Denison Trough

SE QUEENSLAND, ONSHORE

Reservoir:

Catherine and Aldebaran sandstones

Seal:

Black Ally, Bandanna formations

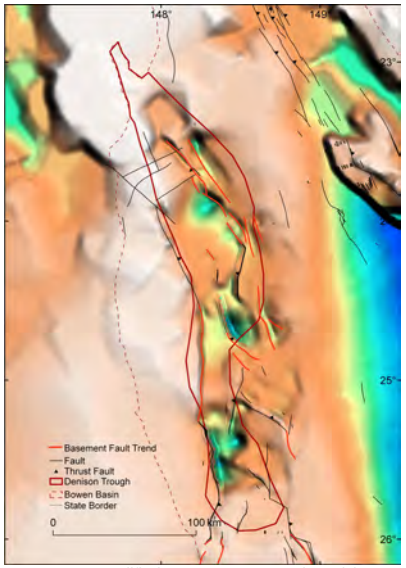
HYDROCARBON POTENTIAL

CATEGORY 1 and 2* (OGRA 2005)

Crude oil	MMBL	7.92
Condensate	MMBL	2.37
LPG	MMBL	2.8
Sales gas	Tcf	0.39

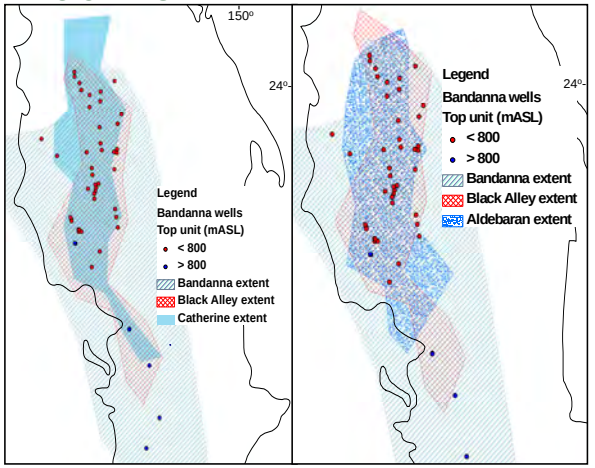
*entire Bowen basin

STRUCTURAL ELEMENTS

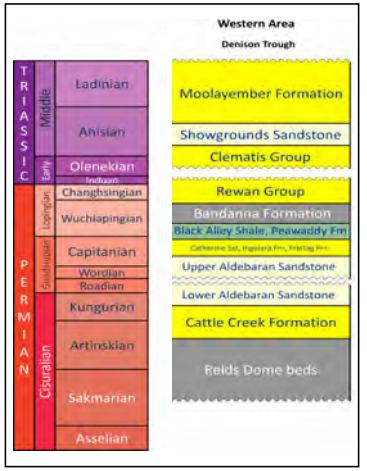


Modified OZ SEE-BASE™ (2005) image

REGIONAL SEAL AREA

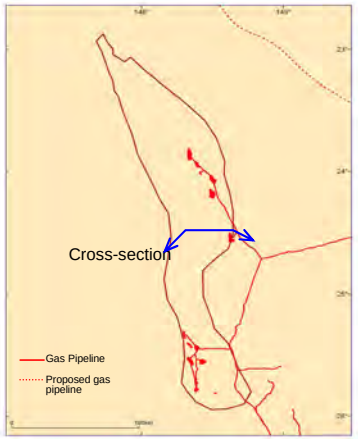


STRATIGRAPHY



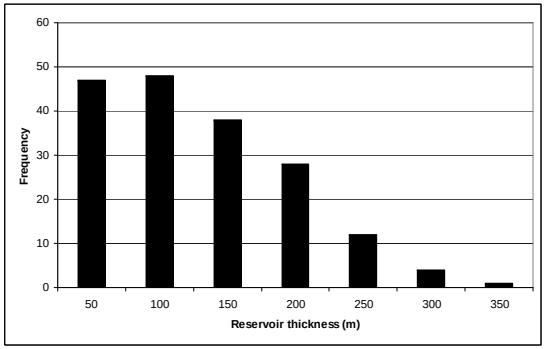
(Bradshaw et al., 2009)

OIL AND GAS FIELDS

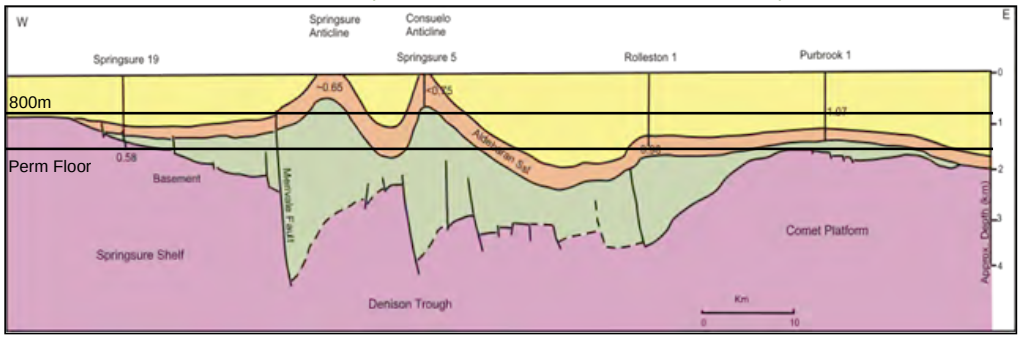


WELLS AND SEISMIC COVERAGE

RESERVOIR THICKNESS

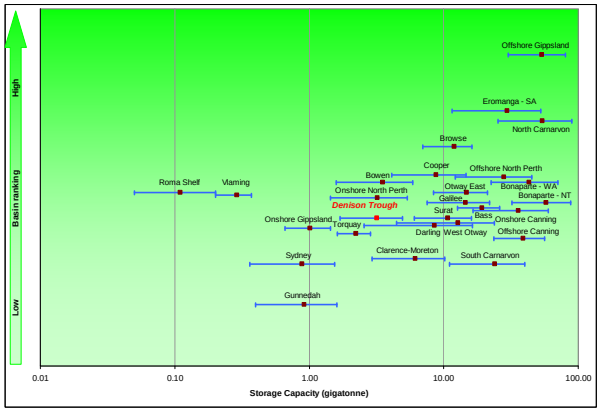


REGIONAL CROSS SECTION (LOCATION IN OIL AND GAS FIELDS MAP)



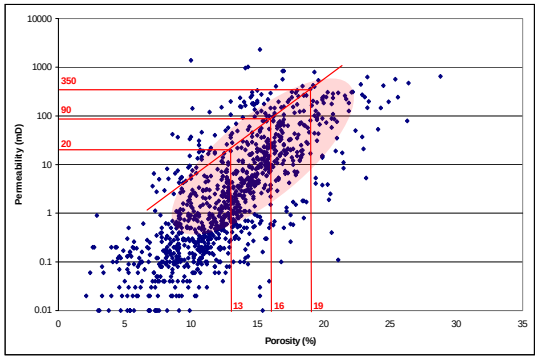
(After Baker, 1989)

BASIN RANKING VS. CAPACITY

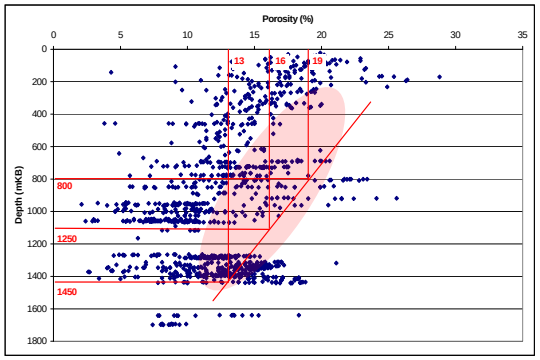


Denison Trough

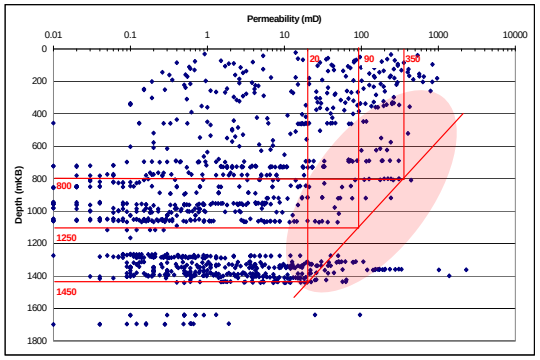
POROSITY VS. PERMEABILITY *Values from basin-wide dataset



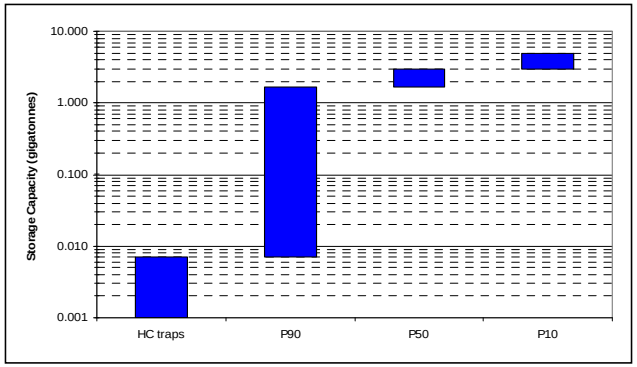
POROSITY VS. DEPTH



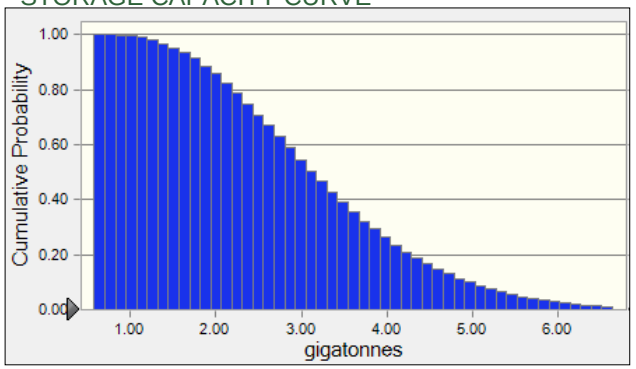
PERMEABILITY VS. DEPTH



STORAGE CAPACITY



STORAGE CAPACITY CURVE



Insufficient data for the following items:
- Fracture Pressure vs. Depth Graph
- Reservoir Pressure vs. Depth Graph
- Top seal Potential Graph

BASIN RANKING

Category	Description	Score	Weighting
Tectonics (Seismicity)	Medium/Low	4	0.00
Size	Large	3	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	Large	4	0.05
Maturity	Mature	4	0.05
Coal and CBM	Deep	3	0.00
Reservoir	Potential	2	0.16
Seal	Good	4	0.18
Reservoir/Seal Pairs	Excellent	4	0.03
Onshore/Offshore	Onshore	3	0.00
Climate	Subtropical	4	0.00
Accessibility	Acceptable	3	0.00
Infrastructure	Moderate	3	0.00
CO_2 sources	Moderate	3	0.00
Knowledge level	Good	3	0.05
Data availability	Good	3	0.05
Overall Ranking			**20**

STORAGE CAPACITY ESTIMATE

Parameter	Unit	Score (P90)	Score (P50)	Score (P10)	Distribution
Area of storage region	km^2	8500	10500	12750	Triangular
Gross thickness of saline formation	m	30	95	200	Triangular
Average porosity of saline formation over thickness interval	%	7	11.5	16.5	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	1.7	3.0	4.9	

POTENTIAL INJECTION PARAMETERS

Parameter	Unit	Shallow	Mid-Depth	Deep
Depth base seal	m	790	1200	1350
Formation thickness	m	10	50	100
Injection depth	m	800	1250	1450
Porosity	%	19	16	13
Absolute permeability	mD	350	90	20
Formation pressure **	psia	1175	1835	2125
Fracture pressure **	psia	1930	3010	3495

** No data, estimated from adjacent basins

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

Baker, J.C., 1989. Petrology, diagenesis and reservoir quality of the Aldebaran Sandstone, Denison Trough, East-Central Queensland. PhD Thesis, University of Queensland.

Bradshaw, B.E., Spencer, L.K., Lahtinen, A.C., Khider, K., Ryan, D.J., Colwell, J.B., Chirinos, A. and Bradshaw, J., 2009. Queensland carbon dioxide geological storage atlas.

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

Petroleum and Marine Division, Geoscience Australia, 2007. Oil and Gas Resources of Australia 2005. Geoscience Australia, Canberra.