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Combined analysis of different logs in quantification of exhumation and its implications for hydrocarbon exploration, a case study from Australia

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ABSTRACT

Exhumation in the Eromanga Basin of South Australia and Queensland has been quantified using the compaction methodology. The standard method of estimating exhumation using the sonic log has been modified and the adjusted sonic, the bulk density and neutron logs, have been used to estimate exhumation. Additionally the use of a single shale has not been adopted, and seven units, ranging in age from Cretaceous to Jurassic have been analysed. All units yield similar results; and burial at depth greater than currently observed is the most likely cause of overcompaction. The use of the adjusted sonic, bulk and neutron logs have been justified. This study has major implications for hydrocarbon exploration since predicted maturation of source rocks will be greater for any given geothermal history if exhumation is incorporated in maturation modelling.

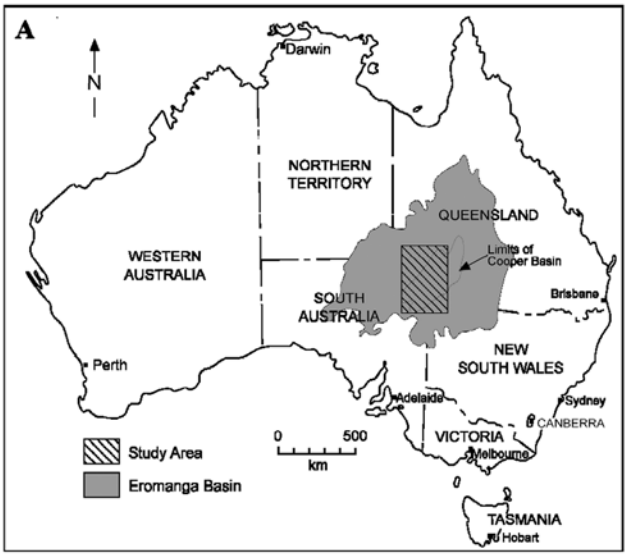
KEYWORDS **Eromanga basin. Compaction. Adjusted sonic log. Density log. Neutron log. Source rock maturity.**

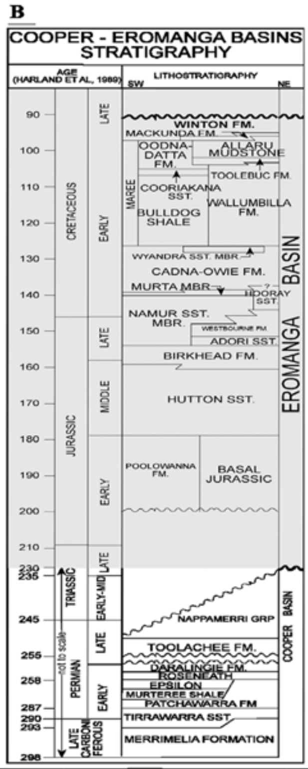
INTRODUCTION

The Eromanga Basin of South Australia and Queensland is not at its maximum burial-depth due to Late Cretaceous - Tertiary exhumation. After the deposition of the Cooper Basin, in Late Triassic - Early Jurassic times (Thornton, 1979), the Eromanga Basin sediments were deposited in Jurassic and Cretaceous times in mainly fluvial-lacustrine and shallow marine environments (Bowering, 1982). The Eromanga Basin, Australia's largest onshore petroleum province, is the larger of the two and completely overlies the Cooper Basin. After the deposition of the Eromanga Basin, major sedimentation ceased and over the last 90 Myr the basin has been characterized by periods of exhumation and minor sedimentation (Fig. 1).

The aims of this study are to: a) Determine the magnitude of Late Cretaceous - Tertiary exhumation in the Eromanga Basin, using the adjusted sonic log, the bulk density and the neutron log from 195 released wells and compare the results with compaction studies using the sonic log (Mavromatidis and Hillis, 2005); b) Assess whether logs other than sonic and lithologies other than shales may be used to estimate exhumation magnitude (Bulat and Stoker, 1987; Hillis, 1991; Hillis et al., 1994; Menpes and Hillis, 1995), seven different stratigraphic units have been used to determine exhumation in the Eromanga Basin, (Fig. 1); and c) Discuss the implications of the exhumation results with respect to thermal maturity of source rocks.

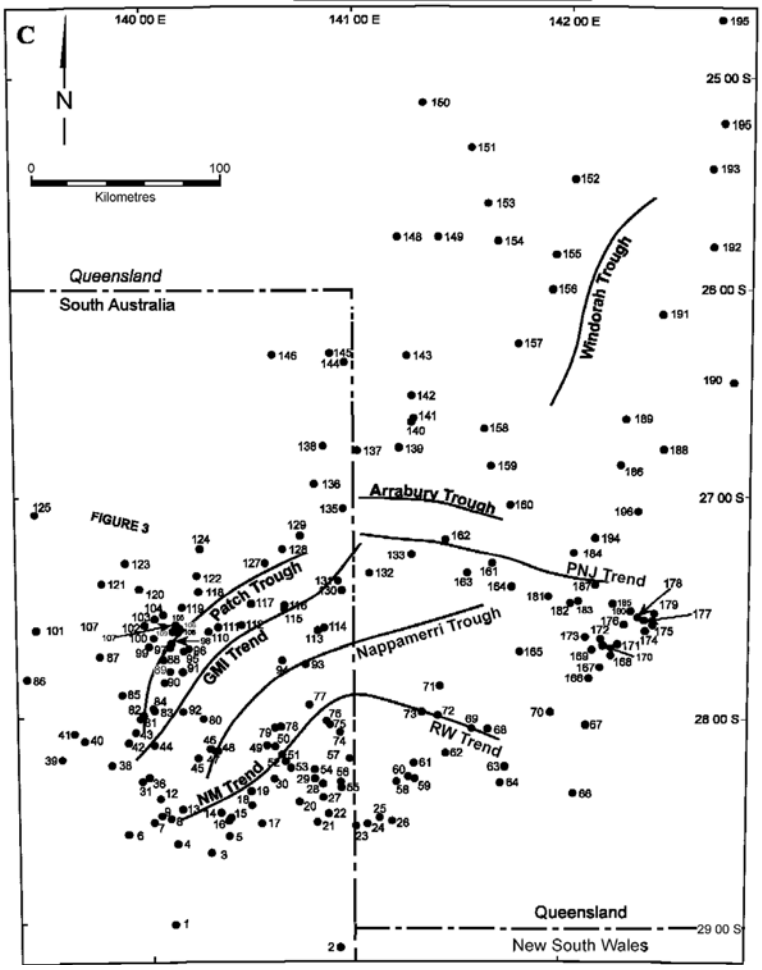
The term exhumation (as opposed to erosion or uplift) is used here in the sense of England and Molnar (1990), to describe displacement of rocks with respect to the surface.





LIST OF WELLS USED IN COMPACTION ANALYSIS AS SHOWN IN FIG. 1C.

1. Tinga Tingana-1
2. Paxton-1
3. Kobari-1
4. Dunoon-1
5. Kiwarrick-1
6. Padulla-1
7. Wancoocha-2
8. Garanjanie-2
9. Dirkala-2
10. Thurakinna-5
11. Bungee-1
12. Alwyn-1
13. Limestone Creek-9
14. Biala-1
15. Battunga-1
16. Mckinlay-3
17. Buckinna-1
18. Keeto-2
19. Wirha-1
20. Azolla-1
21. Munkarie Sth-1
22. Paragilga-1
23. Gidgee-1
24. Munro-1
25. Toolachee-39
26. Toolachee-9
27. Toolachee-21
28. Childie-1
29. Daralingie-15
30. Daralingie-23
31. Pintari-1
32. Lycium-1
33. Taloola-1
34. Sturt-6
35. Spencer-4
36. Muteroo-3
37. Arrakis-1
38. Moomba South-1
39. Moomba-57
40. Big Lake-26
41. Big Lake-35
42. Mudera-3
43. Marabooka-2
44. Strzelecki -27
45. Strzelecki-10
46. Baratta-1
47. Witchetty-1
48. Amyema-1
49. Marsilea-1
50. Kerna-5
51. Wills-1
52. Hydra-1
53. Mooliampah-1
54. Rheims-1
55. Belah-1
56. Wompi-1
57. Rho East-1
58. Atoll-1
59. Watson-1
60. Patroclus-1
61. Hume-1
62. Tennaperra South-1
63. Warnie East-1
64. Orientos-2
65. Lambda-1
66. Burke-2
67. Dullingari-3
68. Dullingari North-1
69. Three Queens-1
70. Della-10
71. Della-7
72. Moomba North-1
73. Kurunda-1
74. Mawson-1
75. Gidgealpa-42
76. Gidgealpa-20
77. Jack Lake-2
78. Lhotsky-1
79. Nulla-1
80. Cooba-1
81. Meranji-1
82. Snake Hole-1
83. Swan Lake-1
84. Moomba-27
85. Mcleod-1
86. Burley-2
87. Merrimelia-25
88. Merrimelia-7
89. Gooranie-2
90. Gooranie-1
91. Andree-1
92. Spectre-1
93. Kalladeina-1
94. Fly Lake-1
95. Fly Lake-4
96. Brolga-2
97. Tirrawarra North-1
98. Tirrawarra-26
99. Tirrawarra West-1
100. Tirrawarra-15
101. Tirrawarra-13
102. Deparanie-1
103. Minkie-1
104. Wantana-2
105. Kirby-1
106. Kirby-2
107. Pondrinie-5
108. Packsaddle-4
109. Bookabourdie-1
110. Lake Mcmillan-1
111. Moorari-4
112. Darter-1
113. Charo-1
114. Moolion-1
115 Yanta-1
116. Daer-1
117. Koonchera-1
118. Wimma-1
119. Beanbush-1
120. Deramookoo-1
121. Innamincka-4
122. Turban-1
123. Innamincka-3
124. Pepita-2
125. Paning-1
126. Kenny-1
127. Yanbee-1
128. James-1
129. Doonmulla-1
130. Cook-1
131. Cook North-1
132. Wicho-1
133. Mackillop-1
134. Araburg-1
135. Potiron-1
136. Haddon Downs-1
137. Curalle-1
138. Meeba-1
139. Copai-1
140. Morney-1
141. Ullenbury-1
142. Cuddapan-1
143. Denley-1
144. Tanbar North-1
145. Tanbar-1
146. Marengo-1
147. Tinchoo-1
148. Barrolka-1
149. Durham Downs-1
150. Keilor-1
151. Macadama-1
152. Challum-1
153. Yanda-2
154. Barylah-1
155. Johba-1
156. Echuburra North-1
157. Bardoc-1
158. Wallawanny-1
159. Jarrar-1
160. Cooroo-1
161. Pallano-1
162. Kutyo-1
163. Jackson South-1
164. Richie-1
165. Karwin-1
166. Jackson-1
167. Graham-1
168. Bycoe-1
169. Tinpilla-1
170. Wackett-3
171. Naccowlah West-1
172. Naccowlah South-1
173. Naccowlah East-1
174. Bogala-1
175. Thurra-1
176. Carney-1
177. Munkah-2
178. Ballera-1
179. Karmona-2
180. Okotoko-1
181. Wippo-2
182. Yumba-1
183. Tartulla-1
184. Hooley-1
185. Kercummurra-1
186. Wareena-1
187. Navalla-1
188. Boldrewood-1
189. Toby-1
190. Coonavalla-1
191. Alkina-1
192. Russel-1
193. Ingella-1
194. Hammond-1
195. Steward-1



QUANTIFICATION EXHUMATION USING THE COMPACTION METODOLOGY

Quantification of apparent exhumatiom

The reduction of porosity of shales, sandstones, siltstones and lithological combinations thereof with increasing burial-depth is a largely non-reversible process. Because depth-controlled compaction is largely irreversible, units that are shallower than their greatest burial depth will be overcompacted, with respect to their present burial depth. The units analysed are assumed to follow a normal compaction trend (i.e. porosity, velocity, density, etc.) with burial, and compaction is assumed not to be reversed by subsequent exhumation. With these assumptions the amount of elevation of exhumed sedimentary rocks above their maximum burial-depth, termed 'apparent exhumation' (EA), is given by the displacement, along the depth axis, of the observed compaction trend from the normal, undisturbed trend (Fig. 2). This can be estimated graphically, however, in practice, it was determined numerically using the simple equation:

$$E_A = (\mathrm{Log}_u - \mathrm{Log}_r)/m - d_u + d_r, \quad (1)$$

where, m = gradient of the normal compaction relationship; Log_u = mean log value of the well under consideration; Log_r = mean log value of the reference well; d_u = midpoint depth of the unit in the well under consideration; and d_r = midpoint depth of the unit in the reference well. The above equation is used for the estimation of apparent exhumation from the adjusted sonic, density and neutron logs where instead of Log_u and Log_r, is used Δt_{adju} and Δt_{adjr}, ρ_{bu} and ρ_{br}, and Φ_{Nu} and Φ_{Nr}, were used as appropriate. The quantity (E_A) is referred to as apparent exhumation because it is exhumation not reversed by subsequent burial. It is not necessarily the same as the amount of exhumation that occurred at the time the rocks were being elevated. If there is no post-exhumational burial, then apparent exhumation is the true exhumation magnitude. However, if renewed burial follows exhumation, the magnitude of apparent exhumation determined from the porosity log data is reduced by the amount of that subsequent burial (Fig. 2, well C). Once the unit reaches its maximum burial-depth (Fig. 2, well D), it is compacted again, and no evidence of the previous exhumational phase can be detected by this method. Overburden weight following exhumation does not cause any further porosity loss until the formation re-attains its previous maximum burial-depth.

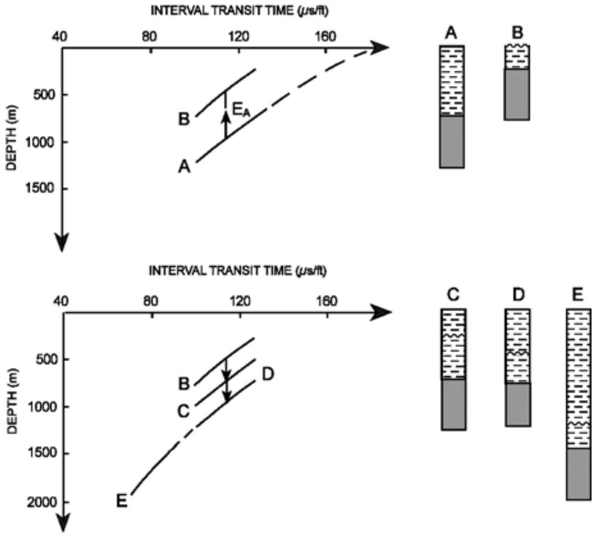


FIGURE 2 | **Interval transit time evolution during burial (A), subsequent uplift and exhumation (B), and post-exhumational burial (C, D and E). The apparent exhumation (E_A) is the amount of exhumation not reversed by subsequent burial (i.e. height above maximum burial depth).**

Porosity logs in compaction studies

The compaction methodology attempts to quantify the magnitude of exhumation by analysing the amount of overcompaction of the rocks. The degree of compaction (as witnessed by porosities, densities, and seismic velocities) of the rocks was attained at burial-depths greater than that presently observed. The sonic and hence the adjusted sonic log, density and neutron logs are collectively known as the porosity logs because their response is strongly controlled by the amount of porosity, as opposed to the resistivity and electromagnetic propagation logs, the response of which is strongly controlled by the nature of the fluids filling the pores (Schlumberger, 1989). Type of fluids in pores (e.g. water or hydrocarbons) has an effect on the density and neutron logs but is not able to overcome the tool response towards the porosity status of the formation. Since porosity describes compaction state, the porosity logs are all appropriate indicators of compaction, and hence are appropriate for quantifying exhumation from compaction. Furthermore, they are routinely run in exploration wells and hence widely available.

Due to computing costs the log data were smoothed and resampled to every 5 ft, from the original 0.5 ft sam-

FIGURE 1 | **A) Location map for the Eromanga Basin. B) Cooper-Eromanga Basin stratigraphic nomenclature (FM = Formation; GRP = Group; MBR = Member; SST = Sandstone) (modified after Moore, 1986). The indicated vertical distribution of the lithostratigraphic units is the maximum extent known relative to the biostratigraphic units. C) Location of wells used in compaction analysis, major tectonic elements are also shown. (NM = Nappacoongee-Murteree; GMI = Gidgealpa-Merrimelia-Innamincka; RW = Roseneath-Wolgolla; PNJ = Pepita-Naccowlah-Jackson South; Patch = Patchawarra).**

pling of the data. This smoothing and resampling has no significant effect on the final results because we are considering the average compaction state of formation-scale stratigraphic units.

Seismic check-shot velocities survey and the adjusted sonic log

An adjusted sonic log can be calculated by combining the check-shot results with the BHC (borehole compensated) sonic log. The adjusted sonic log is the basis for calibration of surface seismic data and in many cases allows a better description of the reservoir. This technique is devoid of sources of error on sonic log such as noise, stretch (in high signal attenuation), cycle skipping and hole conditions, and has the high resolution of the sonic log, but velocities are corrected for 'drift' between the sonic log and the check-shot survey velocities. Drift is principally due to dispersion of velocities between the high frequency (20-40 kHz) of the sonic log and the lower frequency (5-50 Hz) of the seismic pulse (Goetz et al., 1979; Hsu et al., 1992). Adjusted sonic logs were calculated where check-shot surveys were available using the subroutine 'Geophysics-synthetics' in Geoframe, Schlumberger's software package. This subroutine adjusts the sonic time log to compensate for drift, creating the adjusted sonic log, and so ties the sonic logs to the check-shot data. The drift corrected sonic is hereafter referred to as the adjusted sonic log (Δt_{adj}).

Since the adjusted sonic log measures the shortest time for an acoustic sound to travel through the formation, it circumvents any fracture or vugular porosity. Porosity of this type is generally secondary porosity and may constitute a significant part of the total porosity. Although the primary porosity is strongly controlled by burial-depth related processes, secondary porosity development is largely depth-independent. The insensitiveness of the adjusted sonic log to secondary porosity can be a serious drawback in estimating hydrocarbon reservoir porosity, but here, where log measurements are being used to investigate maximum burial-depth and exhumation, it is considered advantageous. Indeed, the values of exhumation based on the adjusted sonic log are considered more reliable than these based on the other porosity logs as discussed in the comparison of exhumation from the different logs in a later section.

Density log

Schlumberger's FDC (formation density compensated) log, with which density measurements were made in the well analysed, has a depth of investigation of the order of 13 cm, decreasing with increasing density. The density tool sees electron density, i.e. the average density both of the grains forming the rock, and the fluids enclosed in the interstitial pores, and as such compaction estimates based thereon include both primary and secondary porosity. However, the insensitiveness of the adjusted sonic log to secondary porosity can be a serious drawback in estimating hydrocarbon reservoir porosity, but here, where log measurements are being used to investigate maximum burial-depth and exhumation, it is considered advantageous.

Neutron log

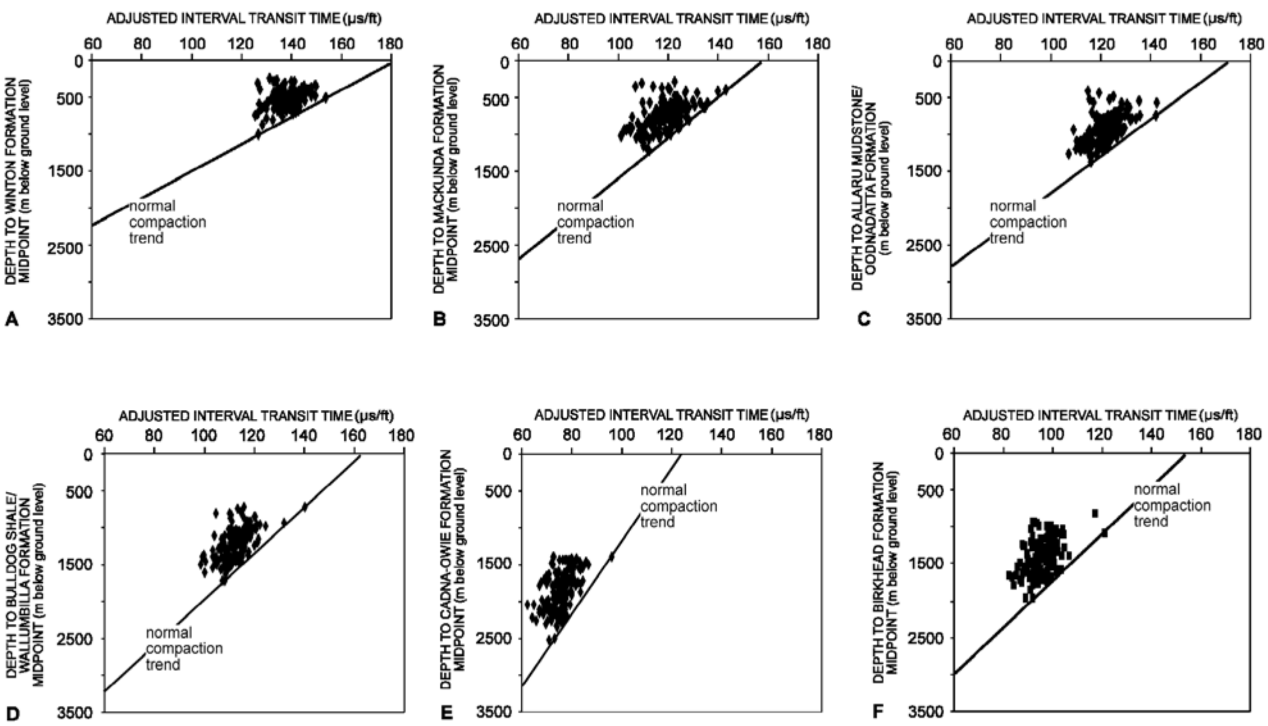
Schlumberger's compensated neutron log (CNL), with which neutron log measurements were made in the data analysed has a depth of investigation of the order of 15-35 cm, increasing with decreasing porosity. Since the neutron log is sensitive to all hydrogen nuclei, it responds to absolute, water-filled porosity, including water bound either within the molecule or absorbed between clay mineral layers. Hence when shales are present the effective porosity cannot be calculated without corrections. Like the density log, the neutron log will see primary and secondary porosity.

Selection of stratigraphic units for compaction-based analysis of exhumation

The use of multiple lithologies in the compaction-based analysis of maximum burial-depth has several advantages. Firstly, often no single stratigraphic unit is encountered in all the wells in an area of study. Secondly, assuming exhumation post-dated the youngest unit analysed, all the stratigraphic units in the same well should yield the same magnitude of exhumation. Hence by using the mean value from several stratigraphic units in the same well, the anomalous influence of any burial-depth-independent, sedimentological and/or diagenetic processes, that may affect the compaction state of a particular unit in the well, is lessened.

Stratigraphically-equivalent units that exhibit a vertically- and laterally-consistent relation between depth and compaction are required to determine maximum burial-depth. The units should show little bulk lateral facies variation, in order to satisfy the assumption that their compaction trends are laterally consistent. The seven units selected for analysis were the Winton Formation, Oodnadatta Formation/Allaru Mudstone, Wallumbilla Formation/Bulldog Shale, Cadna-owie Formation, Birkhead Formation and Hutton Sandstone (detailed description in Moore, 1986).

The tops and the bases of the units analysed were adopted from the study of Mavromatidis and Hillis (2005). The use of these tops and bases have been tested



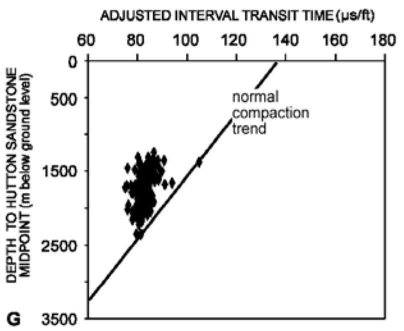


FIGURE 3 **Mean adjusted sonic Δt_{adj} / depth to unit midpoint plots for units analysed in the Eromanga Basin. A) the Winton Fm. B) the Mackunda Fm. C) the Allaru Mudstone/Oodnadatta Fm. D) the Bulldog Shale/Wallumbilla Fm. E) the Cadna-owie Fm. F) the Birkhead Fm, and G) the Hutton Sandstone. The normal compaction relationship for each unit (i.e. that unaffected by exhumation, determined as outlined in the text) is also shown.**

and provided reliable results in their compaction study. As mentioned previously one of the objectives of this study is to compare the exhumation estimates based on the adjusted sonic log, density and neutron logs with the results of Mavromatidis and Hillis (2005) study which was based on the use of sonic log and hence for comparison purposes same tops and bases have been used. Care was taken to edit out spurious data due for example to erroneous scale changes, overpressure sections, temperature effects, salinity effect, cycle skipping effects and hole size effects on the density and neutron logs.

Normal compaction relationships

Since apparent exhumation is given by the displacement, on the depth axis, of a given porosity log/depth point from the normal porosity log/depth relation (i.e. that unaffected by exhumation), the crux of apparent determination lies in the selection of the normal porosity log/depth relation.

The form (linear, exponential etc.) of the normal compaction relation should be dictated by the porosity/depth curve because petrophysical properties such as velocity and density decrease with burial-depth due to their dependence on porosity. Bulat and Stoker (1987) combined the standard exponential porosity/depth relation (Sclater and Christie, 1980) with Wyllie et al. (1956) time average relation.

$$V^{-1} = (1 - \Phi) / V_{ma} + \Phi / V_f \qquad (2)$$

(where, Φ = porosity; V = whole-rock compressional wave velocity; V_f = pore fluid velocity; and V_{ma} = matrix velocity) to obtain the relation between velocity (v) and burial-depth (d):

TABLE 1 | **Adjusted sonic log data defining normal compaction relationships.**

Stratigraphic Unit	Normally Compacted Wells	Mean Δtadj (μs/ft)	Midpoint Depth (m bgl)*	Equation of Normal Compaction Relationship**
Winton Fm	Beanbush-1 Tinga Tingana-1	126.697 153.621	990.463 495.629	Δtadj = 180.578 - 0.0544 dbgl
Mackunda Fm	Beanbush-1 Fly Lake-1	112.200 121.009	1220.208 1004.255	Δtadj = 161.862 - 0.0407 dbgl
Bulldog Shale-Wallumbilla Fm	Tinga Tingana-1 Wimma-1	142.000 116.260	744.769 1370.657	Δtadj = 172.594 - 0.0411 dbgl
Allaru Mudstone-Oodnadatta Fm	Beanbush-1 Paxton-1	108.197 140.296	1717.333 726.324	Δtadj = 163.666 - 0.0323 dbgl
Cadna-owie Fm	Beanbush-1 Tinga Tingana-1	91.864 121.095	1971.093 1086.159	Δtadj = 156.910 - 0.0330 dbgl
Birkhead Fm	Tinga Tingana-1 Wimma-1	104.984 81.372	1374.944 2357.447	Δtadj = 137.950 - 0.0240 dbgl
Hutton Sandstone	Tinga Tingana-1 Wimma-1	95.854 73.213	1388.054 2492.777	Δtadj = 124.065 - 0.0204 dbgl

*m bgl = meters below ground level.
**Δtadj = adjusted interval transit time (µs/ft); dbgl = depth below ground level (in metres).

$$\frac{1}{v} = a + b \exp\left(\frac{-d}{c}\right) \quad (3)$$

where a, b, and c are constants. This relation is close to linear for the burial-depths under consideration, hence the normal compaction relation using the adjusted sonic log was taken to be linear in form (cf. Bulat and Stoker, 1987).

Published results for compaction curves support the linear velocity/depth function, and the assumption that linearity is valid over a large range of depths (Perrier and Quiblier, 1974; Wells, 1990; Bulat and Stoker, 1987; Issler, 1992; Japsen, 1993; Hillis, 1993, 1995a and b). Wyllie et al. (1956) equation for determining porosity from the sonic log (equation 2.2) has the same form as the relation for determining porosity from the density log

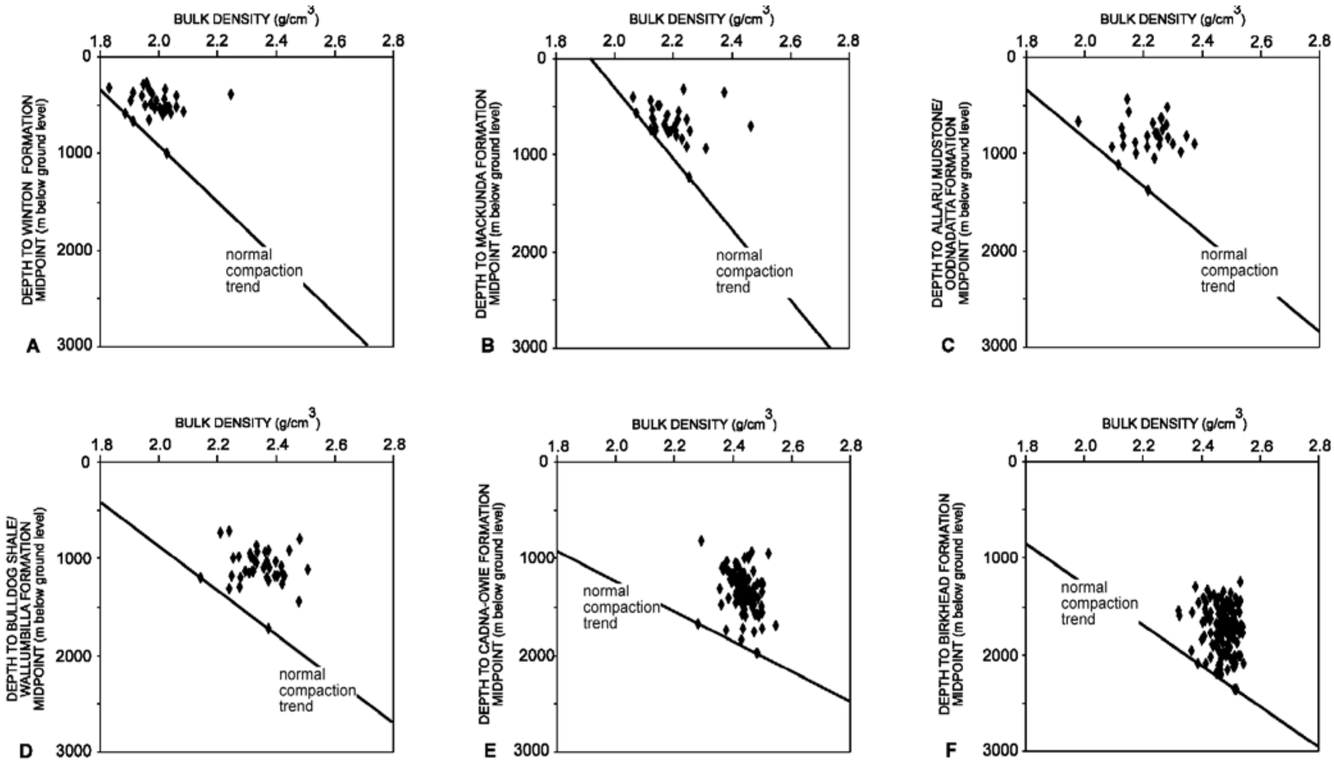
$$\rho_b = \Phi\, \rho_f + (1 - \Phi)\, \rho_{ma}$$

$$\Phi = \frac{\rho_{ma} - \rho_b}{\rho_{ma} - \rho_f} \quad (4)$$

(where, Φ = porosity; ρ_{ma} = matrix (grain) density; ρ_f = fluid density; and ρ_b = bulk density measured by the tool) hence equation (4) and the assumption of linearity is also considered appropriate for the density log. The linear trend is assumed to be suitable for the adjusted sonic and the neutron porosity log.

In an undergoing area to exhumation, the wells with the highest porosity (i.e. highest Δt_{adj}, highest Φ_N, and lowest ρ_b) for their given burial-depth should be taken to be normally compacted, provided that their relatively high porosity is not due to anisotropy and phenomena that may inhibit normal compaction (such as overpressure or hydrocarbon-filled porosity). For a linear decrease of Δt_{adj}, Φ_N with depth, and linear increase of ρ_b with depth, the two wells that can be linked by a straight line that has no points falling to its less compacted side, define normal compaction. These are termed the reference wells. It must be assumed that the reference wells defining the normal compaction relation are at maximum burial-depth, and have not themselves been exhumed. In the event that the reference wells have been exhumed from maximum burial-depth, all apparent exhumation values will be underestimated by the amount of exhumation undergone by the reference wells.

An additional constraint on the selection of the normal compaction relation/reference wells is that the surface intercept on the log/depth plots should have a value close to, or less than 189 μs/ft, 1.03 g/cm^3 or 100 porosity



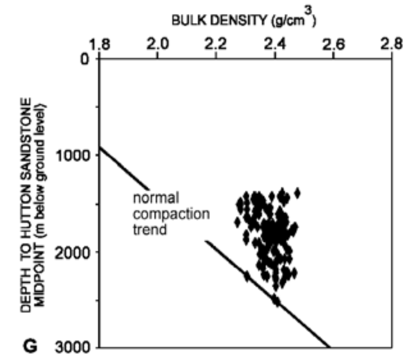


FIGURE 4 | **Mean bulk density ρ_b / depth to unit midpoint plots for units analysed in the Eromanga Basin: A) the Winton Fm. B) The Mackunda Fm. C) The Allaru Mudstone/Oodnadatta Fm. D) The Bulldog Shale/Wallumbilla Fm. E) The Cadna-owie Fm. F) the Birkhead Fm, and G) The Hutton Sandstone. The normal compaction relationship for each unit (i.e. that unaffected by exhumation, determined as outlined in the text) is also shown.**

units, the approximate value for saltwater in each of the logs. Similar constraint has been adopted by Magara (1976) and Hillis (1995a and b).

As many wells as possible, from as wide an area as possible, should be analysed to determine a true normal compaction relation. The greater the number of wells and the larger the study area, the more likely the reference wells are to be at maximum burial-depth.

Normal compaction relations in specific units

The mean adjusted sonic interval transit time (Δt_{adj}) for each unit was determined from the adjusted sonic log data and plotted against the depth of the midpoint of the unit (Fig. 3). The criteria to define the normal compaction trend mentioned in the previous section define the normal compaction relationships and the reference wells for each of the units. The reference wells and the normal compaction relationships for each unit are summarised in Table 1.

The mean bulk density (ρ_b) of the units examined was determined from the density log data and plotted against the depth of the midpoint of the unit (Fig. 4). However, the density log was run in fewer wells than the adjusted sonic log, and even when run, often did not cover the Winton, Mackunda, Allaru Mudstone-Oodnadatta and the Bulldog Shale-Wallumbilla Fms. Consequently, the reference wells for the density log are not the same as those for the adjusted sonic log (e.g. the density log was not run in Tinga Tingana-1

TABLE 2 | **Density Log Data Defining Normal Compaction Relationships.**

Stratigraphic Unit	Normally Compacted Wells	Mean ρ_b (g/cm^3)	Midpoint Depth (m bgl)*	Equation of Normal Compaction Relationship**
Winton Fm	Beanbush-1 Burley-2	2.025 1.884	990.463 578.025	$\rho_b = 1.687 + 341.6 \times 10^{-6}$ dbgl
Mackunda Fm	Beanbush-1 Dunnon-1	2.253 2.072	1220.208 565.276	$\rho_b = 1.916 + 276.4 \times 10^{-6}$ dbgl
Bulldog Shale-Wallumbilla Fm	Beanbush-1 Hume-1	2.372 2.140	1717.333 1194.054	$\rho_b = 1.609 + 444.4 \times 10^{-6}$ dbgl
Allaru Mudstone-Oodnadatta Fm	Beanbush-1 Burley-2	2.216 2.113	1376.418 1106.73	$\rho_b = 1.690 + 382.3 \times 10^{-6}$ dbgl
Cadna-owie Fm	Beanbush-1 Paning-1	2.479 2.280	1971.093 1666.738	$\rho_b = 1.193 + 652.3 \times 10^{-6}$ dbgl
Birkhead Fm	Beanbush-1 Kenny-1	2.512 2.388	2348.393 2092.455	$\rho_b = 1.371 + 486.0 \times 10^{-6}$ dbgl
Hutton Sandstone	Beanbush-1 Russel-1	2.409 2.305	2522.923 2256.136	$\rho_b = 1.428 + 388.6 \times 10^{-6}$ dbgl

*m bgl = meters below ground level.
**ρ_b = bulk density (g/cm^3); dbgl = depth below ground level (in metres).

well which was a reference well for the adjusted sonic log data in several units). The reference wells and the normal compaction relationships for each unit are given in Table 2.

The mean neutron porosity (Φ_N) of the units examined was determined from the neutron porosity log data and plotted against the depth of the midpoint of the unit (Fig. 5). However, the number of wells in which the neutron log was run is extremely low for determining normal compaction relationships for the Winton, Mackunda, Allaru Mudstone-Oodnadatta and the Bulldog Shale-Wallumbilla Fms. Indeed, in these units there are probably too few wells analysed to be confident of the normal compaction relation. Some of the reference wells in the underlying units are different from those of the sonic and bulk density log, for the same unit. The reference wells and the normal compaction relationships for each unit are given in Table 3.

The apparent exhumation values for the analysed units (along with the relevant depth and Δt_{adj}, ρ_b, and ΦN data) are listed in Appendices (see www.geologica-acta.com).

COMPARISON OF APPARENT EXHUMATION FROM DIFFERENT STRATIGRAPHIC UNITS

There is an excellent correlation between apparent exhumation results from different stratigraphic units in the same well (Fig. 6 and Table 4) especially for the adjusted sonic log. Given this correlation, it seems probable that, at a formational and regional scale, overcompaction reflects previously greater burial-depth, rather than laterally varying sedimentological or diagenetic processes. Laterally variable sedimentological or diagenetic processes, such as calcite cementation in the Birkhead Formation and Hutton Sandstone (Schulz-Rojahn, 1993), or secondary porosity generation, would not be likely to generate the same degree of overcompaction in different stratigraphic units within the same well. Exhumation of the entire Eromanga Basin sequence is the only likely cause of the consistent degree of overcompaction of the seven units analysed with different logs.

The apparent exhumation results from the density log in the Cadna-owie, Birkhead and Hutton units are also similar within the same well (Fig. 7 and Table 5). These data further support the hypothesis that overcompaction reflects previously greater burial-depth, rather than later-

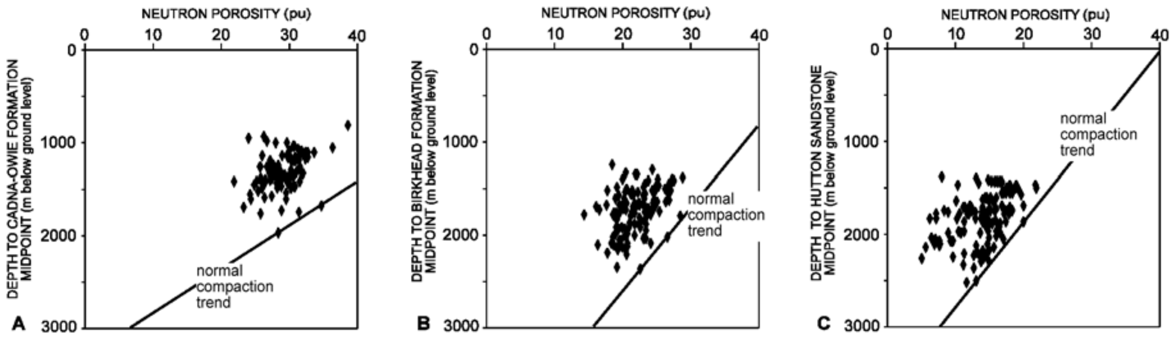


FIGURE 5 | **Mean neutron porosity Φ N / depth to unit midpoint plots for units analysed in the Eromanga Basin. A) The Cadna-owie Fm. B) The Birkhead Fm, and C) The Hutton Sandstone. The normal compaction relationship for each unit (i.e. that unaffected by exhumation, determined as outlined in the text) is also shown.**

ally varying sedimentological or diagenetic processes. In the shallower units, where there are less data (i.e. density log not often run), there is not such a clear correlation between exhumation values from different units in the same well. This is due to the paucity of density log data for these units, where normal compaction relations are poorly constrained, and less reliable.

There are insufficient data from the neutron log to analyse units above the Cadna-owie, and there is some scatter between apparent exhumation results from the Cadna-owie, Birkhead and Hutton units (Fig. 8 and Table 6). However, despite exhibiting more scatter than the results from the adjusted sonic (and sonic) and density logs, the neutron porosity-derived exhumation values from these units are broadly consistent with each other.

Regression analysis was used to determine least-squares, best-fit, linear relationships between the apparent exhumation values from the different units, and associated co-efficients of correlation. The t-statistic of each co-efficients of correlation was calculated and tested against the one-tailed Student's t-distribution in order to test the null hypothesis that the co-efficients of correlation come from a population whose mean value is zero (Till, 1974). This hypothesis can be rejected at the 97.5% confidence level in the vast majority of all cases in all four logs (Tables 4 to 6). Hence the results of apparent exhumation in all logs are statistically similar.

The mean apparent exhumation value, derived from the adjusted sonic log, from such of the Eromanga Basin units as are present in each well has been determined. A high degree of confidence may be placed on these values as reflecting the height of the Eromanga Basin sequence above its maximum burial-depth. These values provide crucial input to modelling the maturation history of source rocks in the Cooper-Eromanga Basins, and to elucidating basin structure, thus migration pathways at the time of maximum burial-depth.

Exhumation estimates of the adjusted sonic log are considered as the most reliable in this study and since these estimates are extremely similar with the sonic log based exhumation estimates it is expected that the geographical distribution of the exhumation estimates in this

TABLE 3 | **Neutron Porosity Log Data Defining Normal Compaction Relationships.**

Stratigraphic Unit	Normally Compacted Wells	Mean ΦN (pu)	Midpoint Depth (m bgl)*	Equation of Normal Compaction Relationship**
Cadna-owie Fm	Paning-1	34.671	1666.738	ΦN = 69.494 - 0.0209 dbgl
	Wimma-1	28.333	1969.437	
Birkhead Fm	Kirby-1	26.614	2010.929	ΦN = 49.506 - 0.0114 dbgl
	Wimma-1	22.632	2357.447	
Hutton Sandstone	Wimma-1	13.097	2492.777	ΦN = 40.517 - 0.0110 dbgl
	Yumba-1	19.977	1869.339	

*m bgl = meters below ground level.
**ΦN = neutron porosity (pu); dbgl = depth below ground level (in metres).

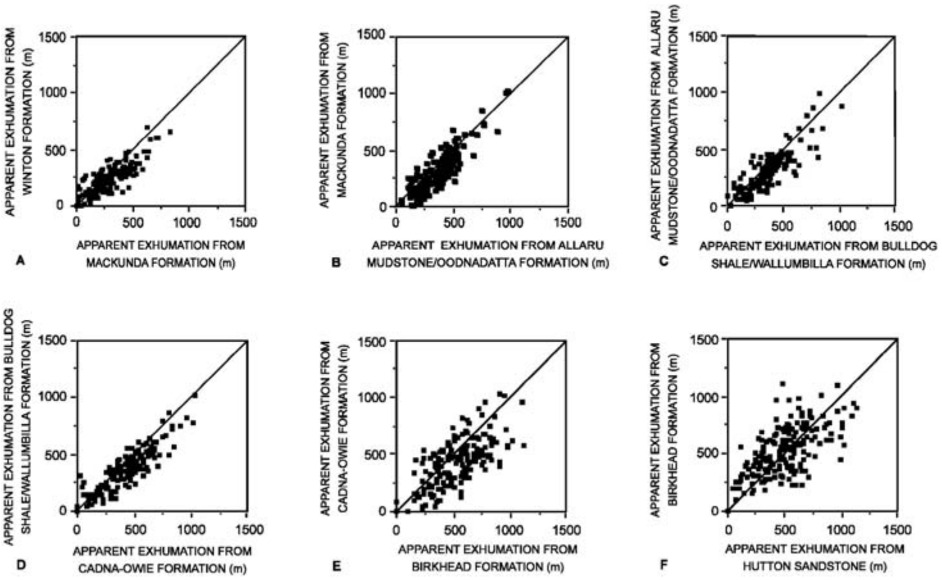


FIGURE 6 | **Crossplots of apparent exhumation (in metres) derived from adjusted sonic interval transit time in the stratigraphic units studied: A) apparent exhumation from Winton Fm against those from the Mackunda Fm. B) Mackunda Fm against Allaru Mudstone/Oodnadatta Fm. C) Allaru Mudstone/Oodnadatta Fm against Bulldog Shale/Wallumbilla Fm. D) Bulldog Shale/Wallumbilla Fm against Cadna-owie Fm. E) apparent exhumation from Cadna-owie Fm against those from the Birkhead Fm. F) Birkhead Fm against Hutton Sandstone. The line illustrating the 1:1 relationship between apparent exhumation values from each pair of units analysed is shown.**

study would be identical to the geographical distribution of exhumation based on the sonic log (cf. Mavromatidis and Hillis, 2005). Hence the reader is referred to Mavromatidis and Hillis (2005) for information regarding the geographical distribution of the exhumation all over the Eromanga Basin.

COMPARISON OF APPARENT EXHUMATION RESULTS FROM DIFFERENT LOGS

One of the purposes of this study was to analyse the suitability of the adjusted sonic log, density and neutron logs for maximum burial-depth/exhumation analysis. The use of the sonic log is widely accepted in such work and hence Mavromatidis and Hillis (2005) quantification of exhumation in the Eromanga Basin using the sonic log has been used as a reference study in order to better justify the use of the adjusted sonic log and the bulk density and neutron logs in compaction studies. If the other porosity logs yield comparable results to the sonic log data, their use is justified. In order to test the viability of the density and neutron logs, the mean apparent exhumation values for the Eromanga Basin sequence derived from each of the porosity logs were crossplotted against each other (Fig. 9). The correlation between the exhumation values from the sonic and the adjusted sonic is excellent. It is significant that the reference wells used for determining the normal compaction relationships for the above two logs are almost always the same (Table 1; Mavromatidis and Hillis, 2005, table 1), and that both data are based on the same physical property (sonic velocity), albeit measured at different frequencies. There is generally a good correlation between exhumation val-

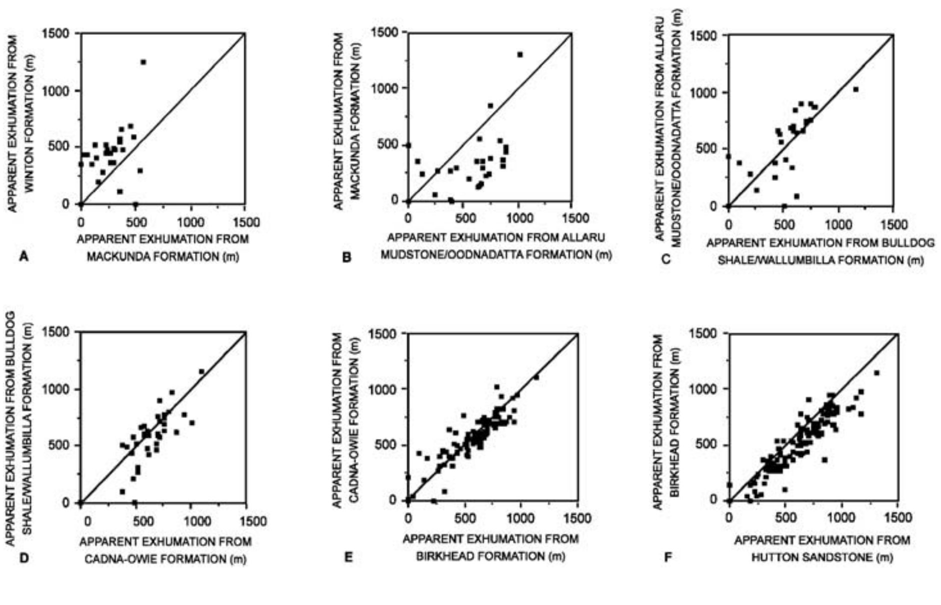


FIGURE 7 | **Crossplots of apparent exhumation (in metres) derived from bulk density in the stratigraphic units studied. A) apparent exhumation from Winton Fm against those from the Mackunda Fm. B) Mackunda Fm against Allaru Mudstone/Oodnadatta Fm. C) Allaru Mudstone/Oodnadatta Fm against Bulldog Shale/Wallumbilla Fm. D) Bulldog Shale/Wallumbilla Fm against Cadna-owie Fm. E) Apparent exhumation from Cadna-owie Fm against those from the Birkhead Fm. F) Birkhead Fm against Hutton Sandstone. The line illustrating the 1:1 relationship between apparent exhumation values from each pair of units analysed is shown.**

TABLE 4 | **Correlation between apparent exhumation results derived from adjusted sonic log from the stratigraphic units analysed*.**

	Winton Formation (W)	Mackunda Formation (M)	Allaru Mudstone/ Oodnadatta Formation (A)	Bulldog Shale/ Wallumbilla Formation (BW)	Cadna-owie Formation (C)	Birkhead Formation (B)
Mackunda Formation (M)	W=48+0.657M M=55+1.012W					
No of Wells Having Both Units	142					
Coefficient of Correlation**	0.814					
t-statistic***	16.6					
Allaru Mudstone/ Oodnadatta Formation (A)	W=32 +0.717A A=71+0.934W	M =13+0.980A A=69+0.761M				
No of Wells Having Both Units	143	153				
Coefficient of Correlation**	0.818	0.863				
t-statistic***	16.9	21				
Bulldog Shale/Wallumbilla Formation (BW)	W=30+0.601BW BW=129+0.949W	M=12+0.813BW BW=123+0.79M	A=23+0.77W BW=89+0.9A			
No of Wells Having Both Units	143	155	159			
Coefficient of Correlation**	0.754	0.803	0.839			
t-statistic***	13.6	16.7	19.3			
Cadna-owie Formation (C)	W = 30 + 0.505C C = 167 + 1.072W	M = 34 + 0.634C C = 193 + 0.799C	A=26 + 0.645C C=135 + 0.98A	BW=36 + 0.6C C=68 + 1.0BW		
No of Wells Having Both Units	143	155	161	162		
Coefficient of Correlation**	0.735	0.712	0.796	0.875		
t-statistic***	12.9	12.5	16.6	22.9		
Birkhead Formation (B)	W = 97 + 0.287B B = 343 + 0.749W	M=161 + 0.292B B=405 + 0.417M	A=90+ 0.415B B=313 +0.71A	BW=121+0.47B B=265 + 0.7BW	C=95 + 0.64B B=216 + 0.71C	
No of Wells Having Both Units	141	151	157	158	170	
Coefficient of Correlation**	0.463	0.349	0.543	0.585	0.678	
t-statistic***	6.2	4.5	8.1	9	12	
Hutton Sandstone (H)	W =50 + 0.398H H=226 + 1.110W	M=73 + 0.525H H=227+0.902M	A = 48 + 0.512H H=187 + 1.053A	BW=60 +0.61H H=99 +1.09BW	C=110 + 0.63H H=136 + 0.85C	B=224 + 0.69H H=134 + 0.70B
No of Wells Having Both Units	141	151	157	158	170	179
Coefficient of Correlation**	0.664	0.692	0.734	0.822	0.737	0.645
t-statistic***	10.5	11.7	13.5	18	14.1	11.2

*Linear, best-fit, least-squares regression between apparent exhumation values derived from the 12 units analysed. Because there is no dependent variable, apparent exhumation from the shallower unit was regressed on that from the deeper unit (first or top equation) and vice versa (second or bottom equation).
**Coefficient of correlation between apparent exhumation values is derived from the two units in the examined wells.
***t-statistic for the coefficient of correlation. In most cases, comparison of the t-statistic with the one-tailed Student's t-distribution allows rejection of the null hypothesis (that the coefficients of correlation come from a population the mean of which is zero) at the 97.5% confidence level. N indicates that the coefficient of correlation is not significant at the stated confidence level.

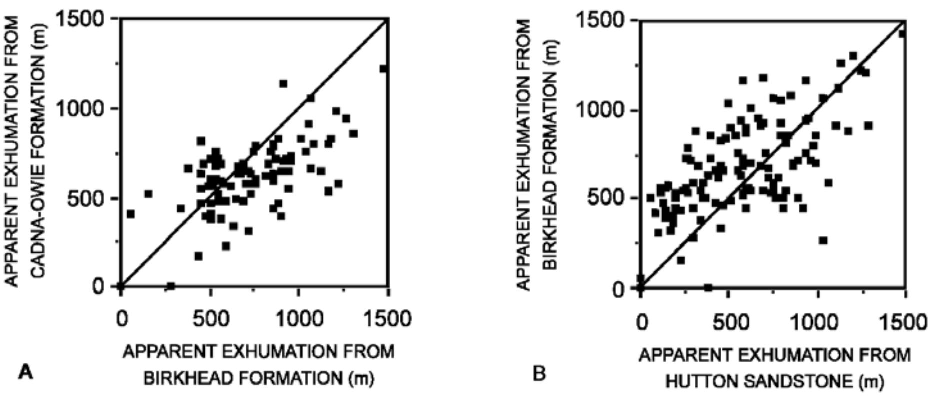


FIGURE 8 | **Crossplots of apparent exhumation (in metres) derived from neutron porosity in the stratigraphic units studied. A) Apparent exhumation from Cadna-owie Fm against those from the Birkhead Fm, and B) Birkhead Fm against Hutton Sandstone. The line illustrating the 1:1 relationship between apparent exhumation values from each pair of units analysed is shown.**

ues from the different logs, with correlation coefficients of 0.597-0.955, and the use of the porosity logs is considered to be justified. The relationships and the correlations between mean apparent exhumation results from the different logs are summarised in Tables 4 to 6.

Much of the scatter between the different logs can probably be attributed to the fact that neutron and density log coverage is not as extensive as the sonic and the adjusted sonic log coverage. Hence the reference wells for the normal compaction relations for a number of units were necessarily different in the different logs. This is probably responsible for the offset from the one-to-one relation of the crossplot of the adjusted sonic (and sonic) and neutron log.

Random scatter in the crossplots is presumably linked to the different ways in which the different logs see porosity, thus compaction. For example, the adjusted sonic log and sonic log, unlike the other two porosity logs, does not tend to see secondary, fracture or vugular porosity. For this reason alone, the adjusted sonic and sonic logs are considered likely to be the most reliable indicator of maximum burial-depth/exhumation. However, differences in the ways the three logs see porosity are considered likely to generate less differences between exhumation values than differences in the reference wells, and thus placement of the normal compaction relation.

INFLUENCE OF EXHUMATION ON SOURCE ROCK MATURITY

To assess the influence of exhumation on source rock maturity, vitrinite reflectance levels have been modelled in Ullenbury-1 well. After many analytical tests, in an effort to model observed maturities from 40 wells (Mavromatidis, 1997), the most representative palaeogeothermal gradients used in modelling were the following, during deposition of the Cooper Basin section (i.e. 250 to 204 Ma) a 47ºC/km, during deposition of the Eromanga Basin section (i.e. from 204 to 0 Ma) a 32ºC/km was used from 204 to 91 Ma and a 42ºC/km from 91 Ma to present day. Source rock maturity has been modelled (in terms of vitrinite reflectance) both without considering exhumation and considering exhumation in Late Cretaceous - Tertiary times. The major potential source rocks for liquid hydrocarbon generation are the Basal Jurassic

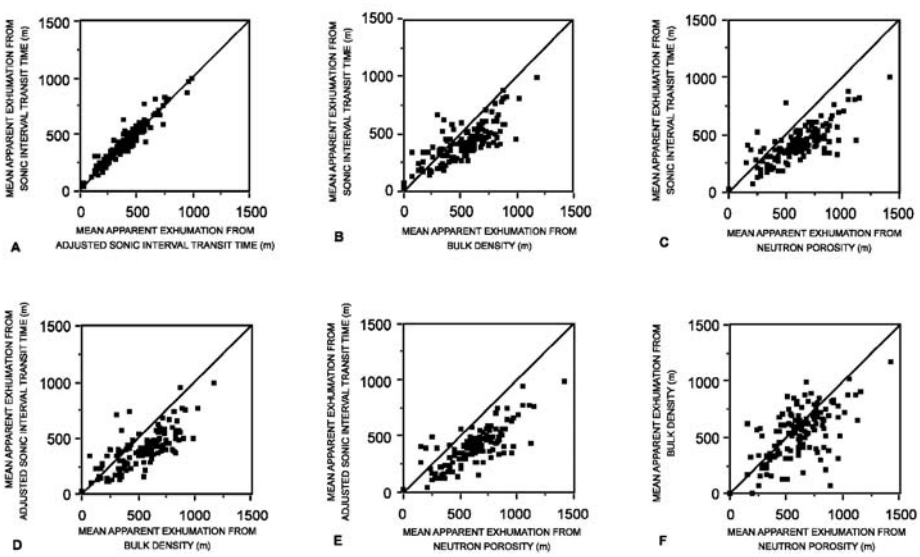


FIGURE 9 | **Comparison of exhumation results from the different logs. Crossplots of mean apparent exhumation (in metres) derived from Eromanga Basin units. A) Apparent exhumation from sonic interval transit time against those from the adjusted interval transit time. B) Apparent exhumation from sonic interval transit time against bulk density. C) Apparent exhumation from sonic interval transit time against neutron porosity. D) Apparent exhumation from adjusted sonic interval transit time against bulk density. E) Apparent exhumation from adjusted sonic interval transit time against neutron porosity and F) apparent exhumation from bulk density against neutron porosity. The line illustrating the 1:1 relationship between apparent exhumation values from each pair of units analysed is shown. The sonic log apparent exhumation values adopted from Mavromatidis and Hillis (2005) exhumation study.**

TABLE 5 **Correlation between apparent exhumation results from bulk density log from the stratigraphic units analysed*.**

	Winton Formation (W)	Mackunda Formation (M)	Allaru Mudstone/ Oodnadatta Formation (A)	Bulldog Shale/ Wallumbilla Formation (BW)	Cadna-owie Formation (C)	Birkhead Formation (B)
Mackunda Formation (M)	W=285 +0.551M M =159+0.255W					
No of Wells Having Both Units	27					
Coefficient of Correlation**	0.374					
t-statistic***	N					
Allaru Mudstone/ Oodnadatta Formation (A)	W=142+0.529A A=278+0.652W	M=83+0.434A A=405+0.501M				
No of Wells Having Both Units	26	29				
Coefficient of Correlation**	0.584	0.466				
t-statistic***	3.5	2.7				
Bulldog Shale/Wallumbilla Formation (BW)	W=320+0.21BW BW=427+0.19W	M=11+0.59BW BW=356+0.53M	A=123+0.8BW BW=197+0.61A			
No of Wells Having Both Units	26	29	29			
Coefficient of Correlation**	0.202	0.562	0.703			
t-statistic***	N	3.5	5.1			
Cadna-owie Formation (C)	W=91+0.565C C=471+0.311W	M =-133 + 0.768C C=522+0.319M	A=-18+0.908C C=374+0.471A	BW=-45+0.95C C=269+0.65BW		
No of Wells Having Both Units	27	31	31	37		
Coefficient of Correlation**	0.42	0.495	0.654	0.788		
t-statistic***	2.3	3.1	4.7	7.6		
Birkhead Formation (B)	W=98+0.519B B=453+0.383W	M=11+0.547B B=548+0.269M	A=75+0.761B B=375+0.482A	BW=69+0.765B B=316+0.58BW	C=103+0.791B B=21+0.999C	
No of Wells Having Both Units	27	29	29	36	107	
Coefficient of Correlation**	0.446	0.383	0.606	0.67	0.889	
t-statistic***	2.5	2.2	4	5.3	19.9	
Hutton Sandstone (H)	W=-17+0.620H H=172+0.516W	M= -110+0.642H H=590+0.399M	A=75+0.655H H=433+0.546A	BW=70+0.652H H=371+0.67BW	C=28+0.772H H=83+1.085C	B=-14+0.863H H=114+0.977B
No of Wells Having Both Units	26	28	28	35	105	134
Coefficient of Correlation**	0.566	0.506	0.598	0.665	0.915	0.918
t-statistic***	3.4	3	3.8	5.1	23	26.6

*Linear, best-fit, least-squares regression between apparent exhumation values derived from the 12 units analysed. Because there is no dependent variable, apparent exhumation from the shallower unit was regressed on that from the deeper unit (first or top equation) and vice versa (second or bottom equation).
**Coefficient of correlation between apparent exhumation values is derived from the two units in the examined wells.
***t-statistic for the coefficient of correlation. In most cases, comparison of the t-statistic with the one-tailed Student's t-distribution allows rejection of the null hypothesis (that the coefficients of correlation come from a population the mean of which is zero) at the 97.5% confidence level. N indicates that the coefficient of correlation is not significant at the stated confidence level.

TABLE 6 | **Correlation between apparent exhumation results derived from neutron porosity log from the Stratigraphic Units Analysed*.**

	Cadna-owie Fm (C)	Birkhead Fm (B)
Birkhead Fm (B)	C=288+0.459B B=193+0.866C	
No of Wells Having Both Units	92	
Coefficient of Correlation**	0.63	
t-statistic***	7.7	
Hutton Sandstone (H)	C=353+0.428H H=31+0.967C	B=372+0.53H H=44+0.781B
No of Wells Having Both Units	94	121
Coefficient of Correlation**	0.642	0.648
t-statistic***	8	9.3

* Linear, best-fit, least-squares regression between apparent exhumation values derived from the 12 units analysed. Because there is no dependent variable, apparent exhumation from the shallower unit was regressed on that from the deeper unit (first or top equation) and vice versa (second or bottom equation).
** Coefficient of correlation between apparent exhumation values is derived from the two units in the examined wells.
***t-statistic for the coefficient of correlation. In most cases, comparison of the t-statistic with the one-tailed Student's t-distribution allows rejection of the null hypothesis (that the coefficients of correlation come from a population the mean of which is zero) at the 97.5% confidence level. N indicates that the coefficient of correlation is not significant at the stated confidence level.

(Hawkins et al., 1989), Birkhead Formation (Jenkins, 1989) and Murta Member (Michaelsen and McKirdy, 1989) in the Eromanga Basin.

The Basal Jurassic and Birkhead Formation reach a vitrinite reflectance level of 0.5%R_O, without allowance for burial/exhumation, equivalent to early maturity for oil generation during Late Cretaceous times and the Murta Member in Tertiary times. In Mid Tertiary times the Basal Jurassic enters the mid mature oil window, reaching a vitrinite reflectance level of 0.7%R_O (Fig. 10A). However, with the incorporation of 445 m exhumation in Late Cretaceous - Tertiary times, all source rocks reach a vitrinite reflectance of 0.5%R_O, during Late Cretaceous times. The Basal Jurassic reach a vitrinite reflectance of 0.7%R_O, at the end of Late Cretaceous, and end of Tertiary times the Birkhead Formation reach the same as the Basal Jurassic maturity levels, i.e. 0.7%R_O, equivalent to mid maturity for oil generation (Fig. 10B).

The combination of any given palaeogeothermal gradients with a burial history plot for a potential hydrocarbon source that allows for exhumation indicates earlier and higher levels of organic maturity than the same palaeogeothermal gradients combined with a burial history plot that does not allow for exhumation. Thus, estimates of exhumation, such as those presented, should be incorporated in maturation modelling of wells not at their maximum burial-depth.

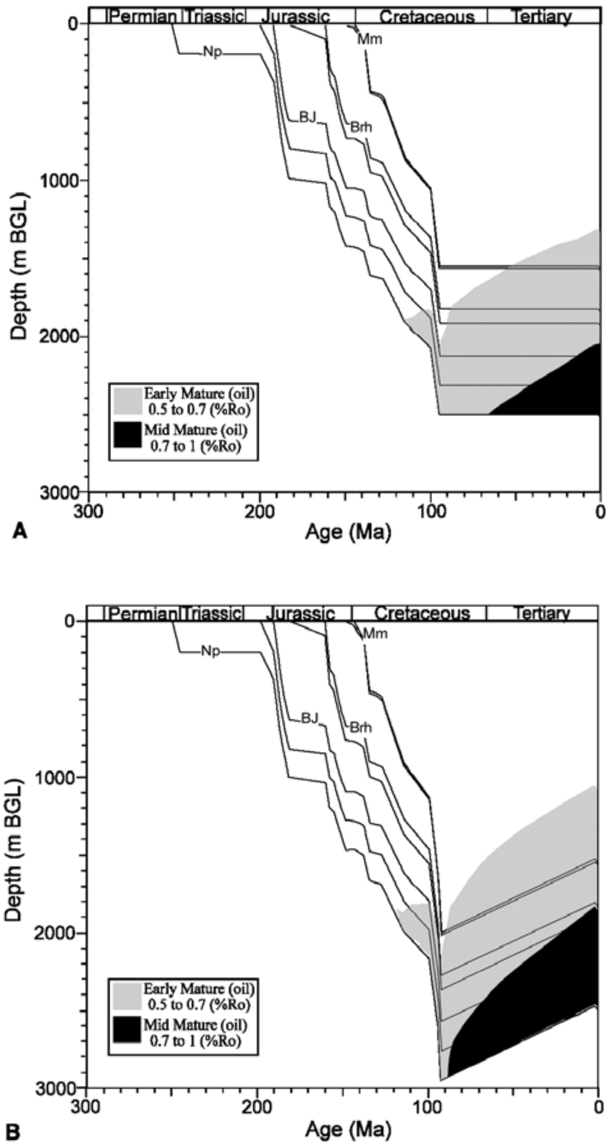


FIGURE 10 | **Burial/exhumation and maturity history for the Ullenbury-1 well A) without allowance for exhumation and B) with allowance for Late Cretaceous - Tertiary exhumation. Modelling was undertaken using the kinetics of Sweeney and Burnham (1990). All burial/exhumation histories were decompacted using the methodology of Sclater and Christie (1980) with allowance for the effect of exhumational event. Ages were taken from the operators' composite logs and geochronologically calibrated after the timescale of Harland et al. (1989). Incorporation of Late Cretaceous-Tertiary exhumation increases the level of thermal maturity of a given stratigraphic level. Modelling was undertaking using the BasinModTM software. (BGL = below ground level, Np = Nappamerri Group, BJ = Basal Jurassic, Brh = Birkhead formation, Mm = Murta member).**

CONCLUSIONS

The compaction method was applied in order to determine the amount of exhumation in the Eromanga Basin. In the compaction-based method of determining exhumation the main assumption is that, at the formational and regional scale, burial-depth exerts the primary control on compaction. Since porosity describes compaction state (Magara, 1976; Japsen, 1993; Hillis, 1995a and b), the porosity logs are all appropriate indicators of compaction, and hence are appropriate for quantifying exhumation from compaction. The porosity logs (i.e. density and neutron), and the velocity survey (check-shot) data, from more than 180 wells, have been used in this study, which thus expands the traditional use of the sonic log as the main 'tool' in compaction-based analysis. Another aspect of the compaction technique relatively rarely applied but used herein, was the use of units of a range of stratigraphic age. This make possible to constrain the stratigraphic units affected by exhumation.

Considering the adjusted sonic log data, there is an excellent correlation between apparent exhumation results from different stratigraphic units in the same well. This correlation confirms that, at a formational and regional scale, in a moderate tectonic evolution, overcompaction reflects previously greater burial-depth, rather than laterally varying sedimentological or diagenetic processes. The apparent exhumation results from the density log are also similar within the same well. Although exhibiting more scatter than the results from the adjusted sonic and the density and neutron porosity-derived exhumation values from these units are broadly consistent with each other.

One of the purposes of this study was to analyse the suitability of the density and neutron logs for maximum burial-depth/exhumation analysis. There is generally a good correlation between exhumation values from the different logs, and the use of all the porosity logs is considered to be justified. Much of the scatter, in exhumation values, between the different logs can probably be attributed to the fact that neutron and density log coverage is not as extensive as the sonic and the adjusted sonic log coverage.

Due to the availability of petrophysical data and the low cost of the technique, compaction analysis could be used to quantify the amount of Late Triassic - Early Jurassic exhumation between the Cooper and Eromanga Basins, Galilee and Eromanga Basins, between the Bowen and Surat Basins, and between the Esk Trough and Moreton Basins. The compaction methodology could also be applied to determine Late Cretaceous - Tertiary exhumation in the Surat and Moreton Basins. Given the broad lithological similarity of these basins to the Cooper-Eromanga Basins, normal compaction relations would be expected to be similar to those determined herein. Accurate knowledge of exhumation in the eastern part of the Australian continent will be a useful to petroleum exploration in these areas to applying a regional tectonic model for the formation and evolution of the eastern part of the continent and its sedimentary basins.

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APPENDICES

Log data from studied logs

APPENDIX I | **Midpoint depth and mean adjusted interval transit time data and apparent exhumation results.**

	Winton Formation			Mackunda Formation			Allaru Mudstone-Oodnadatta Formation			Bulldog Shale-Wallumbilla Formation			Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
Well	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	E_A*** (m)
Alkina-1	440.2	133.0	435.2	755.2	105.6	626.1	931.9	109.1	613.8	1271.9	105.4	531.5	1473.9	90.5	538.9	1841.4	82.3	476.3	1977.4	68.0	769.8	570.2
Alwyn-1	443.4	146.1	191.2	613.4	130.7	153.8	785.9	131.7	209.7	1021.7	120.6	311.4	1154.4	99.9	573.8	1461.8	76.1	1113.5	1496.0	83.8	480.2	433.4
Amyema-1	617.1	138.5	156.1	776.8	122.4	192.9	963.8	123.2	239.2	1212.1	111.9	391.4	1374.1	100.2	344.1	1700.7	83.2	580.6	1747.5	76.6	582.2	355.2
Andree-1	696.6	141.7	18.3	1040.6	116.6	73.0	1182.9	121.4	62.2	1512.6	110.3	138.4	1747.0	94.0	160.2	2115.3	80.2	291.9	2246.4	75.8	119.7	123.4
Araburg-1	554.5	130.6	364.2	802.6	115.3	341.5	995.1	115.4	396.9	1299.5	103.2	572.7	1442.0	90.1	581.2	1750.7	84.8	463.7	1909.8	73.5	566.7	469.6
Arrakis-1	468.1	149.4	104.2	848.2	122.9	109.1	1104.3	123.6	88.5	1387.8	113.5	166.1	1544.7	100.3	169.5	1860.2	79.8	564.1	1964.6	77.6	314.3	216.6
Atoll-1	357.0	150.0	205.4	437.0	131.7	305.9	554.0	135.4	351.8	858.3	115.4	636.7	1041.7	101.5	639.0	1378.6	87.5	722.2	1421.7	81.7	658.9	502.9
Azolla-1	616.5	140.8	115.6	751.9	121.8	232.3	928.5	125.2	224.2	1191.9	116.3	276.6	1337.6	97.6	461.0	1667.3	91.1	287.0	1705.7	80.8	417.8	287.8
Ballera-1	453.9	140.0	292.3	791.0	113.7	393.3	964.0	115.3	430.4	1282.8	114.8	231.3	1514.4	93.0	422.2	1881.3	84.7	339.7	1969.4	70.5	654.7	394.9
Baratta-1	593.0	134.8	248.1	828.0	118.5	238.5	983.0	123.6	209.3	1252.1	112.7	326.5	1427.6	100.0	296.4	1759.2	81.7	585.9	1813.6	74.3	626.0	361.5
Bardoc-1	439.4	148.3	154.0	674.8	121.9	307.7	825.1	123.3	373.2	1155.8	111.1	472.7	1346.8	94.5	545.2	1706.6	80.1	705.3	1758.5	73.1	739.1	471.0
Barrolka-1													1499.9	87.0	617.3	1864.9	81.2	498.4	2020.5	76.6	305.2	473.6
Baryulah-1	489.5	142.7	206.8	857.8	113.6	327.7	1048.4	124.6	119.2	1356.0	109.6	317.6	1572.8	89.8	461.5	1951.1	85.4	240.2	1990.7	73.8	475.8	307.0
Battunga-1	498.5	142.6	199.7	764.9	124.7	149.9	930.3	127.6	165.1	1175.6	116.9	272.8	1334.4	97.8	457.0	1662.5	93.9	173.0	1710.4	84.5	233.6	235.9
Beanbush-1	990.5	126.7	0.0 (P+)	1220.2	112.2	0.0 (P+)		112.5	85.9	1717.3	108.2	0.0 (P+)	1971.1	91.9	0.0 (P+)	2348.4	79.4	89.3	2522.9	71.0	79.8	36.4
Belah-1	431.0	139.6	323.1	666.0	122.7	297.1	858.2	123.5	335.8	1248.6	115.6	239.7	1289.8	97.6	509.2	1625.5	82.6	678.8	1661.0	78.0	598.5	426.0
Biala-1	524.6	137.8	261.6	635.8	128.4	188.4	781.3	132.6	193.1	1017.9	118.7	376.3	1158.1	98.6	607.6				1513.2	84.7	418.9	341.0
Big Lake-26																1952.1	76.2	618.6	2032.7	64.9	864.7	741.6
Big Lake-35	655.1	136.0	163.6	957.3	108.4	355.4	1131.3	113.6	304.2	1443.2	105.0	373.3	1646.5	93.3	280.8	1969.6	82.3	351.2	2053.7	70.8	555.4	340.5
Bogala-1	359.9	140.9	370.0	550.5	117.9	530.9	694.0	125.6	450.3	978.1	117.1	465.1	1195.0	95.1	677.8	1538.8	82.5	771.0	1605.4	77.0	700.7	566.5
Boldrewood-1				291.5	122.7	671.6	869.1	119.7	417.4	824.8	110.8	811.0	1030.2	91.5	952.6	1401.9	85.7	774.9	1508.9	72.7	1010.9	662.6
Bookabourdie-1	682.9	138.0	99.8	1020.9	108.6	287.2	1178.5	116.2	193.1	1481.4	108.4	231.2	1720.1	93.3	208.3	2102.2	80.8	279.1	2231.1	71.8	332.8	233.1
Brolga-2													1758.5	93.8	155.0	2130.2	81.0	243.3	2257.7	71.9	300.5	232.9
Buckinna-1	507.4	143.1	181.3	682.4	124.3	240.1	834.5	127.2	270.8	1051.0	118.6	344.0	1194.5	100.9	504.1	1520.6	84.3	715.7	1557.5	80.7	571.7	403.9
Bungee-1	545.8	145.2	103.7	802.1	122.8	157.1	1002.8	126.8	112.4	1259.8	116.2	209.2	1403.4	103.8	205.7	1705.5	84.7	511.8	1755.0	81.9	312.4	230.3
Burke-2				791.0	118.7	271.0	993.7	119.0	309.2	1293.5	108.8	406.5	1482.0	93.9	428.8							353.9
Burley-2	578.0	134.1	276.8	926.7	102.2	537.6	1106.7	112.1	364.9	1447.1	100.5	506.4	1687.8	83.5	535.1	2082.2	82.1	243.5	2177.0	73.3	309.7	396.3
Bycoe-1	327.1	136.6	481.6	482.1	117.7	603.0	622.1	128.3	454.8	921.8	118.5	478.4	1135.9	99.0	620.4	1491.7	82.2	831.9	1553.7	79.1	652.5	588.9
Carney-1	444.9	141.7	270.5	642.4	115.3	501.3	798.4	122.0	432.8	1072.9	116.3	393.7	1273.4	97.8	518.9	1635.4	85.2	564.7	1704.4	77.9	560.9	463.3
Challum-1	581.4	136.2	235.3	822.1	112.2	398.2	959.5	117.2	387.5	1282.4	107.8	448.7	1489.4	92.7	457.2	1853.3	84.3	382.6	1967.0	72.4	566.7	410.9
Charo-1	473.3	140.1	271.5	815.2	125.0	92.0	970.4	125.6	172.4	1233.7	120.1	116.3	1426.8	100.2	293.0	1766.5	84.7	450.6	1913.7	80.0	246.0	234.5
Childie-1	443.9	141.2	279.3	699.8	125.0	205.5	889.6	122.5	329.4	1176.7	115.6	311.8	1335.9	98.3	441.1	1659.3	81.5	691.3	1695.8	79.3	501.4	394.3
Cooba-1				985.1	119.2	64.3	1132.3	120.1	145.5	1449.3	110.2	205.4	1675.8	95.8	174.7	2025.0	79.5	412.2	2160.1	76.5	172.2	195.7
Cook-1	517.5	140.8	214.3	916.2	113.7	268.1	1111.2	117.0	240.7	1417.3	107.7	314.2	1591.2	103.6	25.1	1920.4	86.5	224.0	2076.1	69.6	593.1	268.5
Cook North-1	628.0	128.4	331.7	918.7	105.6	463.8	1093.6	110.3	421.8	1404.4	104.7	421.8	1596.7	88.4	478.2	1934.7	79.8	487.6	2067.2	72.6	453.8	436.9

APPENDIX I **Continued**

Well	Winton Formation Midpoint Depth (m bgl*)	Winton Formation Mean Δtadj** (μs/ft)	E_A*** (m)	Mackunda Formation Midpoint Depth (m bgl*)	Mackunda Formation Mean Δtadj** (μs/ft)	E_A*** (m)	Allaru Mudstone-Oodnadatta Formation Midpoint Depth (m bgl*)	Allaru Mudstone-Oodnadatta Formation Mean Δtadj** (μs/ft)	E_A*** (m)	Bulldog Shale-Wallumbilla Formation Midpoint Depth (m bgl*)	Bulldog Shale-Wallumbilla Formation Mean Δtadj** (μs/ft)	E_A*** (m)	Cadna-owie Formation Midpoint Depth (m bgl*)	Cadna-owie Formation Mean Δtadj** (μs/ft)	E_A*** (m)	Birkhead Formation Midpoint Depth (m bgl*)	Birkhead Formation Mean Δtadj** (μs/ft)	E_A*** (m)	Hutton Sandstone Midpoint Depth (m bgl*)	Hutton Sandstone Mean Δtadj** (μs/ft)	Mean! E_A*** (m)	E_A*** (m)
Coonavalla-1	362.8	134.3	488.0	564.1	112.7	643.4	743.6	118.5	571.7	1014.3	109.6	658.6	1209.8	91.4	776.1	1555.0	85.4	635.6	1659.7	69.9	993.7	681.0
Cooroo-1	430.0	140.8	301.8	699.7	116.5	415.5	890.6	120.0	390.0	1183.1	110.9	450.9	1366.0	97.2	442.9	1726.7	81.2	636.7	1781.4	72.2	762.2	485.7
Copai-1	438.9	139.3	320.0	693.9	124.0	236.0	903.4	123.1	300.3	1156.9	106.8	603.3	1285.4	91.8	688.6	1602.3	84.7	617.0	1752.5	74.6	674.0	491.3
Cuddapan-1	571.7	133.0	302.2	851.2	111.3	390.6	1086.7	116.9	267.5	1390.2	99.1	607.4	1546.2	88.5	526.7	1879.2	83.2	402.5	2010.2	69.9	644.3	448.7
Curalle-1				350.4	106.9	999.8	518.9	115.6	867.7	802.9	104.7	1021.1	939.9	91.8	1031.7	1246.9	86.6	893.5	1387.8	72.5	1138.6	992.1
Daer-1	665.8	134.6	179.7	914.8	124.1	13.5	1092.8	121.5	151.2	1371.3	117.3	64.8	1546.3	98.6	222.1	1876.8	85.6	303.6	2046.3	77.7	226.1	165.9
Daralingie-15													1483.3	100.6	224.1	1788.6	84.0	460.8	1857.8	79.5	326.2	337.0
Daralingie-23	727.9	135.8	94.9	941.4	121.1	61.8	1090.6	122.9	119.8	1320.7	114.7	196.7	1496.3	99.3	250.9	1791.5	83.4	481.9	1863.2	79.9	303.5	215.6
Darter-1	683.9	140.7	49.6	1001.4	116.7	109.7	1172.4	119.2	127.0	1452.9	112.5	131.5	1643.9	98.1	139.0	2000.9	82.2	321.6	2153.6	77.4	133.7	144.6
Della-7							860.4	120.4	408.5				1353.6	97.9	433.4	1695.6	75.6	901.6	1781.1	66.9	1019.1	690.6
Della-10				674.6	117.3	419.9				1157.3	110.4	491.6	1338.4	94.3	559.6	1670.6	79.4	769.9	1755.8	70.0	894.0	627.0
Denley-1	498.5	136.3	315.1	931.9	103.2	509.5	1200.9	110.1	319.5	1502.7	98.5	514.6	1660.9	85.2	511.0	2005.6	82.2	319.0	2149.5	68.3	583.4	438.9
Deparanie-1							1100.5	120.8	160.3	1402.0	113.7	145.7	1623.4	96.3	213.7	1970.9	83.4	304.0	2086.0	75.8	278.8	220.5
Deramookoo-1	558.1	142.7	138.4	979.3	116.5	134.8	1195.1	112.1	276.8	1503.1	110.5	142.0	1716.6	95.9	133.4	2058.1	84.3	175.5	2203.1	72.4	330.4	190.2
Doonmulla-1							1153.9	112.8	301.5	1456.9	105.7	338.4	1642.0	92.1	321.7	1987.3	83.3	289.8	2128.7	77.2	171.7	284.6
Dullingari-3							947.6	122.1	282.2	1256.7	111.0	375.0	1445.5	96.6	382.9	1800.6	80.0	615.9	1870.4	74.7	549.4	441.1
Dullingari North-1																1780.9	78.3	706.2	1855.6	76.1	494.3	600.2
Dunoon-1	391.5	146.2	241.2	565.3	135.9	74.9	732.8	135.6	168.4	973.9	124.5	239.3	1109.0	103.8	499.6	1407.1	84.6	817.9	1423.4	79.9	743.7	397.8
Durham Downs-1							924.6	124.3	251.4	1241.6	111.9	362.8	1468.3	90.8	535.5	1866.2	83.7	393.8	1999.5	74.1	450.3	398.7
Echuburra North-1	462.0	136.3	351.7	658.2	117.8	425.1	845.2	120.4	425.3	1155.1	112.1	442.2	1342.2	93.8	571.3	1699.1	77.4	825.7	1747.5	73.7	721.0	537.5
Fly Lake-1				1004.3	121.0	0.0 (P+)	1156.7	121.6	84.0	1471.8	113.9	69.1	1714.0	97.0	100.4	2068.0	79.6	361.3	2228.8	74.8	187.8	133.8
Fly Lake-4													1733.5	98.1	48.5	2087.1	81.9	248.4	2239.4	76.6	88.6	128.5
Gidgealpa-20	541.3	142.8	152.4	850.5	116.7	260.1	973.7	126.2	154.4	1247.1	114.2	285.8	1465.8	98.0	319.2	1801.7	85.8	371.4	1869.2	75.2	525.5	295.5
Gooranie-1	615.4	140.1	128.1	981.3	115.4	159.5	1140.1	117.9	190.2	1456.2	114.8	55.9	1681.0	97.3	126.9	2046.7	81.3	312.7	2177.8	75.1	221.5	170.7
Gooranie-2										1462.3	108.1	257.9	1682.5	99.8	47.7	2069.7	82.8	226.6	2188.9	75.1	211.9	186.0
Graham-1	338.4	145.0	316.2	500.8	117.5	590.0	645.8	127.7	447.2	929.3	117.5	502.3	1139.5	97.9	648.9	1481.3	85.4	708.4	1542.0	82.8	485.5	528.4
Haddon Downs-1	410.8	137.0	389.7	631.3	121.2	368.7	825.3	122.6	391.8	1118.1	108.1	601.3	1258.6	93.8	654.2	1542.8	85.0	664.8	1701.8	70.8	908.3	568.4
Hammond-1	525.1	138.1	255.2	902.8	109.3	388.7	1138.7	114.3	278.4	1463.2	104.9	354.6	1629.9	89.0	427.4	2005.6	84.6	217.5	2150.2	67.0	645.8	366.8
Hooley-1	257.2	134.0	599.1	376.9	117.5	713.5	520.3	123.5	674.9	803.4	110.0	858.2	997.1	97.7	797.8	1346.8	90.8	620.0	1424.6	76.5	907.6	738.7
Hume-1	506.7	135.8	316.4	748.4	114.6	413.4	928.9	115.4	462.0	1194.1	107.8	535.6	1377.1	89.9	654.0	1706.1	84.3	531.0	1748.3	77.2	548.5	494.4
Hydra-1	422.0	142.7	274.3	569.5	123.4	375.8	734.5	122.7	478.8	995.9	115.7	489.8	1170.2	96.4	663.8	1497.8	90.0	501.1	1527.8	81.0	584.9	481.2
Ingella-1																1979.0	83.7	283.0	2122.0	70.9	483.4	383.2
Innamincka-3																1525.2	83.9	728.6	1643.3	76.4	692.3	710.4
Innamincka-4	382.6	127.3	597.1	557.8	109.6	725.4	692.1	116.4	675.6	996.4	110.7	644.9	1228.8	92.0	739.3	1595.5	88.0	486.6	1712.4	74.7	708.9	654.0
Jack Lake-2	649.1	139.8	100.7	1048.1	112.0	175.8	1254.6	118.5	61.0	1533.2	107.2	215.9	1696.1	94.4	199.3	2065.0	82.6	240.4	2178.3	77.5	106.9	157.1
Jackson-1				422.3	139.8	120.1				851.8	120.0	500.0	1055.8	98.4	716.3	1402.2	81.2	960.8	1459.1	83.2	546.5	568.8
Jackson South-1	283.7	139.8	465.7	422.3	127.1	432.1	594.0	130.7	426.8	858.2	120.2	487.1	1035.5	104.0	568.1	1396.9	81.0	974.6	1454.6	81.6	630.0	569.2
James-1	615.7	136.0	204.3	906.0	114.4	261.1	1107.2	115.9	271.3	1413.7	108.1	307.7	1578.7	92.4	376.2	1912.6	83.5	354.6	2067.0	70.6	553.5	332.7
Jarrar-1	544.5	137.0	257.2	737.3	115.6	398.7	883.9	119.8	401.4	1118.7	109.8	548.1	1405.7	96.2	434.0	1774.5	80.0	641.5	1826.3	75.1	575.4	465.2
Johba-1	485.8	141.0	241.8	692.8	124.5	227.0	808.8	125.5	336.5	1134.0	113.0	436.0	1329.5	98.9	427.8	1687.1	82.2	636.1	1737.3	74.5	691.2	428.1
Karmona-2	539.7	134.0	316.4	682.1	121.0	321.7	851.8	118.8	456.6	1195.4	113.4	362.2	1434.1	94.1	469.5	1791.0	83.7	471.4	1887.9	78.1	368.7	395.2
Karwin-1	356.8	140.2	385.8	534.7	124.7	378.9	735.1	129.5	312.7	1029.6	117.6	398.2	1209.3	99.3	536.5	1563.3	82.5	748.9	1626.2	80.2	525.3	469.5
Keeto-2	647.1	141.5	70.7	788.6	122.0	191.1	955.5	125.1	199.1	1201.5	110.2	452.7	1363.0	99.9	366.0	1689.2	83.2	592.3	1732.8	80.2	417.2	327.0

APPENDIX I **Continued**

Well	Winton Formation Midpoint Depth (m bgl*)	Winton Formation Mean Δtadj** (μs/ft)	Winton Formation E_A*** (m)	Mackunda Formation Midpoint Depth (m bgl*)	Mackunda Formation Mean Δtadj** (μs/ft)	Mackunda Formation E_A*** (m)	Allaru Mudstone-Oodnadatta Formation Midpoint Depth (m bgl*)	Allaru Mudstone-Oodnadatta Formation Mean Δtadj** (μs/ft)	Allaru Mudstone-Oodnadatta Formation E_A*** (m)	Bulldog Shale-Wallumbilla Formation Midpoint Depth (m bgl*)	Bulldog Shale-Wallumbilla Formation Mean Δtadj** (μs/ft)	Bulldog Shale-Wallumbilla Formation E_A*** (m)	Cadna-owie Formation Midpoint Depth (m bgl*)	Cadna-owie Formation Mean Δtadj** (μs/ft)	Cadna-owie Formation E_A*** (m)	Birkhead Formation Midpoint Depth (m bgl*)	Birkhead Formation Mean Δtadj** (μs/ft)	Birkhead Formation E_A*** (m)	Hutton Sandstone Midpoint Depth (m bgl*)	Hutton Sandstone Mean Δtadj** (μs/ft)	Hutton Sandstone E_A*** (m)	Mean! E_A*** (m)
Keilor-1	465.0	140.3	276.1	784.7	116.1	339.0	953.9	117.9	377.3	1285.3	108.7	417.8	1508.6	92.0	457.6	1878.2	84.2	363.4	1986.1	74.3	452.1	383.3
Kenny-1	592.7	137.4	201.4	1042.7	110.4	222.2	1250.7	118.0	78.9	1559.7	106.4	214.1	1753.1	87.4	352.6	2092.5	81.6	256.0	2248.5	71.5	326.1	235.9
Kercummurra-1	246.3	131.4	658.1	342.0	113.9	837.7	488.6	125.2	663.6	774.9	114.5	747.3	986.0	94.5	906.0	1351.0	88.2	723.7	1442.6	77.4	845.6	768.8
Kirby-1	537.9	133.5	328.4	839.9	110.9	411.3	1000.9	115.4	391.1	1390.4	103.4	473.8	1629.4	89.2	422.6	2010.9	80.8	371.3	2113.9	73.5	365.8	394.9
Kirby-2	512.2	131.8	384.3	839.7	107.8	487.7	1039.9	113.5	398.4	1382.9	106.8	377.8	1610.4	88.7	455.0	1997.3	80.5	397.3	2103.9	72.9	403.4	415.3
Kiwarrick-1	499.2	141.9	211.5	673.3	127.7	166.4	831.9	126.5	288.8	1059.4	117.7	363.1	1195.3	98.3	581.0	1518.5	85.3	677.1	1567.4	83.4	428.1	388.0
Kobari-1	451.4	147.6	154.5	632.6	126.5	236.3	809.5	131.8	184.3	1043.8	117.1	397.4	1172.1	95.1	699.7	1451.6	88.8	597.2	1499.6	86.5	344.8	373.4
Koonchera-1	518.5	138.4	257.1	696.3	123.9	236.5	849.8	126.3	277.6	1122.8	117.3	313.2	1300.3	99.2	447.5	1609.3	88.6	446.0	1795.3	77.5	490.8	352.6
Kurunda-1	678.1	136.7	128.4	927.1	118.9	128.6	1123.8	122.6	93.9	1426.0	112.3	166.1	1575.6	95.3	291.1	1913.3	80.6	476.8	2024.6	77.4	265.0	221.4
Kutyo-1	621.9	143.1	66.7	790.8	122.2	184.9	938.0	121.6	303.2	1257.4	110.0	404.6	1453.6	95.2	416.0	1814.4	82.0	518.8	1869.0	72.4	665.7	365.7
Lake Mcmillan-1	754.3	136.2	60.9	1149.2	110.1	121.3	1312.5	116.3	58.1	1624.6	108.4	86.9	1848.0	91.0	148.2	2212.7	80.4	185.7	2353.5	74.0	101.0	108.9
Lambda-1	405.4	141.5	312.6	634.5	120.1	392.1	820.1	120.0	459.2	1070.3	110.7	568.8	1240.7	88.0	848.5	1558.8	82.7	744.1				554.2
Lhotsky-1	585.4	141.0	142.2	750.4	127.0	107.2	902.9	128.9	159.2	1143.2	121.7	158.7	1288.4	104.7	294.6	1627.2	86.8	504.5	1760.2	83.3	240.4	229.5
Lycium-1	628.9	138.8	139.7	796.9	128.3	27.5	936.4	129.3	116.2	1204.4	121.3	109.0	1401.1	106.6	122.5	1757.8	82.3	562.7	1865.7	83.5	123.3	171.6
Macadama-1	508.8	137.3	287.2	889.3	113.5	300.0	1029.8	114.5	382.8	1373.3	112.3	216.8	1622.4	102.0	41.5	1992.2	82.2	329.1	2112.3	73.9	345.3	271.8
Mackillop-1	605.0	129.5	334.7	893.1	104.5	514.8	1093.1	111.9	382.6	1421.3	103.9	429.3	1568.5	89.3	480.9	1891.6	81.8	449.6	2045.2	68.9	660.3	464.6
Marabooka-2	525.5	138.6	246.9	712.7	122.6	251.7	899.6	124.2	276.9	1196.2	112.2	398.6	1368.8	99.6	368.5	1712.0	78.3	774.6	1781.8	75.3	611.3	418.3
Marengo-1	747.3	125.3	268.3	1033.4	108.8	270.7	1270.8	107.1	321.7	1607.3	100.2	357.4	1799.5	84.4	396.4	2161.2	77.9	339.4	2306.3	69.6	361.3	330.7
Marsilea-1	624.6	138.7	146.0	783.1	121.5	208.7	973.7	121.4	271.0	1241.4	112.6	340.6	1397.3	96.1	445.9	1739.4	81.4	618.1	1773.4	77.9	488.7	359.9
Mawson-1	663.6	142.7	32.7	888.9	125.0	18.8	1110.4	122.2	114.7	1434.1	113.8	111.4	1578.9	101.6	98.8	1893.8	83.3	382.4	2012.4	77.1	289.0	149.7
Mcleod-1													1670.0	82.5	584.1	2046.4	78.1	447.0	2142.6	71.2	450.3	493.8
Meeba-1				864.9	108.1	456.2	1098.7	111.5	387.8	1380.0	99.8	596.4	1543.7	86.0	605.5	1872.8	82.2	451.7	2034.1	62.3	992.2	581.6
Meranji-1	587.7	141.7	127.5	1013.1	114.0	162.7	1167.1	122.8	43.6	1426.2	111.9	176.0	1634.6	96.4	199.2	1982.4	81.8	358.0	2105.6	77.3	188.0	179.3
Merrimelia-7	583.4	139.2	177.2	918.3	116.5	196.0	1047.1	123.1	158.1	1317.2	117.8	104.9	1532.7	98.8	228.4	1874.8	83.0	414.4	1981.8	75.7	387.6	238.1
Merrimelia-25													1559.8	93.7	356.4	1881.2	84.1	363.5	1987.3	77.0	322.4	347.4
Minkie-1	727.8	126.4	268.4	960.8	104.9	438.0	1121.5	116.7	239.1	1387.0	115.1	117.6	1555.0	94.5	335.8	1905.8	82.1	422.3	2014.6	77.0	291.8	301.9
Mooliampah-1	361.0	148.0	237.9	585.1	125.3	314.1	763.4	126.3	362.0	1019.4	117.7	405.4	1186.7	100.4	525.8	1513.2	84.5	716.1	1548.2	78.8	673.8	462.1
Moolion-1	713.9	135.9	106.9	1105.5	110.1	165.0	1279.8	115.5	108.3	1579.9	109.2	105.4	1804.1	92.1	159.4	2183.1	81.9	152.1	2323.2	73.8	142.4	134.2
Moomba-27													1720.6	92.5	232.5	2067.3	81.8	273.8	2171.4	68.8	537.2	347.8
Moomba-57	647.0	139.4	110.9	1004.5	108.1	317.4	1199.3	113.6	235.1	1507.8	105.0	309.5	1694.6	90.6	315.1	2011.0	76.1	566.1	2096.2	69.2	593.1	349.6
Moomba North-1	781.9	129.9	150.3	1044.2	107.1	302.1	1222.6	114.8	184.1	1514.0	107.8	216.3	1703.9	92.0	263.2	2029.7	83.9	221.1	2139.1	68.8	570.1	272.5
Moomba South-1							1180.7	119.8	104.3				1686.4	98.3	90.2	2013.4	81.4	343.2	2109.3	67.0	684.6	305.5
Moorari-4																2158.4	80.3	245.2	2285.7	75.9	75.3	160.2
Morney-1	300.4	126.4	695.3	385.4	120.7	626.7	566.4	128.3	510.7	859.0	110.4	790.3	995.4	99.4	748.7	1332.7	86.3	819.0	1472.9	71.9	1084.5	753.6
Mudera-3	574.5	130.4	348.2	744.3	119.8	290.7	921.6	123.1	281.7	1224.7	112.0	375.0	1412.0	94.0	494.6	1763.1	82.3	555.7	1829.3	76.0	529.8	410.8
Munkah-2	447.7	134.1	407.1	696.5	115.7	438.5	865.9	119.4	427.8	1170.7	113.8	373.6	1390.3	96.1	451.9	1766.6	82.1	561.5	1854.4	74.8	562.3	460.4
Munkarie South-1	336.5	149.5	234.4	533.5	130.0	250.3	682.4	130.3	346.2	920.7	117.0	524.4	1084.8	103.4	538.3	1404.9	87.1	715.7	1429.4	79.0	780.2	484.2
Munro-1	419.2	142.8	275.9	556.3	132.9	156.0	717.8	130.0	319.2	958.4	122.2	328.0	1109.8	104.3	483.6	1435.9	84.3	799.2	1459.4	85.7	425.1	398.2
Naccowlah East-1	497.0	139.4	259.2	694.5	121.2	304.7	836.2	126.3	290.0	1120.2	115.3	379.4	1343.0	95.7	513.5	1699.0	83.2	582.5	1783.4	77.2	517.0	406.6
Naccowlah South-1	409.6	143.4	273.4	649.6	125.2	252.1	808.7	125.4	340.1	1093.1	111.6	518.6	1303.7	96.8	517.3	1653.4	84.4	578.5	1722.6	79.1	483.2	423.3
Naccowlah West-1	389.0	137.0	411.4	633.9	123.7	305.6	813.6	122.4	407.1	1096.3	114.7	421.6	1304.3	94.8	577.2	1661.2	83.2	618.3	1731.9	77.5	550.5	470.3
Navalla-1							407.9	115.0	992.9	739.6	113.2	824.2	962.3	93.6	955.2	1314.0	80.1	1095.7	1428.8	75.2	966.4	966.9
Nulla-1	561.4	142.5	139.4	958.8	115.6	177.9	1112.2	120.6	152.8	1361.6	112.3	229.3	1627.8	95.1	246.4	1998.7	80.1	410.7	2137.1	75.5	246.3	229.0

APPENDIX I **Continued**

Well	Winton Formation Midpoint Depth (m bgl*)	Winton Formation Mean Δtadj** (μs/ft)	Winton Formation E_A*** (m)	Mackunda Formation Midpoint Depth (m bgl*)	Mackunda Formation Mean Δtadj** (μs/ft)	Mackunda Formation E_A*** (m)	Oodnadatta Formation Midpoint Depth (m bgl*)	Oodnadatta Formation Mean Δtadj** (μs/ft)	Oodnadatta Formation E_A*** (m)	Allaru Mudstone-Bulldog Shale-Wallumbilla Formation Midpoint Depth (m bgl*)	Allaru Mudstone-Bulldog Shale-Wallumbilla Formation Mean Δtadj** (μs/ft)	Allaru Mudstone-Bulldog Shale-Wallumbilla Formation E_A*** (m)	Cadna-owie Formation Midpoint Depth (m bgl*)	Cadna-owie Formation Mean Δtadj** (μs/ft)	Cadna-owie Formation E_A*** (m)	Birkhead Formation Midpoint Depth (m bgl*)	Birkhead Formation Mean Δtadj** (μs/ft)	Birkhead Formation E_A*** (m)	Hutton Sandstone Midpoint Depth (m bgl*)	Hutton Sandstone Mean Δtadj** (μs/ft)	Hutton Sandstone E_A*** (m)	Mean! E_A*** (m)
Okotoko-1	478.8	134.5	368.8	698.8	110.4	566.4	828.0	120.9	430.8	1149.6	111.1	477.4	1376.9	95.6	482.5	1732.9	83.8	522.8	1825.0	74.9	584.2	490.4
Orientos-2	433.8	141.6	282.4	623.8	120.5	393.5	788.1	121.1	464.8	1053.1	114.0	486.0	1254.3	88.9	807.2							486.8
Packsaddle-4	506.3	138.1	275.4	739.4	116.7	369.3	872.0	120.4	398.0	1173.3	114.4	351.6	1394.0	94.8	488.1	1736.1	78.8	730.0	1848.2	77.4	441.4	436.3
Padulla-1	384.9	147.2	229.1	627.4	134.1	56.8	788.0	134.0	152.2	993.2	120.1	355.4	1098.3	100.1	622.7	1384.6	80.5	1007.2	1433.2	78.0	828.4	464.6
Pallano-1	512.7	136.3	301.7	752.9	117.8	329.9	900.5	120.7	362.3	1222.1	112.7	355.0	1414.6	96.7	411.4	1773.9	77.6	741.3	1828.5	75.8	536.5	434.0
Paning-1				918.2	109.4	370.9	1082.6	119.5	209.6	1411.3	109.3	272.1	1666.7	90.6	343.4	2037.1	85.4	152.2	2186.9	75.1	214.1	260.4
Paragilga-1	412.9	141.6	303.6	538.5	122.5	428.4	705.1	126.0	429.0	956.6	120.9	368.6	1107.2	104.1	493.9	1441.3	85.0	766.5	1467.6	80.6	664.1	493.4
Patroclus-1				757.6	115.7	377.1	926.3	117.8	407.8	1314.3	106.6	452.1	1404.2	94.3	493.6	1738.5	79.9	681.1	1788.0	81.5	301.9	452.3
Paxton-1				400.4	143.0	63.7	559.5	142.6	171.6	726.3	140.3	0.0 (P+)	815.8	117.2	386.8							155.5
Pepita-2	551.1	136.9	251.2	740.5	114.0	434.7	884.3	121.9	349.1	1188.2	111.3	434.0	1423.2	98.2	355.7	1773.6	80.8	609.1	1884.6	75.0	522.0	422.2
Pondrinie-5	627.8	134.3	223.4	812.8	117.3	282.6	936.2	120.0	343.8	1206.2	113.8	338.5	1432.4	100.1	290.3	1790.4	79.8	634.0	1900.3	79.8	269.8	340.3
Potiron-1	378.4	135.6	448.3	573.2	117.0	528.9	781.7	119.7	504.2	1109.1	103.8	743.1	1256.6	88.2	824.1	1568.1	86.6	570.0	1748.4	67.6	1020.4	662.7
Rheims-1	423.8	145.0	229.5	574.4	127.0	283.7	732.6	127.8	358.3	1019.8	115.9	461.2	1185.8	99.2	562.8	1517.8	87.0	605.7	1550.1	84.3	399.5	414.4
Rho East-1	381.9	144.6	278.7	482.6	122.6	481.9	644.2	130.8	373.0	906.6	117.6	521.1	1071.2	101.4	610.2	1407.4	83.4	865.8	1429.4	80.3	717.6	549.8
Richie-1	280.2	141.2	444.5	425.0	126.7	440.9	630.8	131.4	371.0	916.1	116.9	533.5	1087.1	100.0	637.6	1446.1	82.9	847.2	1496.1	80.4	648.3	560.4
Russel-1	588.1	139.6	165.5	1031.9	100.9	464.9	1225.3	111.8	252.7	1534.7	103.3	334.7	1707.8	92.2	252.1	2106.8	79.0	351.4	2256.1	65.9	593.1	344.9
Snake Hole-1	606.8	143.2	79.6	928.4	118.9	128.2	1145.4	122.9	63.5	1453.9	110.0	207.6	1597.5	97.7	195.8	1929.2	82.3	391.6	2040.6	79.1	163.7	175.7
Spectre-1	814.6	132.4	71.3	1064.4	112.3	153.4	1235.8	115.7	147.8	1552.7	109.6	121.3	1773.3	94.2	128.3	2146.7	81.7	197.5	2278.8	76.6	49.9	124.2
Spencer-4	446.3	145.1	206.0	778.8	121.9	202.6	920.7	124.3	255.0	1192.4	113.2	369.1	1331.7	95.7	522.5	1640.6	83.9	610.8	1743.2	80.9	372.5	362.6
Steward-1	464.4	134.4	384.0	698.5	118.7	361.8	897.7	118.5	418.6	1213.0	107.0	541.2	1358.1	89.8	675.6	1733.4	82.6	572.4	1877.0	72.7	641.3	513.6
Strzelecki-10	457.5	143.3	227.8	744.9	120.6	268.5	923.8	129.5	125.6	1180.6	116.3	286.5	1354.7	99.3	392.2	1719.5	75.1	896.9	1778.4	74.9	631.2	404.1
Sturt-6	549.0	143.5	131.9	794.2	120.5	223.3	974.0	128.2	105.2	1206.2	113.0	363.2	1332.7	102.3	322.8	1648.1	83.8	608.1	1745.9	82.5	293.8	292.6
Swan Lake-1													1727.5	86.9	392.9	2089.6	78.4	391.1	2208.3	74.3	232.8	338.9
Taloola-1	563.9	142.5	136.4	782.5	123.3	165.1	950.6	125.4	198.7	1193.2	114.4	333.3	1326.2	101.1	365.9	1649.8	82.7	650.5	1746.1	80.0	415.0	323.5
Tanbar-1																2107.9	80.7	279.2	2262.2	70.2	376.6	327.9
Tanbar North-1													1713.9	95.2	156.6	2074.2	81.2	288.9	2225.0	64.1	710.8	385.5
Tartulla-1																1877.6	84.6	347.2	1972.2	75.3	418.7	382.9
Tennaperra South-1	380.0	144.1	290.7	639.5	120.3	383.3	872.1	120.0	407.5	1115.9	110.0	546.3	1315.2	97.6	481.3	1656.3	80.9	722.0	1692.1	69.0	1004.4	548.0
Three Queens-1	406.7	140.2	336.2	693.2	116.9	410.8	872.2	120.1	404.8	1209.3	110.3	442.1	1410.3	93.7	503.9	1777.4	81.9	560.0	1871.3	75.0	532.5	455.8
Thurakinna-5	712.8	140.4	26.2	883.0	120.9	123.2	1050.2	121.2	200.7	1331.7	112.4	254.6	1487.7	99.5	252.2	1782.2	81.7	561.6	1834.6	77.1	467.5	269.4
Thurra-1	418.7	136.0	400.8	652.0	123.9	282.2	858.7	121.0	396.0	1142.2	113.6	407.4	1314.6	98.6	453.6	1685.3	81.3	676.9	1755.8	77.4	534.0	450.1
Tinchoo-1	655.5	127.7	315.8	864.0	112.9	338.0	1055.3	114.5	359.0	1377.1	110.0	284.2	1593.8	94.3	303.5	1944.7	82.1	383.5	2099.9	70.4	532.1	359.4
Tinga Tingana-1	495.6	153.6	0.0 (P+)	625.9	134.8	41.3	744.8	142.0	0.0 (P+)	942.1	132.0	40.0	1086.2	121.1	0.0 (P+)	1374.9	105.0	0.0 (P+)	1388.1	95.9	0.0 (P+)	11.6
Tinpilla-1	312.1	137.2	484.9	473.5	123.6	467.2	664.8	130.2	365.9	949.1	118.3	456.7	1136.3	100.2	582.5	1487.0	78.9	973.6	1547.9	83.8	428.3	537.0
Tirrawarra-13																2047.7	84.3	190.0	2192.6	77.9	73.2	131.6
Tirrawarra-15																2024.8	80.7	359.2	2176.4	74.2	270.3	314.7
Tirrawarra-26																2048.3	78.5	430.4	2208.6	72.1	337.1	383.8
Tirrawarra North-1	678.2	135.2	156.7	1046.5	109.2	246.6	1207.0	121.0	48.5	1513.6	110.3	137.6	1739.8	97.8	50.5	2124.8	80.8	255.5	2267.1	75.4	119.5	145.0
Tirrawarra West-1	640.7	138.9	125.1	997.9	111.2	247.4	1165.6	121.6	76.4	1489.9	111.0	140.7	1716.3	97.0	100.1	2089.0	84.1	155.6	2227.9	74.3	211.8	151.0
Toby-1	281.1	132.9	595.5	371.1	120.0	656.8	563.6	117.0	790.2	916.5	111.0	715.5	1134.3	92.2	828.0	1519.3	80.7	864.2	1638.6	70.8	970.0	774.3
Toolachee-9				754.9	116.2	366.7	933.7	120.3	339.5	1189.4	112.5	396.5	1349.3	96.7	475.9	1680.3	84.6	541.8	1728.6	77.4	558.1	446.4
Toolachee-21	545.3	137.7	242.7	753.9	123.6	186.2	927.6	121.8	308.2	1192.8	111.1	434.0	1359.4	95.2	509.4	1689.4	82.9	602.6	1747.6	77.9	516.4	399.9
Toolachee-39	481.7	147.9	118.6	739.9	115.1	408.6	916.7	121.4	329.4	1207.9	111.3	413.7	1378.8	94.9	500.0	1697.4	79.8	724.0	1752.6	77.8	516.2	430.1

APPENDIX I **Continued**

Well	Winton Formation			Mackunda Formation			Oodnadatta Formation			Allaru Mudstone-Wallumbilla Formation			Bulldog Shale-Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean Δtadj** (μs/ft)	E_A*** (m)	E_A*** (m)
Turban-1	585.4	127.1	397.0	712.5	115.1	437.1	860.3	118.4	457.6	1156.6	113.8	389.1	1382.3	95.4	482.6	1761.3	83.4	513.6	1884.9	76.4	451.3	446.9
Ullenbury-1	465.8	137.4	328.2	777.4	112.2	442.5	1078.1	113.2	367.3	1389.6	104.7	436.4	1552.2	88.6	516.7	1911.7	82.9	383.7	2064.1	69.0	632.3	443.9
Wackett-3	435.4	140.1	309.5	623.1	117.4	469.2	793.3	121.6	447.3	1083.2	115.8	400.6	1282.1	96.7	543.7	1643.3	84.6	581.4	1714.6	75.6	662.2	487.7
Wallawanny-1													1409.3	93.0	528.7	1782.8	85.3	411.9	1830.7	76.2	515.2	485.2
Wancoocha-2	554.1	139.9	194.6	750.4	123.7	188.7	907.4	127.6	186.6	1122.0	118.3	282.6	1263.2	101.8	406.6	1550.2	86.8	582.8	1612.2	74.6	812.0	379.1
Wantana-2	648.9	140.2	94.1	859.0	123.2	90.6	1070.2	119.5	222.1	1401.5	111.4	216.9	1647.8	87.8	446.9	2006.2	79.0	450.8	2130.3	74.1	321.0	263.2
Wareena-1				306.8	109.3	985.2	437.7	119.5	854.7	715.2	115.7	771.3	927.8	92.7	1016.8	1294.4	84.4	936.6	1397.5	72.9	1109.8	945.7
Warnie East-1	522.7	136.8	283.0	610.2	118.4	459.3	800.9	120.6	463.9	1132.9	111.4	484.4	1320.4	96.9	497.8	1667.1	83.2	615.7	1702.6	74.2	741.7	506.5
Watson-1	427.0	142.1	279.5	561.3	121.1	441.7	750.6	117.6	587.4	1043.5	112.2	549.0	1227.3	93.9	681.0	1568.8	82.1	757.9	1603.9	73.6	870.6	592.3
Wicho-1	654.5	132.7	225.1	972.5	109.1	323.1	1183.9	111.6	300.7	1458.8	104.1	384.2	1624.6	88.1	460.2	1966.6	83.6	298.1	2119.3	71.3	464.4	350.8
Wills-1	428.2	139.1	333.5	591.2	123.8	345.0	773.1	128.2	308.0	1046.7	118.3	359.9	1215.2	102.0	449.9	1570.5	80.4	828.0	1605.2	80.2	548.9	453.3
Wimma-1	879.9	128.4	80.0	1204.3	111.7	29.3	1370.7	116.3	0.0 (P+)	714.3	107.1	36.6	1969.4	89.1	86.1	2357.4	81.4	0.0 (P+)	2492.8	73.2	0.0 (P+)	33.1
Wippo-2	527.1	135.3	304.8	644.6	126.7	220.0	842.7	120.2	432.7	1188.1	110.5	458.3	1424.2	94.4	469.9	1805.0	82.0	528.2	1886.8	75.6	491.4	415.1
Wirha-1	496.8	142.8	198.0	647.9	123.8	288.9	848.2	120.1	428.5	1091.4	118.8	299.7	1246.7	101.3	437.5	1559.3	82.3	757.8	1595.5	78.0	662.6	439.0
Witchetty-1	567.3	142.8	126.8	726.3	121.6	262.9	910.3	119.5	380.7	1175.3	111.7	435.0	1339.5	98.2	438.9	1673.8	81.1	694.2	1734.2	77.8	533.1	410.2
Wompi-1	380.4	140.0	365.2	574.2	118.8	484.2	746.0	124.2	432.6	1021.1	112.6	560.3	1215.1	95.5	645.4	1555.5	80.9	819.6	1582.4	74.7	839.0	592.3
Yanbee-1	651.1	129.9	280.5	933.5	110.1	339.2	1104.8	113.2	340.5	1397.5	106.8	363.4	1618.3	93.0	318.8	1953.6	79.8	467.7	2100.5	71.4	480.6	370.1
Yanda-2	520.4	137.0	280.9	759.5	114.6	402.2	919.8	120.6	346.2	1229.3	111.8	376.2	1448.2	93.1	486.9	1827.0	86.1	333.3	1912.7	77.7	360.6	369.5
Yanta-1	605.6	140.8	125.8	898.9	121.7	88.1	1049.4	126.3	77.5	1303.2	115.9	175.2	1472.2	97.4	332.4	1810.1	83.9	443.0	1972.7	76.3	367.7	229.9
Yumba-1	567.1	141.4	153.4				897.6	121.4	348.8	1177.1	111.3	445.6	1406.0	94.4	487.8	1790.7	83.9	461.0	1869.3	74.8	548.2	407.5

*m bgl = meters below ground level.
**Dtadj = adjusted interval transit time.
***EA = apparent exhumation.
!Mean = mean of the apparent exhumation values from such of the Eromanga Basin Formations as are present in any given well.
P+ = reference well. i.e. well used to define normal compaction relationship.

APPENDIX II | **Midpoint depth and mean bulk density data and apparent exhumation results.**

	Winton Formation			Mackunda Formation			Allaru Mudstone-Oodnadatta Formation			Bulldog Shale-Wallumbilla Formation			Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
Well	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	E_A*** (m)
Alkina-1													1473.9	2.4	315.1	1841.4	2.4	274.3	1977.4	2.4	452.0	347.1
Alwyn-1	443.4	1.9	189.8	613.4	2.1	154.3	785.9	2.2	659.5	1021.7	2.4	683.7	1154.4	2.4	752.4	1461.8	2.5	905.0	1496.0	2.3	701.9	578.1
Amyema-1													1374.1	2.4	538.8	1700.7	2.5	609.4	1747.5	2.4	749.1	632.4
Andree-1																2115.3	2.5	233.5	2246.4	2.4	257.3	245.4
Arrakis-1																1860.2	2.5	366.0	1964.6	2.4	420.1	393.0
Atoll-1													1041.7	2.4	819.9	1378.6	2.4	824.4	1421.7	2.4	1054.5	899.6
Azolla-1													1337.6	2.4	530.3	1667.3	2.5	604.1	1705.7	2.4	695.5	609.9
Ballera-1													1514.4	2.5	434.8	1881.3	2.4	312.2	1969.4	2.4	428.9	392.0
Baratta-1	593.0	2.0	358.3	828.0	2.2	304.3	983.0	2.3	684.7	1252.1	2.4	569.7	1427.6	2.4	478.4	1759.2	2.5	635.2	1813.6	2.4	694.5	532.2
Bardoc-1													1346.8	2.4	566.9	1706.6	2.5	590.4	1758.5	2.4	817.5	658.3
Baryulah-1													1572.8	2.5	417.8	1951.1	2.4	96.2	1990.7	2.4	498.4	337.4
Beanbush-1	990.5	2.0	0.0 (P+)	1220.2	2.3	0.0 (P+)	1376.4	2.2	0.0 (P+)	1717.3	2.4	0.0 (P+)	1971.1	2.5	0.0 (P+)	2348.4	2.5	0.0 (P+)	2522.9	2.4	0.0 (P+)	0.0
Belah-1													1289.8	2.4	615.6	1625.5	2.5	670.9	1661.0	2.3	607.8	631.4
Biala-1	524.6	2.0	406.0	635.8	2.1	139.5	781.3	2.2	654.2	1017.9	2.3	591.6	1158.1	2.4	699.0	1464.5	2.4	631.0	1513.2	2.3	669.5	541.5
Big Lake-26																1952.1	2.5	345.5	2032.7	2.4	496.8	421.2
Big Lake-35	655.1	1.9	4.6													1969.6	2.5	299.0	2053.7	2.4	366.3	223.3
Bogala-1	359.9	1.9	299.8	550.5	2.2	537.4	694.0	2.3	841.8	978.1	2.3	604.4	1195.0	2.4	705.8	1538.8	2.5	835.4	1605.4	2.4	853.8	668.3
Bookabourdie-1													1720.1	2.4	181.2	2102.2	2.5	135.7	2231.1	2.4	175.6	164.2
Buckinna-1	507.4	2.0	512.9	682.4	2.2	230.1	834.5	2.3	714.5				1194.5	2.4	651.8	1520.6	2.5	768.5	1557.5	2.3	639.4	586.2
Burke-2	476.7	2.0	358.5	791.0	2.2	276.0	993.7	2.2	272.0	1293.5	2.3	204.3	1482.0	2.5	476.6							317.4
Burley-2	578.0	1.9	0.0 (P+)	926.7	2.3	501.8	1106.7	2.1	0.0 (P+)	1447.1	2.5	506.3	1687.8	2.5	383.4	2082.2	2.5	164.9	2177.0	2.4	216.9	253.3
Bycoe-1	327.1	2.0	653.1	482.1	2.2	369.3	622.1	2.3	868.0	921.8	2.4	774.3	1135.9	2.4	752.3	1491.7	2.5	774.4	1553.7	2.4	893.8	726.5
Challum-1													1489.4	2.5	506.3	1853.3	2.5	407.3	1967.0	2.4	639.9	517.8
Charo-1																1766.5	2.4	412.4	1913.7	2.3	446.7	429.5
Childie-1	443.9	2.0	446.4	699.8	2.2	223.1	889.6	2.3	706.4	1176.7	2.4	594.0	1335.9	2.4	568.6	1659.3	2.5	677.4	1695.8	2.3	605.0	545.8
Cook-1																1920.4	2.5	313.1	2076.1	2.4	510.2	411.7
Cook North-1													1596.7	2.5	389.0	1934.7	2.5	364.4	2067.2	2.5	562.9	438.8
Copai-1				693.9	2.5	1286.1							1285.4	2.5	674.5	1602.3	2.5	669.6	1752.5	2.4	790.4	855.2
Curalle-1				350.4	2.4	1306.4	518.9	2.3	1025.4	802.9	2.5	1155.8	939.9	2.5	1094.0	1246.9	2.5	1143.0	1387.8	2.5	1311.9	1172.7
Daer-1																1876.8	2.5	348.8	2046.3	2.4	342.5	345.6
Daralingie-23																			1863.2	2.4	564.2	564.2
Della-7													1353.6	2.5	604.1	1695.6	2.5	699.3	1781.1	2.5	869.2	724.2
Della-10													1338.4	2.4	585.4	1670.6	2.5	685.4	1755.8	2.4	760.1	676.9
Dirkala-2																1627.6	2.4	552.8	1689.0	2.3	626.5	589.7
Dunoon-1	391.5	1.9	354.2	565.3	2.1	0.0 (P+)	732.8	2.1	404.7	973.9	2.3	520.0	1109.0	2.4	687.2	1407.1	2.5	828.8	1423.4	2.3	937.6	533.2
Fly Lake-4													1733.5	2.4	81.5	2087.1	2.5	325.9	2239.4	2.4	381.7	263.0
Garanjanie-2																1629.6	2.4	540.3	1686.9	2.3	481.7	511.0
Gidgealpa-20													1465.8	2.4	438.4	1801.7	2.4	332.7	1869.2	2.3	377.5	382.9
Gidgealpa-42													1464.6	2.4	399.7	1808.7	2.5	531.4	1903.8	2.3	421.1	450.7
Gidgee-1													1125.2	2.4	698.9	1450.1	2.5	939.6	1477.5	2.4	920.8	853.1
Gooranie-1																2046.7	2.5	274.7	2177.8	2.4	325.6	300.1
Graham-1													1139.5	2.4	764.7	1481.3	2.5	792.4	1542.0	2.4	916.6	824.6

APPENDIX II | **Continued**

Well	Winton Formation			Mackunda Formation			Allaru Mudstone-Oodnadatta Formation			Bulldog Shale-Wallumbilla Formation			Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	E_A*** (m)
Hammond-1															718.7							829.2
Hooley-1													997.1	2.4	914.0	1346.8	2.5	921.4	1424.6	2.4	1121.7	812.0
Hume-1	506.7	2.0	489.5	748.4	2.2	304.6	928.9	2.2	436.4	1194.1	2.1	0.0 (P+)	1377.1	2.4	485.4	1706.1	2.5	643.4	1748.3	2.4	745.4	985.7
Hydra-1													1170.2	2.4	709.2	1497.8	2.5	836.3	1527.8	2.4	884.4	443.5
Ingella-1																1979.0	2.5	262.5	2122.0	2.4	347.3	810.0
Innamincka-3																1525.2	2.5	789.7	1643.3	2.4	894.0	304.9
Innamincka-4													1228.8	2.4	629.6	1595.5	2.3	365.7	1712.4	2.4	850.2	841.8
Jackson-1													1055.8	2.4	816.0	1402.2	2.5	848.7	1459.1	2.4	917.2	860.6
Jackson South-1													1035.5	2.4	781.9	1396.9	2.4	775.2	1454.6	2.4	930.9	829.3
James-1													1578.7	2.5	384.0	1912.6	2.5	384.5	2067.0	2.4	487.1	418.5
Jarrar-1													1405.7	2.5	543.6	1774.5	2.5	631.0	1826.3	2.4	771.9	648.8
Kalladeina-1	537.4	2.0	434.4	731.2	2.1	14.5	877.5	2.2	379.2	1146.0	2.3	427.3	1314.1	2.4	466.1	1652.8	2.4	469.5	1820.7	2.3	430.3	374.5
Karwin-1													1209.3	2.4	624.5	1563.3	2.4	581.2	1626.2	2.3	701.5	635.7
Keilor-1													1508.6	2.5	441.1	1878.2	2.5	428.1	1986.1	2.5	645.2	504.8
Kenny-1													1753.1	2.5	208.5	2092.5	2.4	0.0 (P+)	2248.5	2.4	181.6	130.1
Kercummurra-1													986.0	2.5	940.5	1351.0	2.5	967.5	1442.6	2.4	1168.0	1025.3
Kerna-5	640.9	2.0	177.4																			177.4
Kirby-1																2010.9	2.5	363.3	2113.9	2.4	291.8	327.5
Kiwarrick-1													1195.3	2.4	711.2	1518.5	2.4	622.0	1567.4	2.3	761.3	698.2
Kobari-1							809.5	2.2	555.8				1172.1	2.4	721.8	1451.6	2.4	697.2	1499.6	2.3	755.1	682.5
Koonchera-1	518.5	2.1	571.5	696.3	2.2	348.4	849.8	2.3	629.7	1122.8	2.3	474.4	1300.3	2.4	605.5	1609.3	2.5	654.3	1795.3	2.4	744.4	575.4
Kurunda-1													1575.6	2.5	400.2	1913.3	2.4	281.2	2024.6	2.3	345.1	342.2
Kutyo-1													1453.6	2.5	487.4	1814.4	2.5	437.5	1869.0	2.4	695.5	540.1
Lake Mcmillan-1													1848.0	2.4	43.4	2212.7	2.5	38.5	2353.5	2.4	155.5	79.1
Lambda-1	405.4	2.1	688.1	634.5	2.2	446.3	820.1	2.3	895.2	1070.3	2.4	748.1	1240.7	2.5	755.9	1558.8	2.4	493.6				671.2
Limestone Creek-9													1157.7	2.4	694.2							694.2
Marabooka-2	525.5	2.0	348.5	712.7	2.1	93.8				1196.2	2.3	308.7	1368.8	2.4	515.8	1712.0	2.5	600.8	1781.8	2.4	634.8	417.1
Marsilea-1													1397.3	2.4	513.3	1739.4	2.5	575.6	1773.4	2.4	787.8	625.6
Mawson-1													1578.9	2.4	319.3	1893.8	2.4	322.8	2012.4	2.4	368.6	336.9
Mckinlay-3													1153.0	2.4	688.6	1469.9	2.5	750.2	1506.0	2.3	695.7	711.5
Meranji-1																1982.4	2.5	315.4	2105.6	2.4	338.1	326.8
Merrimelia-7	583.4	2.0	448.0	918.3	2.2	271.3	1047.1	2.2	382.5	1317.2	2.2	97.8	1532.7	2.4	378.9	1874.8	2.5	388.8	1981.8	2.4	530.2	356.8
Mooliampah-1													1186.7	2.4	680.5	1513.2	2.5	762.0	1548.2	2.4	868.8	770.4
Moolion-1																2183.1	2.5	37.3	2323.2	2.4	238.9	138.1
Moomba-57																			2096.2	2.4	314.2	314.2
Moomba North-1																2029.7	2.4	151.2	2139.1	2.3	223.8	187.5
Moomba South-1																2013.4	2.5	335.3	2109.3	2.4	397.4	366.4
Moorari-4																2158.4	2.5	89.0	2285.7	2.4	223.6	156.3
Morney-1										859.0	2.3	768.5	995.4	2.5	935.1	1332.7	2.4	827.5	1472.9	2.4	1103.7	908.7
Mudera-3										1224.7	2.4	494.4	1412.0	2.4	414.7	1763.1	2.5	515.1	1829.3	2.4	638.5	515.6
Munkah-2													1390.3	2.5	546.0	1766.6	2.5	525.1	1854.4	2.4	694.9	588.7
Munkarie South-1	336.5	2.0	481.9	533.5	2.1	236.5	682.4	2.2	731.5	920.7	2.3	715.4	1084.8	2.4	714.2	1404.9	2.4	722.5	1429.4	2.3	819.2	631.6

APPENDIX II | **Continued**

Well	Winton Formation			Mackunda Formation			Allaru Mudstone-Oodnadatta Formation			Bulldog Shale-Wallumbilla Formation			Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm³)	E_A*** (m)	E_A*** (m)
Munro-1													1109.8	2.4	692.2	1435.9	2.5	857.1	1459.4	2.3	853.3	800.8
Muteroo-3													1365.0	2.5	574.5	1677.3	2.4	540.1				557.3
Naccowlah East-1													1343.0	2.5	659.2	1699.0	2.5	706.5	1783.4	2.5	878.3	748.0
Naccowlah South-1										1093.1	2.4	629.3	1303.7	2.4	607.6	1653.4	2.5	695.9	1722.6	2.4	750.5	670.8
Naccowlah West-1							813.6	2.1	336.9	1096.3	2.4	584.8	1304.3	2.4	615.5	1661.2	2.5	694.9	1731.9	2.4	790.2	604.4
Nulla-1																1998.7	2.5	286.0	2137.1	2.4	365.7	325.9
Okotoko-1										1149.6	2.4	675.2	1376.9	2.5	572.8	1732.9	2.5	615.5	1825.0	2.4	758.0	655.4
Orientos-2													1254.3	2.5	749.8							749.8
Packsaddle-4													1394.0	2.4	513.9	1736.1	2.5	644.8	1848.2	2.4	632.8	597.1
Padulla-1	384.9	2.2	1248.3	627.4	2.2	559.0	788.0	2.2	658.5	993.2	2.3	454.7	1098.3	2.4	692.0	1384.6	2.4	793.7	1433.2	2.3	884.9	755.9
Pallano-1													1414.6	2.5	564.1	1773.9	2.5	610.2	1828.5	2.4	789.0	654.4
Paning-1													1666.7	2.3	0.0 (P+)	2037.1	2.5	216.7	2186.9	2.4	323.3	180.0
Paragilga-1													1107.2	2.4	708.9	1441.3	2.5	871.8	1467.6	2.4	906.1	828.9
Patroclus-1													1404.2	2.5	554.5	1738.5	2.5	595.0	1788.0	2.4	702.5	617.3
Paxton-1	271.4	2.0	519.6	400.4	2.1	129.6	559.5	2.1	639.2	726.3	2.2	622.6	815.8	2.3	866.2							555.4
Pepita-2										1188.2	2.4	516.1	1423.2	2.4	502.4	1773.6	2.5	571.7	1884.6	2.4	632.1	555.6
Pintari-1	499.8	2.0	279.2	759.5	2.2	201.6	919.6	2.3	556.1	1125.8	2.3	478.0	1239.5	2.4	603.3	1541.7	2.3	416.0	1643.0	2.3	607.7	448.8
Pondrinie-5													1432.4	2.4	443.9	1790.4	2.5	528.5	1900.3	2.4	562.8	511.7
Potiron-1													1256.6	2.5	740.4	1568.1	2.5	672.4	1748.4	2.5	929.7	780.8
Rheims-1													1185.8	2.4	688.4	1517.8	2.5	718.6	1550.1	2.3	705.7	704.2
Rho East-1													1071.2	2.4	796.8	1407.4	2.5	944.4	1429.4	2.3	894.0	878.4
Richie-1	280.2	1.9	478.7	425.0	2.1	317.1	630.8	2.3	867.4	916.1	2.4	801.1	1087.1	2.4	794.0	1446.1	2.5	775.8	1496.1	2.3	837.8	696.0
Russel-1																2106.8	2.5	138.2	2256.1	2.3	0.0 (P+)	69.1
Snake Hole-1													1597.5	2.4	314.5	1929.2	2.5	388.1	2040.6	2.4	362.3	355.0
Spectre-1																2146.7	2.5	153.3	2278.8	2.4	304.0	228.7
Spencer-4													1331.7	2.4	590.7	1640.6	2.4	532.9	1743.2	2.3	551.1	558.2
Strzelecki-10				744.9	2.2	246.9	923.8	2.1	131.3	1180.6	2.2	258.1	1354.7	2.4	524.5	1719.5	2.5	522.5	1778.4	2.4	669.2	392.1
Strzelecki -27	531.4	2.0	389.8													1655.1	2.5	634.6	1707.9	2.4	741.0	588.5
Sturt-6																1648.1	2.4	491.7	1745.9	2.3	603.8	547.8
Swan Lake-1													1727.5	2.5	273.7	2089.6	2.5	266.3	2208.3	2.4	398.7	312.9
Taloola-1													1326.2	2.4	549.0	1649.8	2.5	640.6	1746.1	2.4	647.3	612.3
Tanbar North-1																2074.2	2.5	272.0	2225.0	2.5	442.2	357.1
Tartulla-1																1877.6	2.5	487.0	1972.2	2.4	635.1	561.1
Tennaperra South-1													1315.2	2.4	602.8	1656.3	2.5	672.5	1692.1	2.4	910.2	728.5
Thurakinna-5													1487.7	2.4	418.5	1782.2	2.4	436.4	1834.6	2.4	569.7	474.9
Thurra-1													1314.6	2.4	600.9	1685.3	2.5	593.7	1755.8	2.4	780.3	658.3
Tinpilla-1	312.1	1.8	109.0	473.5	2.1	359.4	664.8	2.0	85.4	949.1	2.3	626.5	1136.3	2.4	751.0	1487.0	2.5	798.3	1547.9	2.3	821.1	507.3
Tirrawarra-13																2047.7	2.5	295.5	2192.6	2.4	389.5	342.5
Tirrawarra North-1																2124.8	2.5	215.5	2267.1	2.4	244.0	229.7
Tirrawarra West-1																2089.0	2.4	60.1	2227.9	2.4	283.9	172.0
Toby-1										916.5	2.4	963.6	1134.3	2.5	821.5	1519.3	2.5	792.0	1638.6	2.4	954.3	882.9
Toolachee-9													1349.3	2.4	553.9	1680.3	2.5	606.3	1728.6	2.4	697.8	619.3

APPENDIX II | **Continued**

	Winton Formation			Mackunda Formation			Allaru Mudstone-Oodnadatta Formation			Bulldog Shale-Wallumbilla Formation			Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
Well	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ρ_b** (g/cm^3)	E_A*** (m)	E_A*** (m)
Toolachee-21													1359.4	2.4	543.8	1689.4	2.5	629.7	1747.6	2.4	647.8	607.1
Turban-1													1382.3	2.5	547.2	1761.3	2.5	566.3	1884.9	2.4	619.8	577.8
Ullenbury-1													1552.2	2.5	449.8	1911.7	2.4	305.7	2064.1	2.4	465.5	407.0
Wackett-3													1282.1	2.4	609.5	1643.3	2.5	609.2	1714.6	2.4	812.5	677.0
Wallawanny-1													1409.3	2.4	483.2	1782.8	2.5	520.1	1830.7	2.4	724.2	575.8
Wancoocha-2	554.1	2.0	434.0	750.4	2.1	57.9	907.4	2.1	246.6	1122.0	2.3	420.9	1263.2	2.4	610.6	1550.2	2.4	627.9	1612.2	2.4	945.9	477.7
Wantana-2																2006.2	2.5	381.8				381.8
Wareena-1				306.8	2.2	842.6	437.7	2.1	748.8	715.2	2.2	704.4	927.8	2.5	1017.3	1294.4	2.4	780.7	1397.5	2.4	1168.9	877.1
Warnie East-1													1320.4	2.5	612.4	1667.1	2.5	687.9	1702.6	2.4	778.2	692.8
Watson-1													1227.3	2.4	694.1	1568.8	2.5	782.3	1603.9	2.4	926.7	801.1
Wills-1	428.2	2.0	540.7	591.2	2.2	352.9	773.1	2.2	682.1	1046.7	2.3	580.0	1215.2	2.5	713.5	1570.5	2.5	666.8	1605.2	2.3	754.2	612.9
Wimma-1													1969.4	2.5	8.4	2357.4	2.5	3.5	2492.8	2.4	4.5	5.4
Wirha-1													1246.7	2.4	622.2	1559.3	2.5	697.9	1595.5	2.4	852.4	724.2
Wompi-1	380.4	2.0	470.4	574.2	2.2	380.0	746.0	2.3	753.6	1021.1	2.4	751.2	1215.1	2.4	704.7	1555.5	2.5	828.9	1582.4	2.4	958.4	692.5
Yanda-2													1448.2	2.5	502.2	1827.0	2.5	509.3	1912.7	2.4	664.4	558.6
Yanta-1													1472.2	2.4	426.1	1810.1	2.5	427.7	1972.7	2.4	449.2	434.3
Yumba-1	567.1	2.1	594.3	751.9	2.3	476.9	897.6	2.4	893.6	1177.1	2.4	663.7	1406.0	2.5	542.1	1790.7	2.5	513.2	1869.3	2.4	681.2	623.6

*m bgl = meters below ground level.
**ρ_b = bulk density.
***E_A = apparent exhumation.
Mean = mean of the apparent exhumation values from such of the Eromanga Basin Formations as are present in any given well.
P+ = reference well, i. e. well used to define normal compaction relationship.

APPENDIX III | **Midpoint depth and mean neutron porosity data and apparent exhumation results.**

	Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
Well	Midpoint Depth (m bgl*)	Mean ϕN** (pu)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ϕN** (pu)	E_A*** (m)	Midpoint Depth (m bgl*)	Mean ϕN** (pu)	E_A*** (m)	EA*** (m)
Alkina-1	1473.9	30.2	407.6	1841.4	22.7	510.6	1977.4	9.0	890.7	603.0
Alwyn-1	1154.4	29.8	746.1				1496.0	18.9	474.7	610.4
Amyema-1	1374.1	29.0	564.4	1700.7	24.6	486.8	1747.5	15.8	503.1	518.1
Andree-1				2115.3	20.7	408.2	2246.4	14.1	154.9	281.5
Arrakis-1				1860.2	21.0	636.6	1964.6	14.8	375.9	506.2
Atoll-1	1041.7	30.7	813.8	1378.6	28.8	442.4	1421.7	14.8	915.6	724.0
Azolla-1	1337.6	29.0	601.9	1667.3	24.8	503.3	1705.7	17.9	348.1	484.4
Ballera-1	1514.4	25.4	594.3	1881.3	21.7	553.8	1969.4	11.3	687.5	611.9
Baratta-1	1427.6	28.1	552.7	1759.2	18.7	936.4	1813.6	14.4	563.9	684.3
Bardoc-1	1346.8	30.4	524.9	1706.6	23.8	552.2	1758.5	12.9	748.7	608.6
Baryulah-1	1572.8	27.5	438.7	1951.1	23.4	337.5	1990.7	13.6	457.2	407.8
Beanbush-1				2348.4	19.2	310.2	2522.9	11.7	96.4	203.3
Belah-1	1289.8	28.2	687.3	1625.5	24.6	558.0	1661.0	15.7	599.2	614.5
Biala-1	1158.1	31.4	664.5	1464.5	25.3	660.0	1513.2	19.3	421.6	582.1
Big Lake-26				1952.1	20.4	595.6	2032.7	6.4	1065.1	830.4
Big Lake-35				1969.6	19.1	698.8	2053.7	7.1	983.3	841.1
Bogala-1	1195.0	27.2	827.0	1538.8	20.4	1012.1	1605.4	16.0	624.7	821.3
Bookabourdie-1	1720.1	28.8	225.7	2102.2	18.7	593.3	2231.1	12.7	296.0	371.7
Buckinna-1	1194.5	31.4	629.9	1520.6	27.1	451.2	1557.5	16.8	600.3	560.4
Burke-2	1482.0	28.3	489.4							489.4
Burley-2	1687.8	23.3	520.4	2082.2	24.1	147.1	2177.0	14.0	229.6	299.0
Bycoe-1	1135.9	30.0	755.6	1491.7	20.5	1047.4	1553.7	18.0	496.9	766.6
Challum-1	1489.4	26.0	592.7	1853.3	22.6	510.1	1967.0	10.5	762.9	621.9
Charo-1				1766.5	23.3	536.8	1913.7	16.5	270.4	403.6
Childie-1	1335.9	28.4	629.0	1659.3	23.1	659.0	1695.8	16.8	461.0	583.0
Cook-1				1920.4	19.9	674.1	2076.1	9.7	725.9	700.0
Cook North-1	1596.7	24.3	564.4	1934.7	20.4	620.4	2067.2	9.3	770.8	651.8
Cooroo-1	1366.0	28.1	616.8	1726.7	20.5	817.0	1781.4	12.0	813.9	749.3
Copai-1	1285.4	27.4	727.8	1602.3	20.3	959.6	1752.5	13.9	670.5	785.9
Curalle-1	939.9	24.1	1233.8	1246.9	18.5	1473.4	1387.8	8.0	1567.9	1425.1
Daer-1				1876.8	23.4	416.9	2046.3	17.0	90.0	253.4
Daralingie-23							1863.2	17.4	235.9	235.9
Della-7	1353.6	29.2	572.3	1695.6	16.1	1229.1	1781.1	7.2	1246.8	1016.0
Della-10	1338.4	28.0	647.8	1670.6	17.6	1121.6	1755.8	9.0	1109.6	959.7
Dirkala-2				1627.6	26.8	369.1	1689.0	19.9	183.1	276.1
Dunoon-1	1109.0	33.6	608.5	1407.1	23.8		1423.4	16.5	762.1	685.3

APPENDIX III | **Continued**

	Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
	Midpoint	Mean		Midpoint	Mean		Midpoint	Mean		
	Depth	ϕN**	E_A***	Depth	ϕN**	E_A***	Depth	ϕN**	E_A***	EA***
Well	(m bgl*)	(pu)	(m)	(m bgl*)	(pu)	(m)	(m bgl*)	(pu)	(m)	(m)
Fly Lake-4	1733.5	31.4		2087.1	19.6	536.7	2239.4	14.6	115.5	326.1
Garanjanie-2				1629.6	26.4	402.1	1686.9	20.0	178.2	290.2
Gidgealpa-20	1465.8	28.9	478.8	1801.7	21.1	687.0	1869.2	15.0	453.5	539.8
Gidgealpa-42	1464.6	30.7	390.1	1808.7	23.4	479.6	1903.8	14.9	427.0	432.2
Gidgee-1	1125.2	32.3	657.0				1477.5	19.1	469.8	563.4
Gooranie-1				2046.7	19.8	555.2	2177.8	15.0	143.3	349.2
Graham-1	1139.5	29.6	767.1	1481.3	23.0	843.1	1542.0	18.3	475.8	695.3
Haddon Downs-1	1258.6	26.7	791.2	1542.8	22.2	852.9				877.7
Hooley-1	997.1	29.6	911.4	1346.8	22.2	1052.4	1424.6	16.1	792.3	918.7
Hume-1	1377.1	25.8	714.2	1706.1	24.4	501.3	1748.3	12.4	804.4	673.3
Hydra-1	1170.2	30.2	708.1	1497.8	26.2	549.0	1527.8	16.9	616.2	624.4
Ingella-1				1979.0	18.9	701.0	2122.0	7.7	861.3	781.1
Innamincka-3				1525.2	21.5	933.5	1643.3	14.9	683.3	808.4
Innamincka-4	1228.8	27.0	803.7	1595.5	18.9	1082.5	1712.4	12.3	849.9	912.1
Jackson-1	1055.8	36.4	529.2	1402.2	25.2	732.8	1459.1	21.7	252.9	504.9
Jackson South-1	1035.5	30.6	826.6	1396.9	20.0	1186.1	1454.6	16.9	697.2	903.3
James-1	1578.7	26.3	486.4	1912.6	20.9	591.7	2067.0	9.6	743.9	607.3
Jarrar-1	1405.7	26.5	652.8	1774.5	18.6	938.1	1826.3	10.2	931.1	840.7
Karmona-2	1434.1	26.0	647.5							647.5
Keilor-1				1878.2	21.1	611.6	1986.1	10.8	717.3	664.5
Kenny-1	1753.1	25.8	337.6	2092.5	18.4	633.0	2248.5	9.6	558.8	509.8
Kercummurra-1	986.0	26.8	1058.6	1351.0	21.9	1073.6	1442.6	13.4	1026.9	1053.0
Kirby-1				2010.9	26.6	0.0 (P+)	2113.9	13.1	379.7	189.9
Kiwarrick-1	1195.3	31.0	648.1	1518.5	24.3	693.5	1567.4	19.7	327.0	556.2
Kobari-1	1172.1	32.4	602.7	1451.6	26.9	537.8	1499.6	21.9	196.6	445.7
Koonchera-1	1300.3	30.2	579.4	1609.3	23.1	705.5	1795.3	13.9	627.5	637.5
Kurunda-1				1913.3	22.6	448.2	2024.6	16.0	203.2	325.7
Kutyo-1	1453.6	30.0	435.7	1814.4	18.9	863.9	1869.0	11.3	789.4	696.3
Lake Mcmillan-1				2212.7	20.6	323.0	2353.5	12.7	175.8	249.4
Lambda-1	1240.7	27.6	764.0	1558.8	23.3	743.7				753.8
Limestone Creek-9	1157.7	32.7	601.8							601.8
Marabooka-2	1368.8	28.4	696.8	1712.0	20.2	684.0	1781.8	11.8	585.1	655.3
Marsilea-1	1397.3	26.5	598.0	1739.4	25.4	859.3	1773.4	17.2	832.9	763.4
Mckinlay-3	1153.0	30.8	660.5	1469.9	25.0	381.3	1506.0	17.5	345.9	462.5
Mcleod-1										248.8
Meranji-1				1982.4	20.7	540.6	2105.6	14.7	239.8	390.2

APPENDIX III Continued

Well	Cadna-owie Formation Midpoint Depth (m bgl*)	Cadna-owie Formation Mean ϕN** (pu)	Cadna-owie Formation E_A*** (m)	Birkhead Formation Midpoint Depth (m bgl*)	Birkhead Formation Mean ϕN** (pu)	Birkhead Formation E_A*** (m)	Hutton Sandstone Midpoint Depth (m bgl*)	Hutton Sandstone Mean ϕN** (pu)	Hutton Sandstone E_A*** (m)	Mean! EA*** (m)
Merrimelia-7	1532.7	29.5	379.5	1874.8	22.3	508.6	1981.8	16.6	192.8	360.3
Mooliampah-1	1186.7	30.6	672.1	1513.2	24.8	658.4	1548.2	17.4	557.9	629.5
Moolion-1				2183.1	17.8	594.5	2323.2	11.1	346.5	470.5
Moomba-57							2096.2	6.9	955.1	955.1
Moomba North-1				2029.7	23.4	262.5	2139.1	5.6	1033.6	648.1
Moomba South-1				2013.4	18.6	692.5	2109.3	7.8	865.7	779.1
Moorari-4				2158.4	20.4	397.5	2285.7	13.8	145.7	271.6
Morney-1	995.4	28.0	990.3	1332.7	20.4	1215.9	1472.9	10.4	1265.6	1157.3
Mudera-3	1412.0	25.2	708.8	1763.1	19.0	909.9	1829.3	6.2	1290.4	969.7
Munkah-2	1390.3	27.2	632.8	1766.6	21.8	666.7	1854.4	14.0	555.2	618.2
Munkarie South-1	1084.8	31.8	721.1	1404.9	27.3	547.0	1429.4	15.8	816.9	695.0
Munro-1	1109.8	31.9	690.1				1459.4	19.0	502.2	596.1
Muteroo-3	1365.0	30.6	496.9	1677.3	23.0	646.2				571.5
Naccowlah East-1	1343.0	29.3	580.5	1699.0	21.9	724.0	1783.4	17.9	275.6	526.7
Naccowlah South-1	1303.7	28.7	650.0	1653.4	20.4	894.5	1722.6	16.0	506.3	683.6
Naccowlah West-1	1304.3	27.1	724.1	1661.2	20.6	873.5	1731.9	15.0	592.7	730.1
Nulla-1				1998.7	20.4	557.0	2137.1	15.7	119.6	338.3
Okotoko-1	1376.9	28.7	576.1	1732.9	23.3	568.1	1825.0	13.8	602.2	582.1
Orientos-2	1254.3	25.7	842.0							842.0
Packsaddle-4	1394.0	27.2	630.4	1736.1	21.4	726.6	1848.2	15.9	395.2	584.1
Padulla-1	1098.3	32.7	660.4				1433.2	15.3	858.6	759.5
Pallano-1	1414.6	21.8	865.3	1773.9	14.4	1302.4	1828.5	7.1	1204.9	1124.2
Paning-1	1666.7	34.7	0.0 (P+)	2037.1	23.1	282.6	2186.9	13.1	302.3	150.0
Paragilga-1	1107.2	32.3	672.5	1441.3	27.1	530.1	1467.6	18.0	580.0	594.2
Patroclus-1	1404.2	28.3	566.5	1738.5	23.8	513.6	1788.0	14.4	583.4	554.5
Paxton-1	815.8	38.6	663.7							663.7
Pepita-2	1423.2	30.0	467.6	1773.6	24.1	453.9	1884.6	16.6	290.1	403.9
Pondrinie-5	1432.4	29.7	469.9	1790.4	19.0	879.9	1900.3	16.2	311.7	553.8
Potiron-1	1256.6	25.8	834.5	1568.1	21.5	889.7	1748.4	8.4	1171.8	965.3
Rheims-1	1185.8	30.3	687.8	1517.8	27.0	457.8	1550.1	18.3	469.6	538.4
Rho East-1	1071.2	31.3	756.8	1407.4	27.5	526.9	1429.4	16.8	730.4	671.4
Richie-1	1087.1	30.0	801.6	1446.1	23.3	852.0	1496.1	18.1	541.3	731.7
Russel-1				2106.8	16.3	798.3	2256.1	5.0	969.9	884.1
Snake Hole-1	1597.5	29.5	316.6	1929.2	19.4	712.3	2040.6	15.0	282.5	437.0
Spectre-1				2146.7	19.3	499.2	2278.8	14.8	58.4	278.9
Spencer-4	1331.7	32.0	461.0	1640.6	25.1	505.7	1743.2	17.3	365.0	443.9

APPENDIX III | **Continued**

	Cadna-owie Formation			Birkhead Formation			Hutton Sandstone			Mean!
	Midpoint	Mean		Midpoint	Mean		Midpoint	Mean		
	Depth	ϕN**	E_A***	Depth	ϕN**	E_A***	Depth	ϕN**	E_A***	EA***
Well	(m bgl*)	(pu)	(m)	(m bgl*)	(pu)	(m)	(m bgl*)	(pu)	(m)	(m)
Strzelecki-10	1354.7	29.9	538.7	1719.5	16.6	1162.7	1778.4	10.6	937.7	879.7
Strzelecki -27				1655.1	22.5	718.0	1707.9	11.2	956.1	837.0
Sturt-6				1648.1	21.8	786.1	1745.9	18.3	273.1	529.6
Swan Lake-1				2089.6	18.6	619.7	2208.3	11.3	444.3	532.0
Taloola-1	1326.2	31.8	477.5	1649.8	24.5	547.6	1746.1	17.6	337.9	454.3
Tennaperra South-1	1315.2	28.5	646.7	1656.3	22.4	722.0	1692.1	12.1	891.1	753.2
Thurakinna-5	1487.7	30.2	390.4	1782.2	18.9	896.3	1834.6	13.9	586.7	624.5
Thurra-1	1314.6	31.0	525.2	1685.3	21.9	735.9	1755.8	14.8	584.8	615.3
Tinpilla-1	1136.3	29.0	801.5	1487.0	19.1	1173.9	1547.9	17.1	582.5	852.6
Tirrawarra-13				2047.7	19.5	579.8	2192.6	14.7	153.9	366.8
Tirrawarra North-1				2124.8	19.9	473.7	2267.1	14.2	128.9	331.7
Tirrawarra West-1				2089.0	20.7	433.8	2227.9	13.5	229.6	331.7
Toby-1	1134.3	26.0	946.9	1519.3	17.7	1265.9	1638.6	10.1	1124.7	1112.5
Toolachee-9	1349.3	27.3	669.4	1680.3	22.5	689.8	1728.6	14.0	679.0	679.4
Toolachee-21	1359.4	28.9	581.6	1689.4	21.5	763.4	1747.6	15.2	553.0	632.7
Turban-1	1382.3	27.4	631.4	1761.3	19.6	861.7	1884.9	15.4	399.5	630.9
Ullenbury-1	1552.2	24.3	611.3	1911.7	19.0	758.4	2064.1	7.6	925.4	765.0
Wackett-3	1282.1	27.9	706.3	1643.3	20.2	927.6	1714.6	14.0	692.4	775.
Wallawanny-1	1409.3	26.5	649.8	1782.8	18.8	911.5	1830.7	12.9	681.3	
Wancoocha-2	1263.2	31.5	553.0	1550.2	26.7	450.6	1612.2	14.0	803.0	602.2
Wantana-2				2006.2	21.8	427.7				427.7
Wareena-1	927.8	26.2	1141.2	1294.4	24.3	914.4	1397.5	13.1	1095.3	1050.3
Warnie East-1	1320.4	27.0	711.8	1667.1	19.6	956.9	1702.6	11.4	943.9	
Wills-1	1215.2	30.4	657.4	1570.5	19.4	1068.4	1605.2	14.6	747.6	824.4
Wimma-1	1969.4	28.3	0.0 (P+)	2357.4	22.6	0.0 (P+)	2492.8	13.1	0.0 (P+)	0.0
Wirha-1	1246.7	28.4	721.3	1559.3	21.1	927.9	1595.5	14.3	783.9	811.0
Yanda-2	1448.2	24.8	690.5	1827.0	19.2	833.1	1912.7	14.5	455.9	659.9
Yanta-1	1472.2	30.8	377.9	1810.1	22.5	556.6	1972.7	16.0	261.1	398.5
Yumba-1	1406.0	31.5	413.4	1790.7	28.5	55.9	1869.3	20.0	0.0 (P+)	156.5

*m bgl = meters below ground level.

**fN = neutron porosity.

***EA = apparent exhumation.

!Mean = mean of the apparent exhumation values from such of the Eromanga Basin Formations as are present in any given well.

P+ = reference well. i.e. well used to define normal compaction relationship