Darling Basin

WESTERN NEW SOUTH WALES, ONSHORE

Reservoir:

Snake Cave and Ravendale sandstones

Seal:

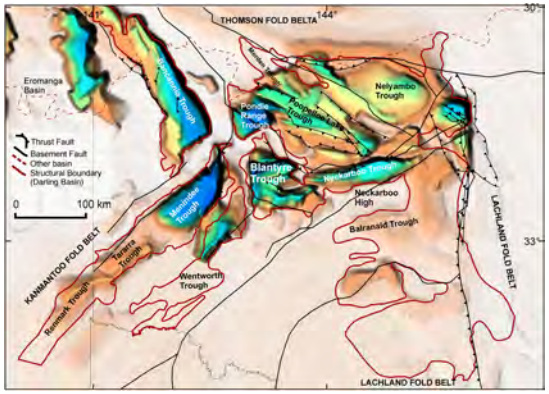
Upper Devonian interbedded siltstones and shales

HYDROCARBON POTENTIAL

The basin has some oil stains and gas shows in the deeper parts of the basin.

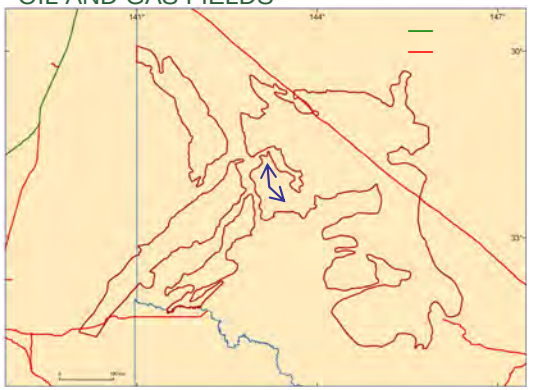
Explanatory Note: As detailed in *Blevin et al., 2007*, the storage concept proposed states that only wells drilled in the central parts of the synclines reflect the true reservoir properties of the basin as a whole, as opposed to those drilled on structural anomalies. Only data from the synclinal wells have been used as input parameters in the "Storage Capacity Estimate" on this montage. These estimates are therefore based on a well reasoned, but as yet unproven, reservoir concept.

STRUCTURAL ELEMENTS

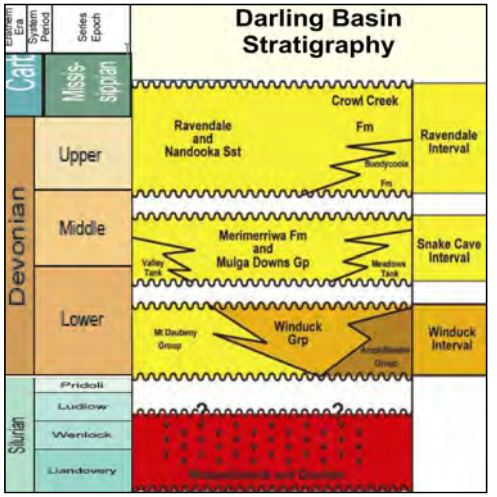


Modified OZ SEE-BASE™ (2005) image

OIL AND GAS FIELDS

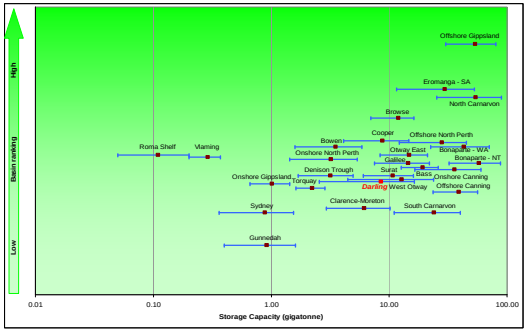


STRATIGRAPHY

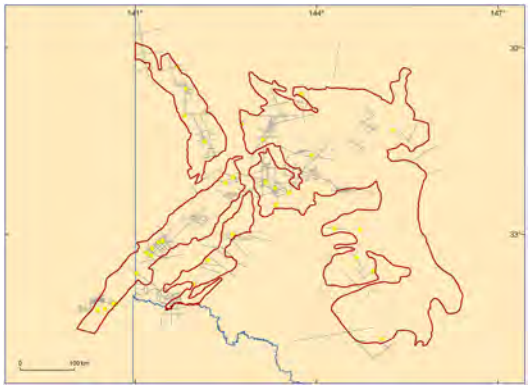


(After Blevin et al., 2007)

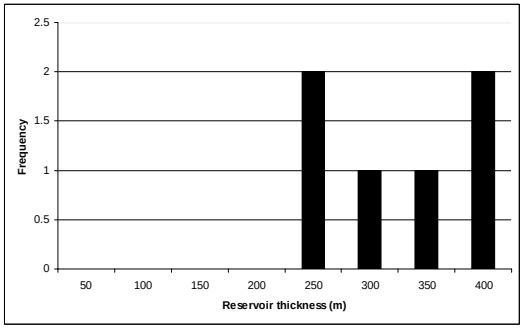
BASIN RANKING VS. CAPACITY



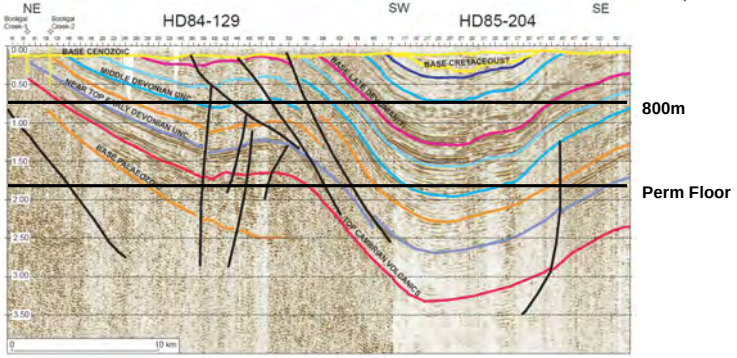
WELLS AND SEISMIC COVERAGE



RESERVOIR THICKNESS



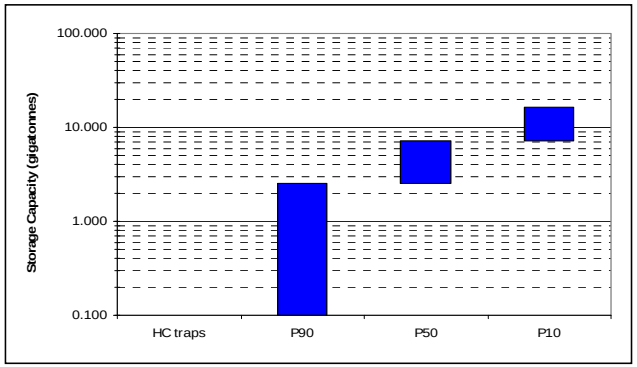
REGIONAL CROSS SECTION (LOCATION IN OIL AND GAS FIELDS MAP)



(After Cooney and Mantaring 2007)

Darling Basin

STORAGE CAPACITY



BASIN RANKING

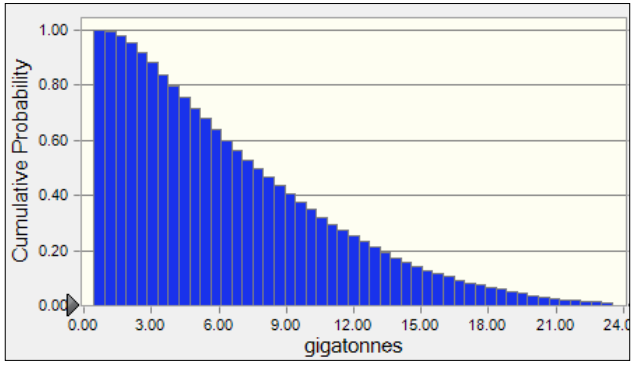
Category	Description	Score	Weighting
Tectonics (Seismicity)	Medium/Low	4	0.00
Size	Very Large	4	0.06
Depth	Intermediate	3	0.10
Type	Non-marine and Marine	2	0.04
Faulting intensity	Moderate	2	0.14
Hydrogeology	Good	3	0.04
Geothermal	Cold basin	3	0.05
Hydrocarbon potential	Medium	3	0.05
Maturity	Exploration	2	0.05
Coal and CBM	None	1	0.00
Reservoir	Good	4	0.16
Seal	Poor	3	0.18
Reservoir/Seal Pairs	Excellent	4	0.03
Onshore/Offshore	Onshore	3	0.00
Climate	Desert	2	0.00
Accessibility	Acceptable	3	0.00
Infrastructure	Minor	2	0.00
CO_2 sources	Few	2	0.00
Knowledge level	Moderate	2	0.05
Data availability	Moderate	2	0.05
Overall Ranking			**22**

POTENTIAL INJECTION PARAMETERS

Parameter	Unit	Shallow	Mid-Depth	East
Depth base seal	m	800	1200	1200
Formation thickness	m	100	100	100
Injection depth	m	900	1300	1300
Porosity	%	13.9	11.5	11.5
Absolute permeability	mD	68	21	30
Formation pressure **	psia	1305	1885	1885
Fracture pressure **	psia	2155	3115	3115

** No data, estimated from adjacent Cooper Basin

STORAGE CAPACITY CURVE



STORAGE CAPACITY ESTIMATE

Parameter	Unit	Score (P90)	Score (P50)	Score (P10)	Distribution
Area of storage region	km^2	1020	5350	45000	Triangular
Gross thickness of saline formation	m	100	150	250	Triangular
Average porosity of saline formation over thickness interval	%	10	12	15	Triangular
Density of CO_2 at average reservoir conditions	$tonne/m^3$	0.5	0.6	0.7	Triangular
E-storage efficiency factor (% of total pore volume)	%	4	4	4	
Calculated storage potential	gigatonnes	2.6	7.2	16.4	

Insufficient data for the following items:

- Porosity vs. Depth Graph
- Permeability vs. Depth Graph
- Porosity vs. Permeability Graph
- Fracture Pressure vs. Depth Graph
- Reservoir Pressure vs. Depth Graph
- Top seal Potential Graph
- Regional Seal Figure

DISCLAIMER

The purpose of these montages is to aid a high level evaluation of the geological storage potential of Australia's sedimentary basins for future CO_2 emissions. The evaluations are based on core analysis and other data derived from Geoscience Australia and other sources. However due to time constraints, it has not been possible to carry out the detailed evaluation of the data, which will be required for the next phase of analysis.

In this exercise, we sought to recognise a range of characteristics within each basin by identifying three sets of parameters at different locations and depths in the basin. The intent is to generate an indication of a range of storage capacity and potential injection rates. These capacities and rates are being used in high level reservoir modelling work to generate injection tariffs* and capacity estimates. All of this work feeds into a process that provides indicative, conceptual transport and storage tariffs for CO_2 emissions captured in various parts of Australia.

This 'top down', simplistic approach seeks to describe the magnitude and range of potential costs for transport and storage in Australia, at a 'conceptual' level of accuracy. Clearly, any final investment decision would call on an increased understanding and level of accuracy through the usual project development process.

* Cost per tonne of CO_2 avoided, calculated using the net present value of cash flows over a 25 year asset life.

REFERENCES

Blevin J, et al., 2007. Darling Basin Reservoir Prediction Study and GIS, Project Code: MR706, Confidential Report to NSW-DPI, Eraring Energy, Macquarie Generation & Delta Electricity by FrOG Tech Pty Ltd.

Cooney, P.M. and Mantaring, A.M. 2007. The petroleum potential of the Darling Basin. In: Munson T.J. and Ambrose G.J. (eds), Proceedings of the Central Australian Basins Symposium (CABS), Alice Springs, Northern Territory, 16–18 August, 2005. Northern Territory Geological Survey, Special Publication 2, 216-235.

OZ SEEBASE™ STUDY, 2005. OZ SEEBASE™ structural GIS, version 2. FrOG Tech Pty Ltd, project code GA703.