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13. MONITORING GROUNDWATERS

13.1 Introduction

The Otway Project is located within the Port Campbell hydrogeological sub-basin, which in turn corresponds to the structural feature recognised as the Port Campbell Embayment (Duran 1986), an onshore basement low, infilled with thick Late Cretaceous and Tertiary sediments (SKM 1999).

Groundwater is used extensively for irrigation, dairy and domestic purposes in the Otway Basin and is sourced from the unconfined to semi-confined Port Campbell Limestone. A second, deeper and confined aquifer, the Dilwyn Formation (Figure 1.5), also contains potable water, and has been used in the past for urban water supply. Both units are located well above the Waarre Formation, the target injection reservoir, and are separated from it by at least 1100 m of alternating aquitards and aquifers. Rigorous characterisation of the site (Dance et al. 2009; Chapter 5) indicated that the likelihood of injected CO_2 moving from the target reservoir into either of these aquifers was remote. Nevertheless, the presence of these water resources meant that there was strong community interest in demonstrating the ongoing integrity of these resources in parallel with CO_2 storage.

A comprehensive assurance monitoring programme was initiated in 2006 to document the natural state of the shallow subsurface and define a baseline prior to the injection of CO_2 (Jenkins et al. 2012). As part of this programme, groundwater from pre-existing bores was sampled biannually from the shallow, unconfined Port Campbell Limestone Aquifer (21 bores) and from the deeper, confined Dilwyn Aquifer (3 bores) within a radius of ~10 km around the injection well CRC-1 (Figure 13.1). Standing water levels (SWLs) were monitored continuously in both aquifers where possible, using pressure and temperature data loggers to determine the transient aquifer flow rates and directions.

The aims of this chapter are to (1) describe in some detail the groundwater monitoring programme developed at the Otway site, both in terms of groundwater levels and groundwater composition; (2) review general methods, results and quality assessment and quality control (QA/QC) procedures; and (3) outline technological applications and innovations that may be useful at other sites.