



23 September 2015

Companies Announcements Office  
Australian Securities Exchange Limited  
10<sup>th</sup> Floor, 20 Bridge Street  
SYDNEY NSW 2000

Dear Sir/Madam,

**ADVENT ENERGY LTD – PEP 11 OFFSHORE SYDNEY BASIN**

Please find attached an update from BPH Energy Ltd (ASX: BPH) investee company Advent Energy Ltd. BPH Energy currently holds 27.04% of Advent Energy.

Yours Sincerely

A handwritten signature in black ink, appearing to read "D. Breeze".

David Breeze  
Executive Director

23 September 2015

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Australian Securities Exchange Limited  
10<sup>th</sup> Floor, 20 Bridge Street  
SYDNEY NSW 2000

Dear Sir/Madam

## PEP11, Offshore Sydney Basin

Advent Energy Ltd is pleased to provide the attached presentation summarising the geological and geophysical basis for a potential exploration well within PEP11, in the offshore Sydney Basin.

The report identifies a revised drill target on the Baleen prospect on seismic data line B4-18 with total depth of 2150 metres. Conclusions of the presentation are provided below:

PEP11 has been pursued since 1981 with the first offshore 2D seismic survey. The nearest equivalent depth/age/commercial gas-condensate fields are west of Brisbane in the Bowen Basin. 2D seismic data (2D) shows that the Permian aged section of the Bowen Basin has conventional gas fields at similar time and depth to PEP11 at the Triassic/Permian age boundary that look similar in seismic amplitude strength on regional 2D to PEP11. These fields have interbedded coal and gas sands in the Late Permian that are probably correlative to the PEP11 Late Permian target.

A 40 BCF gas field called Churchie/Myall Creek south of Roma, Queensland, produces from gas sands between the Late Permian coal seams. The coals appear to be the local source for conventional gas with flow rates up to 10 mmcf/d & 115 bcpd. The presentation shows the lateral continuity of the local facies. Since these facies appear to be similar in depth and age to the PEP11 target, log ascii files were downloaded to create a forward AVO model for comparison to PEP 11 AVO. The forward model presents strong coal impedance and weak, minor amplitude change with offset.

A similar AVO anomaly was found on the PEP 11 anticline on 2D arbitrary line B4-18 to B4-03. The position of this anomaly on the south south west side of the Newcastle syncline sedimentary sink / source kitchen may be favourable for permeable sands locally sourced by coals similar to those at the Churchie/Myall Creek fields. Further, the PEP 11 anticline appears to be structured by an eastward dipping thrust fault. Intersecting 2D lines suggests an extrapolated 6000 acre (24.3 km<sup>2</sup>) amplitude anomaly area could be associated with Late Permian interbedded coal and gas facies. AVO angle gathers at the "DM1" location on line B4-18 suggests that the amplitudes could be related to coal and gas interbeds with a similarity in response to the Myall Creek forward AVO model.

Correlation risk that the anomaly location is at the Triassic/Permian boundary is reduced by jump correlating the 2D PEP11 seismic data to nearby onshore Late Permian well log control using RMS velocities and conversions adapted after a Fugro Geophysical report. Integrating a 1991 Santos/Ampolex offshore report, onshore well result summaries, and a cross-section obtained from <http://digsopen.minerals.nsw.gov.au> with the 2D data suggests that the probable 2D amplitude target is the onshore equivalent of the Permian Mulbring Siltstones and/or Muree Sandstones.

Interbedded coal beds may be the basis for the dominant amplitudes which are roughly equivalent to the overlying Late Permian coal measures. The extrapolated 6000 acre (24.3 km<sup>2</sup>) 2D amplitude anomaly has a finite extent at or about 4400' (1342m) measured depth. It should be noted that few

other amplitude anomalies like this event are present across PEP11 making this location more equivalent to the Bowen basin.

It is postulated that a wellbore at the "DM" location would probably encounter thin, anticlinal Triassic Narrabeen sands below the seabed, a normal section of Permian coal measures, then enter the Mulbring/Muree with interbedded gas sands and coal measures.

The strong petroleum potential of the northern Sydney Basin is indicated by the result of the Strevens Terrigal 1 well drilled in 1961 just onshore from PEP 11. The online records from <http://digsopen.minerals.nsw.gov.au> state that oil entered the wellbore at 338' (103m) (Narrabeen Formation) and 2-3" (5 – 7.6cm) oil fractures were noted at 5000' (1525m) (~Mulbring Siltstone). This oil stayed in the mud throughout the drilling. The wellbore had to be abandoned as the operator left "drilling rods downhole" in the wellbore at 6186' (1887m) TD. Their chief geologist suggested that another 10-15000 feet (3.05 to 4.6 km) of Permian facies lay below the TD of this wellbore. More integration of this available drill log and seismic data will be used to refine a drill location.

As Santos Ltd stated in 1991, "there is presently no commercial production or known commercial size accumulations of oil or gas in the Sydney Basin. However, .....The abundant shows indicate that the Basin is indeed capable of yielding oil and gas."

Although there are a number of risks associated with the new PEP 11 target the encouraging

- 1) the Terrigal #1 well is only 47 km from the proposed location and reported oil above and in the target PEP11 equivalent section
- 2) this thrust anticline has overlying surface oil and gas seeps above a finite target amplitude, and
- 3) most historical reports put the hydrocarbon source kitchen in the Newcastle Syncline adjacent to and down dip to this proposed drilling location.

Correlation from this 2D seismic section west to the onshore Sydney Basin with the very sparse well control suggests a Late Permian target below the Tomago coal Measures. Additionally, Advent drilled and found "Permian" aged-sands in the New Seaclem 1 well well at TD which also provides a relative fit for the formation target versus 2D seismic. The Late Permian section drilled onshore from 0-3050m is dominantly sand of the Upper and Middle Permian so the thrust fault model appears to suggest that the target at the proposed drilling location may be at the Triassic/Permian boundary.

Furthermore, a stratigraphic chart demonstrating the comparison between geological units across the Bowen, Gunnedah and Sydney basins is provided overleaf.

PEP11 is held 85% and operated by Asset Energy Pty Ltd. Asset Energy Pty Ltd is a wholly owned subsidiary of Advent Energy Ltd.

Yours faithfully,



David Breeze  
Executive Director

**Notes:**

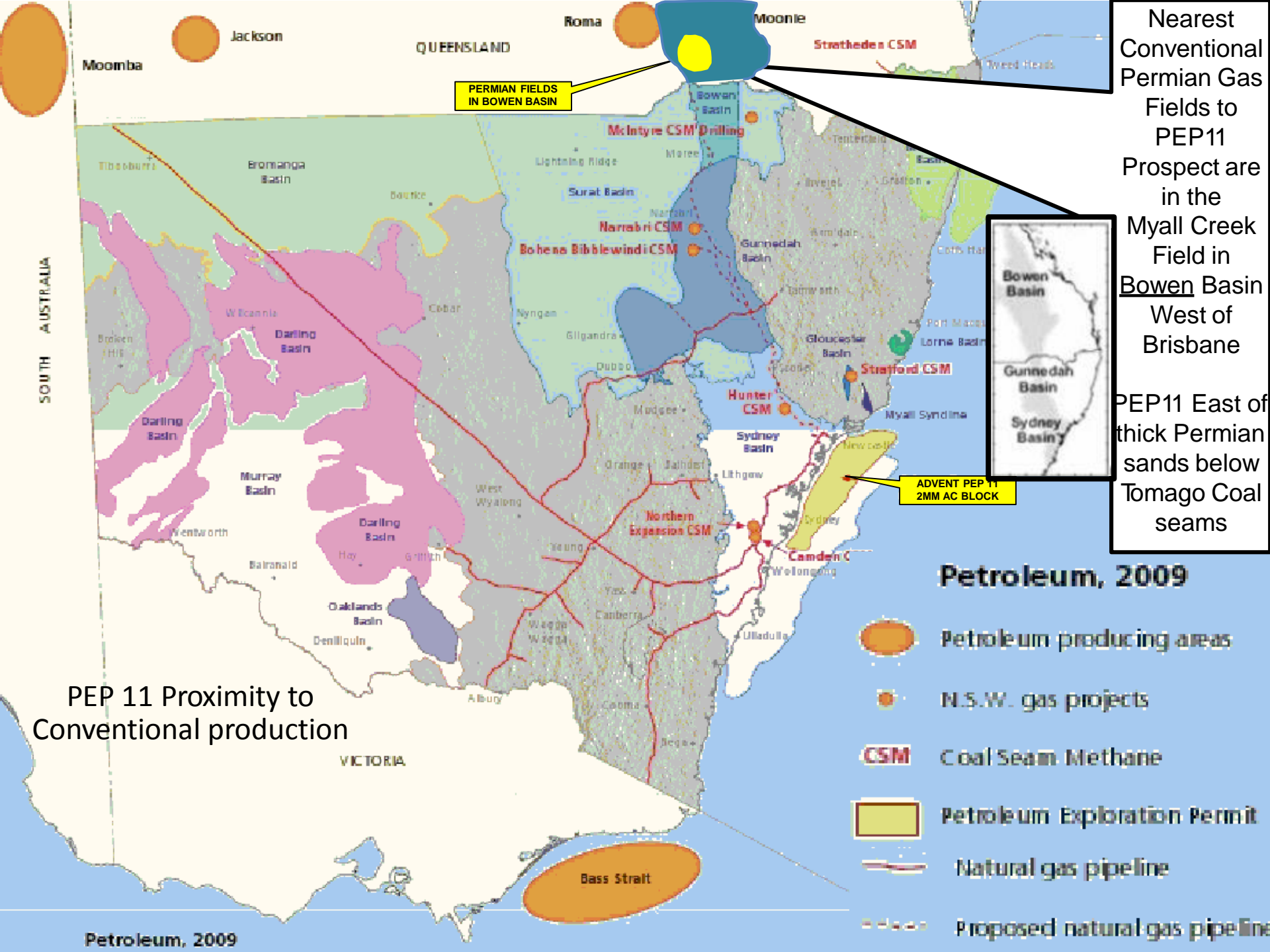
In accordance with ASX listing requirements, the geological information supplied in this report has been based on information provided by geologists who have had in excess of five years' experience in their field of activity. All Mineral Resource and Reserve Statements have been previously published by the companies concerned. Summary data has been used. Please refer to relevant ASX releases for details and attribution. Unless otherwise stated all resource and reserve reporting complies with the relevant standards. Resources quoted in this report equal 100% of the resource and may not represent BPH's investees' equity share.

**About Advent Energy**

Advent Energy Ltd is an unlisted oil and gas exploration company held by major shareholders MEC Resources (ASX: MMR), BPH Energy (ASX: BPH), Grandbridge (ASX: GBA) and Talbot Group Investments. Advent holds a strong portfolio of near term development and exploration assets spanning highly prospective acreage onshore and offshore Australia in proven petroleum basins. Advent Energy's asset base also incorporates both conventional and unconventional petroleum targets.



AVO	Specialised analysis of seismic data comparing amplitude of sound waves versus collection point offsets
Basin	A segment of the earth's crust which has down warped and in which sediments have accumulated, such areas may contain hydrocarbons.
BCF/Bcf	Billion cubic feet, i.e. 1,000 million cubic feet (equivalent to approximately 28.3 million cubic metres) of gas.
GIIP	Gas initially in place
Lead	A structural or stratigraphic feature which has the potential to contain hydrocarbons
License	An agreement in which a national or state government gives an oil Company the rights to explore for and produce oil and/or gas in a designated area.
MCF/Mcf	Thousand cubic feet – the standard measure for natural gas.
MDRT	Measured depth below Rotary Table
MMB/mmb, MMBO/mmbo	Million barrels, million barrels of oil.
MMCF/mmcf, MMCFG/mmcf, MMCFGPD/mmcf <sub>gpd</sub>	Million cubic feet, million cubic feet of gas, million cubic feet of gas per day
Permeability	The degree to which fluids such as oil, gas and water can move through the pore spaces of a reservoir rock.
Permit	A petroleum tenement, lease, licence or block.
Play	A geological concept which, if proved correct, could result in the discovery of hydrocarbons.
Porosity	The void space in a rock created by cavities between the constituent mineral grains. Liquids are contained in the void space.
Prospect (petroleum)	A geological or geophysical anomaly that has been surveyed and defined, usually by seismic data, to the degree that its configuration is fairly well established and on which further exploration such as drilling can be recommended.
Reserves	Quantities of economically recoverable hydrocarbons estimated to be present within a trap, classified as prove, probably or possible.
Reservoir	A subsurface volume of rock of sufficient porosity and permeability to permit the accumulation of crude oil and natural gas under adequate trap conditions.
RMS	Root Mean Squared. A statistical measure also known as the quadratic mean.
Seal, Sealing Formation	A geological formation that does not permit the passage of fluids. Refer also to Cap Rock.
Seismic Survey	A type of geophysical survey where the travel times of artificially created seismic waves are measured as they are reflected in a near vertical sense back to the surface from subsurface boundaries. This data is typically used to determine the depths to the tops of stratigraphic units and in making subsurface structural contour maps and ultimately in delineating prospective structures.
Stratigraphic Trap	A type of petroleum trap which results from variations in the lithology of the reservoir rock, which cause a termination of the reservoir, usually on the up dip extension.
Structure	A discrete area of deformed sedimentary rocks, in which the resultant bed configuration is such as to form a potential trap for migrating hydrocarbons.
Anticline/Syncline	A localised fold or depression within a Basin.
TD	Total drilled depth for a petroleum well
TCF/Tcf	Trillion cubic feet.
TVDS	Total vertical depth below Sea Level
Up-dip	At a structurally higher elevation within dipping strata.



PERMIAN FIELDS IN BOWEN BASIN



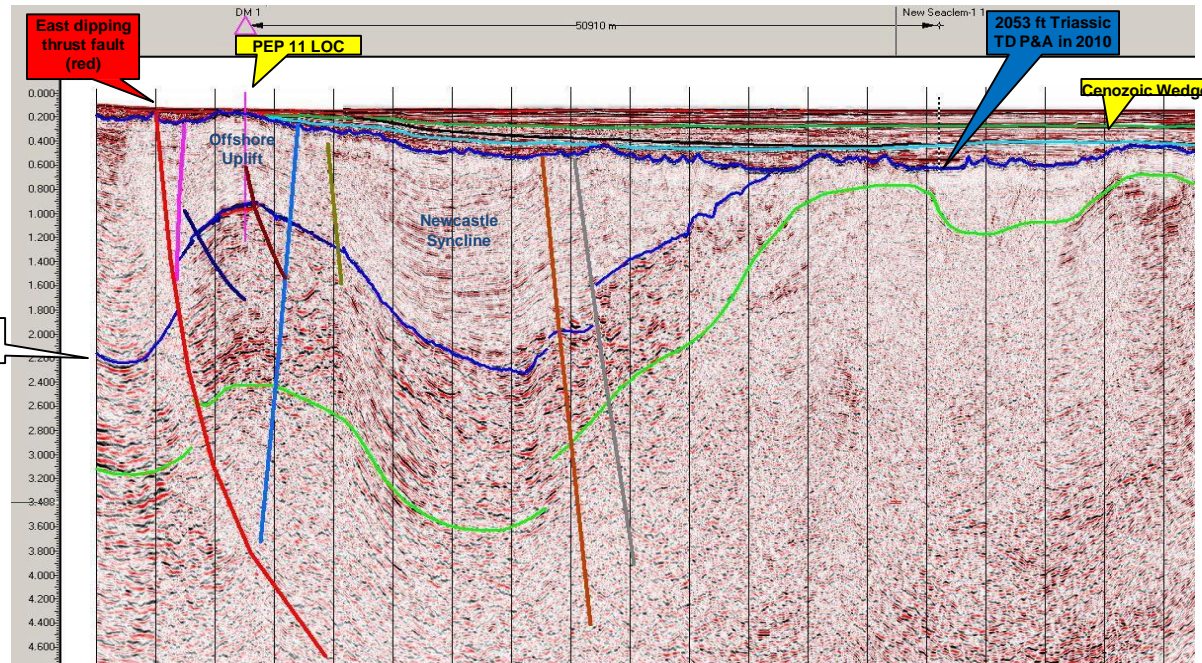
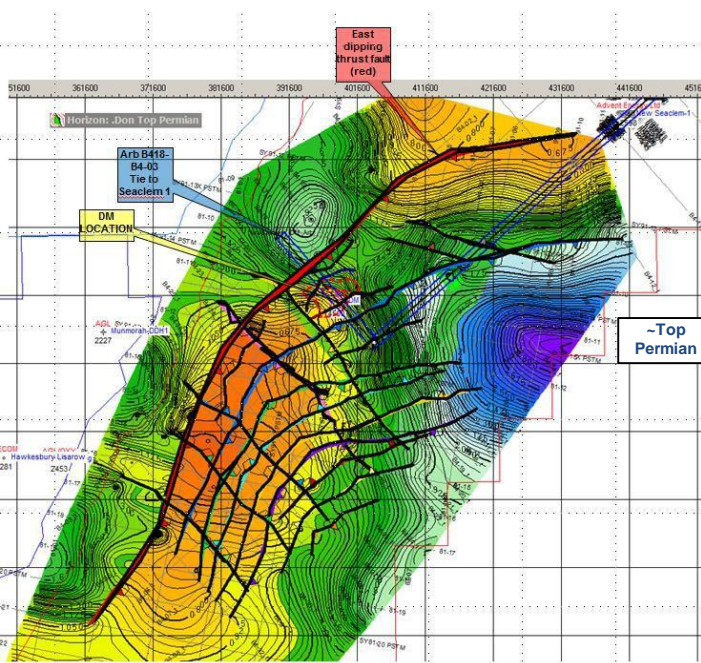
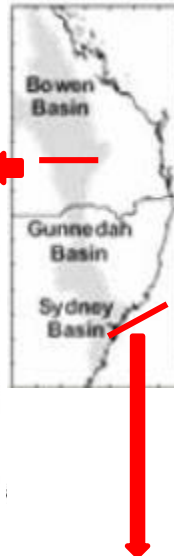
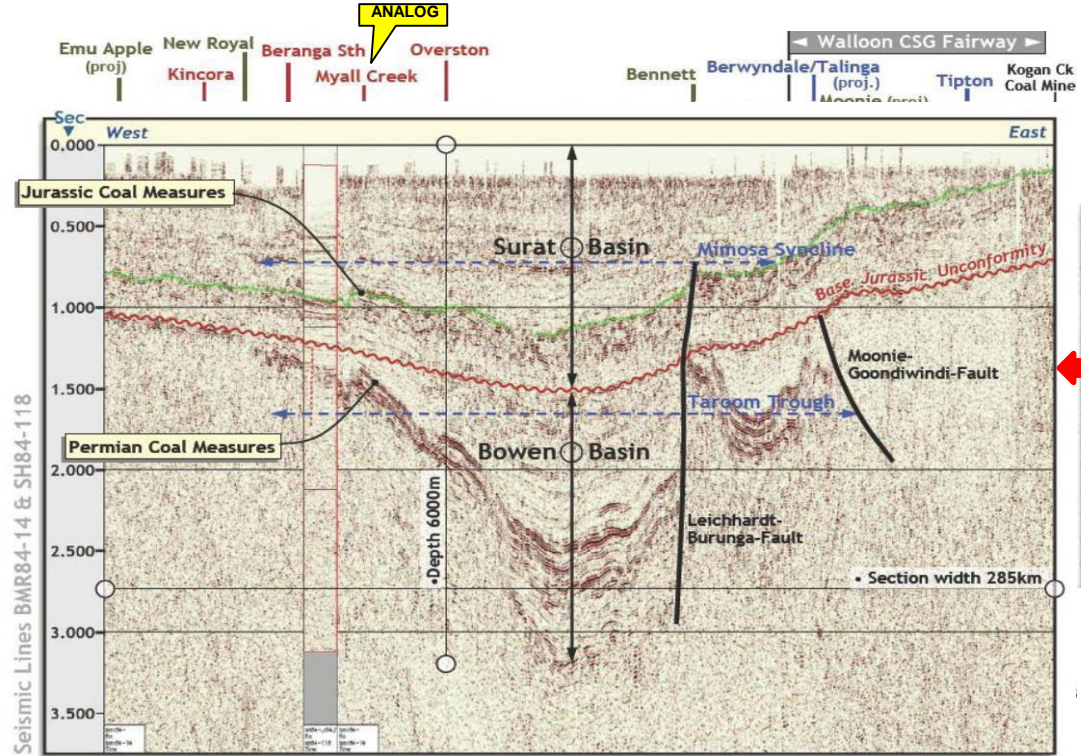
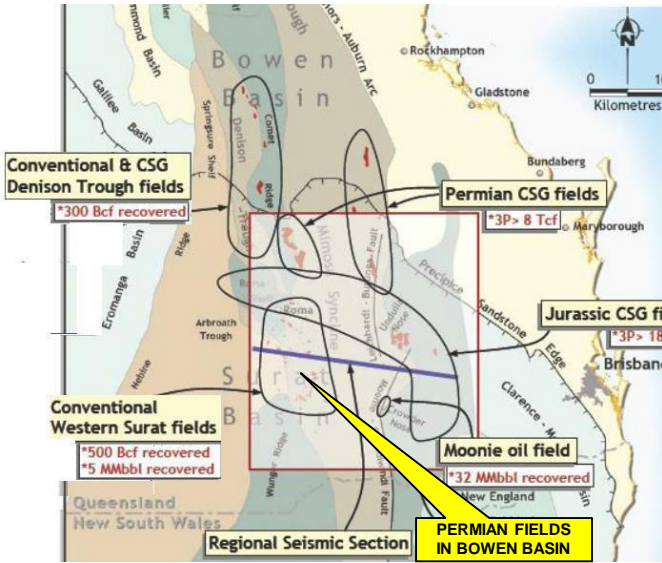
Nearest Conventional Permian Gas Fields to PEP11 Prospect are in the Myall Creek Field in Bowen Basin West of Brisbane

PEP11 East of thick Permian sands below Tomago Coal seams

ADVENT PEP 11 2MM AC BLOCK

PEP 11 Proximity to Conventional production

# Bowen Basin West Surat Production Interpreted 2D Line Showing Permian Amps Versus Offshore Sydney PEP11 2D Line West of Brisbane, AU (Queensland)

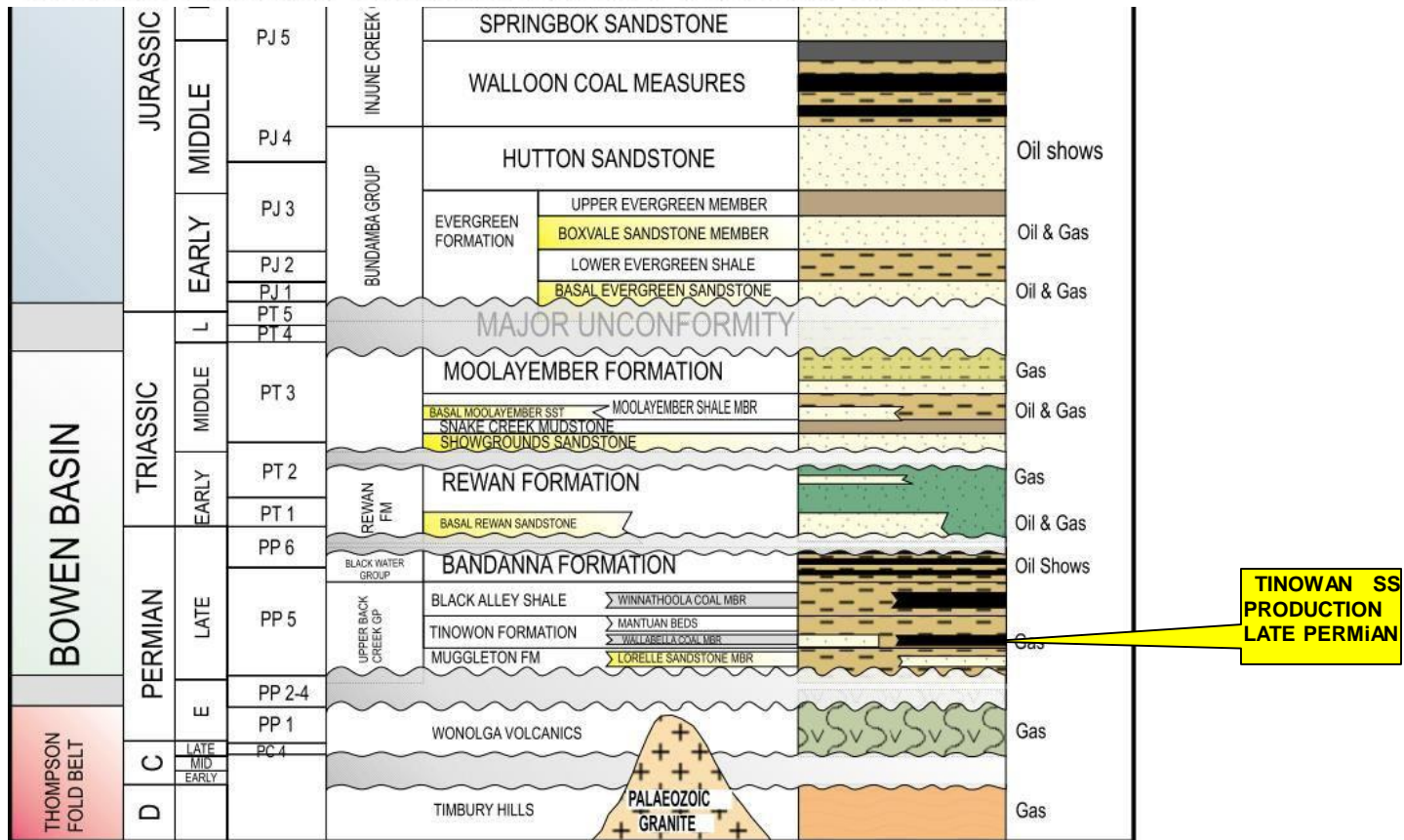






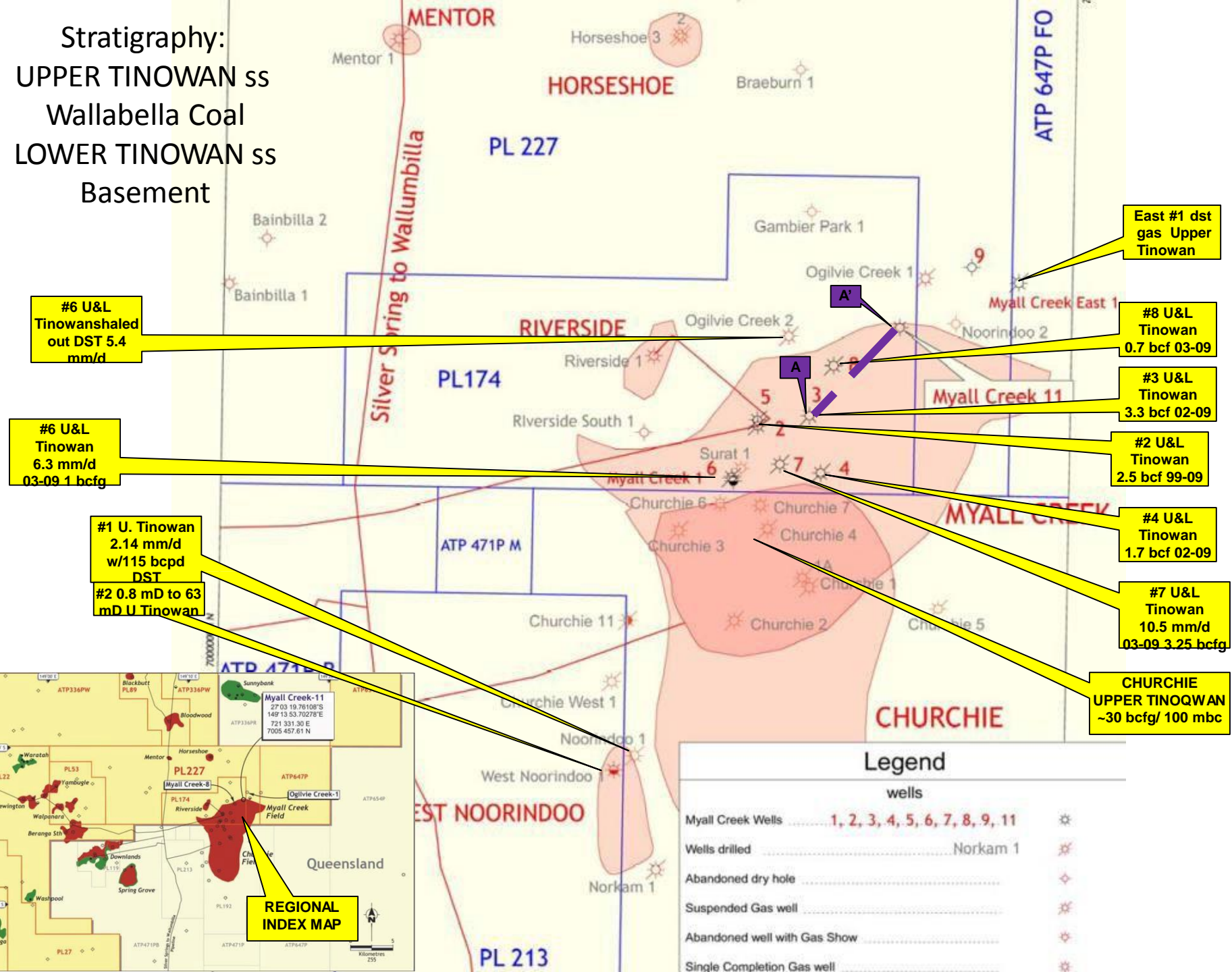
# PEP 11 SAND Analog: 1999 Myall Creek Late Permian gas/condensate Queensland

The Myall Creek field was discovered in 1999 with the drilling of Myall Creek 2 which flowed gas on DST from the Tinowon Formation. First production started in early 2001. Subsequent appraisal and development wells were drilled with 6 wells now producing.



# Stratigraphy:

- UPPER TINOWAN ss
- Wallabella Coal
- LOWER TINOWAN ss
- Basement



#6 U&L  
Tinowanshaled  
out DST 5.4  
mm/d

#6 U&L  
Tinowan  
6.3 mm/d  
03-09 1 bcfg

#1 U. Tinowan  
2.14 mm/d  
w/115 bcpsd  
DST  
#2 0.8 mD to 63  
mD U Tinowan

East #1 dst  
gas Upper  
Tinowan

#8 U&L  
Tinowan  
0.7 bcf 03-09

#3 U&L  
Tinowan  
3.3 bcf 02-09

#2 U&L  
Tinowan  
2.5 bcf 99-09

#4 U&L  
Tinowan  
1.7 bcf 02-09

#7 U&L  
Tinowan  
10.5 mm/d  
03-09 3.25 bcfg

CHURCHIE  
UPPER TINOQWAN  
~30 bcfg/ 100 mbc

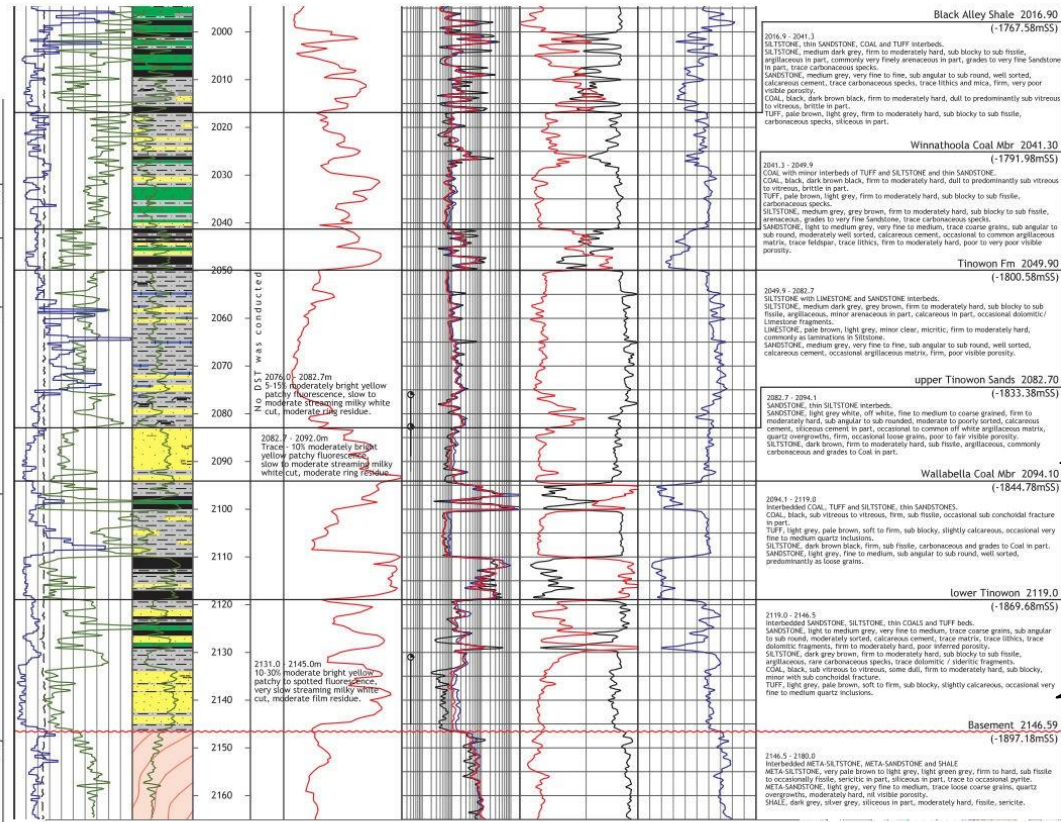
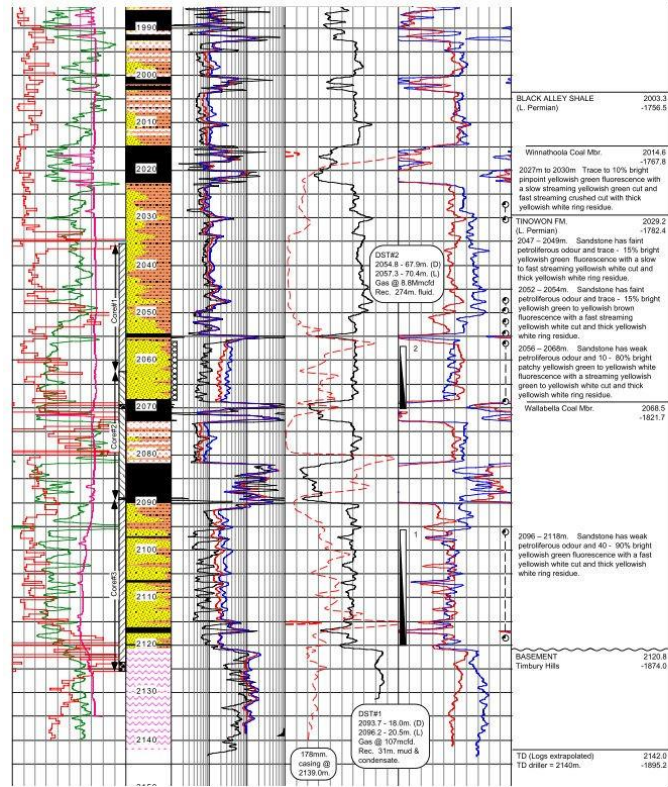
Legend		
wells		
Myall Creek Wells	1, 2, 3, 4, 5, 6, 7, 8, 9, 11	☼
Wells drilled	Norkam 1	☼
Abandoned dry hole		⬮
Suspended Gas well		☼
Abandoned well with Gas Show		☼
Single Completion Gas well		☼

REGIONAL  
INDEX MAP

# PEP 11 ANALOG: INTERBEDDED LATE PERMIAN COAL AND GAS SANDS

Myall Creek 3  
3.5 bcfg

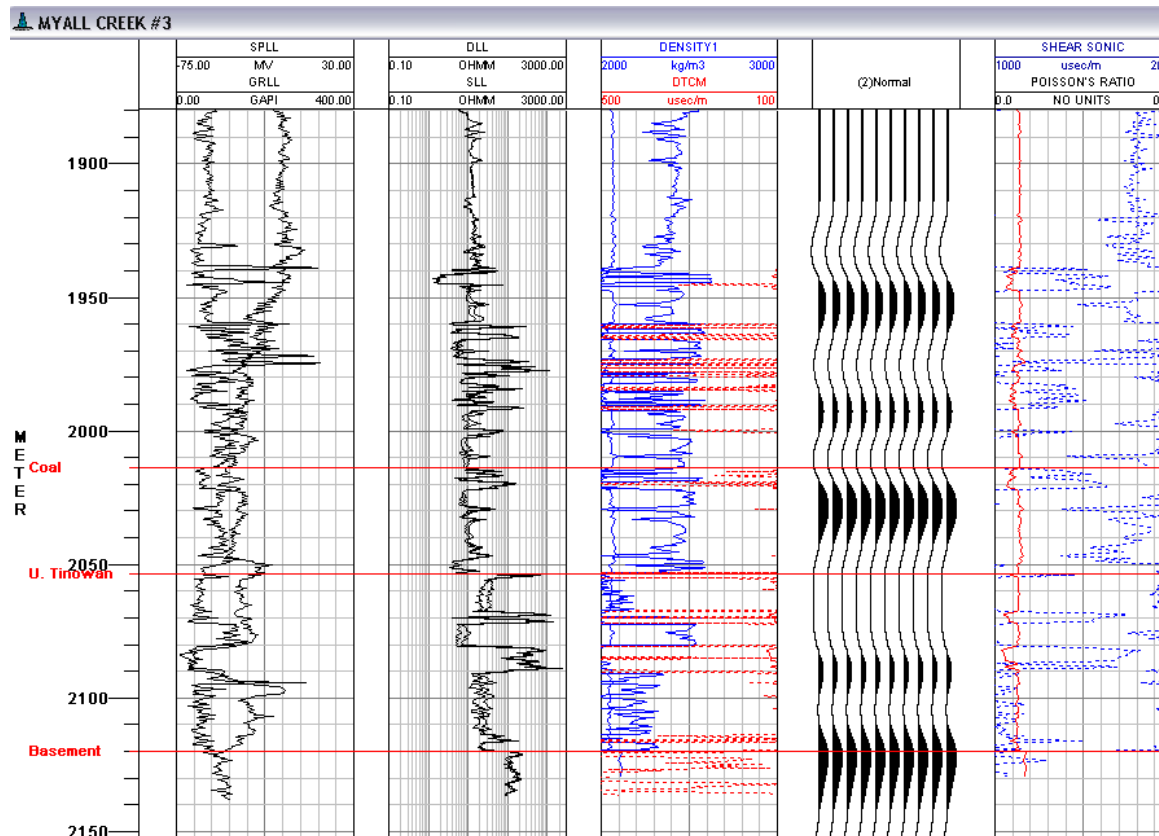
Myall Creek 11  
Wet



UPPER TINOWAN SS

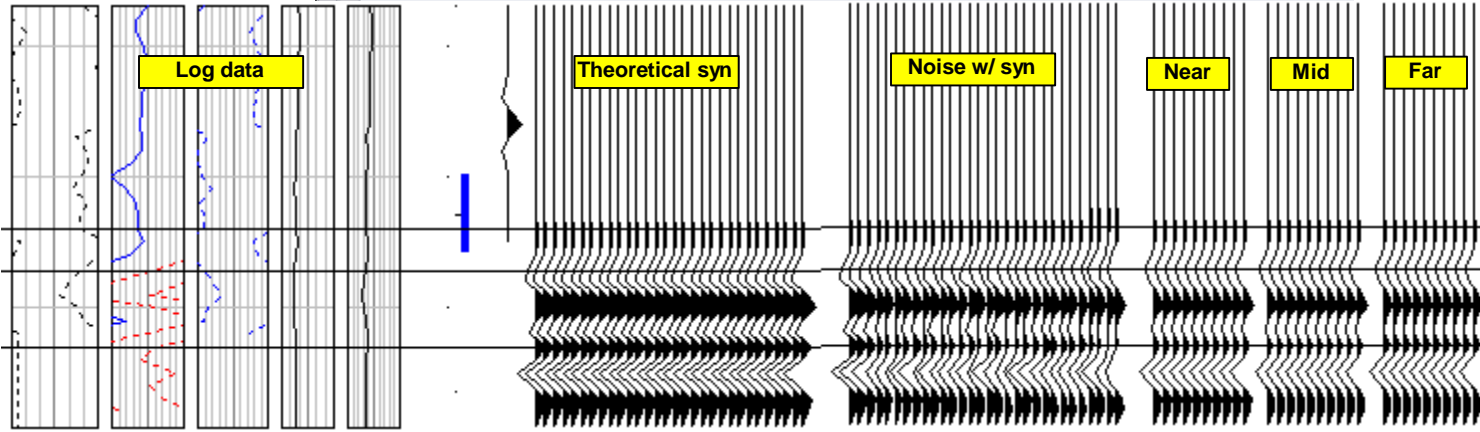
LOWER TINOWAN SS

# PEP 11 FORWARD AVO ANALOG: MYALL CREEK INTERBEDDED LATE PERMIAN COAL AND GAS SANDS TBA



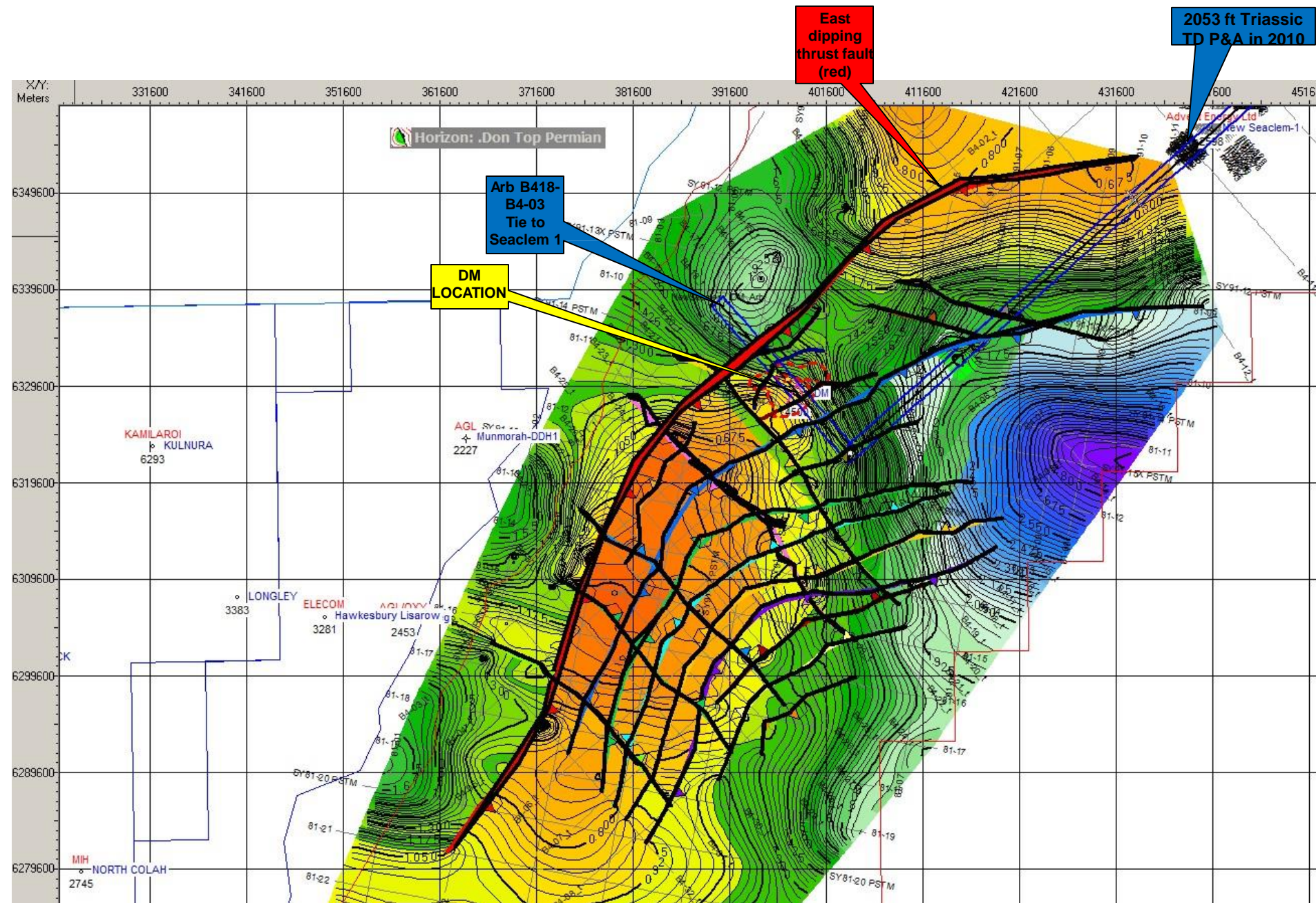
UPPER TINOWAN SS Myall Creek 3 3.5 bcfg

LOWER TINOWAN SS



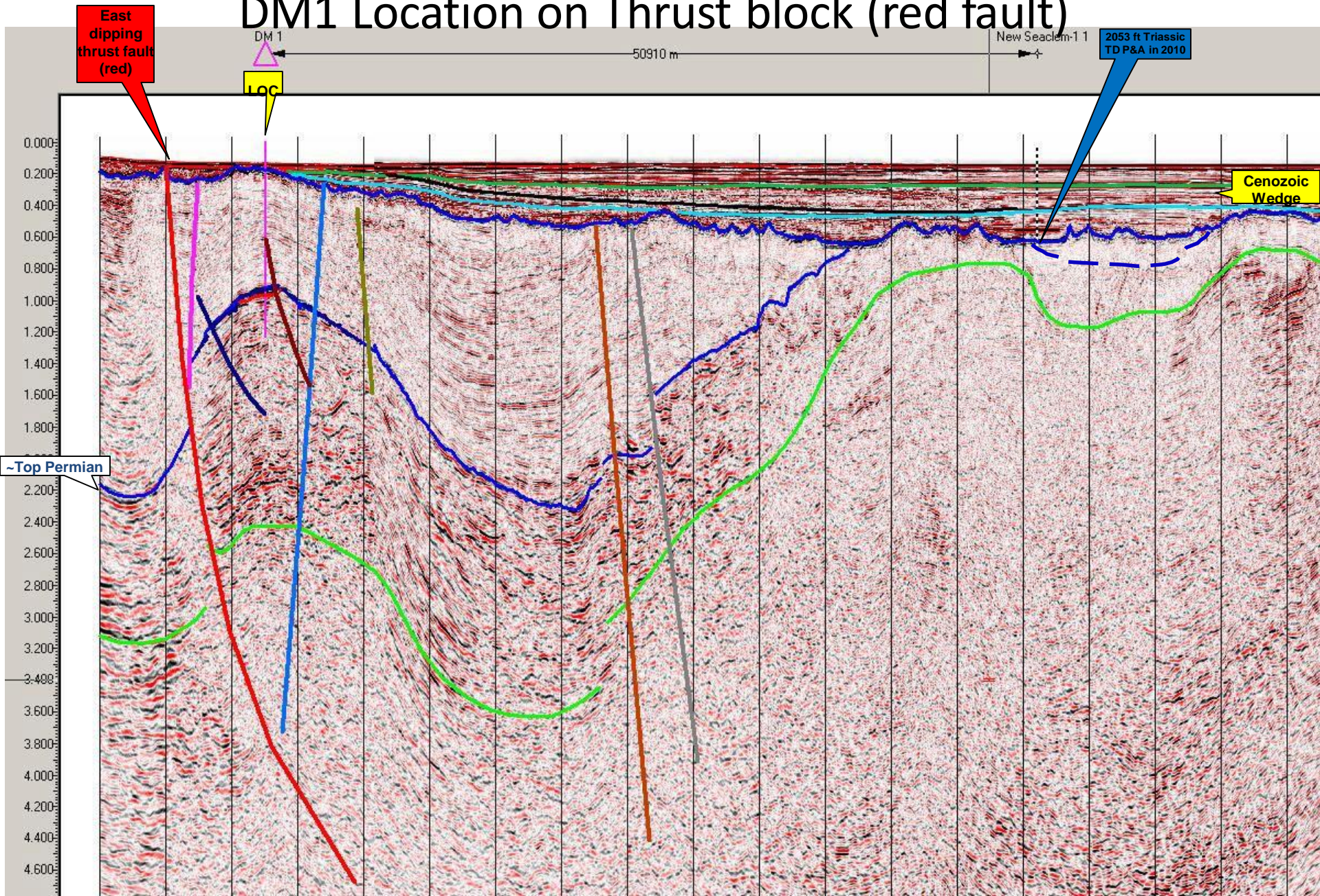
AVO for UPPER TINOWAN SS weak, minor change with offset because of the strong coal impedance

# Near Top Permian (Base Narabeen Triassic)



# Arb B418 to B403 Arb Line Tie to Advent Seaclem #1 P&A

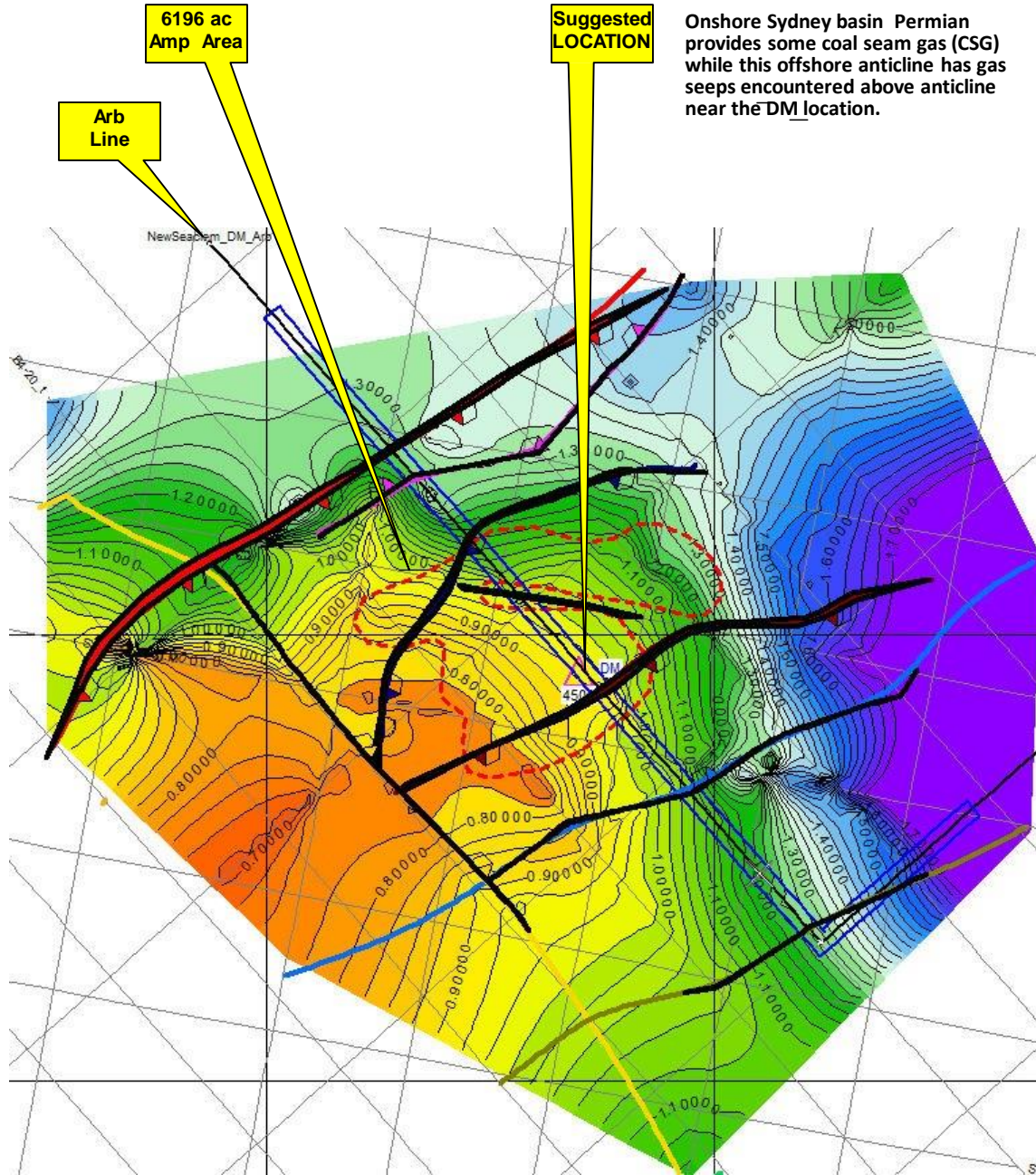
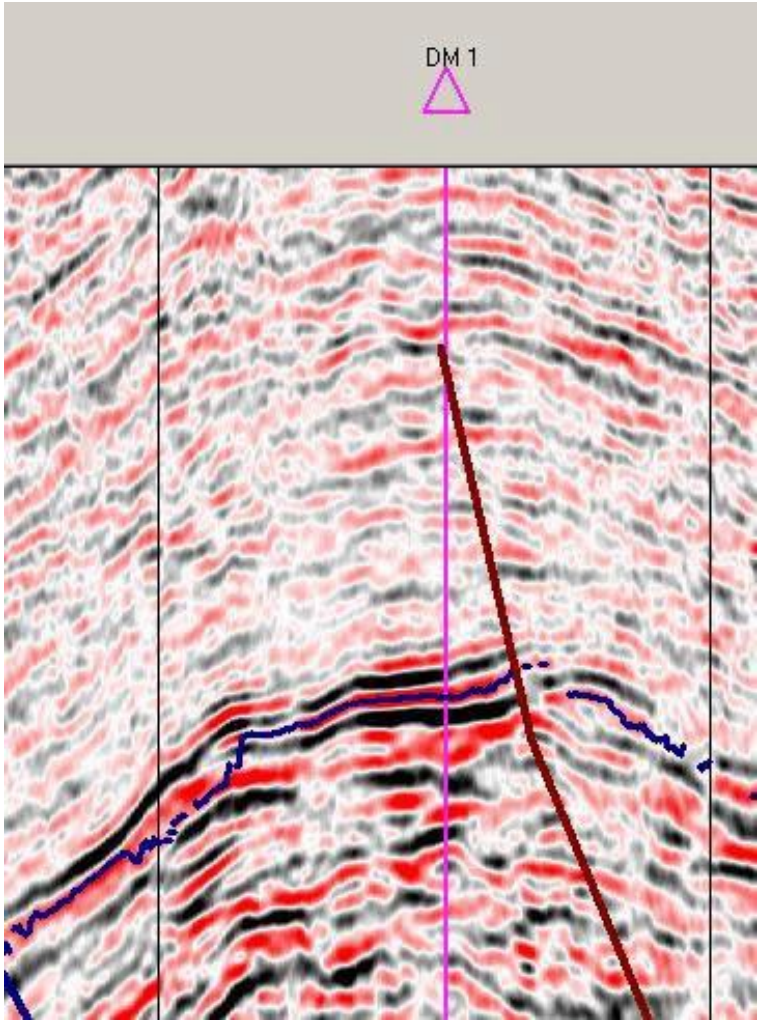
## DM1 Location on Thrust block (red fault)



# Near Top Permian / Base Triassic

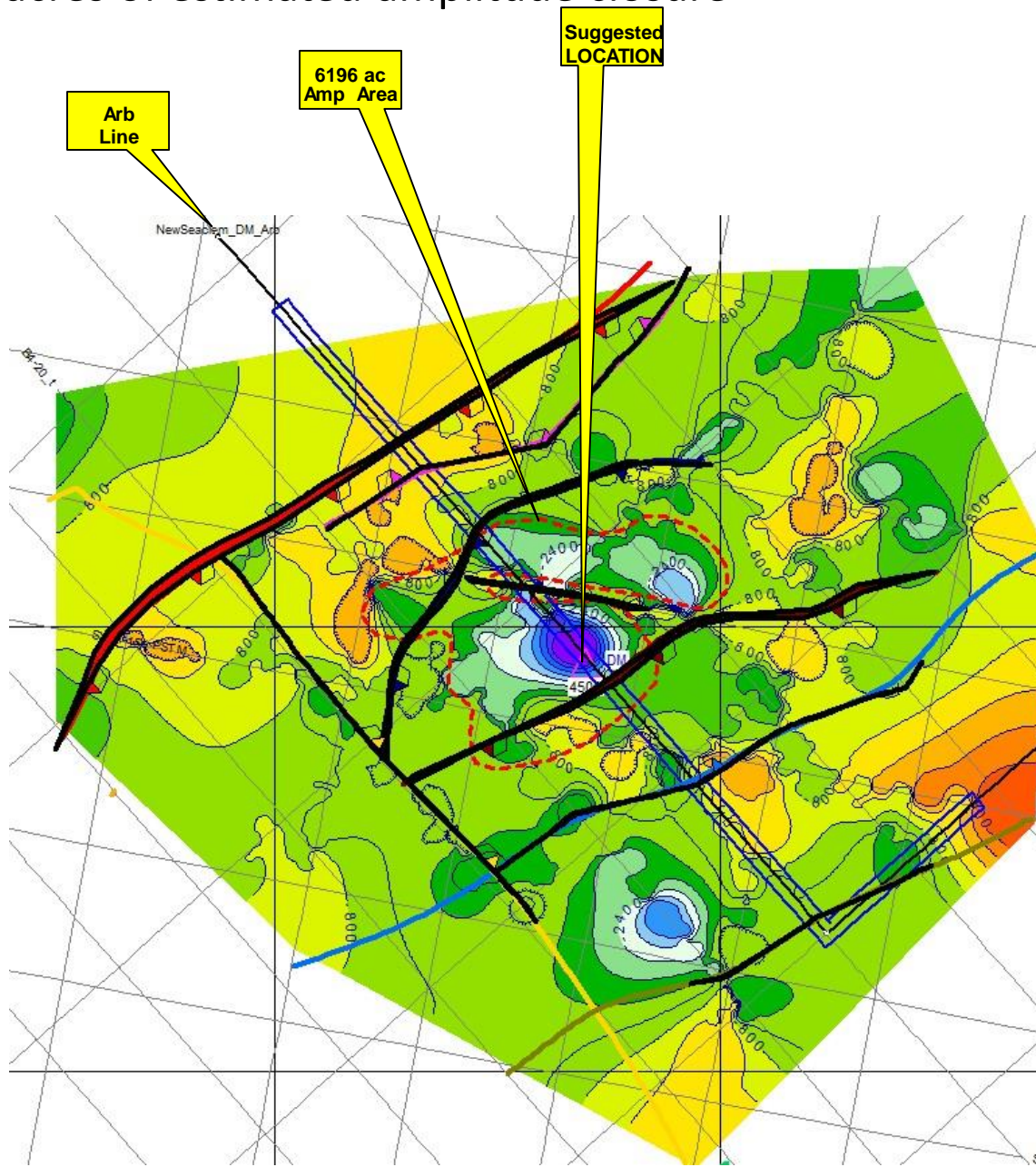
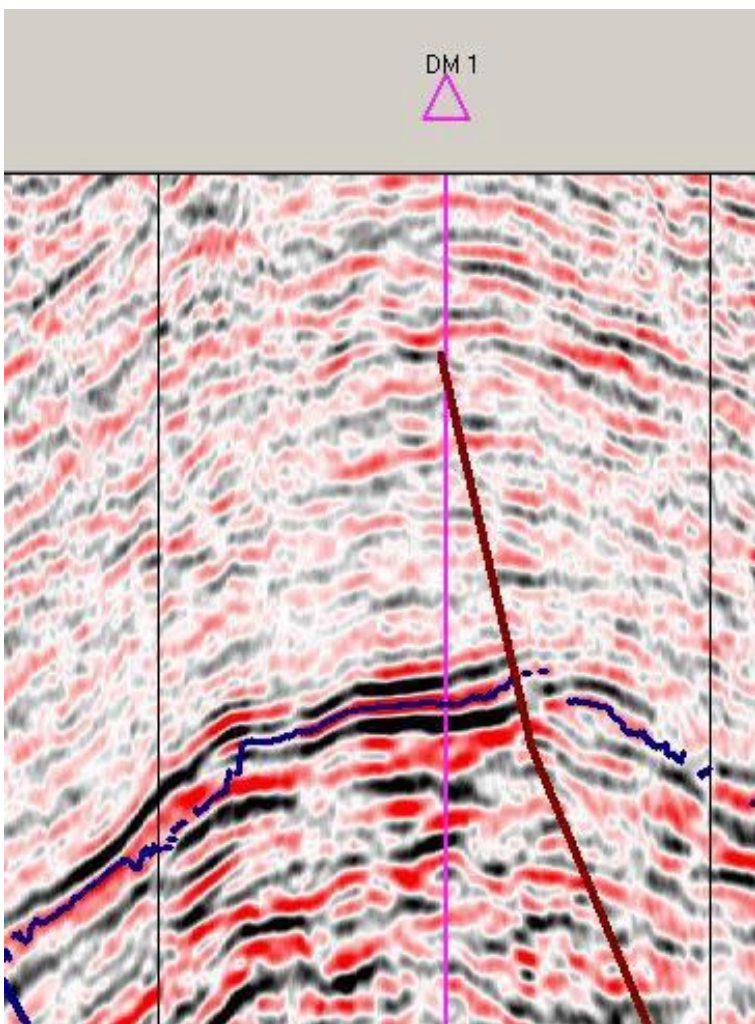
Suggested Target: Test 2D seismic line amplitude anomaly at DM1 on North end of ~Late Permian anticline formed on the upper plate of easterly dipping thrusts fault (red).

Onshore Sydney basin Permian provides some coal seam gas (CSG) while this offshore anticline has gas seeps encountered above anticline near the DM location.



# Near Top Permian / Base Triassic amplitude extraction

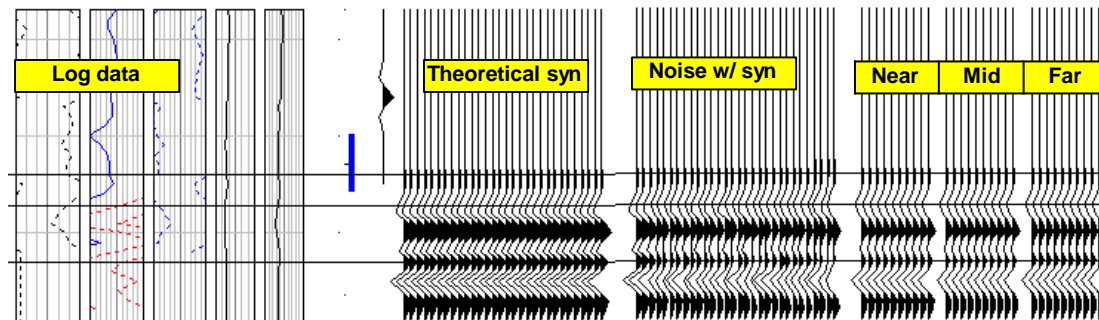
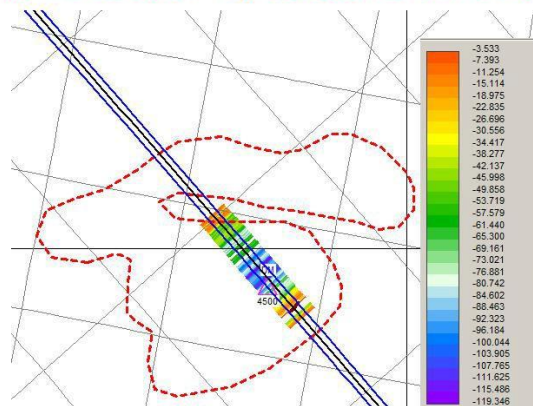
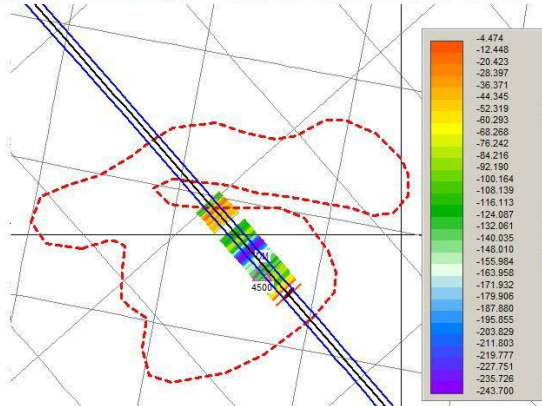
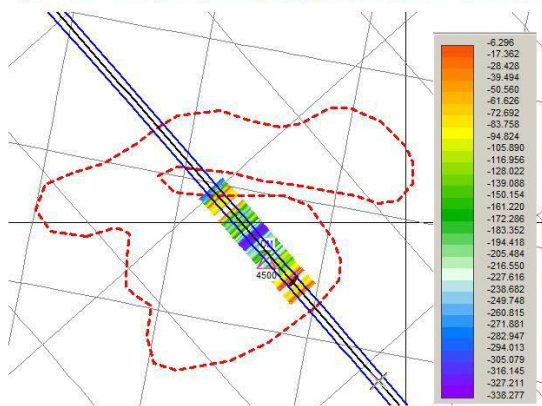
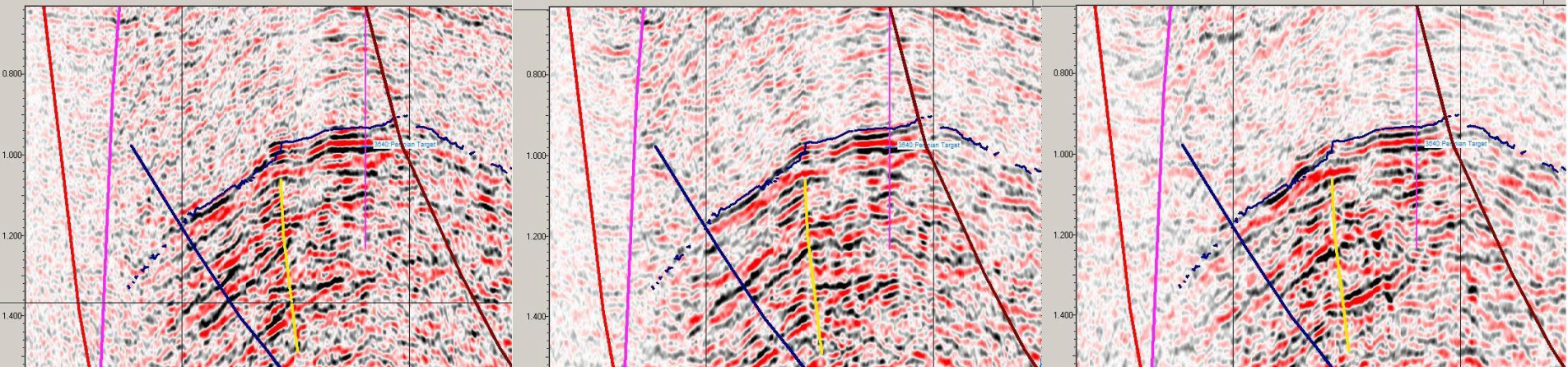
Estimate: 6196 acres of estimated amplitude closure



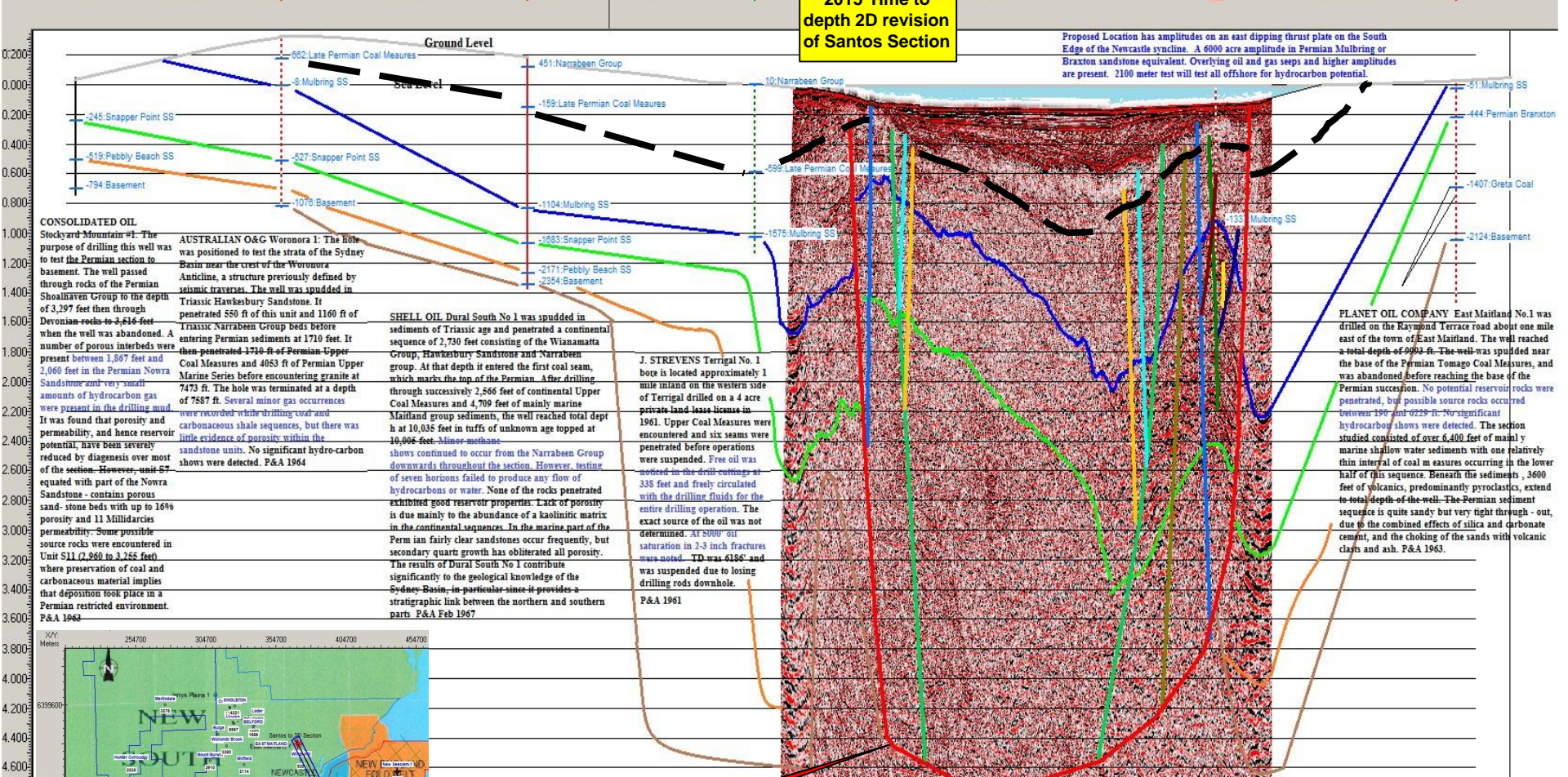


# Near2-12, Mid 12-22, Far 22-32 Angles at Location

Increasing amplitude “at” location; similar to onshore AVO model



**AVO for UPPER TINOWAN SS weak, minor change with offset because of the strong coal impedance. Has similarities to above angle gathers.**



Proposed Location has amplitudes on an east dipping thrust plate on the South Edge of the Newcastle syncline. A 6000 acre amplitude in Permian Mulbring or Braxton sandstone equivalent. Overlying oil and gas seeps and higher amplitudes are present. 2100 meter test will test all offshore for hydrocarbon potential.

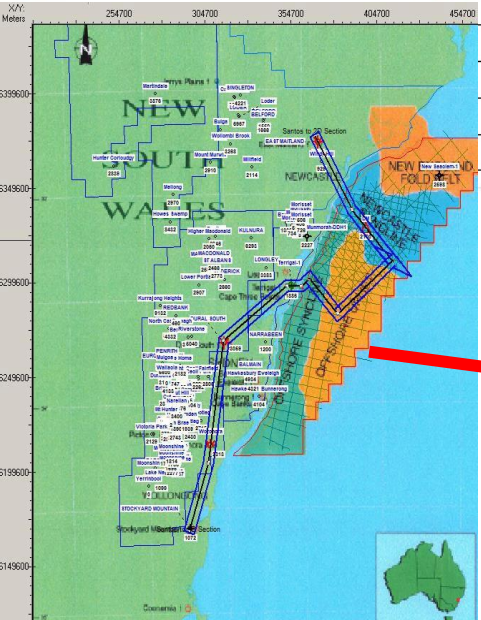
**CONSOLIDATED OIL**  
 Stockyard Mountain #1. The purpose of drilling this well was to test the Permian section to basement. The well passed through rocks of the Permian Shoalhaven Group to the depth of 3,297 feet then through Devonian rocks to 2,816 feet when the well was abandoned. A number of porous interbeds were present between 1,967 feet and 2,060 feet in the Permian Novra Sandstone and very small amounts of hydrocarbon gas were present in the drilling mud. It was found that porosity and permeability, and hence reservoir potential, have been severely reduced by diagenesis over most of the section. However, unit 27, equated with part of the Novra Sandstone - contains porous sandstone beds with up to 16% porosity and 11 Millidarcies permeability. Some possible source rocks were encountered in Unit S11 (2,960 to 3,282 feet) where preservation of coal and carbonaceous material implies that deposition took place in a Permian restricted environment. P&A 1963

**AUSTRALIAN O&C Woronora 1:** The hole was positioned to test the strata of the Sydney Basin near the crest of the Woronora Anticline, a structure previously defined by seismic traverses. The well was spudded in Triassic Hawkesbury Sandstone. It penetrated 550 feet of this unit and 1160 feet of Triassic Narrabeen Group beds before entering Permian sediments at 1710 feet. It then penetrated 1710 feet of Permian Upper Coal Measures and 4053 feet of Permian Upper Marine Series before encountering granite at 7473 feet. The hole was terminated at a depth of 7587 ft. Several minor gas occurrences were recorded while drilling coal and carbonaceous shale sequences, but there was little evidence of porosity within the sandstone units. No significant hydrocarbon shows were detected. P&A 1964

**SHELL OIL Dural South No 1** was spudded in sediments of Triassic age and penetrated a continental sequence of 2,730 feet consisting of the Wianamatta Group, Hawkesbury Sandstone and Narrabeen group. At that depth it entered the first coal seam, which marks the top of the Permian. After drilling through successively 2,566 feet of continental Upper Coal Measures and 4,709 feet of mainly marine Maitland group sediments, the well reached total depth at 10,035 feet in tuffs of unknown age topped at 10,006 feet. Minor methane shows continued to occur from the Narrabeen Group downwards throughout the section. However, testine of seven horizons failed to produce any flow of hydrocarbons or water. None of the rocks penetrated exhibited good reservoir properties. Lack of porosity is due mainly to the abundance of a kaolinitic matrix in the continental sequences. In the marine part of the Permian fairly clear sandstones occur frequently, but secondary quartz growth has obliterated all porosity. The results of Dural South No 1 contribute significantly to the geological knowledge of the Sydney Basin, in particular since it provides a stratigraphic link between the northern and southern parts. P&A Feb 1967

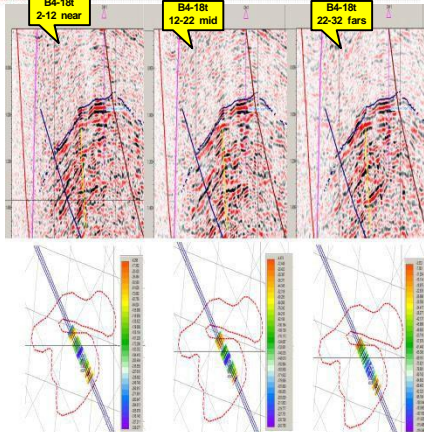
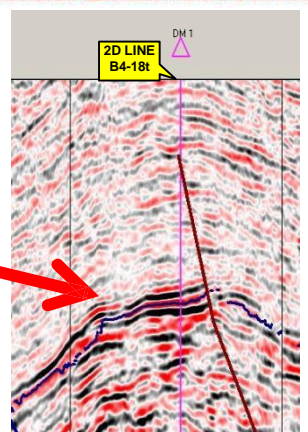
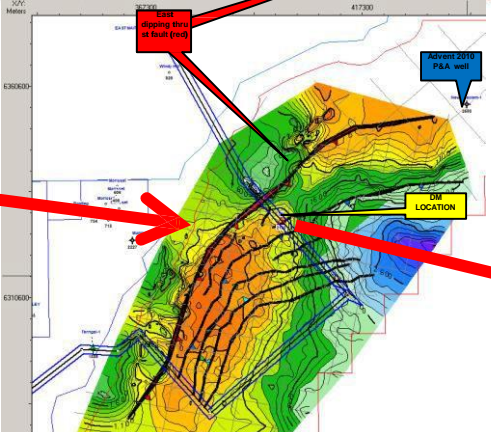
**J. STREVS Terrigal No. 1** bore is located approximately 1 mile inland on the western side of Terrigal drilled on a 4 acre private land lease license in 1961. Upper Coal Measures were encountered and six seams were penetrated before operations were suspended. Free oil was noticed in the drill cuttings at 338 feet and freely circulated with the drilling fluids for the entire drilling operation. The exact source of the oil was not determined. At 5000' oil saturation in 2-3 inch fractures was noted. TD was 6186' and was suspended due to losing drilling rods downhole. P&A 1961

**PLANET OIL COMPANY East Maitland No.1** was drilled on the Raymond Terrace road about one mile east of the town of East Maitland. The well reached a total depth of 9903 ft. The well was spudded near the base of the Permian Tomago Coal Measures, and was abandoned before reaching the base of the Permian succession. No potential reservoir rocks were penetrated, but possible source rocks occurred between 196 and 6229 ft. No significant hydrocarbon shows were detected. The section studied consisted of over 6,400 feet of mainly marine shallow water sediments with one relatively thin interval of coal measures occurring in the lower half of this sequence. Beneath the sediments, 3690 feet of volcanics, predominantly pyroclastic, extend to total depth of the well. The Permian sediment sequence is quite sandy but very tight through-out, due to the combined effects of silica and carbonate cement, and the choking of the sands with volcanic clays and ash. P&A 1963.



**Suggested Target:** Test 6000 acre amplitude anomaly on North end of ~Late Permian anticline formed on the upper plate of easterly dipping thrusts fault (red).

Onshore Sydney basin provides some coal seam gas (CSG) while this offshore anticline has gas seeps encountered above anticline near DM location.



COONEMIA-1

T.D. = 2614' KB = 82'

STOCKYARD MOUNTAIN - 1

T.D. = 3516' KB = 174'

WORONORA-1

T.D. = 7587' KB = 1172'

DURAL SOUTH-1

T.D. = 10035' KB = 849'

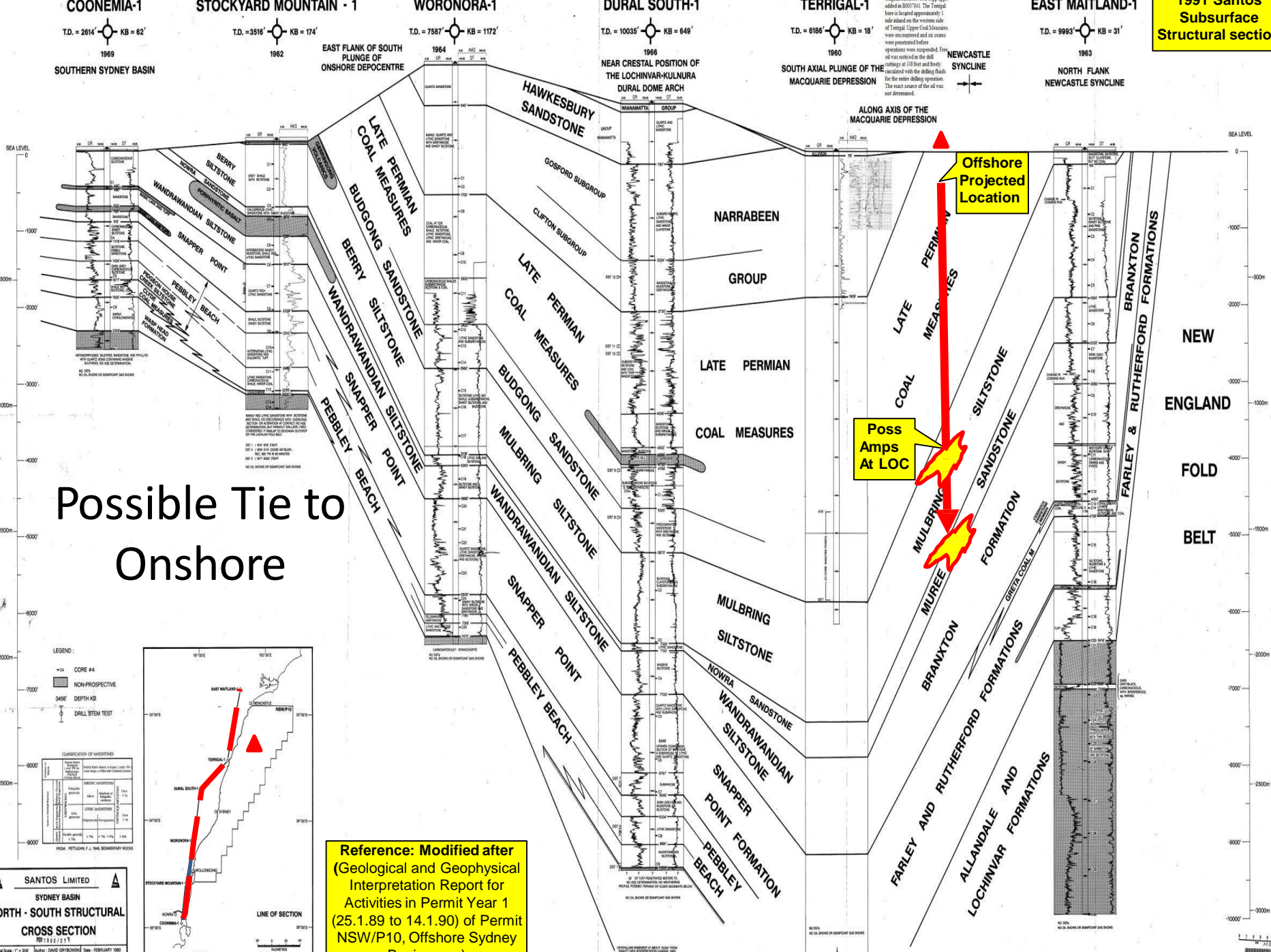
TERRIGAL-1

T.D. = 6166' KB = 18'

EAST MAITLAND-1

T.D. = 9993' KB = 31'

1991 Santos Subsurface Structural section

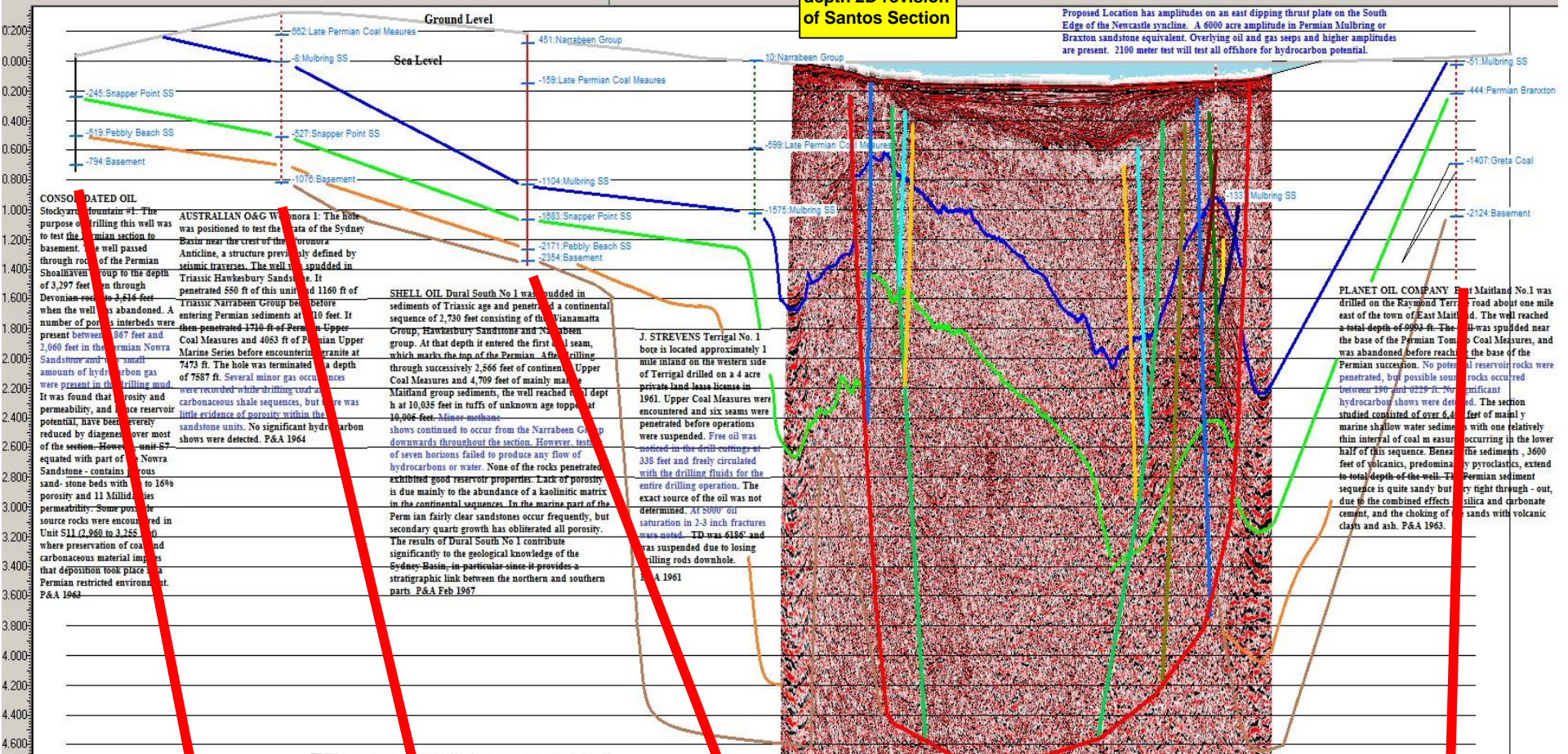


Possible Tie to Onshore

**Reference: Modified after**  
 (Geological and Geophysical Interpretation Report for Activities in Permit Year 1 (25.1.89 to 14.1.90) of Permit NSW/P10, Offshore Sydney Basin, area)

**SANTOS LIMITED**  
 SYDNEY BASIN  
 NORTH - SOUTH STRUCTURAL CROSS SECTION  
 FEB 1992 (1/1)

Vertical Scale: 1" = 200'  
 Author: DAVID GRAYSON  
 Date: FEBRUARY 1992  
 Plot Scale: SHEPPARDSON  
 Drafted: L.F.S.  
 File No: SYD048 001



**2015 Time to depth 2D revision of Santos Section**

Proposed Location has amplitudes on an east dipping thrust plate on the South Edge of the Newcastle syncline. A 6000 acre amplitude in Permian Mulbring or Braxton sandstone equivalent. Overlying oil and gas seeps and higher amplitudes are present. 2100 meter test will test all offshore for hydrocarbon potential.

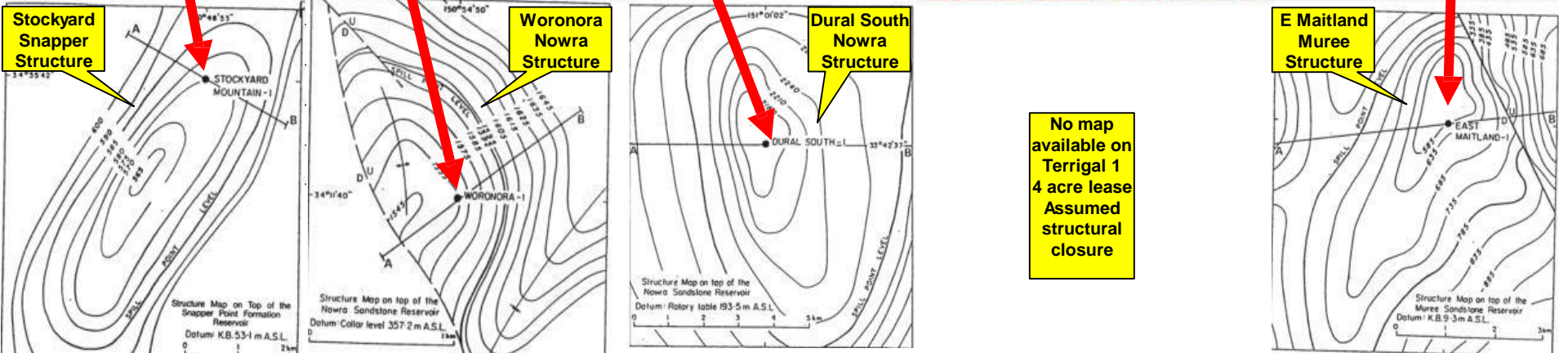
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 Stockyard Mountain #1 - The purpose of drilling this well was to test the Permian section to basement. The well passed through rock of the Permian Shoalhaven group to the depth of 3,297 feet on through Devonian rocks to 4,616 feet when the well was abandoned. A number of porous intervals were present between 567 feet and 2,060 feet in the Permian Nowra Sandstone and 2,060 to 2,200 feet in the Permian Upper Marine Series before encountering granite at 2,473 feet. The hole was terminated at a depth of 7887 ft. Several minor gas occurrences were recorded while drilling, but there was little evidence of porosity within the sandstone units. No significant hydrocarbon shows were detected. P&A 1964

**AUSTRALIAN O&G Woronora 1:** The hole was positioned to test the Permian section to basement. The well passed through rock of the Permian Shoalhaven group to the depth of 3,297 feet on through Devonian rocks to 4,616 feet when the well was abandoned. A number of porous intervals were present between 567 feet and 2,060 feet in the Permian Nowra Sandstone and 2,060 to 2,200 feet in the Permian Upper Marine Series before encountering granite at 2,473 feet. The hole was terminated at a depth of 7887 ft. Several minor gas occurrences were recorded while drilling, but there was little evidence of porosity within the sandstone units. No significant hydrocarbon shows were detected. P&A 1964

**SHELL OIL Dural South No 1** was spudded in sediments of Triassic age and penetrated a continental sequence of 2,730 feet consisting of the Wianamatta Group, Hawkesbury Sandstone and Narrabeen group. At that depth it entered the first coal seam, which marks the top of the Permian. After drilling through successively 2,566 feet of continental Upper Coal Measures and 4,709 feet of mainly marine Maitland group sediments, the well reached total depth at 10,035 feet in tuffs of unknown age topped at 10,906 feet. Minor methane shows continued to occur from the Narrabeen Group downwards throughout the section. However, tests of seven horizons failed to produce any flow of hydrocarbons or water. None of the rocks penetrated exhibited good reservoir properties. Lack of porosity is due mainly to the abundance of a kaolinitic matrix in the continental sequences. In the marine part of the Permian fairly clear sandstones occur frequently, but secondary quartz growth has obliterated all porosity. The results of Dural South No 1 contribute significantly to the geological knowledge of the Sydney Basin, in particular since it provides a stratigraphic link between the northern and southern parts. P&A Feb 1967

**J. STREVENS Terrigal No. 1** bore is located approximately 1 mile inland on the western side of Terrigal drilled on a 4 acre private land lease license in 1961. Upper Coal Measures were encountered and six seams were penetrated before operations were suspended. Free oil was noticed in the drill cuttings at 338 feet and freely circulated with the drilling fluids for the entire drilling operation. The exact source of the oil was not determined. At 5000' oil saturation in 2-3 inch fractures was noted. TD was 6186' and was suspended due to losing drilling rods downhole. P&A 1961

**PLANET OIL COMPANY East Maitland No.1** was drilled on the Raymond Terrace road about one mile east of the town of East Maitland. The well reached a total depth of 9903 ft. The hole was spudded near the base of the Permian Tomago Coal Measures, and was abandoned before reaching the base of the Permian succession. No potential hydrocarbon shows were detected, but possible source rocks occurred between 196 and 6229 ft. No significant hydrocarbon shows were detected. The section studied consisted of over 6,000 feet of mainly marine shallow water sediments with one relatively thin interval of coal in situ occurring in the lower half of this sequence. Beneath pyroclastic, extend to total depth of the well. The Permian sediment sequence is quite sandy but right through - out, due to the combined effects of silica and carbonate cement, and the chinking of sands with volcanic clays and ash. P&A 1963.



**No map available on Terrigal 1 4 acre lease Assumed structural closure**