flexibility in the timing of the sampling program and for the purposes of planning it is only realistic to set time windows for various activities rather than fixed dates. CSIRO will liaise with Origin Energy staff on a weekly basis to keep up to date with the latest changes to the HF program. A summary of the proposed sampling plan is shown in Table 1. Note this may be subject to change.

The laboratory and storage facilities at Reedy Creek IOC are generally excellent and fit for purpose. However the one hour round trip by car from the IOC to the Combabula field site will have to be factored in to the field sampling program.

Table 1 Summary of the proposed water and soil samples to be taken at Combabula

Sample type	Samples to be collected	Number of samples	Notes
Surface waters			
Farm dams	Water	12	Three farm dams sampled at Combabula. Four sampling events: before, during (2 occasions) and after HF operations.
Water bores	Groundwater	12	Four nearby boreholes will be sampled during and on two occasions post hydraulic fracturing operations
Hydraulic fracturing	HF fluid sample	6	HF fluid samples per well to be provided to CSIRO
Production phase	Produced waters	24	Two wells (6 sampling events), 4 wells (3 sampling events)
Wastewater treatment facility	Incoming water	3	3 sampling events over 6 month period
Post-treatment	RO Treated water	3	3 sampling events over 6 month period
Membrane rejects	Brine	3	3 sampling events over 6 month period
Soils	Soil samples from the well pad and adjacent areas	20	Soil samples (0-10 and 10-40) will be collected at 5 points across the well pad at four wells before and after HF activities. Additional soil samples from each well pad will be collected and archived for potential later analysis (if contamination is detected). Near each well pad, paired (matching soil type) reference samples (unaffected by exploration activity) will be collected from the site.



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