Western Otway Basin

SOUTH AUSTRALIA AND VICTORIA, ONSHORE AND OFFSHORE

Reservoir:

Waarre Formation and **Crayfish Subgroup**

Seal:

Pember and **Belfast** mudstones, Flaxman and **Eumeralla** formations

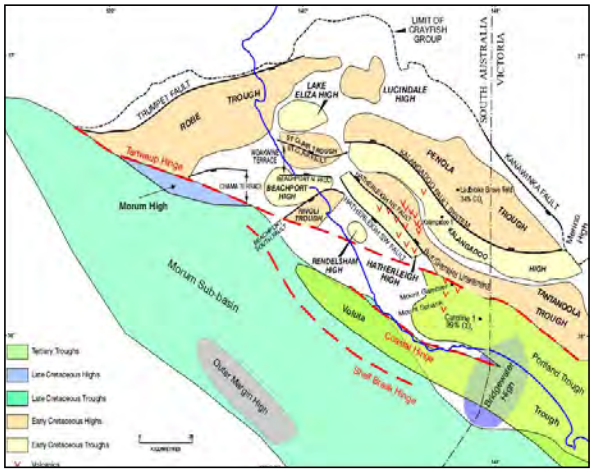
HYDROCARBON POTENTIAL

CATEGORY 1 and 2* (OGRA 2005)

Crude oil	MMBL	0.00
Condensate	MMBL	16.79
LPG	MMBL	0.00
Sales gas	Tcf	1.92

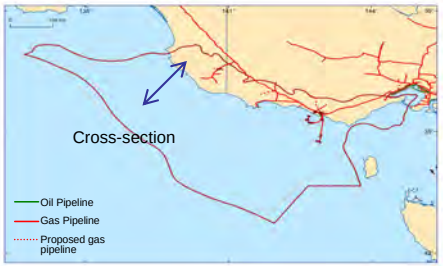
*data from entire basin

STRUCTURAL ELEMENTS



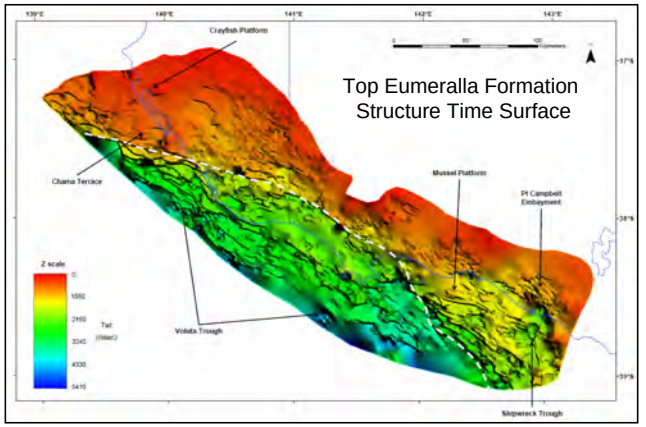
(After PIRSA)

OIL AND GAS FIELDS



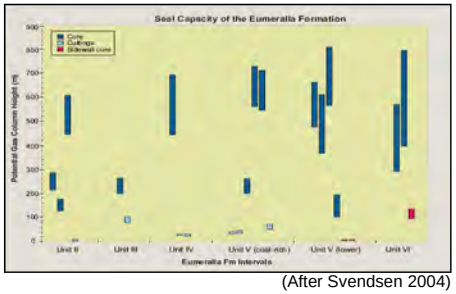
WELLS AND SEISMIC COVERAGE

REGIONAL SEAL AREA



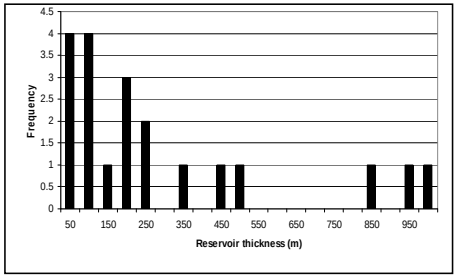
(After Krassay et al., 2009)

TOP SEAL POTENTIAL

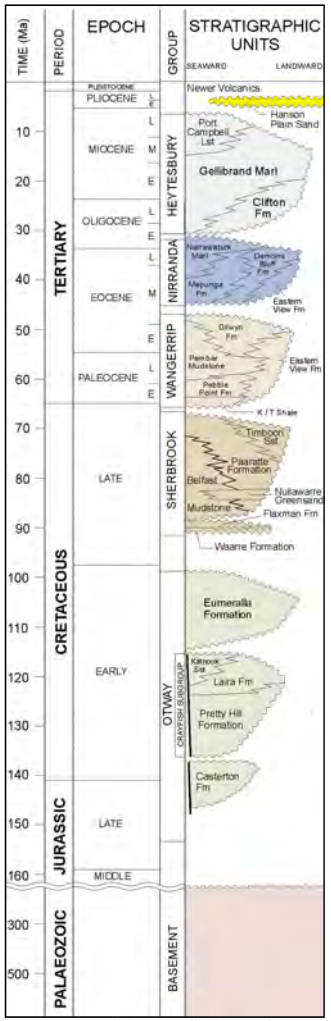


(After Svendsen 2004)

RESERVOIR THICKNESS

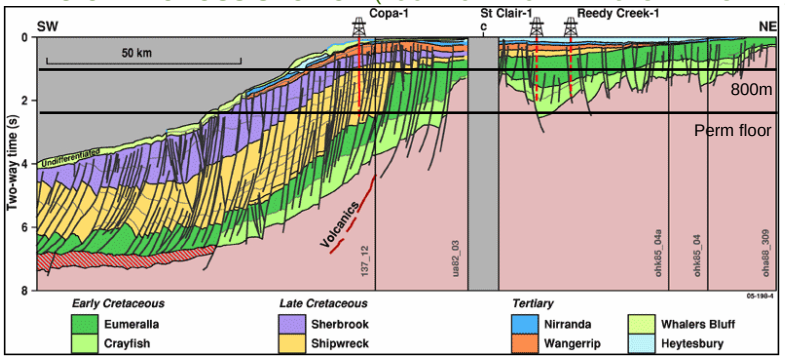


STRATIGRAPHY

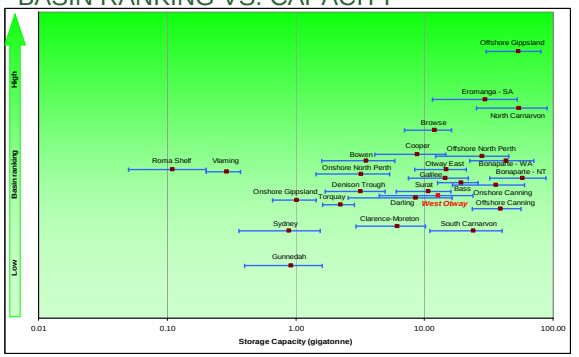


(After Woollands et al., 2001)

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

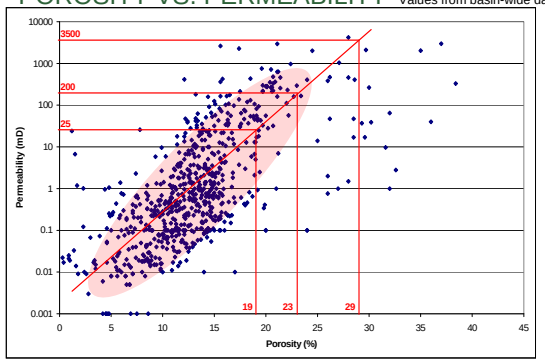


BASIN RANKING VS. CAPACITY

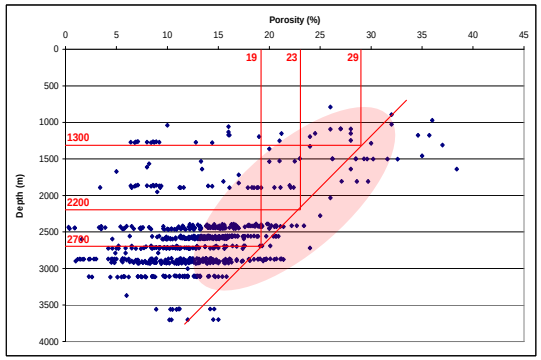


Western Otway Basin

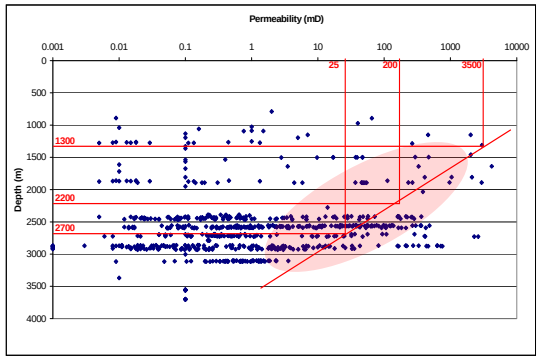
POROSITY VS. PERMEABILITY *Values from basin-wide dataset



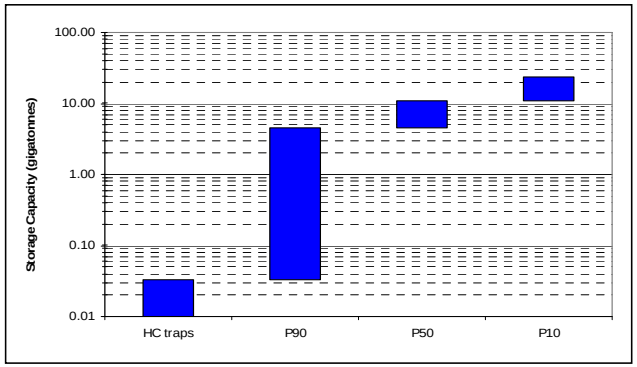
POROSITY VS. DEPTH



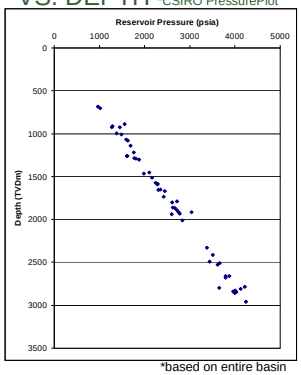
PERMEABILITY VS. DEPTH



STORAGE CAPACITY

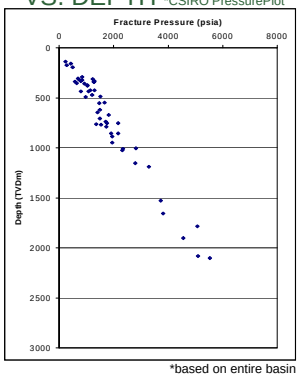


RESERVOIR PRESSURE VS. DEPTH *CSIRO PressurePlot



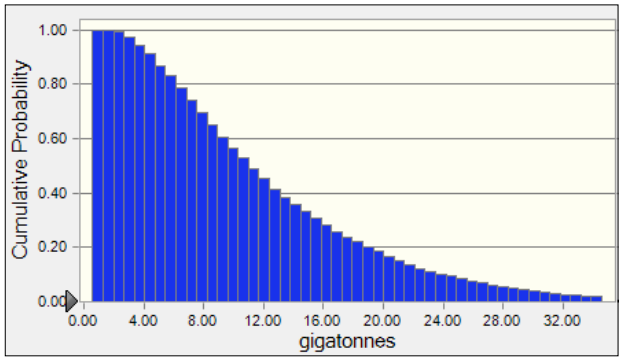
*based on entire basin

FRACTURE PRESSURE VS. DEPTH *CSIRO PressurePlot



*based on entire basin

STORAGE CAPACITY CURVE



BASIN RANKING

Category	Description	Score	Weighting
Tectonics (Seismicity)	High/Meduim	2	0.00
Size	Very Large	4	0.06
Depth	Intermediate	3	0.10
Type	Non-marine and Marine	2	0.04
Faulting intensity	Extensive	1	0.14
Hydrogeology	Intermediate	2	0.04
Geothermal	Moderate	2	0.05
Hydrocarbon potential	Medium	3	0.05
Maturity	Developing	3	0.05
Coal and CBM	Deep	3	0.00
Reservoir	Good	4	0.16
Seal	Good	4	0.18
Reservoir/Seal Pairs	Excellent	4	0.03
Onshore/Offshore	Shallow Offshore	2	0.00
Climate	Temperate	5	0.00
Accessibility	Acceptable	3	0.00
Infrastructure	Moderate	3	0.00
CO_2 sources	Few	2	0.00
Knowledge level	Good	3	0.05
Data availability	Good	3	0.05
Overall Ranking			**23**

STORAGE CAPACITY ESTIMATE

Parameter	Unit	Score (P90)	Score (P50)	Score (P10)	Distribution
Area of storage region	km^2	1100	6100	12000	Triangular
Gross thickness of saline formation	m	65	210	955	Triangular
Average porosity of saline formation over thickness interval	%	17	20	23	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	4.5	11.0	23.7	

POTENTIAL INJECTION PARAMETERS

Parameter	Unit	Shallow	Mid-Depth	Deep
Depth base seal	m	1100	1900	2400
Formation thickness	m	200	300	300
Injection depth	m	1300	2200	2700
Porosity	%	29	23	19
Absolute permeability	mD	3500	200	25
Formation pressure	psia	1895	3205	3935
Fracture pressure	psia	3285	5560	6820

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

Krassay A, et al., 2009. Otway Basin Hot Sedimentary Aquifers & SEEBASE™ Project, Report to PIRSA-GA-DPI Vic.

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

Svendsen, L., Payenberg, T.H.D., Boult, P.J. and Kaldi, J.G., 2004. Seal evaluation of a fluvio-lacustrine rift to post-rift succession, the Eumeralla Formation, Otway Basin, Australia. In: Boult, P.J., Johns, D.R. and Lang, S.C. (eds), Eastern Australasian Basin Symposium II, Petroleum Exploration Society of Australia, Special Publication, 447–460.

Woollands, M.A. and Wong, D., 2001. Petroleum Atlas of Victoria, Australia. Department of Natural Resources and Environment.