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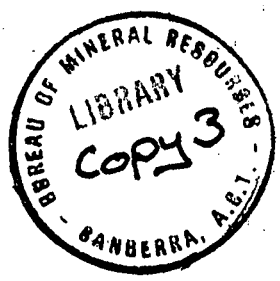

Record No. 1966/102

A summary of pressure and fluid data from wells drilled in the Surat Basin, with a preliminary discussion of the hydrodynamics of the basin.

by

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CONTENTS

List of Tables

List of Figures

Well Data

Abstract

A compilation has been made of pressure, fluid and other test data from wells drilled in the Surat Basin. This material is the basic data required for an hydrodynamic study of the Basin. Data are included from most of the subsidized operations, and in addition, Union Oil Development Corporation gave permission for the use of data from many of their unsubsidized wells.

Isopotential maps have been drawn for the Precipice Sandstone and a small area of the Hutton Sandstone. A discussion of the hydrodynamic environment is presented.

Introduction

This record is a compilation of significant pressure and test data obtained from wells in the Surat Basin. The pressure data have been critically examined and reliable values used to draw up isopotential maps for the formations of interest, in particular the Precipice Sandstone from which most of the readings were obtained. The isopotential maps form the basis for an hydrodynamic study of the basin which will follow on from the present work. It is felt preferable to issue this basic data as soon as possible, rather than hold it up pending completion of the whole study. This should enable all those interested to work on the subject, using more detailed geological information on areas of particular interest.

The Surat Basin covers part of the area of the Great Artesian Basin, probably the largest and most complex aquifer system in the world. The Precipice Sandstone is one of the aquifers in this system, but as it occurs below the highly productive Blythesdale Group aquifers, most water wells are completed in the shallower aquifers. However, the isopotential map of the Precipice clearly shows that water moves across the basin within this formation from the northern intake areas, but it is not at present clear where the bulk of the water reaches the surface.

Interest is concentrated on the Precipice Sandstone because the Moonie Oilfield produces from this formation, which is a thick and permeable reservoir covering a large part of the Surat Basin. If the overlying Evergreen Shale is the source rock for this oil, as has often been suggested, then the Precipice Sandstone is in a favourable position to act as a reservoir rock. However, the Permian Back Creek Formation is also regarded as a likely source rock, but with a more complex relationship with the Precipice Sandstone.

The term "hydrodynamics" has been used to denote the study of oil and gas occurrence in relation to the moving body of water which is often associated with the hydrocarbons. It is thought that the pre-Jurassic surface on which the Precipice Sandstone was deposited was fairly level. The northern and north-eastern uplift of the Surat Basin which produced the present hydrodynamic conditions, occurred almost at the end of the basin's history. It is, therefore, uncertain to what extent existing hydrodynamic forces reflect those responsible for moving the oil and gas to their present traps. The theory of

hydrocarbon migration based on movement towards areas where deposition thins over highs, could give a migration direction the exact opposite of that predicted from present hydrodynamic conditions. Erickson (1965) discusses migration in the Surat Basin in terms of this theory, but specifically excluded consideration of palaeohydrodynamics. Erickson maintains that flushing of Precipice reservoirs by meteoric waters could not have begun until the beds were exposed, by which time hydrocarbons in the outcrop area would already have been lost.

Petroleum geologists have been theorizing on the origin and mode of migration of oil almost since the time of its first discovery, and still no definite conclusions have been reached. There is unfortunately no agreement on estimates as to how far the hydrocarbons are likely to travel in moving from the source rock to the reservoir trap. Thus in the Surat Basin there is uncertainty both as to the likely source rock and the probable distance that the oil and gas can move from it. The large area covered by the basin, roughly 90,000 square miles, and the fact that drilling has been concentrated on only about one quarter of this area, result in a large amount of supposition being necessary in drawing up the isopotential maps. Although some 400 wells have been sunk and drilling is more concentrated in this basin than in any other part of Australia, it is still widely spaced by North American standards. As more wells are drilled, and provided that suitable pressure measurements are made, the detailed picture will become clearer. It is obvious, though, that to be of any practical and economic value, the hydrodynamic study must anticipate the complete coverage of the basin with actual drilling, by as wide a margin as possible.

Whilst the water flow pattern may indicate where oil might be found, in general the flushing effect of artesian waters in the Mesozoic sediments is regarded as an unfavourable factor when considering the prospects of these sediments. The search may have to be directed towards stratigraphic traps which could be immune to the flushing. Various geological methods have been tried for locating stratigraphic traps, and it remains to be seen if hydrodynamic methods prove superior. The influence of a particular geological feature on the regional hydrodynamic pattern is confined to a limited area, and pressures recorded outside the area of influence will not assist in detecting the anomaly created, for example, by a fault.

Conflicting opinions have been given in the literature on the validity of the hydrodynamic approach to oil exploration. Even if the techniques had been conclusively proved successful in other countries, it would not necessarily follow that they are applicable in the area under discussion. The magnitude of present - or paleo-hydrodynamic gradients and the distance between the source rock and potential reservoirs, will be different for each sedimentary basin. Therefore, it may not be possible to generalize on the subject, but rather be necessary to treat each individual basin as a distinct problem.

Because of the relatively small topographical relief the hydrodynamic gradient in the Surat Basin is not large; however, the considerable thickness and continuity of the water bearing Precipice Sandstone particularly on the eastern side of the Basin, may still have resulted in an appreciable hydrodynamic influence. At this stage in the exploration of the basin, the collection of additional data from all possible sources is essential.

The Bureau wishes to acknowledge the assistance rendered to this study by the Union Oil Development Corporation, who generously allowed the use of data from their unsubsidized wells in the basin. Thanks are expressed to other companies who have offered constructive suggestions. The co-operation and assistance afforded by the Queensland Mines Department is also gratefully acknowledged.

Data recorded

The main part of the data presented consists of pressure measurements obtained in drillstem testing. Most of the exploration wells in the basin have been drilled in the past three years during which time the services of the specialist testing contractors have been available. The quality of the data is therefore in general very good, but naturally for present purposes many more test results would be desirable. The primary purpose of most of the early tests was to evaluate hydrocarbon shows, with pressure data a secondary consideration. Lately, however, there has been more attention paid to testing purely to obtain pressure data.

From a pressure viewpoint, the ideal test is one in which the initial flow period is just sufficient to reduce the formation pressure below the initial static reservoir pressure, and the initial closed-in period long enough to enable this reduced pressure to build up again to the initial static pressure. A fuller discussion of this subject is given by Scorer (1965). In many cases the build-up pressure does not reach the original static value, but where a satisfactory build-up curve was obtained, pressure increments have been included to enable the data to be plotted on semi-log paper. The actual plots have not been included in this record because of the large amount of drafting necessary to get them in a form suitable for reproduction.

In addition to the pressure data, most of the significant oil and gas occurrences have been noted (Tables 2 and 3 and Fig. 1) together with test rates. Water analyses are also included since they can provide important information on the direction of water movement.

Before drawing the isopotential maps, all the pressure data were critically reviewed and graded according to their estimated accuracy. When attempting to assess the accuracy of pressures recorded, a considerable number of factors must be taken into consideration, many of which would be difficult to express in actual figures. The grading is, therefore, somewhat arbitrary, but it is considered that readings graded 'A' are accurate to approximately $\pm$ 1% and readings graded 'B' approximately $\pm$ 2%. Appropriate symbols were used to identify the grade of the reading when plotting the well data, and this grading was taken into consideration when drawing the isopotential lines.

The actual potentiometric heights (Tables 4 to 10) are calculated very simply by converting the subsurface pressure measurement in to the height of an equivalent column of fresh water and expressing the result in feet of water above sea level, e.g. a pressure of 1299 p.s.i.g. at 2,500 feet below RTKB (RTKB elevation 1,000 feet A.S.L.) gives a potentiometric height of $\frac{1299}{0.433}$ + 1000 - 2500 = 1500 feet A.S.L. (the pressure exerted by a one foot column of water is 0.433 p.s.i.)

This is a simple method of obtaining a useful general picture of the direction of fluid flow. For a more rigorous treatment of fluid potential in this context, the reader should refer to the classic papers by King Hubbert (1940,1953). At this stage it is sufficient to appreciate that in an isotropic medium, the direction of fluid movement at any point is along the line of maximum potential gradient.

The Great Artesian Basin

A study of the hydrology of the Great Artesian Basin as a whole is necessary for a proper understanding of conditions in the sub-basins. The only major survey of the Great Artesian Basin to date is the 1954 Queensland Water Report. It would appear that the hydrology section of this report was produced almost single handed by Ogilvie (1954). As such, it represents an exceptional achievement, and no subsequent attempt has been made to update or revise this study as a whole, although further measurements are said to confirm its general conclusions. As there are probably over 10,000 bores in current use, any comprehensive investigation would obviously be a major undertaking, requiring a computer and a large number of technicians collecting data. A major limitation of the 1954 study was that no attempt was made to separate the data for the various aquifers, mainly because in most cases the necessary geological information was not available.

Ogilvie's isopotential map (Figure 2 in this record) is based mainly on mathematical analyses of flowing well pressures taken over a number of years. Because of the approximations involved in these analyses, and as the data for all the aquifers are lumped together, a minority report by Parkinson (1954) stated that he doubted the validity of the isopotential map, and also suggested that the total flowrate estimated might be in error up to 50%. As the area covered by the isopotentials extends only to the western limits of the Surat Basin, there is no

way of comparing Ogilvie's values with the data in the present study.

A few figures will give an idea of the amount of water produced in the Great Artesian Basin. The maximum rate of withdrawal in Queensland was about 360 million g.p.d. in 1914. By 1960 the rate had fallen to about 200 million g.p.d. Much of this water was withdrawn from what is termed "elastic storage" in the reservoir, and it was estimated that equilibrium between total flowrate and recharge by rainfall would be reached at a rate of 130 million g.p.d. The total area of the intake beds for the Great Artesian Basin is estimated as 30,000 square miles, and on the basis of an annual rainfall of 25 inches over this area, the daily equivalent is 30,000 million gallons, so it can be seen that only a minute proportion of the rainfall enters the intake beds.

Many water wells have been drilled in the area covered by the Surat Basin and these represent a potential source of pressure data, although it will relate mainly to the Blythesdale Group aquifers. Nevertheless, in a great many cases the different aquifers in a well are found to be in pressure balance, in which case the pressure pattern for the Blythesdale aquifers will be the same as those for the deeper aquifers. The results from water wells are complicated by the drawdown following production, and also by the mechanical condition of wells which often does not allow them to be properly closed-in. However, in the past two years upwards of twenty exploration wells have been converted to Blythesdale water wells on termination of drilling. Wells such as these present an excellent opportunity to obtain comparative values of Blythesdale and Precipice pressures. So far this opportunity appears to have been missed, as static pressures on completion as water wells have not been recorded. It is suggested that this simple measurement be made on all future conversions.

The University of New South Wales has in hand a project for carbon dating of artesian water samples from the Great Artesian Basin, and the results of this project could be of value in tracing the path of underground waters in the basin.

The Surat Basin

The Surat Basin is an eastern extension of the Great Artesian Basin, and overlies the southern end of the Bowen Basin. The Precipice Sandstone was the first formation to be deposited in the Surat Basin, and the sequence ends with the Roma Formation. Table I illustrates the stratigraphic succession.

The Surat Basin is bordered on the west by the Nebine Ridge, but Precipice deposition continued over the northern part of the ridge and into the Eromanga Basin. The northern limits of the basin are the massive cliff forming outcrops of the Precipice Sandstone. To the east the basin is bounded by the Auburn Granite, but in the south-east, Precipice deposition continues over the marginal divide into the Ipswich - Clarence Basin. The Surat Basin succession thins to the south over the New England High, and the older units are progressively overlapped. Because of facies changes, Mack (1963) was unable to distinguish in this area the formations mapped in the north, and refers only to the "Intake Formation", the age of which may be Jurassic to Lower Cretaceous.

The Precipice Sandstone is considered to be a continental facies with a possible change to lacustrine at the top. The Evergreen Shale may be at least partly marine and this was followed by the Hutton Sandstone, Injune Creek Group, Gubberamunda Sandstone, Orallo Formation and Blythesdale Formation, which were deposited in a continental environment (Day 1964; Mollan, 1965). A return to marine conditions occurred during the deposition of the Minmi Member of the Blythesdale Formation.

The brief outline of the basin stratigraphy given above does not go into differences in correlation which have not yet been sorted out. Particular mention might be made of the "Wandoan Formation", part of which is considered by Mack (1965) to be the time equivalent of the Precipice Sandstone. It should also be noted that Mack (1963) considers the Evergreen - Precipice interval to be Triassic - Jurassic in age, based on spore evidence in Cabawin wells. However, the Precipice Sandstone is generally regarded as Lower Jurassic in age.

The probable existence of Precipice Sandstone deposition beyond the basin limits suggests that the outlets for Precipice water may lie outside the basin, unless vertical cross-formation flow occurs.

TABLE I

Stratigraphic Succession

	West*		East**	
L. Cretaceous	Roma Formation Blythesdale Formation		Roma Formation Blythesdale Formation	Cretaceous
U. Jurassic	Orallo Formation Gubberamunda Sandstone Westbourne Formation	Injune Creek Group	Walloon Formation Hutton Sandstone Evergreen Shale Precipice Sandstone	Jurassic
M. Jurassic	Springbok Sst. Lens Birkhead Formation		Wandoan Formation	Jurassic-Triassic
L. Jurassic	Hutton Sandstone Evergreen Shale Precipice Sandstone			

* Exon (1966)

**Mack and Keller (1965)

HUTTON SANDSTONE

(a) Geology

This formation is the upper sand member of what was formerly referred to as the Bundamba Group. It is a fluvial or lacustrine deposit with a maximum known thickness of 870 feet (Meeleebee No. 1). Although the Hutton Sandstone has excellent reservoir sands, it has been generally considered not to be a potential oil bearing rock in the Surat Basin, mainly because of the presumed flushing effect of meteoric waters. However, in at least one well (Leichhardt No. 1) a hydrocarbon show has been obtained in the Hutton Sandstone, and this formation has become a target on the southern edge of the Basin, where it is thought that the pinchout may have prevented flushing of hydrocarbons.

(b) Hydrology

With one exception in Glenroy No. 1, all the tests in the Hutton Sandstone which gave reliable pressures were run in the Dalby area. As Figure 3 shows, the Hutton gradient in this region is towards the west, and it seems likely that the water enters the intake beds shown in the Mt. Bodumba area and flows westwards, in the opposite direction to the flow of Precipice water. The potentiometric levels in the Hutton Sandstone in this area are much higher than the Precipice values, the difference in Tipton No. 1 being about 430 feet. This represents a very favourable trapping factor for any oil or gas present in the underlying Evergreen or Precipice formations. However, to date hydrocarbon shows in this area have been virtually non-existent.

In Glenroy No. 1 the potentiometric levels in the Hutton Sandstone and Evergreen Shale were 1121 and 1216 feet A.S.L. respectively, i.e. in this area the Hutton level is some hundred feet lower than that in the underlying formation. The Hutton water in Glenroy No. 1 is apparently from a northern source and not from the east.

Over most of the basin the hydrology of the Hutton Sandstone is unknown due to lack of testing, but it does appear that water enters the Hutton Sandstone in widely spaced areas, and the relative magnitude of the potentiometric level in the Hutton and other formations above and below varies over the basin from strongly positive to negative.

PRECIPICE SANDSTONE

(a) Geology

Following the discovery of oil at Moonie in 1961, the Precipice Sandstone has been the main target of exploration in the Surat Basin. The maximum thickness found in the parts of the basin drilled so far is 500 feet, but the section may be thicker in the deeper central area. The Precipice Sandstone lies unconformably on Permo-Carboniferous, Permian and Triassic beds. It can generally be divided into two units which are separated by a thin shale or siltstone sequence; the lower unit is a coarse-grained, subangular, clean quartzose sandstone with a siliceous cement. It is kaolinitic but generally exhibits good porosity and permeability and is the reservoir rock in most Moonie wells. Sandstones in the upper unit are usually finer grained and tighter and considerably more kaolinitic, than are those of the lower unit. A few of the Moonie wells produce from this upper unit, and it is probable that the Precipice Sandstone on the Roma Shelf is also this upper part of the section. In the Roma area the distribution of the Precipice Sandstone is highly variable and erratic even on the same structure, and so far little success has been achieved in predicting trends. None of the presently available seismic methods is able to pick up a seismic reflector for the Precipice of this area. Since the oil and gas accumulations found to date do not appear to be structurally controlled, the search for stratigraphic traps probably offers the best prospect for further success, and it is possible that a detailed hydrodynamic study may assist in this search.

The construction of an isopach map for the Precipice Sandstone is complicated in parts by the difficulty of distinguishing it from the adjacent formations. In the south-west the Precipice Sandstone and Evergreen Shale are undifferentiated in most wells, but in any case the section is often tight in this area. Swindon (1965) reports that in the Roma area it is hard to distinguish the Precipice Sandstone from sandstones in the underlying Moolayember Formation.

The lower part of the Precipice Sandstone deposition is thought to have been fluviatile with a possible change to lacustrine conditions towards the top. It is mainly a fresh water deposit with no evidence of a marine environment. Its age is now regarded as Lower Jurassic, whereas it was originally regarded as correlating with the bottom sandstone of the Triassic Bundamba Group of the

Ipswich-Clarence Basin. Because of the difference in age, it is considered that the use of the term Bundamba Group is incorrect when referring to the Hutton-Evergreen-Precipice section of the Surat Basin. At the time of Precipice deposition the unconformity surface is thought to have had little topographical relief, and the uplift which raised the northern intake areas came almost at the end of the basin's history. The maximum northern outcrop elevation is about 1850 feet above sea level, and no other Precipice outcrop areas have been identified in the rest of the Surat Basin.

Although the Precipice Sandstone has often been described as one of the main aquifers of the Great Artesian Basin, very little water is actually produced from this formation in bores in the area covered by the Surat Basin. The Precipice would certainly make an excellent water source on account of its thickness, permeability and continuity. However, almost all the water in the Surat Basin is produced from the shallower Blythesdale aquifers, and very few of the bores drilled for water have penetrated the Precipice.

Figure 4 is an isopach map for the Precipice Sandstone, based on gross formation thicknesses. Approximately half of the values plotted are from palynological determinations by P.R. Evans * (personal communication). The remainder are figures supplied by the operators. The map was drawn by V. Dent.*

(b) Hydrology

As far as can be seen, the flow of water in the Precipice Sandstone is entirely from the northern intake areas, towards the south and possibly the west. The isopotentials on Figure 5 show that the potential readings form a fairly regular pattern across the basin. The main area open to doubt is the deep central part of the basin which has not so far been drilled because it appears to lack structure. The apparent hydraulic gradient over this area is small, suggesting that either its transmissibility is large, or else the main body of water by-passes the area. Bunching of the isopotentials occurs in some areas and these correspond mainly to known buried ridges. A few apparently anomalous readings occur, but in each case there is doubt as to the accuracy of the results. Particular attention should be given to obtaining reliable test results in areas where no readings exist, or where an apparent anomaly occurs.

* B.M.R., Canberra.

The magnitude of the hydraulic gradient appears to range from about 5 to 50 feet per mile. The maximum head in the intake area is around 1,850 feet A.S.L. and the lowest head measured in the area covered by this survey is 600 feet A.S.L.

With the Auburn Granite and a subsurface divide acting as a barrier to the east, and the Nebine Ridge as at least a partial barrier to the west, the direction of water movement is mainly southwards. There may be connection to the Yarrol Basin in the north-east, and possibly connections to the Coonamble Basin in the south, and the Ipswich - Clarence Basin to the east.

In drawing the isopotential map for the Precipice Sandstone, pressure values in adjacent formations were used in areas where the Precipice was not differentiated, or did not occur, or was not tested. In the south-western portion of the basin, potentiometric values are available from only three tests covering Precipice Sandstone intervals; the isopotentials drawn in this area are based mainly on values from the "Wandoan Formation", but there is no evidence to indicate that this formation is in pressure equilibrium with the Precipice Sandstone. The zero Precipice isopach lies to the west of this area, and in view of the poor development of the Precipice on the western side of the basin, it seems likely that the bulk of the Precipice water is flowing in the eastern part of the basin.

An alternative approach to drawing the isopotential map would be to consider the western and eastern halves of the basin separately. As almost nothing is known of the Precipice Sandstone in the deep central part of the basin, it is a matter of speculation as to whether there is fluid or pressure continuity between the two halves.

Source Rocks

In order to follow the migrational history of oil, it is necessary to consider what the likely source rocks are. Two main possibilities have been suggested as the source for the Surat Basin oil viz. the Permian Back Creek Formation and the Jurassic Evergreen Shale. The former was originally considered as the most likely source because apart from the Roma Formation it was the only extensive marine formation known in the area. Later a number of oil shows were encountered throughout the Evergreen Shale. Also, palynological and other evidence (Evans, 1962; Moran and Gussow, 1963; Jensen, Gregory and Forbes, 1964 de Jersey, 1965) has been produced to indicate a marine facies for part of the Evergreen Shale.

Considering first the Back Creek Formation, Erickson (1965) states that by the end of Triassic time lithification of this formation had already taken place and any oil generated must have moved from the source rock, but where to is not known, as no high quality reservoirs have been found in the rocks laid down to that time. Moran (1963) concluded on the basis of saturation pressure evidence that the time of accumulation of the Moonie oil was at the end of Walloon Formation deposition. If the oil was Permian in origin, it appears that we need to explain why it moved from a Permian or Triassic reservoir to the Precipice Sandstone.

The position of the Evergreen Shale adjacent to the Precipice Sandstone provides an easy explanation of the migration process. The presence in the Evergreen Shale of chamosite oolites and microplankton suggest marine incursions into a lacustrine environment (Evans, 1964 and 1966; Jensen et al, 1964; Traves, 1965). Because only a limited part of the Evergreen is of marine origin, some doubt might be expressed on the quantity of oil likely to have been generated by this source. It is of course possible that both suggested sources, together with fresh-water sediments, could all have generated some oil.

By consideration of various theories on the origin and mobilization of hydrocarbons, Conybeare (1965a, b) estimated the possible potential of the Surat Basin as 500 million barrels of recoverable oil and 1000 billion* cubic feet of gas. These calculations were based on the Evergreen Shale being the source rock.

* 1 billion = 10^9

Water Analyses

The Mesozoic waters of the Surat Basin are generally fresh to salty, with a total dissolved solids content ranging from as low as 340 to a maximum of about 7,000 p.p.m. As most of the formations are non-marine, it is difficult to decide which water is connate and which is part or wholly meteoric. The predominance of bicarbonate over chloride in almost every analysis is a strong indication that most of the water is in fact meteoric. The water samples have a low or nil sulphate content, suggesting that reducing conditions, favourable for the preservation of oil accumulations, obtain. The reducing action is probably of the type

$$SO_4^{--} + CH_4 \xrightarrow{\text{bacteria}} HS^- + H_2O + HCO_3^-$$

Although H_2S gas is present in some shallow waters, for example in the Roma area, crude oils and gases found so far are free of H_2S. Many gases do, however, contain a considerable percentage of CO_2.

Research to date does not appear to have produced a reliable hydrogeochemical indicator for the presence of an oil accumulation. Therefore, no guidance can be offered as to which analytical tests are likely to prove of value in oil exploration.

Oil Properties

There is very little published information on the properties of the various crudes found in the Surat Basin. Moonie oil is a high gravity (45° API) crude with a low produced gas-oil ratio. Most of the other oil shows have a similar gravity (see Table 2), and in the absence of more specific information, a value of 45° may be assumed in hydrodynamic calculations. This figure refers to stock tank oil, and for subsurface calculations the Formation Volume Factor (F.V.F.) has to be applied to obtain oil density at reservoir conditions. If the F.V.F. is not known from actual measurements, a value of 1.1 would probably be a reasonable assumption. We then have

45° A.P.I. gravity = 0.8017 sp. gr.

Sp. gr. at reservoir conditions $= \frac{\text{Stock Tank grav.}}{\text{F.V.F.}}$

$= \frac{0.8017}{1.1}$

$= 0.729$

Hydrodynamic Tilt Factor

The interface between two immiscible fluids will be tilted when either or both of the fluids are in motion. The slope of the oil-water interface is given by the expression

$$\tan \theta = \frac{\rho w}{\rho w - \rho o} \quad \frac{dh}{dx}$$

where ρw = specific gravity of water

ρo = specific gravity of oil

$\frac{dh}{dx}$ = hydrodynamic gradient in water

$\frac{\rho w}{\rho w - \rho o}$ = tilt factor for oil

The effect of the tilted interface is to displace an oil accumulation away from the top of a structure. When the angle of tilt is greater than the dip of the reservoir bed, the trap is incapable of holding oil.

Water salinity varies over the basin roughly in proportion to the distance from the intake areas; the highest recorded total dissolved solids content in Precipice water is 7000 p.p.m., and the lowest values are a few hundred p.p.m. Allowing for compressibility, the specific gravity of water will be expected to fall in the range 1.001 to 1.005, and an average value will be 1.003.

The tilt factor for oil is then $\frac{1.003}{1.003 - 0.729} = 3.66$

Gas of gravity 0.7 (air = 1.0) at a pressure of 2000 psia and at a temperature of 200°F has a density of 0.12 gms/cc. approximately.

The tilt factor for gas under these conditions is $\frac{1.003}{1.003 - 0.12} = 1.14$

In most cases the tilt effect for gas will be unimportant.

Problems to be solved

Supporters of the hydrodynamic theory of oil accumulation maintain that it provides an indication of where oil is most likely to be found in a hydrocarbon bearing province. Although many workers are prepared to accept the validity of the basic hydrodynamic principles, the difficulties involved in applying the techniques in practice restrict their usefulness. It is undoubtedly the case that enthusiasm for these techniques has diminished somewhat over the past few years, but it is hoped that continued research throughout the world will lead to

a more precise idea of how oil and gas accumulations evolved from their aqueous environment. This general problem is likely to prove of more importance than more restricted aspects such as tilted fluid contacts. Attention should also be given to the location of features such as faults and permeability variations which interrupt the regional hydrodynamic pattern.

With regard to the Surat Basin, the following specific problems require investigation:-

(a) Although we have a reasonable idea of the pressure pattern in the Precipice Sandstone, it is alos necessary to know the pressures and potential gradient directions in the adjacent formations in order to evaluate the trapping capacity at any location. Apart from the information on the Hutton Sandstone in the Dalby area, very little data is available for formations other than the Precipice.

(b) Whilst over much of the eastern part of the Surat Basin the Precipice Sandstone is continuous and permeable, this is not the case in the Roma area, where the formation has a limited permeability and is generally unpredictable in occurrence. In spite of the lack of continuity in the sand body there is still an apparent regularity in the form of the isopotentials across the Roma Ridge. However, many of the occurrences of oil in this area are found in small lenses, and an explanation is required as to how the oil reached these lenses through the now almost impermeable surrounding rocks.

(c) No wells have been drilled over the deep part of the basin; the hydrodynamic gradient over this area is relatively small and further data is necessary to indicate whether this is due to the high transmissibility of the formation, or the water bypassing this area.

(d) The Precipice Sandstone is not differentiated in the south-west and south of the basin, and its relation to the Wandoan Formation and Evergreen Shale needs further investigation.

(e) As already observed, there is no indication of where the water flowing in the Precipice Sandstone reaches the surface; therefore, the only way to estimate the quantity flowing is to combine the calculated transmissibility of the formation with the measured hydrodynamic gradient.

(f) The hydrodynamic picture as expressed by the isopotentials for a single formation, is essentially two-dimensional only. It has frequently been noted that the very large area of contact between formations when compared to the cross-section of an aquifer makes even an extremely small vertical permeability significant, and introduces a third dimension which cannot be ignored. Thus an answer to the problem of where the Precipice water flows to may be given by cross-formational flow. The term aquitard has been used to describe formations adjacent to aquifers, whose porosity can contribute to the storage capacity of the aquifers, but whose permeability is very small compared with the aquifers themselves. Such formations are thought to play a very significant role in the hydrology of the Great Artesian Basin.

(g) When a reliable overall picture of the hydrodynamics of the Surat Basin has been established, it is possible that it will indicate the general migration paths for hydrocarbons. Particular thought must be given in this basin to the relation between present and palaeo-hydrodynamic conditions, as the uplift which created the present condtions occurred very late in the history of the basin.

(h) The final step in the application of hydrodynamic principles is to examine particular prospects, combining a detailed geological appraisal with the known hydrodynamic conditions. The construction of an analogue model may be necessary for evaluating various interpretations of the data.

CONCLUSIONS

The main purpose of this Record is to present a compilation of pressure, fluid and other test data required for an hydrodynamic study of the Surat Basin. A considerable amount of data from unsubsidized Union Oil Development Corporation wells, not previously available, is included by permission of that company.

Isopotential maps for the Precipice Sandstone and a limited area of the Hutton Sandstone are presented.

The application of hydrodynamics to oil exploration is a subject of continuing research, as one facet of the general investigation into the origin and migration of oil. A study of the Surat Basin and also of the Great Artesian Basin as a whole, may make an important contribution to this research. It is hoped that operators will continue to obtain the necessary basic data and also make them generally available.

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TABLE 2

Summary of Oil Occurrences *

Well Name	Formation	Interval Ft. below RTKB	Oil Flowrate b.p.d.	Oil Gravity °A.P.I.	Specific Gravity
Alton No. 1	Evergreen Shale	6060 - 6120	1150	52-54	0.767
Anabranch No. 1	Evergreen Shale	4190 - 4215	130	46	0.797
Bennett No. 1	?	5330 - 5355	(Recovered 4300 feet)	43	0.811
Conloi No. 1	Evergreen Shale	4313 - 4321	170 (pump)	29.5	0.829
Dirinda No. 1	Timbury Hills Fm	3965 - 4000	(Recovered 590 feet)	46	0.797
Duarran No. 1	Precipice Ss.	4020 - 4072	(Recovered 210 feet)	40.5	0.823
Kinkabilla No. 1	-	9507 - 9612	(Recovered 100 feet)	"High grav"	-
Maffra No. 2	Precipice Ss.	4174 - 4232	(Recovered 120 feet)	51	0.775
Moonie No. 1	Precipice Ss.	5808 - 5840	1765	45	0.802
Richmond No. 1	Precipice Ss.	4005 - 4013	855*	47	0.793
Snake Creek No. 4	Clematis - Showground	4976 - 4989	80	45	0.802
Sunnybank No. 1	Rewan Fm	5852 - 5925	600**	44	0.806
Sunnybank No. 2	Bandanna Fm	6570 - 6592	(Recovered 2300 feet)	41 @ 89°F	0.820
Trinidad No. 1	Precipice Ss.	4590 - 4638	264	48	0.788
Wunger No. 1	"Wandoan Fm"	6283 - 6301	10***	61	0.735

* This initial rate was not sustained; later test 60 b.p.d. on pump

** Rate fell to 45 b.p.d. in production test

*** Together with 730 b.p.d. water

TABLE 3

Summary of Gas Occurrences *

Well Name	Flowrate Million cu.ft/day	Formation	Interval Tested Ft. below RTKB
Apple Grove No. 1	1.64	Precipice Ss.	3919 - 3989
Back Creek No. 1	1.75	Showground Ss.	4750 - 4793
Beaufort No. 1	0.914	Precipice Ss.	3655 - 3836
Blyth Creek No. 1	8.40	Precipice Ss.	3786 - 3820
Bony Creek No. 1	1.252	Precipice Ss.	4287 - 4340
Bungil No. 1	0.098	Evergreen - Precipice	3885 - 4103
Burunga No. 1	0.250	Back Creek Fm.	7889 - 7911
Coolibah No. 1	0.165	Precipice Ss.	4066 - 4118
Glentulloch No. 1	3.538	Early Storms - Staircase	2468 - 3003
Lamen No. 1	0.87	Precipice Ss.	3693 - 3714
Leichhardt No. 1	6.00	?	5042 - 5051
Maffra No. 1	7.30	Precipice Ss.	4235 - 4270
Major No. 1	1.80	Wandoan Fm.	5530 - 5577
Oberina No. 1	5.65	?	4712 - 4733
Pickanjinnie No. 1	6.54	Precipice Ss.	3976 - 4368
Pine Ridge No. 1	4.80	Precipice Ss.	3415 - 3460
Raslie No. 1	4.10	Precipice Ss.	3700 - 3773
Richmond No. 7	6.00	Precipice Ss.	4071 - 4098
Sleepy Creek No. 1	0.192	Precipice Ss.	3280 - 3306
Snake Creek No. 1	6.25	Showground Ss.	4969 - 5079
Tarrawonga No. 1	3.00	?	4400 - 4725
Timbury Hills No. 2	1.25	Precipice Ss.	3697 - 3733
Warooby South No. 1	0.08	Precipice Ss.	3663 - 3717
Westgrove No. 2	3.539	Early Storms Ss.	2807 - 2929
Yanalah No. 1	3.20	Precipice - Showground	3731 - 3983

* Only the first significant producer from each field included

TABLE 4

SUBSURFACE PRESSURES IN THE HUTTON SANDSTONE

Well Name	Datum Level Ft. A.S.L.	D.S.T. No.	Test Interval Ft. below datum	Depth of Measure-ment Ft. below datum	Pressure p.s.i.g.	Potentio-metric level Ft. above sea level	Quality of Reading
Cecil Plains No. 1	1178	1	2203-2330	2257	971.5	1165	A
Durabilla No. 1	1268	1	3026-3113	3059	1260.5	1120	A
Glenroy No. 1	1111	2	3748-3807	3618	1571	1121	A
Kogan No. 1	1237	1	1886-2092	1869	723	1038	B+
Kumbarilla No. 1	1276	1	2905-3048	2970	1199	1075	A
Millmerran No. 1	1253	1	1148-1268	1265	506	1157	B
Tipton No. 1	1147	1	2291-2331	2300	986	1124	B
Tipton No. 1	1147	3*	1995	2003	831.9	1065	B
Waggaba No. 1	1136	1	2470-2556	2552	1077	1074	B
Yarrala No. 1	1115	1	999-1035	1008	428.5	1097	A
Yarrala No. 1	1115	2	1410-1460	1396	593.5	1090	B

* Wireline test

TABLE 5

SUBSURFACE PRESSURES IN THE EVERGREEN SHALE

Well Name	Datum Level Ft. A.S.L.	D.S.T. No.	Test Interval Ft. below datum	Depth of Measure-ment Ft. below datum	Pressure p.s.i.g.	Potentio-metric level Ft. above sea level	Quality of Reading
Alton No. 1	725	1	6060-6120	6083	2769.5	1038	A
Alton No. 1	725	7	6061-6121	6057	2707.5	921	A
Alton No. 2	726	1	6089-6102	6087	2772	1041	A
Alton No. 3	723	4	6068-6110	6076	2754.5	1008	A
Alton No. 4	719	1	6081-6112	6058	2748.5	1009	B
Alton No. 4	719	2	6115-6148	6148	2711	832	C
Alton No. 4	719	3	6087-6110	6090	2700	865	C
Alton No. 5	718	1	6090-6118	6096	2764	1005	A
Binya No. 1	1290	1	4028-4064	4050	1693	1150	B
Boggo Creek No. 1	969	1	5868-5880	5855	2598	1114	B
Boggo Creek No. 1	969	2	5740-5753	5747	2529	1063	B
Cecil Plains No. 1	1178	3	3085-3285	3175	1273	943	B+
Conloi No. 1	1520	4	4311-4325	4312	1559	808	B+
Conloi No. 1	1520	5	-	4300	1592	897	A
Glenroy No. 1	1111	1	3748-3807	3752	1670	1216	A
Killaloe No. 1	866	1	5378-5415	5389	2373.5	959	C
Lorne No. 1	1113	1	3830-3891	3880	1725	1217	B+
Tara South No. 1	1039	1	5028-5090	5033	2188	1059	C
Tipton No. 1	1147	1*	2894	2902	1236.7	1101	B
Yarrala No. 1	1115	3*	2028-2068	2040	865	1073	B

* Wireline test

TABLE 6

SUBSURFACE PRESSURES IN THE PRECIPICE SANDSTONE

Well Name	Datum Level Ft. A.S.L.	D.S.T. No.	Test Interval Ft. below datum	Depth of Measure-ment Ft. below datum	Pressure p.s.i.g.	Potentio-metric level Ft. above sea level	Quality of Reading
Apple Grove No. 1	940	1	3919-3989	3980	1886	1316	A
Balonne No. 1	775	1	4933-4950	4917	2213	969	C
Beaufort No. 1	1021	1	3603-3658	3629	1623	1140	A
Blyth Creek No. 1	1010	1	3786-3820	3816	1698	1115	B
Blyth Creek No. 1	1010	3	3822-3835	3816	1681	1076	A
Bony Creek No. 1	1041	1	4287-4340	4314	1827	946	B
Brigalow Creek No.1	933	1	5500-5530	5486	2481	1177	C
Brucedale No. 1	975	1	4768-4825	4815	2166	1162	A
Canaan No. 1	1074	1	1520-1635	1550	571	843	A
Cecil Plains No. 1	1178	4	3832-3950	3880	1458	665	B+
Cecil Plains West No. 1	1216	1	3093-3138	3110	1125	704	A
Condamine No. 1	1062	1	4643-4676	4661	1906	803	A
Condamine No. 1	1062	2	4572-4599	4575	1871.5	809	B
Conloi No. 1	1520	3	4570-4605	4580	1695	855	A
Coolibah No. 1	1067	1	4066-4118	4110	1953.5	1469	B
Cooloomala No. 1	1094	1	4821-4836	4820	1976	838	A
Crowder East No. 1	872	1	5359-5375	5358	2294.5	813	B
Crowder East No. 1	872	2	5334-5360	5325	2270	789	B
Crowder North No. 1	866	1	5609-5629	5629	2434	858	B
Davidson No. 1	946	1*	6122	6130	2591	800	B
Dockerill No. 1	884	1	5780-5790	5790	2459	773	B
Duarran No. 1	945	1	4020-4072	4020	1890.5	1291	A
Dulacca No. 1	1195	1	5197-5213	5200	2103	852	C
Giligulgul No. 1	1462	1	4262-4280	4264	1587	863	A
Giligulgul No. 1	1462	2	4284-4318	4270	1588	859	A
Gurulmundi No. 1	1203	2	3759-3784	3765	1486	870	A
Humbug Creek No. 1	938	1	5402-5435	5394	2300	856	B
Iminbah No. 1	866	1	5466-5487	5451	2427	1020	B+
Iminbah No. 1	866	2	5565-5677	5677	2455	859	B
Kalima No. 1	1346	1	1899-1952	1944	724	1074	A
Killoran No. 1	1707	2	1777-1842	1770	637	1408	B
Kogan No. 1	1237	3	3247-3407	3230	1199	776	B-
Lorne No. 1	1113	3	4144-4250	4200	1878	1250	B+
Mackie No. 1	1061	1	3755-3770	3750	1590	983	C

Well Name	Datum Level Ft. A.S.L.	D.S.T. No.	Test Interval Ft. below datum	Depth of Measure-ment Ft. below datum	Pressure p.s.i.g.	Potentio-metric level Ft. above sea level	Quality of Reading
Meeleebee No. 1	1040	2	2619-2705	2650	1145	1034	A
Minima No. 1	691	2	5544-5560	5540	2360	601	B
Minnabilla No. 1	836	1	5374-5390	5374	2362	917	A
Moonie No. 1	893	2	5439-5840	5835	2501	834	A
Moonie No. 1	893	3	5808-5840	5804	2474	803	B
Moonie No. 12	879	1	5873-5891	5880	2510	796	B
Moonie No. 16	898	1	5858-5888	5842	2454	723	C
Quibet No. 1	1198	2	3428-3446	3430	1298	766	B
Raslie No. 1	1228	1	3700-3773	3768	1580	1105	B+
Richmond No. 1	983	1	4010-4062	4050	1863.5	1237	A
Rock Creek No. 1	1132	1*	4098	4106	1633	799	B
Sleepy Creek No. 1	1284	1	3280-3306	3299	1357	1115	A
Tara South No. 1	1039	1*	5523	5531	2292	801	B
Tey No. 1	960	1	5140-5150	5119	2162	834	B
Tinhut No. 1	1172	2	2736-2815	2770	1078	892	A
Tinhut No. 1	1172	3	2853-2872	2856	1120.5	904	A
Tipton No. 1	1147	3	3307-3352	3320	1230	668	A
Tipton No. 1	1147	2*	3384	3392	1274.4	698	B
Tooloombilla No. 1	1367	2	1409-1470	1425	665	1478	A
Undulla No. 1	956	1	5554-5647	5540	2332	802	B
Waggaba No. 1	1136	5	3733-3821	3716	1432	727	B
Wallabella No. 1	963	1	4718-4753	4745	2159	1204	B
Warrigabie No. 1	817	1	5264-5284	5267	2347.5	971	B+
Wyena No. 1	1232	1	3425-3480	3451	1436	1188	B
Yarrala No. 1	1115	4	2255-2320	2265	819	741	A
Yarrala No. 1	1115	5	2609-2649	2620	956	703	A
Yarrala No. 1	1115	6	2793-2823	2800	1025	682	A

* Wireline test

TABLE 7

SUBSURFACE PRESSURES IN THE WANDOAN SANDSTONE

Well Name	Datum Level Ft. A.S.L.	D.S.T. No.	Test Interval Ft. below datum	Depth of Measure-ment Ft. below datum	Pressure p.s.i.g.	Potentio-metric level Ft. above sea level	Quality of Reading
Cherwondah No. 1	1078	1	4178-4188	4172	1722	883	B
Cherwondah No. 1	1078	2	4175-4201	4180	1728	889	A
Dalkeith No. 1	809	1	6549-6678	6612	2963	1040	B
Donga No. 1	759	1	5172-5236	5194	2363.5	1023	C
Donga No. 1	759	2	5172-5202	5176	2278	844	B
Elgin No. 1	779	1	5388-5445	5408	2463.5	1060	B
Glenearn No. 1	897	1	5923-5954	5913	2651	1106	A
Major No. 1	881	1	5530-5577	5544	2488	1083	A
Major No. 1	881	1*	5537	5545	2516.6	1143	B
Major No. 2	834	1	5542-5585	5550	2503	1065	A
Thomby No. 1	978	1	6218-6271	6258	2703	962	B
Wunger No. 1	1005	2	6281-6290	6266	2703	981	B+

TABLE 8

SUBSURFACE PRESSURES IN THE SHOWGROUND SANDSTONE

Bardloming No. 1	1031	2	4643-4695	4684	2152	1317	C
Dalmuir No. 1	1152	1	3623-3673	3660	1432	799	B
Raslie No. 1	1228	2	3940-3967	3940	1632	1057	B+
Snake Creek No. 1	957	1	4969-5079	4983	2278	1235	A
Wallabella No. 1	963	2	5135-5156	5146	2296.5	1121	A

* Wireline test

TABLE 9

SUBSURFACE PRESSURES OVER INTERVALS INCLUDING THE PRECIPICE SANDSTONE AND ADJACENT FORMATIONS

Well Name	Datum Level Ft. A.S.L.	D.S.T. No.	Test Interval Ft. below datum	Depth of Measure-ment Ft. below datum	Pressure p.s.i.g.	Potentio-metric level Ft. A.S.L.	Formations	Quality of Reading
Alton West No. 1	712	1*	5861	5869	2692	1057	Evergreen - Precipice	C
Beaufort No. 1	1021	2	3655-3836	3675	1644	1143	Precipice - Moolayember	A
Blyth Creek No. 1	1010	2	3823-3998	3900	1725	1094	Precipice - Moolayember	A
Conloi No. 1	1520	2	4935-4965	4942	1853	857	Precipice - Wandoan	A
Koroon No. 1	764	1	6397-6414	6400	2878	1011	Evergreen - Precipice	A
Quibet No. 1	1198	1	3325-3474	3390	1346	917	Precipice - Moolayember	A
Rosewood No. 1	1405	2	1761-1790	1750	640	1133	Evergreen - Precipice	B
Sawpit Creek No. 1	1283	1	3558-3597	3542	1426	1034	Precipice - Bandanna	B
Tinker Creek No. 1	1154	2	3992-4056	4015	1577	781	Evergreen - Precipice	B
Warooby South No. 1	996	2	3673-3890	3886	1764	1184	Precipice - Moolayember	C
Warrie No. 1	730	1*	5592	5600	2570	1065	Evergreen - Precipice	B
Waroo No. 1	768	1*	5074	5082	2364	1143	Evergreen - Precipice	B
Yanalah No. 1	1183	1	3731-3983	3980	1626	958	Precipice - Moolayember- Showground	B
Yarrandine No. 1	777	1*	5500	5508	2500	1040	Evergreen - Precipice	C

* Wire line test

TABLE 10

MISCELLANEOUS SUBSURFACE PRESSURES

Well Name	Datum Level Ft. A.S.L.	D.S.T. No.	Test Interval Ft. below datum	Depth of Measure-ment Ft. below datum	Pressure p.s.i.g.	Poteptio-metric Level Ft. A.S.L.	Formation	Quality of Reading
Crystalbrook No. 1	1656	1	1655-1685	1678	627	1428+	Clematis	A-
Crystalbrook No. 1	1656	2	1842-1887	1862	728	1475	Clematis - Rewan	A
Dirinda No. 1	1038	2	3965-4000	3990	1771.5	1139	Timbury Hills	B
Kalima No. 1	1346	2	2084-2124	2100	781.5	1050	Moolayember - Rewan	B
Kildare No. 2	1627	1	2996-3065	3059	1225	1400	Permian	B
Rosewood No. 1	1405	3	2027-2056	2020	738	1089	Moolayember	B
Sunnybank No. 1	840	11	6571-6592	6589	3360	2011	Bandanna	B
Undulla No. 1	956	2	5848-5874	5834	2691	1337	Kianga	B

Union-Kern-A.O.G. Alton No. 1

Location: Lat. 27°56' 18" S
Long. 149°22'18" E

Elevation: 725 feet (RTKB)

Total Depth: 7328 feet

Stratigraphy:

	Ft below RTKB
Hutton Sandstone	5452 - 5942
Evergreen-Precipice-Wandoan Formations	5942 - 6855

Testing

D.S.T. No. 1
6060 - 6120'
Evergreen Shale

Flowed oil at 1150 bpd with 440 Mcf/day gas

Initial Flow	: 5 minutes
Initial Closed-in	: 30 "
Final Flow	: 50 "
Final Closed-in	: 70 "

Initial build-up

Time minutes	Top Recorder @ 6048' Pressure (psig)	Bottom Recorder @ 6118' Pressure (psig)
0	764	907
3	2723	2733
6	2733	2748
9	2738	2755
12	2741	2759
15	2745	2763
18	2747	2766
21	2748	2770
24	2748	2771
27	2749	2773
30	2751	2773

Final build-up

0	2061	2139
7	2677	2699
14	2699	2714
21	2706	2723
28	2713	2729
35	2719	2734
42	2720	2738
49	2723	2742
56	2724	2745
63	2726	2747
70	2727	2748

Estimated equilibrium pressures from initial build-up

2757 psig @ 6048'

2782 psig @ 6118'

Average static pressure 2769.5 psig @ 6083'

Estimated equilibrium pressures from final build-up

2741 psig @ 6048'

2772 psig @ 6118'

Average static pressures 2756.5 psig @ 6083'

D.S.T. No. 4 — Recovered 1846 feet fresh water, 290 feet mud

6148 - 6154' — Flow : 65 minutes

Evergreen Shale — Closed-in : 60 "

F.C.I.P. 2703 psig @ 6112'
" 2709 psig @ 6158'
} Pressure appears to be still rising very slowly at end of closed-in period

Average pressure 2706 psig @ 6135' (still rising slowly)

D.S.T. No. 6 — Recovered 140 feet mud, 656 feet fresh water

6213 - 6218' — Flowed for 2 hours. No closed-in period.

Evergreen-Precipice

D.S.T. No. 7 — Flowed oil at rate of 250 bpd

6061 - 6121' — Flow : 346 minutes

Evergreen-Shale — Closed-in : 84 "

C.I.P. 2706 psig @ 6041'
" 2709 psig @ 6073'

Average static pressure 2707.5 psig @ 6057'

Water Analyses

	D.S.T. No. 4 ppm	D.S.T. No. 6 ppm
Total Solids	3200	3650
Na	960	1389
Ca	20	30
Mg	1	1
Cl	300	995
SO_4	115	87
HCO_3	1660	1714
CO_3	72	120
R_w@25°C	2.94 ohm.m	1.96 ohm.m

Comments

Pressures recorded in the undifferentiated Evergreen-Precipice-Wandoan interval are summarised below :

D.S.T. No.	Depth (Ft below RTKB)	Pressure (psig)	Potentiometric Height (Ft above M.S.L.)
1	6083	2769.5	1083
4	6135	2706	839 (still rising)
7	6057	2707.5	921

The pressure in D.S.T. No. 7 was fully built-up during the test and this value is considered reliable. The estimated equilibrium pressure in D.S.T. No. 1 was 50 psi higher than the measured value in D.S.T. No. 7, and the difference appears greater than the combined probable instrument and analysis errors. There is therefore some indication of a depletion condition.

Union-Kern-A.O.G. Alton No. 2 (Non-subsidized)

Location: Lat. 27° 56' 01" S

Long. 149° 21' 47" E

Elevation: 726 feet (RTKB)

Total Depth: 6139 feet.

Stratigraphy

	Ft below RTKB
Hutton Sandstone	5465-5920
Evergreen Shale	5920-T.D.

Testing

D.S.T. No. 1 Oil flowed at rate of 1535 bpd (A.P.I. grav. 52.7°)

6089-6102' Gas rate 785 Mcf/day

Evergreen Shale

Initial Flow	:	4 minutes
Initial Closed-in	:	30 "
Final Flow	:	123 "
Final Closed-in	:	120 "

I.C.I.P. 2772 psig @ 6078' } steady

" 2772 psig @ 6096' }

Average static pressure 2772 psig @ 6087'

Comments:

The calculated potentiometric level of 1039 feet A.S.L. is in good agreement with the value of 1083 feet A.S.L. for Alton No. 1.

Union-Kern-A.O.G. Alton No. 3 (Non-subsidized)

Location: Lat. 27° 56' 36" S

Long. 149° 21' 59" E

Elevation: 723 feet (RTKB)

Total Depth: 7200 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	5405 - 5903
Evergreen-Precipice-Wandoan	5903 - 6800
Kianga Formation	6800 - 7145
Basement	7145 - T.D.

Testing

D.S.T. No. 2 — Recovered 90 feet oily mud

6785 - 6806' — Flow : 5 minutes

Wandoan Formation — Closed-in : 30 minutes

C.I.P. 3587 psig @ 6801'

" 3599 psig @ 6805'

Average static pressure 3593 psig @ 6803'

D.S.T. No. 3 — Flowed 250 Mcf/day gas

Recovered 120 feet clean oil

6784 - 6806' — 90 feet oily mud

Wandoan Formation

Initial Flow : 5 minutes

Initial Closed-in : 30 minutes

Final Flow : 30 minutes

Final Closed-in : 90 minutes

Initial build-up

@ 6767'	@ 6802'
psig	psig
84	82
2844	1233
2989	2931
3034	3021
3061	3058
3077	3078
3088	3094
3097	3104
3104	3111
3108	3118
3113	3120

Final build-up

@ 6767'	@ 6802'
psig	psig
150	148
2935	2922
3009	3012
3043	3051
3063	3071
3077	3085
3086	3097
3093	3104
3099	3111
3106	3115
3108	3120

Initial build-up : Est. equilibrium pressure 3147 psig @ 6767'

Est. equilibrium pressure 3167 psig @ 6802'

Final build-up: Est. equilibrium pressure 3153 psig @ 6767'

Est. equilibrium pressure 3162 psig @ 6802'

Average static pressure 3157 psig @ 6784'

D.S.T. No. 4 — Flowed 1426 bpd oil

6068 - 6110' — Initial Flow : 5 minutes

Evergreen Shale — Initial Closed-in : 30 minutes

Final Flow : 240 minutes

Final Closed-in : 15 minutes

I.C.I.P. 2751 psig @ 6046' (steady)

Bottom recorder @ 6106'

Initial build-up

psig
449
2726
2739
2744
2748
2748
2750
2750
2753
2753
2755

Estimated equilibrium pressure 2758 psig @ 6106'

Average static pressure 2754.5 psig @ 6076'

Comments

The pressure reading from D.S.T. No. 2 is obviously erroneous. The initial and final build-ups in D.S.T. No. 3 both give the same average static pressure.

Union-Kern-A.O.G. Alton No. 4 (Non-subsidized)

Location: Lat. 27° 56' 49" S

Long. 149° 22' 25" E

Elevation: 719 feet (RTKB)

Total Depth: 7292 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	5412 - 5955
Evergreen Shale	5955 - 6893
(Alton 60-6 sand	6074 - 6148)
Permian section	6893 - 7265
Volcanics	7265 - T.D.

Testing

D.S.T. No. 1 Estimated flow rate 1200 b.o.p.d.

Evergreen Shale (47° API @ 56° F)

6081 - 6112'

Initial Flow	:	6 minutes
Initial Closed-in	:	34 minutes
Final Flow	:	65 minutes
Final Closed-in	:	95 minutes

Top chart only. Recorder @ 6058'

Initial build-up	Final build-up
1659 psig	2495 psig
2661	2627
2687	2645
2698	2659
2707	2668
2712	2675
2719	2682
2721	2687
2726	2691
2728	2696
2730	2698

Initial Build-up : Estimated equilibrium pressure 2748.5 psig @ 6058'

Final Build-up : Estimated equilibrium pressure 2735 psig @ 6058'

Estimated static pressure 2748.5 psig @ 6058'

D.S.T. No. 2 Recovered approx. 2600 feet gassy oil

6115 - 6148' 1500 feet gassy fresh water

Evergreen Shale

Initial Flow : 6 minutes

Initial Closed-in : 30 minutes

Final Flow : 73 minutes

Final Closed-in : 75 minutes

Bottom chart only. Recorder @ 6148'

Initial Build-up	Final Build-up
psig	psig
484	1326
1751	1883
1995	2016
2141	2098
2239	2151
2310	2194
2363	2228
2406	2255
2440	2279
2467	2300
2485	2321

Initial Build-up : Est. equilibrium pressure 2711 psig @ 6148'

Final build-up : Est. equilibrium pressure 2542 psig @ 6148'

Estimated static pressure 2711 psig @ 6148'

D.S.T. No. 6 — G.T.S. in 7 mins, oil in 32 mins.

6087 - 6110' — Well produced a small amount of water

Evergreen Shale — Reversed 90 ft. above tester and recovered 60 feet gas, 10 feet oil, 10 feet water.

Flow : 65 minutes

Closed-in : 78 minutes

F.F.P. 2296 psig @ 6073'

F.C.I.P. 2719 psig @ 6073' (appears steady)

F.F.P. 2353 psig @ 6107'

F.C.I.P. 2682 psig @ 6107' (appears steady)

(No analyses of the build-ups supplied)

Average static pressure 2700 psig @ 6090'

D.S.T. No. 7 — W.S.O. test No water recovered

6080 - 6095' — Flow : 30 minutes

Evergreen Shale — C.I. : 30 minutes

F.C.I.P. 2609 psig @ 6071')
F.C.I.P. 2662 psig @ 6092') steady

Average static pressure 2635 psig @ 6080'

Water Analysis

	D.S.T. No. 2 ppm
Total Solids	2700
Na	1007
Ca	8
Mg	2
Cl	130
SO_4	80
HCO_3	2379
pH	8.1
Rw @ 25° C	2.77 ohm.m.

Oil API grav. 50.1° (ex D.S.T. No. 1)

Comments

There appears to be a successive pressure decline in each of the above four tests and therefore only the initial build-up in D.S.T. No. 1 seems likely to approximate the original static pressure. Although the pressure in D.S.T. No. 1 is obtained from a single gauge, the extrapolation was only 18.5 psi and the result is in line with other Alton wells.

Calculated potentiometric height 1011 feet A.S.L.

Union-Kern-A.O.G. Alton No. 5. (Non-subsidized)

Location: Lat. 27° 57' 11" S
Long. 149° 22' 10" E

Elevation: 718 feet (RTKB)

Total Depth: 6925 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	2675 - 4950
Walloon Formation	4950 - 5506
Hutton Sandstone	5506 - 5992
Evergreen Shale	5992 - 6894
Kianga Formation	6894 - T.D.

Testing

D.S.T. No. 1 — Flowed oil at estimated 1100 bpd

6090 - 6118'

Evergreen Shale

Initial flow	: 4 minutes
Initial closed-in	: 32 minutes
Final flow	: 35 minutes
Final closed-in	: 48 minutes

Initial build-up

@ 6078'	@ 6114'
psig	psig
885	1063
2668	2649
2696	2690
2710	2712
2719	2724
2728	2733
2733	2737
2735	2742
2737	2746
2740	2748
2742	2751

Estimated equilibrium pressure 2756 psig @ 6078'

" " " 2772 psig @ 6114'

Average static pressure 2764 psig @ 6096'

Comments

The extrapolation on the above analysis is 17 p.s.i. and the gauge difference 3 p.s.i. The average value should therefore be accurate to ± 10 p.s.i.

Calculated potentiometric height 1012 feet A.S.L.

Union-Kern-A.O.G. Alton No. 6 (Non-subsidized)

Location: Lat. 27° 56' 25" S.

Long. 149° 21' 32" E

Elevation: 727 feet (RTKB)

Total Depth: 6805 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	5405 - 5898
Evergreen Shale	5898 - 6790
Kianga Formation	6790 - T.D.

Testing

D.S.T. No. 1 Flowed oil 1000 bpd (52° API grav.)

6168 - 6183'

Evergreen Shale

Initial flow	:	5 minutes
Initial closed-in	:	30 "
Final flow	:	60 "
Final Closed-in	:	45 "

I.C.I.P. 2743 psig @ 6158' } Both probably still rising

" 2758 psig @ 6178' }

No build-up analysis provided.

Union-Kern-A.O.G. Alton East No. 1 (Non-subsidized)

Location: Lat. 27° 57' 23" S

Long. 149° 24' 31" E

Elevation: 722 feet (RTKB)

Total Depth: 7596 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	5530 - 6100
Evergreen-Precipice	6100 - 6375
Wandoan Formation	6375 - 7112
Kianga - Back Creek	7112 - 7554
Basement	7554 - T.D.

Testing

D.S.T. No. 1 Recovered 280 feet muddy water

7080 - 7115' 700 feet gassy fresh water

Wandoan Formation

Initial Flow : 5 minutes

Initial Closed-in : 31 minutes

Final Flow : 45 minutes

Final Closed-in : 45 minutes

Initial build-up

Time	@ 7065'	@ 7111'
Minutes	psig	psig
0	131	147
3	2830	2834
6	2939	2951
9	2999	3018
12	3039	3062
15	3070	3091
18	3092	3112
21	3109	3130
24	3123	3142
27	3136	3153
31	3248	3166

Estimated equilibrium pressure 3234 psig @ 7065'

" " " 3244 psig @ 7111'

Average static pressure 3239 psig @ 7088'

Water Analysis

	D.S.T. No. 1 p.p.m.
Total Solids	5000
Na	1863
Ca	20
Cl	1360
SO_4	38
HCO_3	2562
pH	7.5
Rw @ 25° C	1.5 ohm.m.

Comments

The extrapolation required in the above analysis is 82 psi. The gauge difference is 10 psi. The overall accuracy is probably ± 25 psi.

Calculated potentiometric height 1120 feet A.S.L.

Union-Kern-A.O.G. Alton West No. 1 (Non-subsidized)

Location: Lat. 27° 57' 04" S

Long. 149° 18' 52" E

Elevation: 712 feet (RTKB)

Total Depth: 6882 feet

Stratigraphy

	Ft. below RTKB
Blythesdale Group	2655 - 4713
Walloon Formation	4713 - 5235
Hutton Sandstone	5235 - 5700
Evergreen-Precipice	5700 - 5977
"Wandoan" Formation	5977 - 6496
Kianga Formation	6496 - 6682
Basement	6682 - T.D.

Testing

W.L.T. No. 1	Recovered 300 ccs watery mud
5861'	
Evergreen-Precipice	C.I.P. 2692 psig (Amerada) @ 5869'

Comments

There is no check on the above reading. The formation appears to be fairly tight and may be "supercharged" to some extent.

Calculated potentiometric level 1060 ft. A.S.L.

A.A.O. Apple Grove No. 1

Location: Lat. 26°40'55" S
Long. 148°51'06" E
Map Ref.: 167 685 (Roma 4 mile sheet)
Elevation: 940 feet (RTKB)
Total Depth: 4144 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2988 - 3585
Evergreen Shale	3585 - 3932
Precipice Sandstone	3932 - 4016
Moolayember Formation	4016 - 4113
Timbury Hills Formation	4113 - T.D.

Testing

D.S.T. No. 1
3919 - 3989'
Precipice Sandstone

Flowed gas at 1.64 million cu. ft/day

Initial Flow	:	2 minutes
Initial Closed-in	:	45 "
Final Flow	:	90 "
Final Closed-in	:	60 "

I.C.I.P. 1876 psig @ 3977'
" 1895 psig @ 3982'
Average Static Pressure 1886 psig @ 3980'

Comments

Initial closed-in pressure fully built up and fair agreement between gauges. Estimated accuracy ± 10 psi.

Union-Kern-A.O.G. Balonne No. 1 (Non-subsidized)

Location: Lat. 27° 30' 20" S

Long. 148° 41' 13" E

Elevation: 775 feet (RTKB)

Total Depth: 5004 feet

Stratigraphy

	Ft. below RTKB
Blythesdale Group	2145 - 3880
Walloon Formation	3880 - 4284
Hutton Sandstone	4284 - 4762
Evergreen-Precipice	4762 - 4944
Basement	4944 - T.D.

Testing

D.S.T. No. 1

4933 - 4950'

Precipice Sandstone

Recovered 3880 feet of fresh water

Initial flow : 6 minutes

Initial closed-in : 30 "

Final flow : 45 "

Final closed-in : 45 "

Top chart only

Recorder @ 4917'

Initial build-up	Final build-up
psig	psig
462	1658
2110	2115
2153	2137
2173	2151
2182	2159
2191	2166
2195	2170
2199	2174
2202	2177
2203	2178
2204	-

Initial build-up: Estimated equilibrium pressure 2213 psig @ 4917'

Final build-up: Estimated equilibrium pressure 2189.5 psig @ 4917'
(doubtful)

Static pressure 2213 p.s.i.g. @ 4917'

Water Analysis

	D.S.T. No. 1
	ppm
Total solids	1840
Na	705
Ca	6
Cl	130
SO_4	15
HCO_3	1268
CO_3	186
pH	8.6
R_w @ 25° C	3.77

Comments

The baseline on the chart had to be corrected. The extrapolation of the initial build-up on the single gauge is 9 psi. The gauge reads 20 psi low on the reported recovery. Estimated overall accuracy is about ± 25 psi.

Calculated potentiometric level 963 ft A.S.L. agrees well with nearby Donga No. 1.

A.A.O. Bardloming No. 1

Location: Lat. 26°43'40" S
Long. 149°01'04" E
Map Ref.: 184 679 (Roma 4 mile sheet)
Elevation: 1031 feet (RTKB)
Total Depth: 4695 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3380 - 4013
Evergreen Shale	4013 - 4375
Precipice Sandstone	4375 - 4418
Moolayember Formation	4418 - 4654
Showground Sandstone	4654 - 4663
Bandanna Formation	4663 - T.D.

Testing

D.S.T. No. 2 — Flowed gas at low rate
4643 - 4695' — Recovered 10 feet slightly gas cut mud
Moolayember-Showground

Initial Flow : 2 minutes
Initial Closed-in : 45 "
Final Flow : 90 "
Final Closed-in : 45 "

Bottom recorder stepping
Top recorder @ 4684'

Initial build-up		Final build-up	
Time Defl.	Pressure	Time Defl.	Pressure
0	78 psig	0	46 psig
9	1151	11	1324
13	1487	15	1567
17	1755	19	1739
21	1896	23	1845
25	1959	27	1912
29	2017	31	1950
33	2039	35	1975
37	2051	39	1991
41	2060	43	2002
45	2066	47	2008
I.F. 1		F.F. 86	

Initial build-up: Estimated equilibrium pressure 2152 psig @ 4684'
Final build-up : " " " not determined
Estimated static pressure 2152 psig @ 4684'

Comments

The extrapolation in the above test was 86 psi and as only one recorder worked satisfactorily, there is no check on the result.

A.A.O. Beaufort No. 1

Location: Lat. 26°34'30" S
Long. 148°54'35" E
Map Ref.: 172 699 (Roma 4 mile sheet)

Elevation: 1021 feet (RTKB)

Total Depth: 3836 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2655 - 3209
Evergreen Shale	3209 - 3645
Precipice Sandstone	3645 - 3670
Moolayember Formation	3670 - 3777
Granite Wash	3777 - 3808
Granite	3808 - 3836

Testing

D.S.T. No. 1
3603 - 3658'
Precipice Sandstone

Flowed gas at max. rate 100 Mcf/day

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 45 "

Initial build-up

Time Defl.	Recorder @ 3605'	Time Defl.	Recorder @ 3653'
0	51 psig	0	60 psig
9	1218	13	1481
13	1490	17	1556
17	1531	21	1565
21	1550	25	1576
25	1562	29	1584
29	1568	33	1589
33	1574	37	1593
37	1577	41	1595
41	1580	45	1597
45	1581	49	1598
I.F. 42		I.F. 42	
I.S.I. 45		I.S.I. 49	

Estimated equilibrium pressure 1625 psig @ 3605'
" " " 1621 psig @ 3653'

Final build-up

Time Defl.	Recorder @ 3605'
0	38 psig
9	1261
13	1448
17	1507
21	1531
25	1546
29	1552
33	1558
37	1562
41	1566
45	1568

F.F. 41
F.S.I. 45

Estimated equilibrium pressure 1621 psig @ 3605'
Average static pressure 1623 psig @ 3629'

D.S.T. No. 2
3655 - 3836'
Precipice-Moolayember

Flowed gas at max. rate 914 Mcf/day
Initial Flow : 45 minutes
Initial Closed-in : 45 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial build-up

Time Defl.	Recorder @ 3670'	Time Defl.	Recorder @ 3675'
0	281 psig	0	283 psig
12	1559	8	1554
16	1574	12	1571
20	1584	16	1583
24	1591	20	1590
28	1595	24	1596
32	1601	28	1602
36	1607	32	1608
40	1611	36	1612
44	1613	40	1614
48	1615	44	1616

I.F. 44
I.S.I. 48

I.F. 44
I.S.I. 44

Estimated equilibrium pressure 1645 psig @ 3670'
" " " 1642.5 psig @ 3675'

Final build-up

Time Defl.	Recorder @ 3670'
0	336 psig
12	1512
16	1531
20	1546
24	1558
28	1569
32	1577
36	1585
40	1593
44	1596
48	1599

F.F. 134
F.S.I. 48

Estimated equilibrium pressure 1660 psig @ 3670'
Average static pressure 1644 psig @ 3675'

Comments

Calculated potentiometric heights in the above two tests are almost identical and the average value for the Precipice-Moolayember interval of 1138 feet A.S.L. should be accurate.

A.A.O. Binya No. 1

Location: Lat. 26°41'57" S
Long. 148°31'20" E
Map Ref.: 131 682 (Roma 4 mile sheet)

Elevation: 1290 feet (RTKB)

Total Depth: 4318 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3218 - 3905
Evergreen Shale	3905 - 4208
Precipice Sandstone	4208 - 4260
Timbury Hills Formation	4260 - 4318

Testing

D.S.T. No. 1
4028 - 4064'
Evergreen Shale

Recovered 1085 feet water

Initial Flow : 45 minutes
Initial Closed-in : 45 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial build-up

Time Def.	Recorder @ 4030'	Time Def.	Recorder @ 4059'
0	333 psig	0	353 psig
9	1378	5	1410
13	1438	9	1422
17	1471	13	1433
21	1502	17	1514
25	1525	21	1522
29	1539	25	1529
33	1558	29	1557
37	1568	33	1565
41	1577	37	1576
45	1585	41	1585
I.F. 43		I.F. 43	
I.S.I. 45		I.S.I. 41	

Estimated equilibrium pressure 1688 psig @ 4030'
" " " 1693 psig @ 4059'

Final build-up

Time Def.	Recorder @ 4030'
0	523 psig
1	622
6	1324
11	1408
16	1455
21	1485
26	1510
31	1527
36	1543
41	1554
46	1564

F.F. 41
F.S.I. 46

Estimated equilibrium pressure 1700 psig @ 4030'
Average static pressure 1693 psig @ 4050'

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	1630
Na	625
Ca	6
Mg	1
Cl	135
SO_4	108
HCO_3	1318
pH	8.2
R_w@25°C	4.17 ohm.m

Comments

Although the average extrapolation on the initial build-ups is 105 psi, the two gauges are in fair agreement and the overall accuracy should be reasonable.

A.A.O. Blyth Creek No. 1

Location: Lat. 26°37'22" S
Long. 148°57'05" E
Map Ref. 177692 (Roma 4 mile sheet)
Elevation: 1010 feet (RTKB)
Total Depth: 3998 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	3437 - 3775
Precipice Sandstone	3775 - 3832
Moolayember Formation	3832 - 3906
Timbury Hills Formation	3906 - T.D.

Testing

D.S.T. No. 1
3786 - 3820'
Precipice Sandstone

Gas flowed at 8.4 million cu. ft/day

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 45 "

Only the bottom recorder gave a satisfactory chart
I.C.I.P. 1698 psig)
F.C.I.P. 1674 psig) recorder @ 3816'
Static pressure 1698 psig @ 3816'

D.S.T. No. 2
3823 - 3998'
Precipice Sandstone - Moolayember Formation

Recovered 20 feet condensate
1130 feet water
Times same as D.S.T. No. 1

I.C.I.P. 1678 psig @ 3805
" 1772 psig @ 3994'
Average static pressure 1725 psig @ 3900'

D.S.T. No. 3
3822 - 3835'
Precipice Sandstone

Produced surging flow of gas and water. Water rate measured at 900 bpd and gas flow estimated at 400 Mcf/day.
Times same as D.S.T. No. 1

I.C.I.P. & F.C.I.P. 1676 psig @ 3805'
" " 1686 psig @ 3828'
Average static pressure 1681 psig @ 3816'

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm	D.S.T. No. 3 ppm
T.D.S.	6100	6100	5600
Na	1635	1810	1850
Ca	30	30	30
Mg	2	5	4
Cl	1680	1845	1865
SO_4	155	2	4
HCO_3	1370	1675	1740
CO_3	-	30	30
pH	8.0	8.3	8.4
R_w@25°C	1.39 ohm.m	1.26 ohm.m	1.25 ohm.m

Comments

The static pressures and calculated potentiometric heights for the three tests are as follows :-

D.S.T. No.	Depth (ft below RTKB)	Pressure psig	Potentiometric Height Ft above MSL	Formation
1	3816	1698	1115	Precipice Sandstone
2	3900	1725	1094	Precipice - Moolayember
3	3816	1681	1076	Precipice Sandstone

The three calculated potentiometric heights are in close agreement, and an average value of 1095 feet A.S.L. can be taken.

Union-Kern-A.O.G. Boggo Creek No. 1

Location: Lat. 27°34'13" S
Long. 149°08'46" E

Elevation: 969 feet (RTKB)

Total Depth: 6257 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	5150 - 5592
Evergreen Shale	5592 - 5980
Wandoan Sandstone	5980 - 6240
Timbury Hills Form.	6240 - T.D.

Testing

D.S.T. No. 1
586 - 5880'
Evergreen Shale

Recovered 270 feet mud cushion (79 lbs/cu. ft)
685 feet slightly gassy water

Initial Flow	: 5 minutes
Initial Closed-in	: 30 "
Final Flow	: 30 "
Final Closed-in	: 30 "

Bottom chart slipped in holder.
I.C.I.P. 2598 psig @ 5855' (top recorder)
F.F.P. 431 psig (agrees with recovery)

D.S.T. No. 2
5740 - 5753'
Evergreen Shale

Recovered 360 feet mud cushion (79 lbs/cu. ft)
2620 feet slightly gassy water

Initial Flow	: 5 minutes
Initial Closed-in	: 25 "
Final Flow	: 30 "
Final Closed-in	: 30 "

Initial build-up

Time (minutes)	Pressures (psig) Top Recorder @ 5725'	Bottom Recorder @ 5747'
0	518	524
2.5	2509	2462
5.0	2539	2477
7.5	2542	2485
10.0	2545	2494
12.5	2545	2498
15.0	2551	2502
17.5	2554	2506
20.0	2557	2508
22.5	2557	2510
25.0	2557	2512

Estimated equilibrium pressure 2557 psig @ 5725'
(doubtful, gauge plugging)
Estimated equilibrium pressure 2529 psig @ 5747'
Static pressure 2529 psig @ 5747' (bottom recorder)
F.F.P. 1422 psig @ 5725' (top recorder)

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm
T.D.S.	2500	3300
Na	995	1250
Ca	15	20
Cl	590	1150
SO_4	75	40
HCO_3	1575	1370
R_w@25°C	2.63 ohm.m	1.94 ohm.m
pH	7.5	7.5

Comments

The pressure values for the Evergreen Shale are summarised below :-

D.S.T. No.	Recorder Depth (Ft below RTKB)	Pressure (psig)	Potentiometric Height	Comments
1	5855 (top)	2598	1114	Fully built-up. Gauge stepping.
2	5725 (top)	2557	1149	Gauge plugging. Doubtful
2	5747 (bottom)	2529	1063	Good build-up.

The same top recorder was used in both tests and in each case it shows either stepping or a plugging effect. The bottom recorder in D.S.T. No. 2 gave a good build-up curve with a 17 psi extrapolation on the analysis. An average of the top recorder of D.S.T. 1 and bottom recorder of D.S.T. 2 is probably the most acceptable value for the potentiometric height.

A.A.O. Bony Creek No. 1

Location: Lat. 26°45'00" S
Long. 148°58'00" E
Map Ref.: 180 677 (Roma 4 mile sheet)
Elevation: 1041 feet (RTKB)
Total Depth: 4585 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3326 - 3961
Evergreen Shale	3961 - 4294
Precipice Sandstone	4294 - 4348
Moolayember Formation	4348 - 4493
Timbury Hills Formation	4493 - T.D.

Testing

D.S.T. No. 1
4287 - 4340'
Precipice Sandstone

Flowed gas at max. rate of 1.252 million cu.ft/day

Initial Flow	: 2 minutes
Initial Closed-in	: 45 "
Final Flow	: 90 "
Final Closed-in	: 45 "

I.C.I.P. 1825 psig @ 4294'
" 1829 psig @ 4334'
Average Static Pressure 1827 psig @ 4314'

Comments

Visual inspection of the pressure charts indicates that the initial build-up is not quite complete, and this reading is therefore slightly low.

Union-Kern-A.O.G. Brigalow Creek No. 1

Location: Lat. 27°37'03" S
Long. 150°20'12" E
Elevation: 933 feet (RTKB)
Total Depth: 5777 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	4956 - 5435
Precipice Sandstone	5435 - 5733
Kuttung Formation	5733 - T.D.

Testing

D.S.T. No. 1
5500 - 5530'
Precipice Sandstone

Recovered 250 feet mud cushion (74 lbs/cu. ft)
4900 feet fresh water

Initial Flow	: 5 minutes
Initial Closed-in	: 20 "
Final Flow	: 45 "
Final Closed-in	: 45 "

Bottom gauge read lower than top gauge and fell off during the closed-in period.
I.C.I.P. 2481 psig @ 5486' (top recorder)
F.F.P. 2267 psig @ 5486' (cf calc. 2248 psig)

Water Analysis

	D.S.T. No. 1 ppm
T.D.S.	2050
Na	800
Ca	4
Mg	1
SO_4	67
HCO_3	1830
Cl	75
pH	8.0
R_w@25°C	3.39 ohm.m

Comments

Although only one gauge recorded satisfactorily, the agreement between the F.F.P. and the recovery is very close, and the static value may be accepted as reliable. The calculated potentiometric height of 1177 ft A.S.L. is much higher than other values in the area.

A.A.O. Brucedale No. 1

Location: Lat. 26°54'51" S
Long. 148°56'39" E
Map Ref. 177 657 Roma
Elevation: 975 feet (RTKB)
Total Depth: 5255 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3668 - 4275
Volcanics	4275 - 4500
Evergreen Shale	4500 - 4747
Precipice Sandstone	4747 - 4842
Moolayember Formation	4842 - 5012
Showground Sandstone	5012 - ?
Granite	? - T.D.

Testing

D.S.T. No. 1 — Recovered 4800 feet of salty water
4768 - 4825'
Precipice Sandstone

Initial Flow	:	3 minutes
Initial Closed-in	:	45 "
Final Flow	:	90 "
Final Closed-in	:	45 "

I.C.I.P. 2161 psig @ 4814'
" 2172 psig @ 4819'
Average static pressure 2166 psig @ 4815'

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	3930
Na	1504
Ca	8
Mg	1
Cl	1165
CO_3	150
HCO_3	1696
pH	8.4
R_w@25°C	1.63 ohm.m

Comments

The agreement between the gauges is good and the static pressure can be accepted as accurate.

A.A.O. Bungil No. 1

Location: Lat. 26°39'52" S
Long. 148°49'50" E
Map Ref. 164687 (Roma 4 mile sheet)

Elevation: 952 feet (RTKB)

Total Depth: 4103 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2912 - 3547
Evergreen Shale	3547 - 3921
Precipice Sandstone	3921 - 3942
Moolayember Formation	3942 - 4060
Timbury Hills Formation	4060 - 4107

Testing

D.S.T. No. 1
3885 - 4103'
Evergreen-Precipice-Moolayember

Flowed gas at max. rate 98 Mcf/day decreasing to T.S.T.M.

Initial Flow : 45 minutes
Initial Closed-in : 45 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial build-up

Time Def.	Recorder @ 3886'	Time Def.	Recorder @ 3907'
0	68 psig	0	76 psig
8	889	6	500
12	1165	11	728
16	1379	16	1125
20	1508	21	1327
24	1603	26	1481
28	1665	31	1591
32	1712	36	1673
36	1748	41	1718
40	1772	46	1754
44	1793	51	1779
I.F. 44		I.F. 44	
I.S.I. 44		I.S.I. 51	

Estimated equilibrium pressure 2080 psig @ 3886'
" " " 2140 psig @ 3907'

Final build-up

Time Def 1.	Recorder @ 3886'
0	55 psig
11	1242
15	1456
19	1597
23	1679
27	1737
31	1772
35	1797
39	1814
43	1824
47	1830

F.F. 44
F.S.I. 47

Estimated equilibrium pressure 1962 psig @ 3886'
Average static pressure 2110 psig @ 3896'

Comments

It appears that plugging occurred in the formation during the initial build-up, and for this reason the build-up analyses are very doubtful. In this particular case the final build-up may give a rather more accurate result.

Union-Kern-A.O.G. Burunga No. 1

Location: Lat. 26°00'00" S
Long. 150°04'43" E
Map Ref. 298769 (Chinchilla 4 mile sheet)

Elevation: 1091 feet (RTKB)

Total Depth: 10,242 feet

Stratigraphy

	Ft below RTKB
Bundamba Group	296 - 2030
Wandoan Sandstone	2030 - 2083
Kianga Formation	2083 - 4657
Back Creek Formation	4657 - 9801
Cracow Formation	9801 - T.D.

Testing

D.S.T. No. 2
4106 - 4214'
Kianga Formation

Recovered 2720 feet nett rise of fluid,
made up of 270 feet watery mud,
400 feet slightly gassy water
and 2050 feet mud which entered the tester due to faulty operation of a valve.

D.S.T. No. 3
7889 - 7911'
Back Creek Formation

Flowed 250 Mcf/day gas
Flow period : 43 minutes

Water Analysis

	D.S.T. No. 2 ppm
Total Solids	2100
Na	671
Ca	80
SO_4	164
HCO_3	976
pH	7.9

Comments

No closed-in pressures were obtained from the tests in this well.

Union-Kern-A.O.G. Cabawin No. 1

Location: Lat. 27°29'46" S
Long. 150°11'22" E
Elevation: 968 feet (RTKB)
Total Depth: 12,035 feet

Stratigraphy

	Ft below RTKB
Bundamba Group	5444 - 7640
Cabawin Formation	7640 - 9835
Kianga Formation	9835 - 10,357
Back Creek Formation	10,357 - 11,662
Cracow Formation	11,662 - 12,035

Testing

D.S.T. No. 1
6728 - 6776'
Bundamba Group

Recovered 2800 feet slightly gassy muddy water (35 g/g)
Flow : 65 minutes
No closed-in period
F.F.P. 1250 psig (depth not stated)

Prod. Test No. 1
11,881 - 11,995'
Cracow Formation

Recovered 1220 feet slightly gassy muddy water
Flow : 69 minutes

Prod. Test No. 2
11,744 - 11,760'
Cracow Formation

Flowed 2500 bpd salt water

Prod. Test No. 3
10,006 - 10,172'
Kianga Formation

Flowed 120 bpd oil (30% mud cut), together with 1 million cu.ft/day gas.
F.C.I.P. 6019 psig (still rising)

Prod. Test No. 5
9925 - 10,172'
Kianga Formation

Production test over the period 23rd April 17th May, 1961, flowed total of 1761 barrels of oil. After 22 days continuous flow the well was producing at the rate of 62 bpd with 534 Mcf/day gas.

Water Analyses

	Prod. Test No. 1 ppm	Prod. Test No. 2 ppm
Total Dissolved Solids	19,210	23,390
Na	4,090	3,930
Ca	2,040	1,760
Mg	10	7
Fe	27	-
Cl	9,300	10,450
SO_4	515	280
CO_3	50	-
HCO_3	260	100
SiO_2	22	58
pH	7.8	7.2

Comments

No reliable static pressures appear to have been obtained in the open-hole and production tests noted above. However a subsequent Amerada survey run on 10th August, 1961, after the well had been shut in for 52 days, gave the following results :-

Perforations Ft below RTKB	Depth Ft below RTKB	Pressure psig	Temperature °F
9925 - 10,172	9934	5984	205

This reading is about 900 psi less than the pressure recorded in Prod. Test No. 3, and this latter pressure was not fully built-up. There is indication of a considerable permanent pressure decline following a limited amount of production.

Condamine Canaan No. 1

Location: Lat. 26°27'38" S
Long. 150°42'47" E

Elevation: 1074 feet (RTKB)

Total Depth: 1635 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	830 - 1526
Precipice Sandstone	1526 - 1571
Basement	1571 - T.D.

Testing

D.S.T. No. 1

Recovered 800 feet of mud (9.7 p.p.g.)
380 feet of fresh water

1520 - 1635'

Precipice Sandstone

C.I.P. 561 psig @ 1535'
C.I.P. 574 psig @ 1550'
Pressures steady throughout test
Average Static Pressure 571 psig @ 1550'

Comments

The measured pressure agrees very closely with the value of 568 psig calculated from the recovery.

Phillips - Sunray Cecil Plains No. 1

Location: Lat. 27°31'57" S
Long. 151°14'50" E

Elevation: 1178 feet (RTKB)

Total Depth: 5501 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2168 - 2964
Evergreen Shale	2964 - 3869
Precipice Sandstone	3869 - 4252
Upper Triassic	4252 - T.D.

Testing

D.S.T. No. 1
2203 - 2330'
Hutton Sandstone

Recovered 150 feet mud (10 ppg)
2030 feet fresh water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	30 "
Final Closed-in	:	30 "

I.C.I.P. 940 psig @ 2188'
I.C.I.P. 1003 psig @ 2326'
Average Static Pressure 971.5 psig @ 2257'

D.S.T. No. 3
3085 - 3285'
Evergreen Shale

Recovered 500 feet mud (10.4 ppg)
1785 feet fresh water

Initial Flow	:	10 minutes
Initial Closed-in	:	30 "
Final Flow	:	30 "
Final Closed-in	:	30 "

Initial Build-up

Time (minutes)	Pressure (psig) Top recorder @ 3070'	Bottom recorder @ 3281'
0	547	678
3	1054	1130
6	1100	1178
9	1135	1212
12	1158	1239
15	1172	1255
18	1183	1265
21	1191	1273
24	1197	1281
27	1201	1284
30	1203	1286

Estimated equilibrium pressure 1234 psig @ 3070'
" " " 1313 psig @ 3281'
Average static pressure 1273 psig @ 3175'

D.S.T. No. 4
3832 - 3950'
Precipice Sandstone

Recovered 420 feet mud (10.1 ppg)
2930 feet fresh water

Initial Flow	:	10 minutes
Initial Closed-in	:	30 "
Final Flow	:	30 "
Final Closed-in	:	30 "

I.C.I.P. & F.C.I.P. 1442 psig @ 3817'
F.C.I.P. 1475 psig @ 3946'
Average static pressure 1458 psig @ 3880'

Water Analyses

	D.S.T. No. 1	D.S.T. No. 3	D.S.T. No. 4
	ppm	ppm	ppm
Total Solids	2400	1500	1600
Na	547	498	535
Ca	20	4	16
Mg	1	1	2
Cl	95	15	130
CO_3	96	114	66
HCO_3	1159	1080	1122
pH	8.4	8.8	8.4
R_w@25°C	4.9 ohm.m	5.26 ohm.m	4.63 ohm.m

Comments

Measured or calculated pressures and potentiometric heights were as follows :-

D.S.T. No.	Depth (Ft below RTKB)	Pressure (psig)	Potentiometric Ht (Ft above MSL)	Formation	Comments
1	2257	97.5	1165	Hutton	Pressure fully built-up. Gauges slightly low cf recovery.
3	3175	1273	943	Evergreen	30 psi extrapolation. Gauges low cf recovery.
4	3880	1458	665	Precipice	Pressure fully built-up. Gauges low cf recovery.

In each test the gauges read low when the F.F.P. measured is compared with the value calculated from the reported recovery; however, checks against the hydrostatic mud pressure are reasonable in each case.

Phillips - Sunray Cecil Plains South No. 1

Location: Lat. 27° 35' 57" S.

Long. 151° 12' 48" E.

Elevation: 1194 feet (RTKB)

Total Depth: 3667 feet

Stratigraphy

	Ft. below RTKB
Walloon Formation	210 - 1635
Hutton Sandstone	1635 - 2268
Evergreen Shale	2268 - 2856
Precipice Sandstone	2856 - 3192
Un-named Unit	3192 - 3247
? Triassic	3247 - 3667

Testing

D.S.T. No. 1

2969 - 3034'

Precipice Sandstone

Recovered 180 feet mud (10.2 p.p.g.)

180 feet muddy water

1987 feet fresh water

Initial Flow: 5 minutes

Initial Closed-in: 60 minutes

Final Flow: 60 minutes

Final Closed-in: 60 minutes

I.C.I.P. 1061 psig @ 2949'

F.C.I.P. 1062 psig @ 2949'

I.C.I.P. 1098 psig @ 3031'

F.C.I.P. 1099 psig @ 3031'

Average static pressure 1080.5 psig @ 2990'

Water Analysis	D.S.T. No. 1
	p.p.m.
T.D.S.	1400
Na	540
K	11
Ca	10
Mg	2
Cl	120
SO_4	9
HCO_3	1275
pH	8.0
R_w @ 25°C	4.54

Comments

As the two gauges agree perfectly and the build-ups were complete, the pressures recorded in D.S.T. No. 1 are considered to be very accurate.

The calculated potentiometric height is 698 feet A.S.L.

Phillips - Sunray Cecil Plains West No. 1

Location: Lat. 27°32'36" S
Long. 151°09'31" E
Elevation: 1216 feet (RTKB)
Total Depth: 3812 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	1685 - 2370
Evergreen Shale	2370 - 2945
Precipice Sandstone	2945 - 3340
Unnamed Unit	3340 - 3383
Carboniferous	3383 - T.D.

Testing

D.S.T. No. 1
3093 - 3138'
Precipice Sandstone

Recovered 10 feet mud, 180 feet muddy water, 2270 feet fresh water.

Initial Flow	:	5 minutes
Initial Closed-in	:	60 "
Final Flow	:	33 "
Final Closed-in	:	60 "

I.C.I.P. 1117 psig @ 3081'
" 1132 psig @ 3136'
Average static pressure 1125 psig @ 3110'

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	1400
Na	555
Ca	14
Cl	105
HCO_3	1342
pH	7.9
R_w@25°C	4.67 ohm.m

Comments

The Precipice Sandstone tested in D.S.T. No. 1 is a very strong aquifer and the water reached its static level almost immediately after opening the tester. Agreement between the gauges was very close and this is considered to be an accurate static pressure.

Union-Kern-A.O.G. Cherwondah No. 1 (Non-subsidized)

Location: Lat. 26° 15' 53" S

Long. 149° 55' 11" E

Elevation: 1078 feet (RTKB)

Total Depth: 5383 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2165 - 2990
Evergreen Shale	2990 - 3503
Precipice Sandstone	3503 - 3918 (top of main permeable zone 3644')
Wandoan Sandstone	3918 - 5011
Cabawin Formation	5011 - T.D.

Testing

D.S.T. No. 1 Flowed estimated 50 Mcf/day gas

4175 - 4188' Initial flow : 5 minutes

Wandoan Sandstone Initial closed-in : 28 "

Final flow : 46 "

Final closed-in : 44 "

Initial build-up

Time	@ 4160'	@ 4184'
minutes	psig	psig
0	24	18
4	1053	1099
8	1667	1650
12	1700	1693
16	1709	1704
20	1711	1706
24	1714	1709
28	1716	1709

Estimated equilibrium pressure 1727 psig @ 4160'

" " " 1717 psig @ 4184'

Average static pressure 1722 psig @ 4172'

D.S.T. No. 2 — Flowed gas at estimated 50 Mcf/day

4175 - 4201'

Wandoan Sandstone

Initial flow : 4 minutes

Initial closed-in : 29 "

Final flow : 64 "

Final closed-in : 59 "

Initial build-up

Time (minutes)	@ 4161' psig	@ 4197' psig
0	14	27
3	621	374
6	946	821
9	1390	1233
12	1575	1522
15	1640	1632
18	1667	1668
21	1679	1684
24	1686	1688
27	1688	1695
29	1691	1697

Estimated equilibrium pressure 1722 psig @ 4161'

" " " 1734 psig @ 4197'

Average static pressure 1728 psig @ 4180'

Comments

The results of the two tests are in very good agreement and an average value of 887 ft A.S.L. may be taken for the potentiometric level.

Union-Kern-A.O.G. Condamine No. 1 (Non-subsidized)

Location: Lat. 27° 01' 58" S

Long. 150° 17' 52" E

Elevation: 1062 feet (RTKB)

Total Depth: 5015 feet

Stratigraphy

	Ft below RTKB
Walloon Formation	1714 - 3135
Hutton Sandstone	3135 - 3890
Evergreen Shale	3890 - 4408
Precipice Sandstone	4408 - 4740
Back Creek Formation	4740 - 4966
Kuttung Formation	4966 - T.D.

Testing

D.S.T. No. 1 — Recovered 4300 feet fresh water

4643 - 4676'

Precipice Sandstone — I.C.I.P. 1897 psig @ 4646') steady
" 1915 psig @ 4676')

Average static pressure 1906 psig @ 4661'

D.S.T. No. 2 — Recovered 3986 feet fresh water

4572 - 4599'

Precipice Sandstone — F.C.I.P. 1875 psig @ 4556'
" 1870 psig @ 4599'

Average static pressure 1871.5 psig @ 4575'

Comments

The average potentiometric level calculated from these two static pressure values is 804 feet A.S.L. Range of values is +28 to -26.

Union-Kern-A.O.G. Conloi No. 1

Location: Lat. 26°25'42" S
Long. 149°57'48" E

Elevation: 1520 feet (RTKB)

Total Depth: 6005 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	3918 - 4490
Precipice Sandstone	4490 - 4939
Wandoan Sandstone	4939 - 5815
Cabawin Formation	5815 - T.D.

Testing

D.S.T. No. 2
4935 - 4965'
Precipice-Wandoan

Recovered 4275 feet fresh water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	45 "
Final Closed-in	:	45 "

I.C.I.P. and F.C.I.P. 1838 psig @ 4922'
" " 1868 psig @ 4961'
Average static pressure 1853 psig @ 4942'

D.S.T. No. 3
4570 - 4605'
Precipice Sandstone

Recovered 500 feet salty water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	45 "
Final Closed-in	:	45 "

Initial Build-up

Time (minutes)	Top Recorder @ 4558'	Bottom Recorder @ 4603'
0	61 psig	91 psig
3	1579	1578
6	1602	1619
9	1619	1641
12	1629	1654
15	1636	1662
18	1642	1668
21	1647	1672
24	1650	1676
27	1654	1678
30	1658	1682

Estimated equilibrium pressure 1686 psig @ 4558'
" " " 1704 psig @ 4603'
Average static pressure 1695 psig @ 4580'

D.S.T. No. 4
4311 - 4325'
Evergreen Shale

Recovered 3520 feet oil

Initial Flow : 5 minutes
Initial Closed-in : 30 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial Build-up

Time (minutes)	Pressure (psig) Top Recorder @ 4299'	Bottom recorder @ 4325'
0	553	765
3	1453	1441
6	1474	1477
9	1488	1497
12	1497	1509
15	1505	1520
18	1511	1527
21	1518	1532
24	1522	1538
27	1524	1542
30	1526	1543

Estimated equilibrium pressure 1548 psig @ 4299'
" " " 1570 psig @ 4325'

Average static pressure 1599 psig @ 4312'

D.S.T. No. 5
4300 - 4313'
Evergreen Shale

Swabbed oil at 170 bpd

Initial Closed in: 60 minutes
Flow :1513 "
Final Closed-in : 242 "

I.C.I.P. 1591 psig @ 4291'
" 1595 psig @ 4313'

Average static pressure 1592 psig @ 4300'

Water Analyses

	D.S.T. No. 2 ppm	D.S.T. No. 3 ppm
Total Solids	310	2900
Na	116	1013
Ca	10	90
Mg	Trace	1
Cl	20	40
SO_4	5	210
HCO_3	299	-
CO_3	147	264
OH	-	292
pH	7.5	12.4
R_w@25°C	20.83 ohm.m	1.22 ohm.m

Comments

The pressures recorded in the above tests are summarised below :-

D.S.T. No.	Depth (Ft below RTKB)	Pressure (psig)	Potentiometric Height (Ft above MSL)	Formation
2	4942	1853	857	Precipice-Wandoan
3	4580	1695	855	Precipice Sandstone
4	4312	1559	808	Evergreen Shale
5	4300	1592	897	Evergreen Shale

It can be seen that the two readings in the Precipice Sandstone are in very close agreement. Calculated potentiometric heights in the Evergreen Shale differ by 89 feet but the mean value comes very near to the Precipice value. It is likely that the overall mean height of 854 ft above M.S.L. is close to the true value for both formations.

A.A.O. Coolibah No. 1

Location: Lat. 26°39'43" S
Long. 148°47'36" E
Map Ref.: 161691 (Roma 4 mile sheet)

Elevation: 1067 feet (RTKB)

Total Depth: 4313 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3030 - 3713
Evergreen Shale	3713 - 4057
Precipice Sandstone	4057 - 4108
Moolayember Formation	4108 - 4290
Timbury Hills Formation	4290 - T.D.

Testing

D.S.T. No. 1
4066 - 4118'

Flowed gas 165 Mcf/day

Initial Flow	: 45 minutes
Initial Closed-in	: 30 "
Final Flow	: 60 "
Final Closed-in	: 30 "

Initial build-up

Time Defl.	Recorder @ 4108'	Time Defl.	Recorder @ 4113'
0	80 psig	0	84 psig
7	1703	8	1021
10	1720	11	1426
13	1739	14	1677
16	1816	17	1768
19	1824	20	1805
22	1834	23	1828
25	1846	26	1841
28	1855	29	1850
31	1858	32	1858
34	1863	35	1863
I.F.	44	I.F.	44
I.S.I.	34	I.S.I.	35

Estimated equilibrium pressure 1943 psig @ 4108'
" " " 1964 psig @ 4113'

Final build-up

Time Def.	Recorder @ 4108'	Time Def.	Recorder @ 4113'
0	85 psig	0	88 psig
10	1658	7	1136
13	1672	10	1600
16	1730	13	1755
19	1799	16	1799
22	1809	19	1815
25	1820	22	1830
28	1831	25	1839
31	1838	28	1846
34	1845	31	1851
37	1849	34	1855
F.F. 63		F.F. 57	
F.S.I. 37		F.S.I. 34	

Estimated equilibrium pressure 1991 psig @ 4108'
" " " 1965 psig @ 4113"
Average static pressure 1953.5 psig @ 4110'

Comments

Average extrapolation on the initial build-ups is 90 psi and the difference between the gauges is 20 psi. Only moderate accuracy can be expected.

Union-Kern-A.O.G. Cooloomala No. 1

Location: Lat. 27°03'09" S
Long. 150°16'09" E
Elevation: 1094 feet (RTKB)
Total Depth: 4992 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	4228 - 4695
Precipice Sandstone	4695 - 4963
Undiff. Kianga-Back Creek	4963 - T.D.

Testing

D.S.T. No. 1
4821 - 4836'
Precipice Sandstone

Recovered 200 feet mud cushion
4290 feet fresh water

Initial Flow	: 30 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 45 "

F.C.I.P. 1977 psig @ 4805'
" 1975 psig @ 4836'
Average static pressure 1976 psig @ 4820'

Water Analysis

	D.S.T. No. 1 ppm
Total Dissolved Solids	2830
Na	1081
Ca	25
Mg	4
Cl	1105
SO_4	3
HCO_3	1061
pH	7.0
R_w@25°C	2.222 ohm.m

Comments

The close agreement between the two gauges and the recovery indicates that this is an accurate pressure value.

Union Kern-A.O.G. Crowder No. 1

Location: Lat. 27°52'36" S
Long. 150°15'34" E
Map Ref. 320542 (Dalby 4 mile sheet)

Elevation: 868 feet (RTKB)

Total Depth: 5864 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	1346 - 3430
Walloon Coal Measures	3430 - 4323
Hutton Sandstone	4323 - 4850
Evergreen Shale	4850 - 5385
Precipice Sandstone	5385 - 5620
Kuttung Formation	5620 - T.D.

Testing

D.S.T. No. 1
5388 - 5434'
Precipice Sandstone

Recovered 700 feet mud cushion (70 lbs/cu.ft)
3835 feet fresh gassy water (19 gr./gall)
Flow : 60 minutes
Closed-in : 26 minutes

Pressure still rising slowly at end of closed-in period. Halliburton BT recorder @ 5365', analysis of build-up not supplied.

Water Analysis

	D.S.T. No. 1 ppm
Total Dissolved Solids	870
Na	335
Ca	4
Mg	1
Cl	70
SO_4	Trace
HCO_3	786
pH	8.3
R_w@25°C	7.69 ohm.m

Union-Kern-A.O.G. Crowder East No. 1 (Non-subsidized)

Location: Lat. 27° 53' 28" S

Long. 150° 17' 10" E

Elevation: 872 feet (RTKB)

Total Depth: 5544 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	4364 - 4896
Evergreen Shale	4896 - 5293
Precipice Sandstone	5293 - 5477
Kuttung Formation	5477 - T.D.

Testing

D.S.T. No. 1

5359 - 5375'

Precipice Sandstone

Rec. 240 feet mud cushion

390 feet v. sl. gassy fresh water

Initial Flow : 5 minutes

Initial Closed-in : 30 minutes

Final Flow : 35 minutes

Final Closed-in : 45 minutes

Initial Build-up

@ 5345'	@ 5371'
psig	psig
419	243
2163	2117
2205	2158
2208	2179
2228	2194
2243	2206
2246	2215
2255	2223
2261	2229
2264	2235
2264	2240

Estimated equilibrium pressure 2308 psig @ 5345'

" " " 2281 psig @ 5371'

Average static pressure 2294.5 psig @ 5358'

D.S.T. No. 2

5334 - 5360'

Precipice Sandstone

Rec. 240 feet mud cushion

2070 feet slightly gassy water

Initial Flow : 5 minutes

Initial Closed-in : 30 minutes

Final Flow : 30 minutes

Unable to close for final build-up

Initial build-up

@ 5319'	@ 5334'
psig	psig
380	389
2060	2067
2116	2119
2149	2150
2170	2171
2200	2185
2218	2198
2221	2208
2227	2217
2230	2223
2233	2229

Estimated equilibrium pressure 2259.5 psig @ 5319'

" " " 2282.5 psig @ 5334'

Average static pressure 2270 psig @ 5325'

Water Analysis

	D.S.T. No. 2
	ppm
T.D.S.	1300
Na	420
Ca	12
Cl	305
SO_4	160
HCO_3	421
pH	8.1
Rw @ 25° C	5.181 ohm.m.

Comments

Calculated potentiometric heighis for the two tests are as follows:-

D.S.T. No. 1	813 feet A.S.L.
D.S.T. No. 2	787 feet A.S.L.

As the extrapolations in the analyses were 42.5 and 39 psi respectively, the agreement in the two results can be considered reasonable and the average potentiometric height is probably good to ± 40 feet.

Union-Kern-A.O.G. Crowder North No. 1

Location: Lat. 27°51'43" S
Long. 150°14'40" E
Elevation: 866 feet (RTKB)
Total Depth: 5707 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	4384 - 5050
Evergreen Shale	5050 - 5438
Precipice Sandstone	5438 - 5637
Kuttung Formation	5637 - T.D.

Testing

D.S.T. No. 1
5609-5629'
Precipice Sandstone

Recovered 240 feet mud cushion (74 lbs/cu. ft)
4570 feet slightly gassy water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	45 "
Final Closed-in	:	45 "

Top gauge stepping on initial build-up.

Initial build-up Time (mins)	Pressure (psig) 2067 2119 Bottom recorder @ 5629'
0	1093
3	2362
6	2379
9	2390
12	2396
15	2402
18	2404
21	2408
24	2410
27	2412
30	2415

Estimated equilibrium pressure 2434 psig @ 5629'

The above value compares with the stabilised pressure of 2436 psig at 5595' measured by the top recorder; in view of the stepping on the chart this latter value should be neglected.

Water Analysis

	D.S.T. No. 1 ppm
T.D.S.	2385
Na	965
Ca	10
Cl	435
SO_4	30
HCO_3	1825
pH	7.9
R_w @ 25° C	2.8 ohm.m

Comments

Although the condition of the top recorder was doubtful, the reading from it is in reasonable agreement with the calculated equilibrium value from the bottom gauge. Both gauges are in close agreement with the recovery, and the quoted pressure value should be of fair accuracy.

Planet Crystalbrook No. 1

Location: Lat. 25°29'03" S
Long. 147°59'35" E
Elevation: 1656 feet (RTKB)
Total Depth: 2060 feet

Stratigraphy

	Ft below RTKB
Clematis Sandstone	1538 - 1870
Rewan Formation	1870 - 1998

Testing

D.S.T. No. 1
1655 - 1685'
Clematis Sandstone

Recovered 75 feet mud, 1110 feet fresh water.

Initial Flow	: 15 minutes
Initial Closed-in	: 30 "
Final Flow	: 90 "
Final Closed-in	: 30 "

Both recorders give 627 psig for the I.C.I.P. and F.C.I.P. However they both appear to be still rising at the end of the final build-up period.
Top Recorder @ 1676'; Bottom Recorder @ 1680'
Average static pressure 627 psig @ 1678'

D.S.T. No. 2
1842 - 1887'
Clematis - Rewan

Recovered 80 feet mud (10.6 ppg)
1570 feet fresh water

Initial Flow	: 11 minutes
Initial Closed-in	: 30 "
Final Flow	: 15 "
Final Closed-in	: 30 "

F.C.I.P. 723 psig @ 1844'
" 733 psig @ 1881'
Average static pressure 728 psig @ 1862'

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm
Total Solids	1100	2150
Na	279	802
Ca	12	58
Mg	6	Trace
Cl	17	25
SO_4	3	4
HCO_3	763	2257
pH	7.6	6.7
R_w@25°C	10 ohm.m	3.57 ohm.m

Comments

There is good agreement between the two gauges in D.S.T. No. 2 and the pressure calculated from the recovery is also in close agreement with the measured F.F.P. The pressures in D.S.T. No. 1 were still rising slowly at the end of the test.

Union-Kern-A.O.G. Dalkeith No. 1 (Non-subsidized)

Location: Lat. 27° 45' 36" S

Long. 149° 17' 38" E

Elevation: 809 feet (RTKB)

Total Depth: 6678 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	5302 - 5850
Evergreen-Precipice	5850 - 6116
"Wandoan" sequence	6116 - 6573
Basement	6573 - T.D.

Testing

D.S.T. No. 1

6549 - 6678'

Wandoan Formation

Recovered 5500 feet fresh water

Initial Flow : 7 minutes

Initial Closed-in : 30 minutes

Final Flow : 45 minutes

Final Closed-in : 45 minutes

Initial build-up

@ 6550' psig	@ 6674' psig
989	1088
2717	2747
2782	2843
2816	2887
2836	2912
2852	2929
2861	2940
2867	2947
2872	2954
2879	2959
2883	2963

Estimated equilibrium pressure 2924 psig @ 6550'

" " " 3002 psig @ 6674'

Average static pressure 2963 psig @ 6612'

Comments

The gauge difference in the above analysis is 24 psi and the extrapolation 40 psi.

Calculated potentiometric height 1047' A.S.L.

A.A.O. Dalmuir No. 1

Location: Lat. 26°25'00" S
Long. 149°04'20" E
Map Ref. 191 707 (Roma 4 mile sheet)
Elevation: 1152 feet (RTKB)
Total Depth: 4367 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2158 - 2963
Evergreen Shale	2963 - 3406
Precipice Sandstone	3406 - 3447
Moolayember Formation	3447 - 3656
Showground Sandstone	3656 - 3661
Rewan Formation	3661 - 4030
Bandanna Formation	4030 - 4351
Basement	4351 - 4367

Testing

D.S.T. No. 1
3623 - 3673'
Showground Sandstone

Recovered 1950 feet water

Initial Flow	: 45 minutes
Initial Closed-in	: 30 "
Final Flow	: 45 "
Final Closed-in	: 30 "

Initial build-up

Time Defl.	Recorder @ 3660'	Recorder @ 3665'
0	599 psig	612 psig
3	1130	1113
6	1177	1177
9	1208	1210
12	1230	1233
15	1251	1253
18	1266	1269
21	1280	1284
24	1291	1294
27	1302	1306
30	1310	1315

I.F. 42
I.S.I. 30

Estimated equilibrium pressure 1428 psig @ 3660'
" " " 1438 psig @ 3665'
Average static pressure 1432 psig @ 3660'

Final build-up

Time Defl.	Recorder @ 3660'
0	883 psig
3	1139
6	1176
9	1196
12	1210
15	1223
18	1235
21	1244
24	1254
27	1261
30	1266

F.F. 42
F.S.I. 30

Estimated equilibrium pressure 1374 psig @ 3660'

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	4300
Na	1736
Ca	8
Mg	6
Cl	1555
SO_4	6
HCO_3	1647
CO_3	156
pH	8.7
R_w@25°C	1.46 ohm.m

Comments

Although there is good agreement between the two recorders in the initial build-up, the extrapolation of 120 psi makes the accuracy uncertain.

Union-Kern-A.O.G. Davidson No. 1 (Non-subsidized)

Location: Lat. 27° 12' 05" S

Long. 150° 10' 10" E

Elevation: 946 feet (RTKB)

Total Depth: 7524 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	1093 - 3434
Walloon Formation	3434 - 4742
Hutton Sandstone	4742 - 5453
Evergreen Shale	5453 - 5932
Precipice Sandstone	5932 - 6340
Cabawin Formation	6340 - T.D.

Testing

W.L.T. No. 1 Recovered 7500 ccs water

6122'

Precipice Sandstone C.I.P. 2591 psig @ 6130' (Amerada)

Water Analysis

	WLT @ 6122'
	ppm
Total Solids	2400
Na	444
Ca	6
Cl	100
SO_4	42
HCO_3	976
pH	8.3
R_w @ 25°C	5.0 ohm.m.

Comments

The calculated potentiometric level of 800 feet A.S.L. is in agreement with a nearby well (Undulla No. 1, 802 ft A.S.L.)

A.A.O. Dirinda No. 1

Location: Lat. 26°40'47" S
Long. 148°40'32" E
Map Ref. 150686 (Roma 4 mile sheet)

Elevation: 1038 feet (RTKB)

Total Depth: 4295 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3008 - 3627
Evergreen Shale	3627 - 3964
Timbury Hills Formation	3964 - T.D.

Testing

D.S.T. No. 2
3965 - 4000'
Timbury Hills Formation

Flowed gas at max. rate 36.5 Mcf/day
Recovered 590 feet oil (46°API grav. @ 60°F)
280 feet oil- and gas-cut mud

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 60 "
Final Closed-in	: 60 "

Initial build-up

Time Defl.	Recorder @ 3986'	Time Defl.	Recorder @ 3995'
0	199 psig	0	208 psig
8	1330	10	1347
12	1438	14	1452
16	1483	18	1485
20	1510	22	1515
24	1534	26	1538
28	1556	30	1560
32	1575	34	1577
36	1589	38	1592
40	1601	42	1605
44	1613	46	1615
I.F. 43		I.F. 44	
I.S.I. 44		I.S.I. 46	

Estimated equilibrium pressure 1768 psig @ 3986'
" " " 1775 psig @ 3995'

Final build-up

Time Def.	Recorder @ 3986'
0	370 psig
7	1217
13	1328
19	1375
25	1407
31	1438
37	1464
43	1485
49	1507
55	1523
61	1535

F.F. 43
F.S.I. 44

Estimated equilibrium pressure 1741 psig @ 3986'
Average static pressure 1771.5 psig @ 3990'

Comments

The extrapolation on the initial build-up of the above test is over 150 psi, so that although the gauges agree well, the overall accuracy may not be better than ± 40 psi.

The oil in the Timbury Hills Formation is thought to have originated in the Precipice Sandstone.

Union-Kern-A.O.G. Dockerill No. 1

Location: Lat. 27°50'46" S
Long. 150°17'21" E

Elevation: 884 feet (RTKB)

Total Depth: 6009 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	4573 - 5151
Evergreen Shale	5151 - 5587
Precipice Sandstone	5587 - 5873
Pre-Back Creek Fm	5873 - T.D.

Testing

D.S.T. No. 1
5780 - 5790'
Precipice Sandstone

Recovered 240 feet mud cushion, 1400 feet slightly gassy water.

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	45 "
Final Closed-in	:	45 "

Initial build-up on top recorder stepping

Initial build-up (Bottom recorder @ 5790')

Time (mins)	Pressure (psig)
0	638
3	2254
6	2298
9	2325
12	2346
15	2358
18	2371
21	2379
24	2387
27	2394
30	2398

Estimated equilibrium pressure 2459 psig @ 5790'

Water Analysis

	D.S.T. No. 1 ppm
T.D.S.	3600
Na	850
Ca	20
Mg	8
Cl	385
SO_4	65
CO_3	420
HCO_3	744
Organic matter	800
pH	9.2
R_w@25°C	3.08 ohm.m

Comments

The accuracy of the above pressure is uncertain as it is from a single gauge, and is also obtained by an extrapolation of 60 psi.

Union-Kern-A.O.G. Donga No. 1 (Non-subsidized)

Location: Lat. 27° 31' 31" S

Long. 148° 49' 35" E

Elevation: 759 (RTKB)

Total Depth: 5236 feet

Stratigraphy

	Ft. below RTKB
Blythesdale Group	2080 - 3869
Walloon Formation	3869 - 4360
Hutton Sandstone	4360 - 4849
Evergreen-Precipice	4849 - 5082
"Wandoan" Formation	5082 - 5193
Basement	5193 - T.D.

Testing

D.S.T. No. 1 Recovered 105 feet of oil

5172 - 5236' 2197 feet of fresh water

"Wandoan" Formation Initial Flow : 10 minutes

Initial Closed-in : 30 minutes

Final Flow : 45 minutes

Final Closed-in : 45 minutes

Initial build-up

@ 5156'	@5232'
psig	psig
353	344
2323	2292
2334	2307
2341	2318
2345	2322
2350	2326
2352	2331
2354	2333
2356	2335
2358	2337
2361	2339

Estimated equilibrium pressure 2374 psig @ 5156'

" " " 2353 psig @ 5232'

Average static pressure 2363.5 psig @ 5194'

D.S.T. No. 2 — Recovered 1597 feet fresh water with slight oil and gas cut

5172 - 5202'

"Wandoan" Formation

Initial Flow : 5 minutes

Initial Closed-in : 30 minutes

Final Flow : 30 minutes

Final Closed-in : 30 minutes

Initial build-up

@ 5156'	@ 5197'
psig	psig
205	374
2219	2246
2230	2258
2235	2265
2237	2269
2241	2271
2243	2273
2243	2275
2246	2278
2248	2280
2248	2280

Estimated equilibrium pressure 2260 psig @ 5156'

" " " 2296 psig @ 5197'

Average static pressure 2278 psig @ 5176'

Water Analysis

	D.S.T. No. 1
	ppm
Total Solids	2750
Na	920
Ca	16
Mg	2
Cl	960
SO_4	57
HCO_3	775
pH	7.1
Rw @ 25° C	2.17 ohm.m.

Comments

The zone tested in D.S.T. Nos. 1 and 2 appears to have suffered a depletion effect, and only the results of D.S.T. No. 1 can be expected to approximate the original static pressure. There is a 54 psi difference between the gauges in D.S.T. No. 1, and with a 13.5 psi extrapolation the results are only likely to be good to ± 30 psi.

Calculated potentiometric height 1030' A.S.L.

A.A.O. Duarran No. 1

Location: Lat. 26°41'55" S
Long. 148°48'33" E
Map Ref. 162 683 (Roma 4 mile sheet)
Elevation: 945 feet (RTKB)
Total Depth: 4315 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2957 - 3703
Evergreen Shale	3703 - 4025
Precipice Sandstone	4025 - 4068
Moolayember Formation	4068 - 4288
Timbury Hills Formation	4288 - T.D.

Testing

D.S.T. No. 1
4020 - 4072'
Precipice Sandstone

Recovered 210 feet oil (40.5° API gravity)
860 feet brackish water (no analysis supplied)
Flowed gas at max. rate 472 Mcf/day
I.C.I.P. and F.C.I.P. 1888 psig @ 4003'
" " 1891 psig @ 4032'
Average static pressure 1890.5 psig @ 4020'

Comments

The agreement between the gauges is good and the static pressure value can be considered accurate.

Union-Kern-A.O.G. Dulacca No. 1 (Non-subsidized)

Location: Lat. 26° 33' 17" S

Long. 149° 52' 34" E

Elevation: 1195 feet (RTKB)

Total Depth: 6469 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	3560 - 4590
Evergreen Shale	4590 - 5080
(Conloi Sand	4890 - 4905)
Precipice Sandstone	5080 - 5350 (Top main permeable zone 5194')
Wandoan Formation	5350 - T.D.

Testing

D.S.T. No. 1

5197 - 5213'

Precipice Sandstone

Flowed 5 Mcf/day gas for 15 minutes then died

Recovered 120 feet slightly gassy mud

240 feet slightly muddy water

4434 feet slightly gassy water with scum of oil.

Initial flow : 5 minutes

Initial closed-in : 30 "

Final flow : 45 "

Final closed-in : 45 "

F.F.P. 2061 psig @ 5182'

F.C.I.P. 2074 psig @ 5182' (Steady)

F.F.P. 2121 psig @ 5213'

F.C.I.P. 2130 psig @ 5213' (Steady)

Average static pressure 2103 psig @ 5200'

Water Analysis

	D.S.T. No. 1
	ppm
Total Solids	1280
Na	487
Ca	10
Cl	85
SO_4	3
HCO_3	1170
pH	7.5
R_w @ 25°C	5.35 ohm.m.

Comments

After correcting for elevation there is approximately 42 psi difference between the gauges. Because of the gas in the liquids it is not possible to check properly against recovery.

Calculated potentiometric level is 850' A.S.L. Because of gauge difference, must be considered ± 50 feet.

Phillips-Sunray Durabilla No. 1

Location: Lat. 27°33'00" S
Long. 150°51'45" E
Elevation: 1268 feet (RTKB)
Total Depth: 4358 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2528 - 3150
Evergreen Shale	3150 - 3744
Carboniferous	3744 - T.D.

Testing

D.S.T. No. 1 — Recovered 1916 feet muddy water
3026 - 3113'
Hutton Sandstone

Initial Closed-in : 48 minutes
Flow : 60 "
Final Closed-in : 45 "

I.C.I.P. 1228 psig @ 3009'
" 1293 psig @ 3109'
Average static pressure 1260.5 psig @ 3059'

Comments

Agreement between the gauges is only fair, and the static pressure is probably correct to ± 20 psi.

Union-Kern-A.O.G. Elgin No. 1 (Non-subsidized)

Location: Lat. 27° 38' 18" S

Long. 148° 51' 17" E

Elevation: 779 feet (RTKB)

Total Depth: 5445 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	2261 - 4135
Walloon Formation	4135 - 4550
Hutton Sandstone	4550 - 5065
Evergreen-Precipice	5065 - 5310
"Wandoan" Sandstone	5310 - 5411
Basement	5411 - T.D.

Testing

D.S.T. No. 1 Recovered 480 feet muddy fresh water

5388 - 5445'

"Wandoan" Sandstone

Initial flow : 5 minutes

Initial closed-in : 30 minutes

Final flow : 30 minutes

Final closed-in : 30 minutes

Initial build-up

@ 5375'	@ 5441'
psig	psig
73	93
1850	2166
2223	2285
2300	2335
2336	2364
2359	2384
2376	2398
2385	2407
2394	2416
2401	2422
2406	2427

Estimated equilibrium pressure 2454 psig @ 5375'

" " " 2473 psig @ 5441'

Average static pressure 2463.5 psig @ 5408'

Water Analysis

	D.S.T. No. 1
	ppm
Total Solids	3500
Na	1267
Ca	20
Mg	5
Cl	1015
SO_4	31
HCO_3	1659
pH	7.6
R_w @ 25° C	1.89 ohm.m.

Comments

The extrapolation is 47 psi and the difference between the gauges 10 psi. The result is therefore probably good to ± 25 psi. Calculated potentiometric height 1060 ft A.S.L.

Union-Kern-A.O.G. Giligulgul No. 1

Location: Lat. 25°, 22' 21" S
Long. 149° 56' 52" E
Elevation: 1462 feet (RTKB)
Total Depth: 6117 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2818 - 3665
Evergreen Shale	3665 - 4180
Precipice Sandstone	4180 - 4620
Wandoan Sandstone	4620 - 5553
Cabawin Formation	5553 - T.D.

Testing

D.S.T. No. 1
4262 - 4280'
Precipice Sandstone

Recovered 525 feet muddy water
Initial Flow : 5 minutes
Initial Closed-in : 30 "
Final Flow : 45 "
Final Closed-in : 45 "
I.C.I.P. 1585 psig @ 4248'
" 1589 psig @ 4279'
Average static pressure 1587 psig @ 4264'

D.S.T. No. 2
4284 - 4318'
Precipice Sandstone

Recovered 3620 feet fresh water
I.C.I.P., F.F.P. and F.C.I.P. 1588 psig (top gauge)
" " " 1625 psig (bottom gauge)
Calculated pressure 3620 x 0.433 = 1567.5 psig
This is in reasonable agreement with the top gauge
Static pressure 1588 psig @ 4270' (Assumed depth of top recorder)

D.S.T. No. 3
4896 - 4911'
Wandoan Sandstone

Recovered 360 feet mud
Initial Flow : 5 minutes
Initial Closed-in : 30 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial build-up

Time (minutes)	Pressure (psig) Top Recorder @ 4874'	Bottom Recorder @ 4910'
0	39	64
3	322	355
6	742	706
9	1144	1097
12	1348	1358
15	1471	1483
18	1543	1564
21	1592	1619
24	1630	1661
27	1659	1691
30	1688	1716

Estimated equilibrium pressure 1925 psig @ 4874'
" " " 1990 psig @ 4910'
Average static pressure 1957.5 psig @ 4892'

Water Analysis

	D.S.T. No. 2 ppm
Total Solids	340
Na	92
Ca	16
Mg	1
Cl	22
SO_4	3
HCO_3	256
pH	6.9
R_w@25°C	22.22 ohm.m

Comments

The pressure values for the Precipice Sandstone from D.S.T. Nos. 1 and 2 are in very close agreement and an average value for the potentiometric height of 861 feet A.S.L. may be taken.

Because of the lengthy extrapolation, the Wandoan Sandstone pressure must be considered very doubtful.

Union-Kern-A.O.G. Glenearn No. 1 (Non-subsidized)

Location: Lat. 27° 29' 18" S

Long. 148° 59' 39" E

Elevation: 897 feet (RTKB)

Total Depth: 5954 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	2356 - 4308
Walloon Formation	4308 - 4968
Hutton Sandstone	4968 - 5416
Evergreen-Precipice	5416 - 5684 (no permeable sands)
"Wandoan" Formation	5684 - 5934
Basement	5934 - T.D.

Testing

D.S.T. No. 1

5923 - 5954'

"Wandoan" Formation

Fresh water flowed @ 1470 bpd

Recovered 5907 feet of gas cut fresh water

Initial flow : 5 minutes

Initial closed-in : 30 "

Final flow : 30 "

Final closed-in : 30 "

I.C.I.P. 2641 psig
F.C.I.P. 2643 psig
} @ 5907' steady

I.C.I.P. 2662 psig
F.C.I.P. 2658 psig
} @ 5919' steady

Average static pressure 2651 psig @ 5913'

Water Analysis

	D.S.T. No. 1
	ppm
Total Solids	4000
Na	1300
Ca	36
Cl	1415
SO_4	120
HCO_3	975
pH	7.4
R_w @ 25° C	1.69 ohm.m.

Comments

The calculated potentiometric level is 1104 ft A.S.L., which is 207 feet above the level of the RTKB. Agreement between the gauges is good and the value should be accurate.

A.A.O. Glenroy No. 1

Location: Lat. 26°49'27" S
Long. 148°10'18" E
Elevation: 1111 feet (RTKB)
Total Depth: 3929 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3108 - 3689
Evergreen Shale	3689 - 3874
(Boxvale Sandstone	3754 - 3804)
Precipice Sandstone or equiv.	3874 - 3892
Timbury Hills Formation	3892 - T.D.

Testing

D.S.T. No. 1
3748 - 3807'
Evergreen Shale

Water flowed at the rate of 180 gallons/hour

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 50 "
Final Closed-in	: 45 "

F.C.I.P. 1665 psig @ 3731'
" 1674 psig @ 3770'
Average static pressure 1670.0 psig @ 3752'

D.S.T. No. 2
3596 - 3712'
Hutton Sandstone

Recovered 3560 feet of water (fluid level 30 feet below RTKB)

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 30 "

F.C.I.P. 1569 psig @ 3579'
" 1571 psig @ 3618'
Static pressure 1571 psig @ 3618' re 2651 psig @ 5913'
(agrees with recovery)

Water Analyses

	D.S.T. No. 1	D.S.T. No. 2
	ppm	ppm
Total Solids	1980	1675
Na	273	187
Ca	16	20
Mg	2	2
Cl	45	75
SO_4	20	20
HCO_3	683	415
R_w@25°C	8.7 ohm.m	11.36 ohm.m
pH	8.1	8.1

Comments

The calculated potentiometric levels for the Evergreen Shale and Hutton Sandstone are 1209 feet and 1118 feet A.S.L. respectively. Both values are in very close agreement with levels calculated from the recoveries. It is of interest to note that in this part of the basin, the potentiometric level of the Evergreen Shale is higher than that of the Hutton Sandstone.

A.A.O. Glentulloch No. 1

Location: Lat. 25°47'17" S
Long. 148°22'47" E
Map Ref. 663 793 (Eddystone 4 mile sheet)

Elevation: 1516 feet (RT)

Total Depth: 4083 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	40 - 973
Boxvale Sandstone	973 - 1139
Evergreen Shale	1139 - 1348
Precipice Sandstone	1348 - 1572
Moolayember Formation	1572 - 1683
Bandanna Formation	1683 - 2092
Mantuan Production Fm.	2092 - 2220
Dry Creek Shale	2220 - 2496
Early Storms Sandstone	2496 - 2658
Staircase Sandstone	2658 - 2914
Conglomerate	2914 - 4007
Timbury Hills Formation	4007 - T.D.

Testing

D.S.T. No. 1 — 2470 - 2530' — Early Storms Sst.
Flowed 1.75 million cu. ft/day gas
Flow period : 50 minutes

D.S.T. No. 4 — 2579 - 2720' — Early Storms - Staircase Sst.
Flowed 2.468 million cu. ft/day gas
Flow period : 98 minutes
Closed-in : 30 minutes
F.C.I.P. 1000 psig (depth not stated)

D.S.T. No. 5 — 4727 - 2809' — Staircase Sandstone
Flowed 2.9 million cu. ft/day gas
Flow period : 67 minutes
Closed-in : 32 "
F.C.I.P. 1000 psig (depth not stated)

D.S.T. No. 6 — 2804 - 2875' — Staircase Sandstone
Recovered 2470 feet water. Small gas flow at 6 Mcf/day
Flow period : 60 minutes
Calculated pressure 1070 psig @ 2800'

Prod. Test No. 1 — 2496 - 2530' (perfs.) — Early Storms Sst.
In a 17 hrs. 10 min. flow period, well produced 480 g.p.h. water together with a small amount of gas estimated at 336 Mcf/day.

D.S.T. No. 8 — Flowed 770 Mcf/day gas together with 206 bpd water
2496 - 2530'
Early Storms Sst.
Flow period : 372 minutes
Max. C.I.P. 1030 psig

Prod. Test No. 2 — Flowed 2.1 million cu. ft/day gas together with 330 b.p.d. water
2496 - 2530'
Early Storms Sst.
Flow period : 72 hours
Closed-in : 4¼ "
F.C.I.P. 1030 psig (depth not stated)

D.S.T. No. 9 — Flowed 1.574 million cu. ft/day gas together with 110 b.p.d. water (R_w 0.72 ohm.m @ 85°F)
2585 - 2662')
2794 - 2795')
Flow period : 6 hrs 50 mins.
Early Storms - Staircase Sst.

D.S.T. No. 10 — Flowed 1.277 million cu. ft/day gas together with 165 b.p.d. water
2722 - 2795' (perfs.)
Staircase Sandstone
Flow period : 8 hours

Prod. Test No. 3 — After flowing for 95½ hours, the well was producing 3.538 million cu. ft/day gas together with an unmeasured quantity of water.
2496 - 2795' (perfs.)
Early Storms - Staircase Sst.

Water Analyses

	D.S.T. No. 6		D.S.T. No. 9		D.S.T. No. 10		Prod. Test No. 2	
	g/g	ppm*	g/g	ppm	g/g	ppm	g/g	ppm
Total Solids	746.0	10,657	816.0	11,657	821.0	11,729	812.0	11,600
$CaSO_4$	4.1	59	2.7	39	3.5	50	2.3	33
$MgSO_4$	-	-	1.1	16	1.2	17	0.4	6
$CaCO_3$	5.7	81	-		-		-	
$MgCO_3$	-	-	1.7	24	1.7	24	1.7	24
Na_2CO_3	598.0	8,543	655.0	9,357	652.0	9,314	650.0	9,286
NaCl	131.0	1,871	142.0	2,028	146.0	2,086	145.0	2,071
pH	7.4		8.0		8.0		8.0	

* Original analysis reported in grains/gallon, ppm calculated.

Comments

The closed-in pressures were measured with a coarse type of recorder and are not consistent. After initial testing in which water free gas was produced, subsequent tests all produced gas and water. The cement bond log was considered to show satisfactory bonding and the water was thought to come from the individual zones tested and not from below.

The gas produced in all tests had a CO_2 content of around 10%.

Union-Kern-A.O.G. Gurulmundi No. 1

Location: Lat. 26°25'50" S
Long. 150°03'56" E
Elevation: 1203 feet (RTKB)
Total Depth: 4784 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2235 - 3062
Evergreen Shale	3062 - 3616
Precipice Sandstone	3616 - 4100
Wandoan Formation	4100 - 4496
Cabawin Formation	4496 - T.D.

Testing

D.S.T. No. 2 — Recovered 3300 feet water
3759 - 3784'
Precipice Sandstone
Top Recorder F.C.I.P. 1473 psig @ 3749'
Bottom Recorder I.C.I.P. and F.C.I.P. 1499 psig @ 3780'
Average static pressure 1486 psig @ 3765'

Water Analysis

	D.S.T. No. 2 ppm
Total Solids	500
Na	187
Ca	4
Cl	70
SO_4	2
HCO_3	384
pH	7.4
R_w@25°C	12.8 ohm.m

Comments

Agreement between the gauges is fair and the result should be accurate to ± 10 p.s.i.

Union-Kern-A.O.G. Humbug Creek No. 1 (Non-subsidized)

Location: Lat. 27° 10' 04" S

Long. 150° 11' 36" E

Elevation: 938 feet (RTKB)

Total Depth: 5779 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	1022 - 2838
Walloon Formation	2838 - 3942
Hutton Sandstone	3942 - 4890
Evergreen Shale	4890 - 5296
Precipice Sandstone	5296 - 5668
Back Creek Formation	5668 - T.D.

Testing

D.S.T. No. 1 Recovered 4745 feet of fresh water

5402 - 5435'

Precipice Sandstone

Initial flow : 5 minutes

Initial closed-in : 30 minutes

Final flow : 45 minutes

Final closed-in : 45 minutes

Initial build-up

@ 5386'	@ 5402'
psig	psig
789	873
2191	2191
2216	2233
2229	2253
2238	2267
2245	2274
2249	2281
2254	2286
2258	2290
2261	2290
2263	2293

Final build-up

@ 5386'	@ 5402'
psig	psig
2045	2074
2198	2224
2214	2240
2223	2251
2229	2258
2236	2265
2241	2270
2245	2274
2247	2277
2249	2279

Initial build-up: Estimated equilibrium pressure 2287 psig @ 5386'

" " " 2313 psig @ 5402'

Final build-up: Estimated equilibrium pressure 2270 psig @ 5386'

" " " 2307 psig @ 5402'

Average static pressure from initial build-up 2300 psig @ 5394'

D.S.T. No. 2 Recovered 2500 feet fresh water

5403 - 5416'

Precipice Sandstone

Initial flow : 7 minutes

Initial closed-in : 30 "

Final flow : 30 "

Final Closed-in : 30 "

Top gauge only (bottom clock stopped)

Recorder @ 5390'

Initial build-up	Final build-up
psig	psig
501	1287
2151	2097
2191	2142
2213	2164
2225	2180
2236	2191
2240	2200
2245	2209
2249	2213
2252	2220
2256	2222

Initial build-up: Estimated equilibrium pressure 2283.5 psig @ 5390'

Final build-up: Estimated equilibrium pressure 2268 psig @ 5390'

Estimated static pressure 2283.5 psig @ 5390'

Water Analyses

	D.S.T. No. 1
	ppm
Total Solids	1400
Na	549
Ca	4
Mg	5
Cl	105
SO_4	5
HCO_3	1305
pH	7.2
R_w @ 25° C	4.76 ohm.m.

	D.S.T. No. 2
	ppm
Chloride as Na Cl	264
Alk. as Ca CO_3	1260
Hardness as $CaCO_3$	100
Sulphate as $CaCO_3$	36
pH	8.0
R_w @ 25° C	1.73 ohm.m.

Comments

The best value for the static pressure should be that obtained from the initial build-up in D.S.T. No. 1, since there appears to be a decline in pressure after further flowing.

Calculated potentiometric height 854 ft A.S.L.

Union-Kern-A.O.G. Iminbah No. 1

Location: Lat. 27°52'10" S
Long. 150°15'07" E
Elevation: 866 feet (RTKB)
Total Depth: 5677 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	4330 - 5012
Evergreen Shale	5012 - 5396
Precipice Sandstone	5396 - 5590
Kuttung Formation	5590 - T.D.

Testing

D.S.T. No. 1
5466 - 5487'
Precipice Sandstone

Recovered 240 feet mud cushion (75 lbs/cu.ft)
4947 feet slightly gassy fresh water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	45 "
Final Closed-in	:	45 "

I.C.I.P. 2427 psig @ 5451'
F.F.P. 2263 psig @ 5451' (agrees with recovery)

The other reported I.C.I.P. of 2541 psig @ 5487' does not agree with the top recorder reading and does not correspond with the line on the chart; it should therefore be neglected.

D.S.T. No. 2
5565 - 5677'
Precipice Sandstone

Recovered 240 feet mud cushion
1420 feet fresh water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	45 "
Final Closed-in	:	45 "

Only the bottom gauge gave a satisfactory initial build-up.

Initial build-up

Time (minutes)	Pressure (psig) Recorder @ 5677'
0	331
3	2169
6	2252
9	2294
12	2321
15	2342
18	2358
21	2369
24	2381
27	2390
30	2394

Estimated static pressure 2453 psig @ 5677'

Water Analyses

	D.S.T. No. 1	D.S.T. No. 2
	ppm	ppm
Total Dissolved Solids	2450	2450
Na	752	640
Ca	8	8
Mg	-	2
Cl	265	295
SO_4	96	128
HCO_3	1452	1073
pH	7.6	7.6
R_w@25°C	3.36 ohm.m	3.79 ohm.m

Comments

Calculated potentiometric heights from the above two tests are 1020 and 859 feet A.S.L. respectively. As the pressure in D.S.T. No. 1 was fully built-up and the F.F.P. agrees with the recovery it should be an accurate value. However the value obtained from D.S.T. No. 2 is in close agreement with the value of 858 feet A.S.L. for the nearby Crowder North No. 1 well. There is therefore some uncertainty as to which value is more nearly correct.

A.A.O. Kalima No. 1

Location: Lat. 26°06'04" S
Long. 148°45'11" E
Map Ref. 154 756 (Roma 4 mile sheet)
Elevation: 1346 feet (RTKB)
Total Depth: 2173 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	555 - 1470
Evergreen Shale	1470 - 1846
Precipice Sandstone	1846 - 1996
Moolayember Formation	1996 - 2120
Granite	2120 - T.D.

Testing

D.S.T. No. 1 — Recovered 1600 feet water
1899 - 1952'
Precipice Sandstone

Initial Flow	: 30 minutes
Initial Closed-in	: 30 "
Final Flow	: 15 "
Final Closed-in	: 15 "

I.C.I.P. and F.C.I.P. 723 psig @ 1941'
725 psig @ 1947'
Average static pressure 724 psig @ 1944'

D.S.T. No. 2 — Recovered 460 feet muddy water (R_w 13.3 ohm.m. @ 63°F)
2084 - 2124'
Moolayember-Rewan

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 45 "

Initial build-up

Time Defl.	Recorder @ 2072'	Time Defl.	Recorder @ 2117'
0	149 psig	0	169 psig
8	657	9	676
12	676	13	696
16	687	17	709
20	696	21	719
24	705	25	726
28	710	29	733
32	716	33	737
36	721	37	741
40	725	41	744
44	727	45	747
I.F. 45		I.F. 45	
I.S.I. 44		I.S.I. 45	

Estimated equilibrium pressure 773 psig @ 2972'
" " " 785.5 psig @ 2117'

Final build-up

Time Defl.	Recorder @ 2072'
0	208 psig
8	651
12	667
16	677
20	685
24	693
28	700
32	704
36	708
40	712
44	715

Estimated equilibrium pressure 767 psig @ 2972'
Average static pressure 781.5 psig @ 2100'

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	600
Na	54
Ca	10
Cl	15
SO_4	7
HCO_3	140
pH	7.4
R_w@25°C	35.8 ohm.m

Comments

There is very close agreement between the two gauges in D.S.T. No. 1 and the static pressure value can be considered accurate.

The average extrapolation in D.S.T. No. 2 is 42 psi, but the gauges agree closely.

Calculated potentiometric heights in the two tests differ by only 25 feet, so that the formations appear to be in pressure equilibrium.

A.A.O. Kildare No. 1

Location: Lat. 25°43'16" S
Long. 148°24'46" E
Map Ref. 664 801 (Eddystone 4 mile sheet)
Elevation: 1604 feet (RTKB)
Total Depth: 5724 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	0 - 950
Boxvale Sandstone	950 - 1124
Evergreen Shale	1124 - 1330
Precipice Sandstone	1330 - 1624
Moolayember Formation	1624 - 1750
Rewan Formation	1750 - 2410
Bandanna Formation	2410 - 3010
Mantuan Productus Fm.	3010 - 3090
Dry Creek Shale	3090 - 3445
Permian Units 4-7	3445 - 3760 (not differentiated)
" Unit 8	3760 - T.D.

Testing

D.S.T. No. 1 — Recovered 1450 feet water
3664 - 3701'
Permian — No closed-in pressures.

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	17,200
Na	7,225
Ca	28
SO_4	71
HCO_3	17,006
Cl	1,345
R_w@25°C	0.4762 ohm.m
pH	7.3
Sp. gr.	1.018

A.A.O. Kildare No. 2

Location: Lat. 25°43'09" S
Long. 148°23'00" E
Map Ref. 661 802 (Eddystone 4 mile sheet)
Elevation: 1627 feet (RTKB)
Total Depth: 7662 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	1108 - 1292
Precipice Sandstone	1292 - 1626
Moolayember Formation	1626 - 1805
Bandanna Formation	1805 - 2449
Mantuan Productus Fm.	2449 - 2565
Dry Creek Shale	2565 - 2890
Permian Units 4-10	2890 - T.D.

Testing

D.S.T. No. 1
2996 - 3065'
Permian

Recovered 180 feet mud
2645 feet gasified water

Initial Flow	:	2 minutes
Initial Closed-in	:	30 "
Final Flow	:	90 "
Final Closed-in	:	30 "

Top recorder clock stopped
I.C.I.P. & F.C.I.P. 1225 psig @ 3059' (bottom recorder)

Water Analysis

	D.S.T. No. 1 ppm
T.D.S.	9950
Na	4016
Mg	7
SO_4	61
Cl	350
HCO_3	10,650
pH	7.7
R_w@25°C	0.76 ohm.m

Comments

The static pressure value in D.S.T. No. 1 was obtained from only one recorder and cannot be checked.

Union-Kern-A.O.G. Killaloe No. 1 (Non-subsidized)

Location: Lat. 27° 49' 39" S

Long. 150° 13' 31" E

Elevation: 866 feet (RTKB)

Total Depth: 5941 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	1573 - 3727
Walloon Formation	3727 - 4638
Hutton Sandstone	4638 - 5266
Evergreen Shale	5266 - 5640
Precipice Sandstone	5640 - 5835
Kuttung Formation	5835 - T.D.

Testing

D.S.T. No. 1

5378 - 5415'

Evergreen Shale

Flowed fresh water with slight gas cut.

Rate 1370 bpd through 1" orifice.

Initial flow : 7 minutes

Initial closed-in : 30 "

Final flow : 31 "

Final closed-in : 30 "

I.C.I.P. and F.C.I.P. 2337 psig @ 5366'

I.C.I.P. and F.C.I.P. 2410 psig @ 5412'

Average static pressure 2373.5 psig @ 5389'

D.S.T. No. 2

5704 - 5722'

Precipice Sandstone

Recovered nett 4025 feet slightly muddy fresh water. Packer leaked during initial build-up.

Water Analysis	D.S.T. No. 1
Total Solids	2000 ppm
Na	848
Cl	285
SO_4	76
HCO_3	1665
pH	7.2
R_w @ 25° C	3.3 ohm.m.

Comments

There is a difference of 53 psi between the gauges in D.S.T. No. 1, after correcting for elevation. The average value taken for the static pressure is probably only accurate to about ± 25 psi, and the calculated potentiometric level of 957 ft A.S.L. is probably only good to ± 60 feet.

A.A.O. Killoran No. 1

Location: Lat. 25°54'00" S
Long. 148°19'00" E
Map Ref.: 654 780 (Eddystone 4 mile sheet)
Elevation: 1707 feet (RTKB)
Total Depth: 2350 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	590 - 1372
Boxvale Sandstone	1372 - 1570
Evergreen Shale	1570 - 1760
Precipice Sandstone	1760 - 1900
Dry Creek Shale	1900 - 2031
Early Storms Sandstone	2031 - 2305
Timbury Hills Formation	2305 - 2350

Testing

D.S.T. No. 2 — Recovered 1470 feet of water
1777 - 1842' — Johnston test with now obsolete pressure recorder
Precipice Sandstone
F.F.P. 675 psig
Depth of gauge and tester valve not reported
Assume tester valve @ 1770 feet
Calculated pressure 637 psig @ 1770'

D.S.T. No. 3 — Recovered 1360 feet of water.
2242 - 2350' — No closed-in period, fluid still rising at the
Early Storms Sandstone — end of the test.

Water Analyses

	D.S.T. No. 2 grains/gallon	D.S.T. No. 2 ppm*	D.S.T. No. 3 grains/gallon	D.S.T. No. 3 ppm*
Total Solids	168	2400	60.0	857
$CaSO_4$	0.5	7	0.4	6
$CaCO_3$	9.5	136	3.9	56
$MgCO_3$	1.5	21	1.5	21
Na_2CO_3	1.8	26	39.6	566
NaCl	5.8	83	6.9	99
pH	8.0		7.7	

* N.B. Original analysis given in grains/gallon, ppm calculated.

Comments

Calculation of the static pressure from the recovery in D.S.T. No. 1 is considered to be more accurate than taking the reading of the old type Johnson pressure recorder. Recovery is probably quoted to the next full stand of drillpipe, and the depth of the tester valve was estimated.

Phillips-Sunray Kogan No. 1

Location: Lat. 27°05'16" S
Long. 150°47'55" E
Elevation: 1237 feet (RTKB)
Total Depth: 3437 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	0 - 320
Walloon Coal Measures	320 - 1753
Hutton Sandstone	1753 - 2550
Evergreen Shale	2550 - 3050
Precipice Sandstone	3050 - 3340
Basement	3340 - T.D.

Testing

D.S.T. No. 1 1886 - 2092' Hutton Sandstone

Recovered 270 feet mud (11 ppg), 1385 feet water
Initial Closed-in : 45 minutes
Flow : 60 "
Final Closed-in : 45 "

F.C.I.P. 723 psig @ 1869'
" 842 psig @ 2088'
Static pressure 723 psig @ 1869' (top recorder)

D.S.T. No. 3 3247-3407' Precipice Sandstone

Recovered 180 feet mud, 2227 feet water
Initial Closed-in : 45 minutes
Flow : 60 "
Final Closed-in : 45 "

F.C.I.P. 1199 psig @ 3230'
" 1326 psig @ 3403'
Static pressure 1199 psig @ 3230' (top recorder)

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 3 ppm
Total Solids	2800	4750
Na	713	1647
Ca	40	96
Mg	-	19
SO_4	39	168
HCO_3	1220	3294
Cl	300	735
CO_3	60	-
pH	9.0	7.0
R_w@20°C	2.44 ohm.m	1.415 ohm.m

Comments

A very strong flow of water was obtained in both the D.S.T.'s reported above. Agreement between the widely spaced gauges is only fair, and the pressure values quoted can be considered only moderately accurate.

A.A.O. Kooringa No. 1

Location: Lat. 26°07'10" S
Long. 148°58'40" E
Map Ref. 179 754 (Roma 4 mile sheet)

Elevation: 1168 feet (RT)

Total Depth: 1823 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	482 - 1144
Evergreen Shale	1144 - 1552
Precipice Sandstone	1552 - 1653
Bandanna Formation	1653 - 1760
Timbury Hills Formation	1760 - T.D.

Testing

D.S.T. No. 2
1582 - 1594'
Precipice Sandstone

Recovered 1160 feet fresh water

Initial Closed-in : 8 minutes
Flow : 30 "
Final Closed-in : 12 "

F.F.P. 590 psig @ 1590' (estimated depth) cf calc. 502 psig.

Water Analysis

	D.S.T. No. 2 ppm
Total Solids	310
Na	57
Ca	16
Cl	15
SO_4	5
HCO_3	171
pH	7.7

Comments

The chart reproduction was not very clear, and the difference between the recovery and F.F.P. suggests that this is not an accurate value.

Union-Kern-A.O.G. Kooroon No. 1 (Non-subsidized)

Location: Lat. 27° 52' 21" S

Long. 149° 22' 57" E

Elevation: 764 feet (RTKB)

Total Depth: 7602 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	5565 - 6110
Evergreen-Precipice	6110 - 6427
"Wandoan" sequence	6427 - 7120
Kianga Formation	7120 - 7377
Back Creek section ?	7377 - 7558
Basement	7558 - T.D.

Testing

D.S.T. No. 1 Recovered 4285 feet of fresh water

6397 - 6414'

Evergreen-Precipice

Initial Flow : 5 minutes

Initial Closed-in : 34 minutes

Final Flow : 45 minutes

Final Closed-in : 55 minutes

Initial build-up

Time	@ 6383'	@ 6410'
minutes	psig	psig
0	445	499
3	2751	2788
6	2791	2816
9	2813	2834
12	2825	2844
15	2832	2851
18	2838	2856
21	2843	2859
24	2846	2862
27	2848	2864
30	2850	2866
34	2853	2867

Estimated equilibrium pressure 2872.5 psig @ 6383'

" " " 2881 psig @ 6410'

Average static pressure 2878 psig @ 6400'

Final build-up

Time	@ 6383'	@ 6410'
minutes	psig	psig
0	1781	1908
5	2723	2733
10	2769	2782
15	2791	2808
20	2807	2823
25	2817	2833
30	2825	2840
35	2831	2845
40	2835	2849
45	2839	2852
50	2841	2855
55	2842	2856

Estimated equilibrium pressure 2875.5 psig @ 6383'

" " " 2886.5 psig @ 6410'

Average static pressure 2882.5 psig @ 6400'

Water Analysis

	D.S.T. No. 1
Total Solids	3250
Na	1262
Ca	8
Cl	1000
SO_4	42
HCO_3	1604
pH	7.9
Rw @ 25° C	1.96 ohm.m.

Comments

The longer extrapolation in the final build-up may account for the small difference in the two analyses. It is probably more correct to take the result of the initial build-up.

Phillips-Sunray Kumbarilla No. 1

Location: Lat. 27°25'38" S
Long. 150°47'06" E
Elevation: 1276 feet (RTKB)
Total Depth: 4034 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	Surface - 1746
Walloon Coal Measures	1746 - 2848
Hutton Sandstone	2848 - 3600
Evergreen Shale	3600 - 4004
Basement	4004 - T.D.

Testing

D.S.T. No. 1
2905 - 3048'
Hutton Sandstone

Recovered 240 feet drilling mud
2319 feet water

Initial Flow : 11 minutes
Initial Closed-in : 30 "
Final Flow : 30
Final Closed-in : 30 "

F.C.I.P. 1164 psig @ 2889'
" 1231 psig @ 3044'
Average static pressure 1199 psig @ 2970'

Water Analysis

	D.S.T. No. 1 ppm
T.D.S.	1800
Na	692
Ca	4
CO_3	96
HCO_3	1427
Cl	130
pH	8.4
R_w@25°C	3.85 ohm.m

Comments

Very good agreement between the gauges and pressure fully built-up after strong flow.

Union-Kern-A.O.G. Liddell No. 1

Location: Lat. 27°35'32" S
Long. 150°21'28" E
Elevation: 943 feet (RTKB)
Total Depth: 5757 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	5030-5418
Precipice Sandstone	5418-5740
Kuttung Formation	5740-T.D.

Testing

D.S.T. No. 1
5599-5644'
Precipice Sandstone

Recovered 400 feet mud cushion, 480 feet watery mud, 600 feet muddy water, 2420 feet fresh water.
Unable to close tool for build-up

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	1590
Na	616
Ca	8
Mg	5
SO_4	8
HCO_3	1208
Cl	165
pH	7.9
R_w@25°C	4.22 ohm.m

A.A.O. Lorne No. 1

Location: Lat. 26°42'15" S
Long. 148°26'00" E
Elevation: 1113 feet (RTKB)
Total Depth: 4250 feet

Stratigraphy

	Ft below RT KB
Hutton Sandstone	3050 - 3732
Evergreen Shale	3732 - 4025
Precipice Sandstone	4025 - 4227
Permian Unit 8	4227 - T.D.

Testing

D.S.T. No. 1
3830 - 3891'
Evergreen Shale

Recovered 3895 feet of fresh water

Initial Flow	:	2 minutes
Initial Closed-in	:	45 "
Final Flow	:	90 "
Final Closed-in	:	45 "

I.C.I.P. 1716 psig @ 3880'
" 1737 psig @ 3885'
Average static pressure 1725 psig @ 3880'

D.S.T. No. 3
4144 - 4250'
Precipice Sandstone

Water flowed at the surface at 1100 g.p.h.

F.C.I.P. 1872 psig @ 4166'
F.C.I.P. 1887 psig @ 4243'
Average static pressure 1878 psig @ 4200'

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 3 ppm
T.D.S.	1580	1620
Na	541	606
Ca	6	4
Mg	1	8
Cl	45	45
CO_3	126	30
HCO_3	1128	1495
R_w @25°C	4.76 ohm.m	4.48 ohm.m
pH	8.8	8.3

Comments

In D.S.T. No. 1 the agreement between the two gauges is fair and the gauges check well with the recovery. In D.S.T. No. 3 the check between the gauges is fair; as the well was flowing it is not possible to check the gauges against recovery without further information.

Union-Kern-A.O.G. Mackie No. 1

Location: Lat. 26°56'16" S
Long. 150°21'35" E
Elevation: 1061 feet (RTKB)
Total Depth: 3965 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2452 - 3230
Evergreen Shale	3230 - 3710
Precipice Sandstone	3710 - 3913
Kuttung Formation	3913 - T.D.

Testing

D.S.T. No. 1
3755 - 3770'
Precipice Sandstone

Recovered 240 feet mud cushion (73 lbs/cu. ft)
1645 feet slightly gassy water
Initial Closed-in : 30 minutes
Flow : 45 "
Final Closed-in : 45 "

I.C.I.P. { 1605 psig @ 3730'
{ 1575 psig @ 3770'

Average static pressure 1590 psig @ 3750'

Water Analysis

	D.S.T. No. 1 ppm
T.D.S.	2500
Na	911
Ca	40
Mg	1
SO_4	16
HCO_3	146
Cl	1380
R_w @25°C	3.39 ohm.m
pH	7.0

Comments

The accuracy of the pressure value quoted above is doubtful for the following reasons :-

(1) Both recorders were 'stepping' after the initial closed-in period.

(2) The bottom recorder read lower than the upper recorder.

Union-Kern-A.O.G. Major No. 1 — Non-subsidised

Location: Lat. 27° 37' 22" S

Long. 148° 54' 10" E

Elevation: 881 feet (RTKB)

Total Depth: 5576 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	2141-4142
Walloon Formation	4142-4585
Hutton Sandstone	4585-5102
Evergreen-Precipice	5102-5314 (no sand development)
"Wandoan" Sandstone	5314-5546
Basement	5546-T.D.

Testing

D.S.T. No. 1

5530 - 5577'

"Wandoan" Sandstone

Flowed gas at 1.8 million cu. ft/day, together with 60 bpd condensate. Recovered gross rise of 250 feet of condensate contaminated mud; approximately 50% of 54° A.P.I. gravity condensate with trace of water.

Opened tool 6:16 a.m.

(unable to close)

Pulled loose 7.51 a.m.

Reset and reopened 8.14 a.m.

Closed in 8.19 a.m.

Pulled loose 9.49 a.m.

F.C.I.P. 2482 psig @ 5515')
) steady
F.C.I.P. 2494 psig @ 5573')

Average static pressure 2488 psig @ 5544'

W.L.T. No. 1

5537'

"Wandoan" Sandstone

Recovered 29.5 cu. ft. gas

930 ccs mud filtrate

170 ccs mud

Trace of oil

Closed-in pressure 2516.6 psig (Amerada)

" " 2550 psig (Schlumberger)

Static pressure 2516.6 psig @ 5545'

Static gradient pressure survey

Depth	Pressure
Ft below RTKB	psig
0	2060
2000	2209
4000	2362
5000	2434
5538	2475

Static B.H.T. 164°F

Comments

Calculated potentiometric levels for the above three tests are:-

D.S.T. No. 1	1067 ft A.S.L.
W.L.T. No. 1	1148 ft A.S.L.
Static survey	1063 ft A.S.L.

There is a possibility that supercharging in the formation has not been relieved in the wire-line test. The best value is probably the average of the other two readings, i.e., 1065 ft A.S.L.

Union-Kern-A.O.G. Major No. 2 (Non-subsidized)

Location: Lat. 27° 38' 30" S
Long. 148° 54' 27" E

Elevation: 834 feet (RTKB)

Total Depth: 5585 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	2313 - 4156
Walloon Formation	4156 - 4655
Hutton Sandstone	4655 - 5118
Evergreen-Precipice	5118 - 5367
Wandoan Formation	5367 - 5555
Basement	5555 - T.D.

Testing

D.S.T. No. 1.
5542 - 5585'
Wandoan Formation

Well flowed gas-cut fresh water at estimated 1000-1200 barrels/day.
Oil scum on water (½ bbl yellow-green crude)

Initial Flow	:	11 minutes
Initial Closed-in	:	31 "
Final Flow	:	47 "
Final Closed-in	:	45 "

I.C.I.P. 2488 psig) @ 5522' (steady)
F.C.I.P. 2489 psig)
I.C.I.P. 2512 psig) @ 5581' (steady)
F.C.I.P. 2519 psig)

Average static pressure 2503 psig @ 5550'

Water Analysis

	D.S.T. No. 1
	ppm
Total Solids	5490
Na	2178
Ca	40
Mg	2
Cl	2580
SO_4	16
HCO_3	1330
pH	7.2
Rw @ 25° C	1.1 ohm.m.

Comments

Agreement between the gauges is close. The calculated potentiometric level (1074 feet A.S.L.) is almost identical with that of Major No. 1. As Major No. 1 produced gas and there were traces of oil in Major No. 2, a well situated structurally between these two wells might produce oil.

A.A.O. Meeleebee No. 1

Location: Lat. 26°11'00" S
Long. 149°12'00" E
Map Ref. 204 745 (Roma 4 mile sheet)
Elevation: 1040 feet (RT)
Total Depth: 5075 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	1280 - 2150
Evergreen Shale	2150 - 2553
Precipice Sandstone	2553 - 2758
Rewan Formation	2758 - 3551
Bandanna Formation	3551 - 4398
Mantuan Productus Fm.	4398 - 4428
Dry Creek Shale	4428 - 4914
Early Storms Sandstone	4914 - 5032
Timbury Hills Formation	5032 - T.D.

Testing

D.S.T. No. 2
2619 - 2705'
Precipice Sandstone

Recovered full string of water.
Fluid rose to ground level and did not flow at the surface.
Fluid level 1030 feet A.S.L.
Static pressure calc. = 1145 psig @ 2650'
This calculated pressure compares with a value of 1150 psig measured by a coarse gauge.

Water Analysis

	D.S.T. No. 2 Grains/gallon	ppm *
Total Solids	98.0	1400
Calcium Carbonate	1.7	24
Magnesium Carbonate	0.8	11
Magnesium Chloride	14.5	207
Sodium Chloride	5.8	83
pH	7.1	

* Analysis reported in grains/gallon, ppm calculated.

Comments

The pressure was calculated on the basis of the fluid recovered being all fresh water, but as the water was probably mud contaminated, the calculated pressure could be slightly low.

Phillips - Sunray Millmerran No. 1

Location: Lat. 27°46' 34" S
Long. 151°14' 51" E
Elevation: 1253 feet (RTKB))
Total Depth: 1919 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	914 - 1554
Evergreen Shale	1554 - 1884
Basement	1884 - 1919

Testing

D.S.T. No. 1
1148 - 1268'
Hutton Sandstone

Recovered 270 feet mud (9.2 p.p.g.), 180 feet muddy water, 572 feet fresh water.

Initial Flow	:	5 minutes
Initial Closed-in	:	60 "
Final Flow	:	60 "
Final Closed-in	:	60 "

I.C.I.P. and F.C.I.P. 506 psig @ 1265'
F.F.P. 504 psig @ 1265' (Tester Valve @ 1126')
Top chart damaged.

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	2200
Na	775
Ca	24
Mg	2
Cl	1085
SO_4	6
HCO_3	268
pH	7.9
R_w@25°C	2.67

Comments

The well was drilled to test a postulated wedge-out of the Precipice Sandstone against the subsurface projection of the New England High, within the westward plunging embayment of the Surat Basin. Hydrodynamic flow was expected to be favourable down-dip off the New England High.

Union-Kern-A.O.G. Minima No. 1

Location: Lat. 28° and 24.5 miles S
Long. 150° and 7.0 miles E
Map Reference 306 484 (Goondiwindi 4 mile sheet)

Elevation: 691 feet (RTKB)

Total Depth: 7142 feet

Stratigraphy

	Ft below RTKB
Bundamba Group	4577 - 5695
Cabawin Formation	5695 - 6153
Kianga Formation	6153 - 6264
Back Creek Formation	6264 - 6782
Kuttung Formation	6782 - T.D.

Testing

D.S.T. No. 1
5403 - 5418'
Precipice Sandstone

Recovered 270 feet mud, 2700 feet fresh water.
B T recorder clock stopped. Tool did not close.

D.S.T. No. 2
5544 - 5560'
Precipice Sandstone

Recovered 180 feet mud cushion (77 lbs/cu. ft)
270 feet muddy water, 4920 feet fresh water.
Tool open for 60 minutes. Flowing pressure steady after 45 minutes.
Static pressure calculated 2360 psig @ 5540'
(Depth of recorder estimated)
F.F.P. 2300 psig on P.R.D.

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm
Total Solids	4870	1300
Na	808	979
Ca	2	10
HCO_3	2098	1250
Cl	30	80
pH	8.3	8.0
R_w@25°C	3.4 ohm.m	5.1 ohm.m

Comments

The static pressure calculated from the recovery in D.S.T. No. 2 agrees reasonably well with the F.F.P. recorded, but cannot be considered an accurate value.

Union-Kern-A.O.G. Minnabilla No. 1

Location: Lat. 27°55'31" S
Long. 150°15'23" E
Elevation: 836 feet (RTKB)
Total Depth: 5526 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	4363 - 4890
Evergreen Shale	4890 - 5306
Precipice Sandstone	5306 - 5481
Kuttung Formation	5481 - T.D.

Testing

D.S.T. No. 1
5374 - 5390'
Precipice Sandstone

Recovered 180 feet mud cushion (76 lbs/cu. ft)
250 feet gassy watery mud with oil scum
3120 feet gassy fresh water

Initial Flow : 5 minutes
Initial Closed-in : 30 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial Build-up

Time (minutes)	Pressure (psig) Top recorder @ 5361'	Bottom recorder @ 5386'
0	515	549
3	2068	2049
6	2144	2148
9	2184	2197
12	2211	2230
15	2232	2250
18	2247	2268
21	2260	2280
24	2269	2290
27	2278	2298
30	2285	2305

Estimated equilibrium pressure 2355 psig @ 5361'
" " " 2369 psig @ 5386'
Average static pressure 2362 psig @ 5374

Water Analysis

	D.S.T. No. 1
	ppm
T.D.S.	2600
Na	831
Ca	16
Mg	2
Cl	665
SO_4	38
HCO_3	1074
pH	8.0
R_w@25°C	2.94 ohm.m

Comments

The readings of the two gauges check well both with the recovery and with each other, and although the extrapolations were 70 psi and 64 psi respectively, the calculated static pressure should be fairly accurate.

Union-Kern-A.O.G. Moonie No. 1

Location: Lat. 27°44'54" S
Long. 150°15'25" E
Elevation: 893 feet (RTKB)
Total Depth: 6106 feet

Stratigraphy

	Ft below RTKB
Walloon Coal Measures	3538 - 4557
Bundamba Group	4557 - 5933
Kuttung Formation	5933 - T.D.

Testing

D.S.T. No. 1
5816 - 5925'
Precipice Sandstone

Flowed 250 bpd oil
250 bpd water
200 Mcf/day gas
Flow: 74 minutes
Closed-in: 34 "
F.F.P. 2515 psig)
F.C.I.P. 2800 psig)
Depth not stated

D.S.T. No. 2
5439 - 5840
Precipice Sandstone

Flowed 1440 bpd oil and 100 Mcf/day gas
Flow: 85 minutes
Closed-in: 60 "
F.F.P. 1577 psig)
F.C.I.P. 2501 psig)
@ 5835'

D.S.T. No. 3
5808 - 5814')
5818 - 5840')
Precipice Sandstone

Flowed 1765 bpd oil and 175 Mcf/day gas
Flow: 58 minutes
Closed-in: 52 "
F.F.P. 2165 psig)
F.C.I.P. 2474 psig)
@ 5804'

Water Analysis

	D.S.T. No. 1 ppm
Na	608
Ca	14
Mg	1
Cl	160
SO_4	18
HCO_3	1385
pH	7.8

Comments

From Amerada surveys the accepted value for the initial static pressure is 2501 psig @ 4928 feet subsurface (5821' RTKB).

Union-Kern-A.O.G. Moonie No. 12 (Non-subsidized)

Location: Lat. 27° 47' 02" S.

Long. 150° 13' 37" E

Elevation: 879 feet (RTKB)

Total Depth: 6047 feet

Stratigraphy

	Ft below RTKB
Walloon Formation	3707 - 4646
Bundamba Group	4646 - 5979
Kuttung Formation	5979 - T.D.

Testing

D.S.T. No. 1

5873 - 5891'

Precipice Sandstone

Recovered 445 feet mud cushion (71 lbs/cu. ft.)

5355 feet fresh water

Initial closed-in : 30 minutes

Flow : 60 "

Final closed-in : 30 "

I.C.I.P. and F.C.I.P. 2510 psig @ 5880' (est.)

Comments

The calculated potentiometric level is 800 feet A.S.L., assuming the depth of measurement as 5880'. This level is 50 feet lower than that of Moonie No. 1. The measured F.F.P. is low when compared with the reported recovery.

Union-Kern-A.O.G. Moonie No. 16 (Non-subsidized)

Location: Lat. 27° 43' 26" S.

Long. 150° 16' 37" E

Elevation: 898 feet (RTKB)

Total Depth: 6178 feet

Stratigraphy

	Ft below RTKB
Walloon Formation	3550 - 4588
Bundamba Group	4588 - 6025
Kuttung Formation	6025 - T.D.

Testing

D.S.T. No. 1 Nett rise 1550 feet slightly muddy fresh water

5858 - 5888'

Precipice Sandstone

Initial closed-in : 30 minutes

Flow : 60 "

Final closed-in : 30 "

Initial build-up

Top gauge at 5842'

psig
2244
2279
2306
2322
2341
2352
2360
2374
2382
2386

Estimated equilibrium pressure 2454 psig @ 5842'

(using an assumed value T = 3 minutes)

Comments

The above pressure value gives a calculated potentiometric level of 721 ft A.S.L. This is some 130 feet lower than the level in

Moonie No. 1. However, as the reading in Moonie No. 16 is a single unchecked value from an extrapolation of 66 psi, it is of uncertain reliability.

Union-Kerr-A.O.G. Myall Creek No. 1

Location: Lat. 27°04'47" S
Long. 149°12'11" E

Elevation: 618 feet (RTKB)

Total Depth: 7159 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	4334 - 5069
Evergreen Shale	5069 - 5647
Wandoan - Precipice Sandstones	5647 - 6099
Cabawin Formation	6099 - 6380
Kianga Formation	6380 - 7088
Timbury Hills Formation	7088 - T.D.

Testing

D.S.T. No. 1
6218 - 6240'
Cabawin Formation

Flowed gas 20 Mcf/day
No useable pressures

D.S.T. No. 2
6968 - 6989'
Kianga Formation

Recovered 300 feet watery mud
150 feet muddy water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	60 "
Final Closed-in	:	-

In the initial build-up, the top recorder showed 'stepping', and the extrapolation on the build-up of the bottom recorder is too big to obtain an accurate static pressure.

Water Analysis

	D.S.T. No. 2 ppm
Total Dissolved Solids	6700
Na	2375
Ca	18
Mg	20
SO_4	340
HCO_3	965
Cl	3025
R_w@25°C	0.97 ohm.m
pH	6.9

Comments

No reliable static reservoir pressures were obtained in the above tests.

A.A.O. Quibet No. 1

Location: Lat. 26°27'06" S
Long. 148°50'25" E
Map Ref.: 166 713 (Roma 4 mile sheet)
Elevation: 1198 feet (RTKB)
Total Depth: 3555 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2198 - 2957
Evergreen Shale	2957 - 3414
Precipice Sandstone	3414 - 3453
Moolayember Formation	3453 - 3484
Granite Wash	3483 - 3530
Basement	3530 - T.D.

Testing

D.S.T. No. 1
3325 - 3474'
Evergreen-Precipice-Moolayember

Recovered 300 feet gas-cut mud
120 feet water and gas-cut mud
2349 feet water

Initial Flow : 55 minutes
Initial Closed-in : 30 "
Final Flow : 30 "
Final Closed-in : 30 "

I.C.I.P. 1313 psig @ 3308'
" 1379 psig @ 3471'
Average static pressure 1346 psig @ 3390'

D.S.T. No. 2
3428 - 3446'
Precipice Sandstone

Recovered 2840 feet water

Initial Flow : 45 minutes
Initial Closed-in : 30 "
Final Flow : 30 "
Final Closed-in : 30 "

Initial build-up

Time Dei.	Recorder @ 3420'	Recorder @ 3440'
0	781 psig	1213 psig
5	1221	1230
8	1228	1234
11	1233	1239
14	1239	1245
17	1243	1250
20	1247	1255
23	1252	1258
26	1255	1261
29	1259	1264
32	1261	1268
	I.F. 39 I.S.I. 32	I.F. 38 I.S.I. 32

Estimated equilibrium pressure 1298 psig @ 3420'
" " " 1298 psig @ 3440'

Final build-up

Time Deft.	Recorder @ 3420'
0	1274 psig
10	1282
12	1283
14	1284
16	1285
18	1286
20	1287
22	1288
24	1289
26	1290
28	1290
F.F. 29	
F.S.I. 28	

Estimated equilibrium pressure 1305 psig @ 3420'
Average static pressure 1298 psig @ 3430'

D.S.T. No. 3
3457.5 - 3471.5'
Precipice-Moolayember

Recovered 765 feet water
Initial Flow : 45 minutes
Initial Closed-in : 45 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial build-up

Time Defl.	Recorder @ 3446'	Recorder @ 3465'
0	186 psig	204 psig
8	757	804
12	842	879
16	903	934
20	949	979
24	981	1004
28	1012	1023
32	1037	1040
36	1060	1061
40	1079	1086
44	1095	1105
	I.F. 41	I.F. 45
	I.S.I. 44	I.S.I. 44

Estimated equilibrium pressure 1332 psig @ 3446'
" " " 1394 psig @ 3465'

Final build-up

Time Defl.	Recorder @ 3446'
0	299 psig
9	753
13	806
17	848
21	882
25	909
29	932
33	954
37	973
41	990
45	1004

Estimated equilibrium pressure 1260 psig @ 3446'
Extrapolations too lengthy for results to be of significance.

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm	D.S.T. No. 3 ppm
Total Solids	6700	6850	6940
Na	2730	2695	2800
Ca	2	4	12
Cl	280	275	260
HCO_3	6770	3420	5915
CO_3	-	420	540
pH	8.2	8.3	8.4
R_w@25°C	1.16 ohm.m	1.13 ohm.m	1.11 ohm.m

Comments

Agreement between the two gauges in D.S.T. No. 1 is very good and the static pressure value can be regarded as accurate.

The extrapolation in the analysis of D.S.T. No. 2 is 33 psi and the agreement between the gauges is satisfactory.

The extrapolation in D.S.T. No. 3 averages 263 psi for the two gauges; this is too long to get any accuracy.

On the basis of the calculated potentiometric heights in D.S.T. Nos. 1 and 2, there appears to be a depletion condition in this zone.

A.A.O. Raslie No. 1

Location: Lat. 26°29'40" S.
Long. 149°04'48" E
Map Ref. 192 707 (Roma 4 mile sheet)

Elevation: 1228 feet (RTKB)

Total Depth: 4388 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	3408 - 3710
Precipice Sandstone	3710 - 3790
Moolayember Formation	3790 - 3948
Showground Sandstone	3948 - 3980
Rewan Formation	3980 - 4157

Testing

D.S.T. No. 1
3700 - 3773'
Precipice Sandstone

Flowed gas at 4.1-4.3 million cu. ft/day
Initial Flow : 45 minutes
Initial Closed-in : 45 "
Final Flow : 70 "
Final Closed-in : 45 "

Initial build-up

Time Defl.	Recorder @ 3765'	Recorder @ 3770'
0	1044 psig	1038 psig
9	1491	1491
13	1505	1508
17	1513	1515
21	1520	1522
25	1525	1528
29	1529	1534
33	1533	1538
37	1539	1542
41	1541	1545
45	1542	1547

I.F. 41
I.S.I. 45

Estimated equilibrium pressure 1575 psig @ 3765'
" " " 1585 psig @ 3770'

Final build-up

Time Defl.	Recorder @ 3765'
0	1020 psig
7	1404
11	1419
15	1435
19	1445
23	1453
27	1460
31	1467
35	1474
39	1481
43	1484

F.F. 68
F.S.I. 43

Estimated equilibrium pressure 1575 psig @ 3765'
Average static pressure 1580 psig @ 3768'

D.S.T. No. 2
3940 - 3967'
Showground Sandstone

Recovered 120 feet heavy oil-cut mud
3590 feet slightly oil-cut water

I.C.I.P. & F.C.I.P. 1633 psig @ 3918 feet
" " 1631 psig @ 3963 feet
Average static pressure 1632 psig @ 3940 feet

Water Analysis

	D.S.T. No. 2 ppm
Total Solids	5080
Na	2093
Ca	10
Mg	2
Cl	1355
SO_4	14
HCO_3	2794
CO_3	35
pH	8.6
R_w@25°C	1.3 ohm.m

Comments

There is very close agreement between the three build-up curves analysed in D.S.T. No. 1, and although the extrapolations on the initial build-up were about 35 psi, the overall accuracy should be ± 15 psi.

The gauges in D.S.T. No. 2 differ by 22 psi, but as the curves were both fully built-up, the average of the two readings should be good to ± 15 psi.

A.A.O. Richmond No. 1

Location: Lat. 26°40'30" S
Long. 148°53'00" E
Map Ref. 169 687 (Roma 4 mile sheet)

Elevation: 983 feet (RTKB)

Total Depth: 4125 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3041 - 3643
Evergreen Shale	3643 - 4003
Precipice Sandstone	4003 - 4084
Moolayember Formation	4084 - 4125

Testing

D.S.T. No. 1
4010 - 4062
Precipice Sandstone

Flowed oil at an initial rate of 1000 bpd
(Oil gravity 42.8° API)
Recovered 30 feet gassy muddy water
100 feet water

Initial Flow	:	2 minutes
Initial Closed-in	:	60 minutes
Final Flow	:	147 "
Final Closed-in	:	63 "

I.C.I.P. 1867 psig @ 4050'
" 1862 psig @ 4055'
Average static pressure 1863.5 psig @ 4050'

Water Analysis

	D.S.T. No. 1 ppm
Total Dissolved Solids	3500
Na	1148
Ca	26
Mg	2
SO_4	103
HCO_3	1440
Cl	990
pH	7.9
R_w @25°C	1.98 ohm.m

Comments

The agreement between the gauges is very close and the static pressure is an accurate value. A subsequent Amerada survey following production from the well gave a pressure of 1802 psig @ 4009'. The indications are that this well penetrated a small reservoir which shows a rapid decline of pressure with production.

Union-Kern-A.O.G. Rock Creek No. 1 (Non-subsidized)

Location: Lat. 27° 21' 38" S

Long. 150° 43' 23" E

Elevation: 1132 feet (RTKB)

Total Depth: 4300 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	0 - 1445
Walloon Formation	1445 - 2648
Hutton Sandstone	2648 - 3318
Evergreen Shale	3318 - 3897
Precipice Sandstone	3897 - 4278 (top of main permeable sand 4060')
Kuttung Formation	4278 - T.D.

Testing

W.L.T. No. 1	Recovered 5000 ccs water
4098'	400 ccs mud
Precipice Sandstone	50 ccs sand
	C.I.P. 1633 psig @ 4106' (Amerada)

Water Analysis

	D.S.T. No. 1
Total Solids	1700 ppm
Na	349
Ca	10
Mg	6
Cl	60
SO_4	24
HCO_3	850
pH	7.9
R_w @ 25° C	7.52 ohm.m.

Comments

The calculated potentiometric level 799' A.S.L. seems reasonable for this location.

A.A.O. Rosewood No. 1

Location: Lat. 26°04'00" S
Long. 148°41'50" E
Map Ref. 147 760 (Roma 4 mile sheet)

Elevation: 1405 feet (RT)

Total Depth: 2075 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	512 - 1343
Evergreen Shale	1343 - 1785
Precipice Sandstone	1785 - 1900
Moolayember Formation	1900 - 2062
Basement	2062 - T.D.

Testing

D.S.T. No. 1 (988 - 1017', Hutton Sandstone)
Recovered 743 feet fresh water (level steady)
Assume tester valve at 980 feet
Calc. pressure at 1000 feet = 763 x 0.433
= 330 psig
Estimated static pressure 330 psig @ 1000'

D.S.T. No. 2 (1761 - 1790', Evergreen - Precipice)
Recovered 1476 feet water (level steady)
F.F.P. 560 psig (low for recovery)
Flow : 64 minutes
Closed-in : 10 "
Calc. static pressure 640 psig @ 1750' (est. depth)

D.S.T. No. 3 (2027 - 2056, Moolayember Formation)
Recovered 1704 feet water
Flow :121 minutes
Closed-in : 10 "
F.F.P. 660 psig (low for recovery)
Calc. static pressure 738 psig @ 2020' (est. depth)

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm	D.S.T. No. 3 ppm
Total Solids	-	450	-
Na	171	73	80
Ca	16	8	12
Mg	41	-	34
Cl	170	20	30
SO_4	25	2	5
HCO_3	146	183	366
CO_3	120	-	
pH	10.5	7.5	8.2
R_w@20°C	6.24	20.86	13.65

Comments

The pressures noted above are calculated from the reported recoveries and are of uncertain accuracy. However the three values are mutually consistent.

Potentiometric Heights

Hutton Sandstone	1167	feet A.S.L.
Evergreen - Precipice	1133	" "
Moolayember Formation	1089	" "

A.A.O. Sawpit Creek No. 1

Location: Lat. 26°29'55" S
Long. 149°09'25" E
Map Ref. 198708 (Roma 4 mile sheet)

Elevation: 1283 (RTKB)
Total Depth: 3753 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2418 - 3040
Evergreen Shale	3040 - 3547
Precipice Sandstone	3547 - 3575
Bandanna Formation	3575 - 3638
Mantuan Productus Fm. - Dry Creek Shale	3638 - 3668
Basement	3668 - T.D.

Testing

D.S.T. No. 1
3558 - 3597'
Precipice - Bandanna

Recovered 410 feet water

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 45 "

Bottom recorder had split stylus.

Top recorder @ 3542'

Time (mins)	Initial build-up Pressure (psig)	Final build-up Pressure (psig)
0	146	223
4.5	1265	1268
9.0	1326	1326
13.5	1353	1350
18.0	1366	1363
22.5	1377	1371
27.0	1382	1379
31.5	1387	1382
36.0	1390	1387
40.5	1393	1390
45.0	1395	1393

Estimated equilibrium pressure 1426 psig @ 3542'

(Initial and final build-ups gave same result)

Water Analysis

	D.S.T. No. 1
	ppm
T.D.S.	4250
Na	1652
Ca	30
Mg	5
Cl	1130
SO_4	41
HCO_3	2501
pH	8.0
R_w@25°C	1.562 ohm.m

Comments

Although the static pressure value above was estimated by extrapolation of the readings of a single gauge, the agreement between the estimates obtained from the initial and final build-ups increases the degree of confidence that can be placed in the result.

A.A.O. Sleepy Creek No. 1

Location: Lat. 26°26'50" S
Long. 148°55'45" E
Map Ref. 175713 (Roma 4 mile sheet)
Elevation: 1284 feet RTKB
Total Depth: 3392 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2115 - 2883
Evergreen Shale	2883 - 3288
Precipice Sandstone	3288 - 3303
Moolayember Formation	3303 - 3352
Basement	3352 - T.D.

Testing

D.S.T. No. 1
3280 - 3306'
Precipice Sandstone

Flowed gas @ 191.8 Mcf/day

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 45 "

Initial build-up

Time Defl.	Recorder @ 3208'	Time Defl.	Recorder @ 3299'
0	67 psig	0	85 psig
7	1295	12	1304
11	1305	16	1314
15	1317	20	1322
19	1324	24	1327
23	1326	28	1331
27	1329	32	1334
31	1332	36	1338
35	1334	40	1341
39	1335	44	1342
43	1336	48	1343
I.F. 42		I.F. 45	
I.S.I. 43		I.S.I. 48	

Estimated equilibrium pressure 1348 psig @ 3208'
" " " 1357 psig @ 3299'

Final build-up

Time Defl.	Recorder @ 3208'
0	88 psig
13	1272
17	1286
21	1295
25	1299
29	1303
33	1305
37	1307
41	1311
45	1313
49	1315
F.F. 43	
F.S.I. 49	

Estimated equilibrium pressure 1349 psig @ 3208'
Static reservoir pressure 1357 psig @ 3299'

Comments

After correcting for elevation in a gas column, the two initial build-up curves give almost identical pressures. As the lower gauge is closer to the presumed gas-water contact, its value is the preferred one for calculating the potentiometric height (1115 feet A.S.L.).

The Gubberamunda member of the Blythesdale Group produced water which stood 31 feet below RTKB. This gives a potentiometric height of 1253 feet A.S.L.

Amalgamated Snake Creek No. 1

Location: Lat. 26°50'35" S
Long. 149°07'18" E

Elevation: 957 feet (RTKB)

Total Depth: 5270 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3687 - 4315
Evergreen Shale	4315 - 4650
Precipice Sandstone	4650 - 4740
Clematis Sandstone	4740 - 5034
Showground Sandstone	5034 - 5050
Rewan Formation	5050 - 5246
Bandanna Formation	5246 - T.D.

Testing

D.S.T. No. 1
4969 - 5079'
Showground Sandstone

Flowed gas at rate of at least 6.25 million cu. ft/day

F.C.I.P. 2270 psig @ 4958'
" 2286 psig @ 5008'
Average Static Pressure 2278 psig 4983'
Using a gradient of 0.077 psi/ft the calculated pressure at 5072' is 2285 psig. This pressure value compares with 2294 psig at 5072' subsequently measured in an Amerada survey.

D.S.T. No. 2
5082 - 5190'
Rewan Formation

Flowed gas at an estimated 50 Mcf/day for 5 minutes before the packer seat failed.

Comments

The agreement between the pressure recorded in D.S.T. No. 1 and the Amerada measurement is good and the readings noted above are considered reliable.

A.A.O. Sunnybank No. 1

Location: Lat. 26°56'25"S
Long. 149°13'30"E
Map Ref. 2071 6539 (Roma 4 mile sheet)
Elevation: 832 feet (RT)
Total Depth: 7134 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	4163 - 4817
Evergreen Shale	4817 - 5134
Precipice Ss.	5134 - 5165
Moolayember Fm.	5165 - 5718
Showground Sandstone	5718 - 5747
Rewan Formation	5747 - 6202
Bandanna Formation	6202 - 6682
Mantuan Productus Fm.	6682 - 6740
Dry Creek Shale	6740 - 6953
Early Storms Sandstone	6953 - 7030
Granite	7030 - T.D.

Testing

D.S.T. No. 1
5723 - 5820'
Showground--Pickanjinnie
Recovered 1110 feet gas cut water
Flow : 93 minutes
Closed-in : 10 minutes
F.C.I.P. 2500 psig (depth not stated)

D.S.T. No. 2
5852 - 5925'
Pickanjinnie Fm.
Gas flowed at 330 Mcf/day
Recovered full string of gas-cut oil (44.8°API)
Initial Closed-in: 2 minutes
Flow : 35 minutes
Final Closed-in : 40 minutes
No pressures recorded.

D.S.T. No. 3
5852 - 5925'
Pickanjinnie Fm.
Flowed oil @ 600 bpd + 300 Mcf/day gas
Flow : 86 minutes
Closed-in : 18 minutes
Pressure build-up incomplete
Estimated formation pressure 2800 psig @ 5890'

D.S.T. No. 5
6139 - 6175'
Pickanjinnie Fm.
Recovered 240 feet gas-cut oil-mud emulsion
60 feet clean oil (44° API gravity)
245 feet water
No pressures recorded.

D.S.T. No. 8
6432 - 6468'
Bandanna Fm.
Gas rate 265 Mcf/day
Flow : 68 minutes
Closed-in : 18 minutes
No pressures recorded.

D.S.T. No. 10	Recovered 90 feet mud
6032 - 6196'	120 feet oil
Pickanjinnie Fm.	120 feet water

No pressures recorded.

D.S.T. No. 11	Recovered 180 feet gas-cut mud
6143 - 6168'	1165 feet gas-cut muddy water
Pickanjinnie Fm.	(R_w 2.36 ohm.m @ 90°F)
	Flowed for 3 hrs. 28 mins.

No pressures recorded.

Prod. Test No. 1	Produced oil and gas spasmodically
5858 - 5885'	Lost swab
Pickanjinnie Fm.	

D.S.T. No. 12	Well flowed 382 bpd water
5152 - 5166'	Reported F.C.I.P. 2130 psig
Sub - unit 4	

(According to chart FCIP = 2070 psig)

Water Analyses

	D.S.T. No. 1	D.S.T. No. 5	D.S.T. No. 12
	ppm	ppm	ppm
Total Solids	2850	5250	4550
Na	1106	1427	1288
Ca	14	24	14
Mg	2	5	Trace
SO_4	24	10	33
HCO_3	1890	3050	2685
Cl	625	475	610
pH	7.5	7.8	7.8
R_w	2.27 ohm.m	1.68 ohm.m	1.76 ohm.m
Sp. Gr	1.001	1.003	1.002

Comments

None of the pressures reported in the above tests can be considered accurate.

A.A.O. Sunnybank No. 2

Location: Lat. 26°56'25"S
Long. 149°13'59"E
Map Ref.: 2080 6539 (Roma 4 mile sheet)

Elevation: 840 feet (RT)

Total Depth: 7244 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	4234 - 4862
Evergreem Shale	4862 - 5196
Precipice Ss	5196 - 5227
Moolayember Fm	5227 - 5803
Showground Sandstone	5803 - 5838
Rewan Formation	5838 - 6370
Bandanna Formation	6370 - 6807
Mantuan Productus Form.	6807 - 6880
Dry Creek Shale	6880 - 7078
Early Storms Sandstone	7078 - 7145
Granite	7145 - 7244

Testing

D.S.T. No. 10
6570 - 6592'
Bandanna Fm.

Recovered 2300 feet oil (A.P.I. gravity 41°@89°F) 100 feet gas-cut oil/mud emulsion
Max. gas flow rate 280 Mcf/day

D.S.T. No. 11
6571 - 6592'
Bandanna Formation

Flowed gas at 246 Mcf/day
Recovered 720 feet oil
Initial closed-in: 65 minutes
Flow :121 "
Final Closed-in : 60 "

Initial build-up

Time (minutes)	Pressures (psig) Top Recorder @ 6556'	Bottom Recorder at 6589'
0	214	215
6.5	2930	3123
13	3198	3203
19.5	3238	3230
26	3262	3249
32.5	3275	3262
39	3286	3273
45.5	3297	3281
52	3305	3289
58.5	3313	3297
65.0	3318	3302

As there was no reported initial flow period, effective values of 3.25 and 6.5 minutes respectively were assumed. For both values of 'T' the analysis for the bottom recorder gave an estimated equilibrium pressure value of 3360 psig. The results for the top recorder were :-

T = 3.25 minutes; Est. equil. press. 3372 psig @ 6556'

T = 6.5 minutes; Est. equil. press. 3394 psig @ 6556'

It will be noted that the top recorder is reading higher than the bottom recorder.

As the analysis for the bottom gauge is the same for two assumed values of 'T' it is preferable to accept this reading, although the inconsistency between the gauges makes the accuracy of the accepted value uncertain.

Estimated equilibrium pressure 3360 psig @ 6589'

Comments

The pressure reading noted above gives a calculated potentiometric height of 2011 feet above M.S.L. (This value is abnormally high and a gauge error is possible, although a check against calculated hydrostatic mud pressures indicates the gauges are, if anything, reading low. There is no other check on the validity of this value.)

Union-Kern-A.O.G. Tara South No. 1 (Non-subsidized)

Location: Lat. 27° 23' 21" S

Long. 150° 29' 11" E

Elevation: 1039 feet (RTKB)

Total Depth: 5661 feet

Stratigraphy

	Ft. below RTKB
Blythesdale Group	768 - 2775
Walloon Formation	2775 - 4014
Hutton Sandstone	4014 - 4772
Evergreen Shale	4772 - 5312
Precipice Sandstone	5312 - 5593
Back Creek Formation	5593 - T.D.

Testing

D.S.T. No. 1 Recovered 60 feet mud

5028 - 5090' 320 feet sl.g.cut muddy water

Evergreen Shale

Initial Flow	:	5 minutes
Initial Closed-in	:	30 minutes
Final Flow	:	30 minutes
Final Closed-in	:	45 minutes

Initial Build-up

@ 5012'	@ 5054'
psig	psig
55	68
2048	2054
2079	2081
2099	2095
2112	2106
2123	2115
2130	2123
2137	2129
2142	2135
2149	2141

Estimated equilibrium pressure 2193 psig @ 5012'

" " " 2183 psig @ 5054'

Average static pressure 2188 psig @ 5033'

W.L.T. No. 1 Recovered 2700 ccs water

5523' 400 ccs mud

Precipice Sandstone F.C.I.P. 2292 psig @ 5531'

Water Analysis

	D.S.T. No. 1
	ppm
Total Solids	6000
Na	1859
Ca	20
Cl	1860
HCO_3	1793
pH	7.8
Rw @ 25° C	1.5 ohm.m.

Comments

The extrapolation in D.S.T. No. 1 is 43 psi and the gauge difference 28 psi.

Calculated potentiometric heights for D.S.T. No. 1 and W.L.T. No. 1 are 1059 and 801 feet A.S.L. respectively. The value of 1059 feet A.S.L. seems abnormally high for the location and is probably erroneous.

Union-Kern-A.O.G. Tey No. 1

Location: Lat. 27°08'37" S
Long. 150°13'31" E
Elevation: 960 feet (RTKB)
Total Depth: 5374 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	4600 - 4980
Precipice Sandstone	4980 - 5334
Back Creek Formation	5334 - T.D.

Testing

D.S.T. No. 1 — Recovered 200 feet mud cushion (76 lbs/cu. ft)
5140 - 5150' — 2220 feet fresh water
Precipice Sandstone — Only the top gauge was a BT type
I.C.I.P. 2162 psig @ 5119'
F.F.P. 1182 psig @ 5119' (c.f. calc. 1066 psig)

Water Analysis

	D.S.T. No. 1 ppm
T.D.S.	1560
Na	609
Ca	14
Mg	4
Cl	150
SO_4	22
HCO_3	1391
pH	7.6
R_w@25°C	4.17

Comments

Although the agreement between the F.F.P. and the recovery is poor, the PRD reads the same as the BT gauge. Also the calculated hydrostatic mud pressure checks with the measured value. The static pressure value can therefore be accepted as reliable.

Union-Kern-A.O.G. Thomby No. 1 (Non-subsidized)

Location: Lat. 27° 40' 25" S

Long. 149° 06' 05" E

Elevation: 978 feet (RTKB)

Total Depth: 6271 feet

Stratigraphy

	Ft. below RTKB
Blythesdale Group	2650 - 4578
Walloon Formation	4578 - 5058
Hutton Sandstone	5058 - 5603
Evergreen-Precipice	5603 - 5872
"Wandoan" Sandstone	5872 - 6233
Basement	6233 - T.D.

Testing

D.S.T. No. 1 Recovered 60 feet mud

" 120 feet muddy water

605 feet gas cut water

"Wandoan" Sandstone

Initial Flow : 21 minutes

Initial Closed-in: 30 minutes

Final Flow : 45 minutes

Final Closed-in : 45 minutes

Initial build-up

@ 5979' psig	@ 6004' psig
205	208
1341	755
1734	1418
1904	1735
2001	1913
2073	2004
2125	2076
2165	2132
2201	2176
2237	2216
2263	2246

Estimated equilibrium pressure 2565 psig @ 5979'

" " " 2615 psig @ 6004'

Average static pressure 2594 psig @ 6000'

Calc. potentiometric height 975' A.S.L.

D.S.T. No. 2 — Recovered 100 feet mud

6218 - 6271' — 6100 feet gas cut water

"Wandoan" Formation — Unable to close tester. Flow: 60 minutes.

F.F.P. 2708 psig @ 6250'

F.F.P. 2698 psig @ 6266'

Average pressure 2703 psig @ 6258'

Calc. potentiometric height 970' A.S.L.

Water Analyses

	D.S.T. No. 1	D.S.T. No. 2
	ppm	ppm
Total Solids	4200	6450
Na	1355	2220
Ca	25	35
Mg	Trace	18
Cl	1230	2600
SO_4	13	17
HCO_3	65	135
pH	7.4	7.2
Rw @ 25° C (ohm.m.)	1.61	1.0

Comments

The 350 psi extrapolation necessary in the analysis of D.S.T. No. 1 makes the estimated static pressure of very dubious accuracy. Although the tester could not be closed in D.S.T. No. 2, the strong flow of water almost to the surface suggests that an equilibrium condition could have been reached. The two tests in fact agree closely.

Union-Kern-A.O.G. Tinhut No. 1 (Non-subsidized)

Location: Lat. 26° 23' 38" S

Long. 150° 09' 57" E

Elevation: 1172 feet (RTKB)

Total Depth: 3467 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	1300 - 2222
Evergreen Shale	2222 - 2653 (Base Conloi sand 2498')
Precipice Sandstone	2653 - 3003 (Top main permeable zone 2856')
Back Creek Formation	3003 - T.D.

Testing

D.S.T. No. 2 Recovered 316 feet fresh water

2736 - 2815'

Precipice Sandstone

Initial flow : 5 minutes
Initial closed-in : 30 "
Final flow : 30 "
Final closed-in : 30 "

I.C.I.P. 1054 psig @ 2724')
" 1102 psig @ 2815') steady

Average static pressure 1078 psig @ 2770'

D.S.T. No. 3 Recovered 2570 feet of fresh water

2853 - 2872'

Precipice Sandstone

Initial flow : 5 minutes
Initial closed-in : 30 "
Final flow : 30 "
Final closed-in : 3 "

I.C.I.P. and F.C.I.P. 1112 psig @ 2840')
" " 1129 psig @ 2872') steady

Average static pressure 1120.5 psig @ 2856'

Water Analysis

	D.S.T. No. 2
	ppm
Total Solids	640
Na	236
Ca	8
Mg	3
Cl	35
HCO_3	604
pH	7.3
R_w @ 25° C	10.47 ohm.m.

Comments

D.S.T. Nos. 2 and 3 give potentiometric levels of 894 and 906 feet A.S.L. respectively. The close agreement between the two readings indicates that the average value of 900 ft A.S.L. should be accurate.

Phillips-Sunray Tinker Creek No. 1

Location: Lat. 27°45'25" S
Long. 150°47'46" E

Elevation: 1154 feet (RTKB)

Total Depth: 4207 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2794 - 3426
Evergreen Shale	3426 - 4007
Precipice Sandstone	4007 - 4184
Basement	4184 - T.D.

Testing

D.S.T. No. 1
2790 - 2865'
Hutton Sandstone

Recovered 180 feet drilling mud (10.2 ppg)
2143 feet fresh water

Initial Flow	: 5 minutes
Initial Closed-in	: 30 "
Final Flow	: 30 "
Final Closed-in	: 40 "

F.C.I.P. 1176 psig @ 2775'
" 1215 psig @ 2862'
Average static pressure 1196 psig @ 2820'

D.S.T. No. 2
3992 - 4056'
Evergreen-Precipice

Recovered 240 feet mud, 450 feet fresh water.

Initial Flow	: 5 minutes
Initial Closed-in	: 30 "
Final Flow	: 30 "
Final Closed-in	: 30 "

Initial build-up

Time (minutes)	Pressure (psig) Top recorder @ 3977'	Bottom recorder @ 4052'
0	114	354
3	1307	1305
6	1365	1361
9	1400	1401
12	1429	1430
15	1450	1451
18	1469	1467
21	1483	1480
24	1492	1493
27	1500	1501
30	1506	1509

Estimated equilibrium pressure 1573 psig @ 3977'
" " " 1580 psig @ 4052'
Average static pressure 1577 psig @ 4015'

Water Analysis

	D.S.T. No. 1
	ppm
T.D.S.	1750
Na	601
Ca	4
Mg	2
SO_4	12
HCO_3	1019
Cl	340
R_w@25°C	4.0 ohm.m

Comments

Although the agreement between the gauges in D.S.T. No. 1 is very close, both gauges read high relative to the reported recovery.

The calculated pressures in D.S.T. No. 2 differ by approximately 25 psi, and as the extrapolations are nearly 70 psi, the static pressure cannot be considered very accurate.

Phillips-Sunray Tipton No. 1

Location: Lat. 27°23'50" S
Long. 151°11'43" E
Elevation: 1147 feet (RTKB)
Total Depth: 3822 feet

Stratigraphy

	Ft below RTKB
Walloon Formation	13 - 1870
Hutton Sandstone	1870 - 2652
Evergreen Shale	2652 - 3224
Precipice Sandstone	3224 - 3628
Pre-Precipice	3628 - T.D.

Testing

D.S.T. No. 1
2291 - 2331'
Hutton Sandstone

Recovered 500 feet muddy water
100 feet slightly muddy water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	60 "
Final Closed-in	:	60 "

Initial build-up

Time (minutes)	Pressure (psig) Top recorder @ 2275'	Bottom recorder @ 2328'
0	102	136
3	821	859
6	868	918
9	893	941
12	907	955
15	918	962
18	925	969
21	930	974
24	934	979
27	937	981
30	939	984

Estimated equilibrium pressure 964 psig @ 2275'
" " " 1010 psig @ 2328'

Average static pressure 986 psig @ 2300'

D.S.T. No. 3
3307 - 3352'
Precipice Sandstone

Recovered 60 feet mud (10.2 ppg), 60 feet muddy water, 600 feet water.
Same times as D.S.T. No. 1

I.C.I.P. 1219 psig @ 3291'
" 1240 psig @ 3348'

Average static pressure 1230 psig @ 3320'

Schlumberger W.L.T. No. 1	Recovered 400 ccs mud
Test depth 2894'	Amerada pressure readings :-
Evergreen Shale	Hydrostatic mud pressure: 1611.2 psig
	Formation shut-in: 1236.7 psig
W.L.T. No. 2	Recovered 830 ccs water, 300 ccs mud.
Test depth 3384'	Amerada pressure readings :-
Precipice Sandstone	Hydrostatic mud pressure: 1910.0 psig
	Formation shut-in: 831.9 psig

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 3 ppm
Total Solids	1700	2500
Na	574	728
Ca	6	18
Mg	Trace	Trace
Cl	110	435
SO_4	8	Trace
HCO_3	1220	1424
CO_3	60	-
pH	8.4	7.6
R_w@25°C	5.26 ohm.m	4.17 ohm.m

Comments

Measured and calculated static pressures and potentiometric heights are summarised below :-

Test No.	Depth (ft below RTKB)	Pressure (psig)	Potentiometric Height (ft above MSL)	Formation	Remarks
D.S.T. 1	2300	986	1124	Hutton	25 psi extrapolation
D.S.T. 3	3320	1230	668	Precipice	Fully built-up
W.L.T. 1	2894	1236.7	1109	Evergreen	Mud only recovered
W.L.T. 2	3384	1274.3	706	Precipice	Good recovery
W.L.T. 3	1995	831.9	1073	Hutton	Zone tested was tight

In this well the Hutton Sandstone and Evergreen Shale have pressures close to normal hydrostatic, whereas the pressure in the Precipice Sandstone appears to be some 200 psi below hydrostatic.

Planet Tooloombilla No. 1

Location: Lat. 25°53'13" S
Long. 147°57'46" E
Elevation: 1367 feet (RTKB)
Total Depth: 1750 feet

Stratigraphy

	Ft below RTKB
Evergreen Shale	980 - 1290
Precipice Sandstone	1290 - 1520
Moolayember Formation	1520 - T.D.

Testing

D.S.T. No. 2 — Flowed water at the surface. Rate 20 b.p.h.
1409 - 1470' — Flow Period : 45 minutes
Precipice Sandstone — Closed-in : 60 minutes

F.F.P. and F.C.I.P. 663 psig @ 1425'
" " 669 psig @ 1430'
Average static pressure 665 psig @ 1425'

Water Analysis

	D.S.T. No. 2 ppm
Total Solids	730
Na	134
Ca	28
Cl	55
SO_4	4
CO_3	54
OH	63
pH	11.5
R_w@25°C	8.33 ohm.m

Comments

The static pressure is equivalent to a head of water 110 feet above the rotary table. As the well flowed quite strongly, this pressure value seems accurate.

Union-Kern-A.O.G. Undulla No. 1

Location: Lat. 27°13'40" S
Long. 150°16'04" E
Map. Ref. 321 621 (Dalby 4 mile sheet)
Elevation: 956 feet (RTKB)
Total Depth: 8849 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	4162 - 4928
Evergreen Shale	4928 - 5398
Precipice Sandstone	5398 - 5656
Kianga Formation	5656 - 6182
Back Creek Formation	6182 - 8700
Kuttung Formation	8700 - 8849

Testing

D.S.T. No. 1
5554 - 5647'
Precipice Sandstone

Recovered 270 feet mud cushion (77.5 lbs/cu. ft)
4984 feet slightly gassy fresh water
Initial Closed-in : 30 minutes
Flow : 60 "
Final Closed-in : 30 "

I.C.I.P. 2333 psig @ 5540'
F.C.I.P. 2331 psig @ 5540'
As there was no initial flow period it is advisable to take the average of the above readings.
Static pressure = 2332 psig @ 5540'

D.S.T. No. 2
5848 - 5874'
Kianga Formation

Recovered 270' mud cushion (77.5 lbs/cu. ft)
1020' gassy water
Initial Closed-in : 30 minutes
Flow : 60 "
Final Closed-in : 30 "

Initial build-up

Time (minutes)	Top Recorder @ 5834' Pressure (psig)
0	-
3	2631
6	2640
9	2645
12	2650
15	2653
18	2659
21	2661
24	2664
27	2667
30	2669

Estimated equilibrium pressure 2691 psig @ 5834'

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm
Total Dissolved Solids	1340	6400
Chloride as Na Cl	181	693
R_w@25°C	4.87	1.36
pH	8.5	8.5

Comments

Only a single gauge reading was available in the tests reported above.

Phillips Waggaba No. 1

Location: Lat. 27°42'01" S
Long. 150°54'58" E
Elevation: 1136 feet (RTKB)
Total Depth: 4025 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2472 - 3094
Evergreen Shale	3094 - 3630
Precipice Sandstone	3630 - 3769
Basement	3769 - T.D.

Testing

D.S.T. No. 1
2470 - 2556'
Hutton Sandstone

Recovered 150 feet of mud (10 ppg)
2208 feet of water

Initial Flow	:	5 minutes
Initial Closed-in	:	30 "
Final Flow	:	30 "
Final Closed-in	:	30 "

Top recorder clock stopped
F.C.I.P. 1077 psig @ 2552' (bottom recorder)

D.S.T. No. 5
3733 - 3821'
Precipice Sandstone

Recovered 240 feet of mud (10.1 ppg)
1460 feet of water
Same times as D.S.T. No. 1

Bottom recorder clock stopped
I.C.I.P. 1432 psig @ 3716' (top recorder)
F.F.P. 819 psig @ 3716'

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 5 ppm
T.D.S.	1380	2060
Na	510	818
Ca	4	8
Mg	1	Trace
CO_3	54	288
HCO_3	927	1317
Cl	200	170
pH	8.3	8.3
R_w@25°C	4.88 ohm.m	3.33 ohm.m

Above analyses by Queensland Mines Department

	D.S.T. No. 1 ppm	D.S.T. No. 5 ppm
T.D.S.	1360	2150
Na	535	760
K	10.5	15
Ca	-	5
Mg	-	2
SO_4	10	15
HCO_3	1035	1870
Cl	200	173
pH	8.3	7.87
R_w@25°C	4.99 ohm.m	3.16 ohm.m

Analyses by B.M.R. Pet. Tech. Lab.

Comments

One of the recorder clocks stopped in both D.S.T.'s so that the only check on the values quoted is that of F.F.P. against recovery; the gauge read higher in each case.

Amalgamated Wallabella No. 1

Location: Lat. 26°46'50" S
Long. 149°09'55" E
Map Ref.: 201 673 (Roma 4 mile sheet)

Elevation: 963 feet (RTKB)

Total Depth: 6350 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	3629 - 4332
Evergreen Shale	4332 - 4702
Precipice Sandstone	4702 - 4737
Moolayember Formation	4737 - 4822
Clematis Sandstone	4822 - 5136
Showground Sandstone	5136 - 5160
Rewan Formation	5160 - 5576
Bandanna Formation	5576 - 5890
Mantuan Productus Formation	5890 - 5986
Dry Creek Shale	5986 - 6210
Early Storms Sandstone	6210 - 6305
Volcanics	6305 - T.D.

Testing

D.S.T. No. 1
4718 - 4753'
Precipice Sandstone

Recovered 90 feet watery mud
110 feet slightly gas cut watery mud

Initial Flow : 11 minutes
Initial Closed-in : 90 "
Final Flow : 38 "
Final Closed-in : 31 "

Initial build-up

Time (minutes)	Pressure (psig) Top recorder @ 4741'	Bottom recorder @ 4746'
0	55	64
9	1315	1329
18	1628	1626
27	1734	1755
36	1833	1847
45	1884	1904
54	1929	1939
63	1958	1966
72	1978	1994
81	2000	2009
90	2008	2021

Estimated equilibrium pressure 2148 psig @ 4741'
" " " 2168 psig @ 4746'

Average static pressure 2159 psig @ 4745'

D.S.T. No. 2
5135 - 5156'
Showground Sandstone

Recovered 40 feet watery mud
210 feet gas-cut muddy water
Initial Flow : 10 minutes
Initial Closed-in : 75 "
Final Flow :108 "
Final Closed-in :122 "
I.C.I.P. 2295 psig @ 5144'
" 2298 psig @ 5149'
Average static pressure 2296.5 psig @ 5146'

D.S.T. No. 3
5486 - 5494'
Rewan Formation

Flowed gas at rate T.S.T.M.
Recovered 30 feet gas-cut mud
Initial Flow : 5 minutes
Initial Closed-in : 45 "
Final Flow :155 "
Final Closed-in : 97 "

Initial build-up

Time Defl.	Recorder @ 5464'	Time Defl.	Recorder @ 5469'
40	789 psig	39	802 psig
71	1153	69	1234
102	1577	99	1556
133	1730	129	1817
164	1950	159	1992
195	2115	189	2128
226	2192	219	2214
257	2270	249	2279
288	2306	279	2323
319	2340	309	2349
I.F.	34	I.F.	32
I.S.I.	319	I.S.I.	309

Neither of the two curves reached a straight line portion.

Final build-up

Time Defl.	Recorder @ 5464'	Time Defl.	Recorder @ 5469'
0	17 psig	0	17 psig
70	1294	70	1287
138	1811	137	1861
206	2098	204	2117
274	2220	271	2225
342	2268	338	2274
410	2292	405	2299
478	2310	472	2316
546	2323	539	2328
614	2332	606	2337
682	2336	673	2340
F.F.	1094	F.F.	1072
F.S.I.	682	F.S.I.	673

Neither of the two curves gave a satisfactory straight line portion.

Water Analyses

The water samples were badly contaminated with mud and the analyses should be neglected.

Comments

The lengthy extrapolation required in the analysis of D.S.T. No. 1 makes the accuracy of the result obtained uncertain. Calculated potentiometric heights for D.S.T. Nos. 1 and 2 are 1204 and 1121 feet A.S.L. respectively. As D.S.T. No. 2 appears to give an accurate value, it is probable that the estimated equilibrium pressure in D.S.T. No. 1 is too high, assuming the formations are in pressure balance.

Satisfactory straight lines were not obtained for the analyses of the build-up curves in D.S.T. No. 3.

Union-Kern - A.O.G. Wandoan No. 1

Location: Lat. 26° and 12 miles S.
Long. 149° 30' and 25 miles E.

Elevation: 977 feet (RTKB)

Total Depth: 10,736 feet.

Stratigraphy

	Ft. below RTKB
Walloon Formation	0 - 1753
Hutton Sandstone	1753 - 2618
Evergreen Shale	2618 - 3159
Precipice Sandstone	3159 - 3530
"Wandoan" Formation	3530 - 4817

D.S.T. No. 1

3260 - 3278'

Precipice Sandstone

Recovered 280 feet water cushion
2830 feet water (sal. 10 g/g)
Flow: 60 minutes
Recorders read high.
Calculated static pressure 1347 psig @ 3255'

Comments

The test reported above gave a strong flow of water and a steady level was reached after approximately 15 minutes.

Calculated potentiometric height 832 feet A.S.L.

A.A.O. Warooby South No. 1

Location: Lat. 26°35'46" S
Long. 148°55'46" E
Map Ref: 174 695 (Roma 4 mile sheet)
Elevation: 996 feet (RTKB)
Total Depth: 3890 feet

Stratigraphy

	Ft. below RTKB
Hutton Sandstone	2614 - 3278
Evergreen Shale	3278 - 3678
Precipice Sandstone	3678 - 3707
Moolayember Formation	3707 - 3760
Timbury Hills Formation	3760 - T.D.

Testing

D.S.T. No. 1
3663 - 3717'
Precipice Sandstone

Flowed gas at 80 Mcf/day

Initial Flow	: 11 minutes
Initial Closed-in	: 45 "
Final Flow	: 93 "
Final Closed-in	: 45 "

Initial build-up

Time (minutes)	Top Recorder @ 3647' Pressure psig	Bottom Recorder @ 3714' Pressure psig
0	27	53
4.5	121	125
9.0	280	271
13.5	537	511
18.0	838	819
22.5	1125	1122
27.0	1322	1326
31.5	1445	1440
36.0	1525	1515
40.5	1573	1560
45.0	1591	1589

Estimated equilibrium pressures

1900 psig @ 3647'
1900 psig @ 3714'

Average static pressure 1900 psig @ 3680'

D.S.T. No. 2
3673 - 3890'
Precipice - Moolayember

Flowed gas 27 Mcf/day
Recovered 178 feet gas cut mud
400 feet water

Initial Flow	:	45 minutes
Initial Closed-in	:	63 "
Final Flow	:	52 "
Final Closed-in	:	45 "

Stylus split on top recorder

Initial build-up

Bottom Recorder @ 3886'

Time (minutes)	Pressure psig
0	279
6.3	527
12.6	1210
18.9	1424
25.2	1504
31.5	1546
37.8	1578
44.1	1599
50.4	1615
56.7	1629
63.0	1637

Estimated equilibrium pressure 1764 psig @ 3886'

Water Analysis

	D.S.T. No. 2 ppm
T.D.S.	6950
Na	1460
Ca	40
Mg	20
Cl	840
SO_4	65
HCO_3	2560
pH	7.9
R_w@25°C	1.75 ohm.m

Comments

The calculated equilibrium pressures in the above tests do not agree, the value for D.S.T. No. 1 being some 225 psi higher after correcting for elevation using a hydrostatic gradient. Possible explanations for the difference are :-

(1) The lengthy extrapolation of 300 psi in the analysis of the initial build-up of D.S.T. No. 1 could be erroneous.

(2) The zone tested in D.S.T. No. 1 may have suffered a depletion effect, as the top recorder stabilised at 1549 psig in the final build-up.

(3) It is possible that the source of the water produced in D.S.T. No. 2 is a lower pressure zone than that tested in D.S.T. No. 1.

As the accuracy of both tests is uncertain, no satisfactory pressure value can be obtained from them.

Union-Kern-A.O.G. Warrie No. 1 (Non-subsidized)

Location: Lat. 28° 06' 12" S

Long. 149° 04' 56" E

Elevation: 730 feet (RTKB)

Total Depth: 5959 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	5069 - 5488
Evergreen-Precipice	5488 - 5669
"Wandoan" Formation	5669 - 5881
Volcanic Basement	5881 - T.D.

Testing

W.L.T. No. 1	Recovered 3750 ccs water
5592'	400 ccs mud
Evergreen-Precipice	C.I.P. 2570 psig @ 5600' (Amerada)

Water Analysis

	W.L.T. No. 1
	ppm
Total Solids	4500
Chloride as Na Cl	165
Alkalinity as $CaCo_3$	560
Hardness as $CaCo_3$	60
Volatile matter	3200
pH	7.9
R_w @ 25° C	7.52 ohm.m.

Comments

Calculated potentiometric level 1065 ft A.S.L.

Union-Kern-A.O.G. Warrigabie No. 1

Location: Lat. 27°56'45" S
Long. 150°15'37" E
Elevation: 817 feet (RTKB)
Total Depth: 5509 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	4280 - 4808
Evergreen Shale	4808 - 5232
Precipice Sandstone	5232 - 5368
Kuttung Formation	5368 - T.D.

Testing

D.S.T. No. 1
5264 - 5284'
Precipice Sandstone

Recovered 60 feet water-cut mud

Initial Flow	: 10 minutes
Initial Closed-in	: 30 "
Final Flow	: 30 "
Final Closed-in	: 30 "

Initial build-up

Time (minutes)	Pressure (psig) Top recorder @ 5254'	Bottom recorder @ 5280'
0	51	62
3	2031	1951
6	2142	2124
9	2197	2193
12	2227	2231
15	2246	2254
18	2260	2269
21	2270	2280
24	2277	2289
27	2284	2296
30	2288	2301

Note that although the reported initial flow period was 10 minutes the chart indicates that it was closer to 5 minutes. The analysis was performed for both 5 and 10 minutes and the same equilibrium pressures obtained.

Estimated equilibrium pressure 2336.5 psig @ 5254'
" " " 2358.5 psig @ 5280'
Average static pressure 2347.5 psig @ 5267

Comments

Agreement between the two calculated equilibrium pressures is good, and the average value should be accurate to ± 10 psi.

Planet Warrong No. 1

Location: Lat. 25°09'46" S
Long. 147°53'37" E
Elevation: 2052 feet (RTKB)
Total Depth: 3573 feet

Stratigraphy

	Ft below RTKB
Precipice Sandstone	0 - 515
Moolayember Formation	515 - 1382
Clematis Sandstone	1382 - 1713
Rewan Formation	1713 - 1840
Bandanna Formation	1840 - 2369
Peawaddy Formation?	2369 - 2782
Carboniferous?	2782 - T.D.

Testing

D.S.T. No. 1
2602 - 2652'
Peawaddy Formation

Recovered 40 feet mud
80 feet muddy water
320 feet fresh water

Initial Flow : 9 minutes
Initial Closed-in : 30 "
Final Flow : 45 "
Final Closed-in : 30 "

Initial build-up

Time Defl.	Recorder @ 2604'	Time Defl.	Recorder @ 2647'
0	51 psig	0	98 psig
3	666	6	766
6	707	9	773
9	725	12	778
12	738	15	788
15	747	18	794
18	752	21	798
21	759	24	801
24	762	27	797
27	766	30	794
30	768	33	791
I.F. 8		I.F. 9	
I.S.I. 30		I.S.I. 33	

Estimated equilibrium pressure 794.5 psig @ 2604"
" " " 828.5 psig @ 2647'

Final build-up

Time Defl.	Recorder @ 2604'
0	202 psig
3	617
6	654
9	675
12	692
15	700
18	711
21	717
24	724
27	728
30	730

F.F. 44
F.S.I. 30

Estimated equilibrium pressure 803.5 psig @ 2604'
Average static pressure 810 psig @ 2622'

Water Analysis

	D.S.T. No. 1 ppm	
Chloride (as Na Cl)	244	sample very muddy
Alkalinity (as CO_3)	700	
R_w@25°C	4.44 ohm.m	

Comments

The quality of the build-up curves was not good and the expected accuracy of the result is about ± 20 psi.

Union-Kern-A.O.G. Warroo No. 1 (Non-subsidized)

Location: Lat. 27° 34' 55" S

Long. 148° 48' 19" E

Elevation: 768 feet (RTKB)

Total Depth: 5251 feet

Stratigraphy

	Ft below RTKB
Blythesdale Group	2150 - 3957
Walloon Formation	3957 - 4456
Hutton Sandstone	4456 - 4908
Evergreen-Precipice	4908 - 5149
Wandoan Formation	5149 - 5177
Basement	5177 - T.D.

W.L.T. No. 1	Recovered 9400 ccs water
5074'	300 ccs mud
Evergreen-Precipice	C.I.P. 2364 psig @ 5082' (Amerada)
	No water analysis

Comments

The calculated potentiometric level 1146 feet A.S.L. appears high in relation to nearby wells.

A.A.O. Westgrove No. 1

Location: Lat. 25°32'00" S
Long. 148°26'00" E
Map Ref.: 665 827 (Eddystone 4 mile sheet)

Elevation: 1715 feet (RT)
Total Depth: 6442 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	0 - 200
Evergreen Shale	200 - 306
Precipice Sandstone	306 - 705
Rewan Formation	705 - 1657
Bandanna Formation	1657 - 2254
Mantuan Productus Formation	2254 - 2488
Dry Creek Shale	2488 - 2924
Unit 4	2924 - 3100
Unit 5	3100 - 3270
Unit 6	3270 - 3609
Unit 7	3609 - 4126
Unit 8	4126 - T.D.

Testing

D.S.T. No. 1
1345 - 1360'
Rewan Formation

Recovered 775 feet gas-cut water in 65 minute flow period.
No pressure recorder.

D.S.T. No. 7
3546 - 3558'
Unit 6

Recovered 3100 feet gas-cut water
Flow : 90 minutes
Closed-in : 15 "

F.F.P. 1325 psig)
C.I.P. 1350 psig) Assumed depth 3540'
Estimated static pressure 1350 psig @ 3540'

D.S.T. No. 8
4146 - 4161'
Unit 8

Recovered 900 feet gas-cut watery mud.
Open for 60 minutes

Water Analysis

	D.S.T. No. 7 grains/gallon	ppm*
Total Solids	1380.0	19,715
$Ca\ SO_4$	8.5	121
$Mg\ SO_4$	2.5	36
$Na_2\ SO_4$	3.5	50
$Na_2\ CO_3$	1168.0	16,686
Na Cl	187.0	2,671
pH	7.5	

* Original analysis reported in grains/gallon

Comments

The F.F.P. and pressure calculated from the recovery in D.S.T. No. 7 are in good agreement, so it can be assumed that the static pressure value is reasonably accurate.

A.A.O. Westgrove No. 2

Location: Lat. 25°33'00" S
Long. 148°26'00" E
Map Ref. 665 823 (Eddystone 4 mile Sheet)
Elevation: 1753 feet (RT)
Total Depth: 5550 feet

Stratigraphy

	Ft below RT
Hutton Sandstone	0 - 60
Evergreen Shale	60 - 350
Precipice Sandstone	350 - 735
Rewan Formation	735 - 1370
Bandanna Formation	1370 - 1971
Mantuan Productus Fm.	1971 - 2138
Dry Creek Shale	2138 - 2584
Early Storms Sandstone	2584 - 2662
Unit 5	2662 - 2786
Unit 6	2786 - 3121
Unit 7	3121 - 3643
Unit 8	3643 - 4790
Unit 9	4790 - T.D.

Testing

D.S.T. No. 1
3067 - 3110'
Unit 6

Recovered 2570 feet water (R_w 0.44 ohm.m @ 80°F)
Flowed gas T.S.T.M.
Flow : 120 minutes
Closed-in : 60 "
Johnston recorder pressures
F.F.P. and F.C.I.P. 1010 psig (depth not given)
Calculated F.F.P. from recovery 1115 psig

D.S.T. No. 2
2868 - 3110'
Unit 6

Fluid Rise 1970 feet
Flow : 40 minutes
Closed-in : 40 "
F.F.P. and F.C.I.P. 1000 psig (depth not given)
Calculated F.F.P. from recovery 852 psig

D.S.T. No. 3
2859 - 2990'
Unit 6

Flowed gas at 1.3 million cu. ft/day

D.S.T. No. 8
4757 - 4820'
Units 8 and 9

Flowed gas at maximum rate of 250 Mcf/day, falling to T.S.T.M.

Water Analysis

	D.S.T. No. 1
	ppm
Total Solids	19,500
Na	4,974
Ca	8
Mg	19
Cl	1,645
SO_4	110
HCO_3	10,370
pH	7.9

Comments

No reliable pressures were recorded in the above tests.

A.A.O. Westgrove No. 3

Location: Lat. 25°34'00" S
Long. 148°26'00" E
Map Ref. 668 820 (Eddystone 4 mile sheet)

Elevation: 1732 feet (RT)

Total Depth: 12,663 feet

Stratigraphy

	Ft below RT
Hutton - Boxvale Sandstones	0 - 240
Evergreen Shale	240 - 423
Precipice Sandstone	423 - 762
Rewan Formation	762 - 1393
Bandanna Formation	1393 - 1950
Mantuan Productions Fm	1950 - 2153
Dry Creek Shale	2153 - 2553
Early Storms Sandstone	2553 - 2620
Permian Unit 5	2620 - 2756
" Unit 6	2756 - 3052
" Unit 7	3052 - 3576
" Unit 8	3576 - T.D.

Testing

D.S.T. No. 1
2748 - 2802'
Unit 6
Flowed gas at max. rate 541 Mcf/day

D.S.T. No. 2
2855 - 2911'
Unit 6
Flowed gas at max. rate 827 Mcf/day

D.S.T. No. 3
3001 - 3028'
Unit 6
Recovered 1700 feet water

D.S.T. No. 6
12,303 - 12,360'
Unit 8
Flowed gas at max. rate 293 Mcf/day. Mud dropped in annulus.

Water Analysis

	D.S.T. No. 3 ppm
Total Solids	18,650
Na	7,264
Ca	40
Mg	6
HCO_3	15,616
Cl	2,225
pH	8.2
R_w@25°C	0.44 ohm.m
Sp. gr.	1.0165

Union-Kern-A.O.G. Wunger No. 1

Location: Lat. 27°40'45" S
Long. 149°07'34" E
Elevation: 1005 feet (RTKB)
Total Depth: 6339 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	5228 - 5647
Evergreen Shale	5647 - 5842
Wandoan Sandstone	5842 - 6306
Timbury Hills Formation	6306 - 6339

Testing

D.S.T. No. 1
6283 - 6301'
Wandoan Sandstone

Flowed 730 b.w.p.d. + 10 b.o.p.d. together with 180 Mcf/day gas.
(Oil 61°API gravity)

Initial Closed-in : 30 minutes
Flow : 80 "
Final Closed-in : 30 "

Both pressure devices failed.

D.S.T. No. 2
6281 - 6290'
Wandoan Sandstone

Recovered 540 feet mud cushion (80 lbs/cu. ft).
5290 feet slightly gassy water

Initial Closed-in : 30 minutes
Flow : 115 "
Final Closed-in : 30 "

Only one BT recorder; I.C.I.P. plugged
F.F.P. 2561 psig @ 6266'
F.C.I.P. 2703 psig @ 6266'

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm
Total Dissolved Solids	6350	6700
Na	2265	2275
Ca	30	31
Mg	4	4
SO_4	26	18
HCO_3	1678	1300
Cl	2565	2600
pH	7.9	7.2
R_w@25°C	1.05 ohm.m	1.04 ohm.m

Comments

Although the static pressure in D.S.T. No. 2 was obtained from a single BT recorder, the check of F.F.P. against recovery is good and the pressure is considered accurate.

A.A.O. Wyena No. 1

Location: Lat. 26°28'10" S
Long. 149°08'40" E
Map Ref. 197 710 (Roma 4 mile sheet)
Elevation: 1323 feet (RTKB)
Total Depth: 3713 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2164 - 3082
Evergreen Shale	3082 - 3436
Precipice Sandstone	3436 - 3490
Bandanna Formation	3490 - 3613
Granite Wash	3613 - 3698
Granite	3698 - T.D.

Testing

D.S.T. No. 1
3425 - 3480'
Precipice Sandstone

Recovered 1000 feet water
Initial Flow : 45 minutes
Initial Closed-in : 45 "
Final Flow : 45 "
Final Closed-in : 45 "

Initial build-up

Top Recorder @ 3428'		Bottom Recorder @ 3474'	
Time (minutes)	Pressure (psig)	Time (minutes)	Pressure (psig)
0	367	0	375
8	969	9	1000
12	1038	13	1063
16	1089	17	1113
20	1133	21	1153
24	1166	25	1188
28	1191	29	1210
32	1210	33	1230
36	1229	37	1247
40	1241	41	1259
44	1253	45	1269

Estimated equilibrium pressure 1432 psig @ 3428'
" " " 1440 psig @ 3474'

Final build-up

Top Recorder @ 3428'

Time (minutes)	Pressure (psig)
0	561
9	1044
13	1094
17	1132
21	1161
25	1185
29	1205
33	1221
37	1233
41	1243
45	1253

F.F. 45

F.S.I. 45

Estimated equilibrium pressure 1424 psig @ 3428'

Average static pressure 1436 psig @ 3451'

Water Analysis

	D.S.T. No. 1 ppm
Total Solids	4600
Na	1837
Ca	26
Mg	8
Cl	1535
SO_4	57
HCO_3	2263
pH	7.6
R_w@25°C	1.41 ohm.m

Comments

The average extrapolation in the analysis is 175 psi and this makes the accuracy of the static pressure uncertain. Result might be in error by ± 50 psi.

A.A.O. Yanalah No. 1

Location: Lat. 26°31'42" S
Long. 148°51'17" E
Map Ref. 166 705 (Roma 4 mile sheet)

Elevation: 1183 feet (RTKB)

Total Depth: 4136 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	2663 - 3367
Evergreen Shale	3367 - 3733
Precipice Sandstone	3733 - 3807
Moolayember Formation	3807 - 3875
Showground Sandstone	3875 - 3903
Bandanna Formation	3903 - 4039
Timbury Hills Formation	4039 - T.D.

Testing

D.S.T. No. 1
3731 - 3983'
Precipice-Moolayember-Showground

Flowed gas at rate of 3.2 million cu. ft/day

Initial Flow	: 45 minutes
Initial Closed-in	: 45 "
Final Flow	: 45 "
Final Closed-in	: 45 "

Stylus split on top recorder
I.C.I.P. 1626 psig @ 3980' (bottom recorder)

Comments

The charts were in poor condition, and with the pressure from only one recorder available, this value may not be accurate.

Phillips - Sunray Yarrala No. 1

Location: Lat. 27°07'20" S
Long. 151°10'40" E
Elevation: 1115 feet (RTKB)
Total Depth: 2955 feet

Stratigraphy

	Ft below RTKB
Hutton Sandstone	975 - 1650
Evergreen Shale	1650 - 2263
Precipice Sandstone	2263 - 2819
Basement	2819 - T.D.

Testing

D.S.T. No. 1
999 - 1035'
Hutton Sandstone

Recovered 180 feet rat hole mud, 760 feet fresh water } Tester valve @ 940 ft.

Initial Flow : 5 minutes
Initial Closed-in : 10 "
Final Flow : 30 "
Final Closed-in : 30 "

F.F.P. and F.C.I.P. 419 psig @ 985'
" 438 psig @1031'
Average static pressure 428.5 psig @ 1008'

D.S.T. No. 2
1410 - 1460'
Hutton Sandstone

Recovered 300 feet muddy water, 700 feet fresh water.

Initial Flow : 5 minutes
Initial Closed-in : 20 "
Final Flow : 45 "
Final Closed-in : 46 "

Clock on bottom recorder stopped.

Initial build-up
Top Recorder @ 1396'

Time (minutes)	Pressure (psig)
0	160
2	546
4	561
6	570
8	576
10	577
12	580
14	581
16	582
18	584
20	584

Estimated equilibrium pressure 593.5 psig @ 1396'
F.F.P. 403 psig @ 1396' (low for recovery)

D.S.T. No. 3 — Recovered 10 feet mud
2028 - 2068'
Evergreen Shale

Initial Flow : 5 minutes
Initial Closed-in : 23 "
Final Flow : 30 "
Final Closed-in : 30 "

Initial build-up

Time (minutes)	Pressure (psig) Top recorder @ 2014'	Bottom recorder @ 2065'
0	11	32
2.3	476	424
4.6	587	573
6.9	647	647
9.2	683	691
11.5	709	718
13.8	729	741
16.1	745	756
18.4	757	771
20.7	767	780
23.0	775	790

Estimated equilibrium pressure 854 psig @ 2014'
" " " 876 psig @ 2065'
Average static pressure 865 psig @ 2040'

D.S.T. No. 4 — Recovered 300 feet muddy water
2255 - 2320'
Precipice Sandstone

Initial Flow : 5 minutes
Initial Closed-in : 20 "
Final Flow : 30 "
Final Closed-in : 31 "

Initial build-up

Time (minutes)	Pressure (psig) Top recorder @ 2214'	Bottom recorder @ 2317'
0	44	80
2	737	751
4	763	791
6	773	806
8	780	814
10	784	819
12	788	823
14	791	826
16	792	827
18	793	829
20	793	829

Estimated equilibrium pressure 800.5 psig @ 2214'
" " " 838 psig @ 2317'
Average static pressure 819 psig @ 2265'

D.S.T. No. 5
2609 - 2649'
Precipice Sandstone

Recovered 180 feet mud (9.2 ppg), 240 feet muddy water, 1747 feet slightly gassy fresh water.

Initial Flow	:	5 minutes
Initial Closed-in	:	15 "
Final Flow	:	30 "
Final Closed-in	:	30 "

F.F.P. and F.C.I.P. 948 psig @ 2595'
" " 965 psig @ 2646'
Average static pressure 956 psig @ 2620'

D.S.T. No. 6
2793 - 2823'
Precipice Sandstone

Recovered 90 feet mud (10.4 ppg), 120 feet muddy water, 1080 feet water.

Initial Flow	:	5 minutes
Initial Closed-in	:	60 "
Final Flow	:	60 "
Final Closed-in	:	60 "

Initial build-up

Time (minutes)	Pressure (psig) Top recorder @ 2779'	Bottom recorder @ 2820'
0	136	153
6	955	958
12	966	984
18	973	995
24	977	1002
30	984	1007
36	986	1012
42	989	1014
48	991	1016
54	993	1019
60	998	1021

Estimated equilibrium pressure 1014 psig @ 2779'
" " " 1036 psig @ 2820'

Average static pressure 1025 psig @ 2800'

Water Analyses

	D.S.T. No. 1 ppm	D.S.T. No. 2 ppm	D.S.T. No. 5 ppm	D.S.T. No. 6 ppm
Total Solids	1300	2750	5700	3200
Na	406	107	2240	1250
Ca	4	12	65	40
Mg	Trace	5	25	40
Cl	130	160	465	450
SO_4	4	7	Trace	Trace
HCO_3	598	829	5460	2745
CO_3	132	108	-	-
pH	8.7	8.8	7.0	7.5
R_w@25°C (ohm.m)	6.13	5.1	1.34	2.08

Comments

Measured and calculated pressures and potentiometric heights are summarised below :-

D.S.T. No.	Depth (Ft below RTKB)	Pressure (psig)	Potentiometric Ht (Ft above MSL)	Formation	Remarks
1	1008	428.5	1097	Hutton	Pressure fully built-up
2	1396	593.5	1090	Hutton	Single gauge reading. 10 psi extrapolation.
3	2040	865	1073	Evergreen	80 psi extrapolation. Formation tight.
4	2265	819	741	Precipice	8 psi extrapolation.
5	2620	956	703	Precipice	Pressure fully built-up
6	2800	1025	682	Precipice	15 psi extrapolation

Although a rather lengthy extrapolation was required in the estimation of the Evergreen Shale static pressure, the difference in potentiometric heights between the Evergreen Shale and Precipice Sandstone is much larger than the probable measuring errors. A similar result to the above was obtained in the nearby Tipton No. 1 well.

Fig. 1

LOCATION OF OIL AND GAS OCCURRENCES IN THE SURAT BASIN

10 0 10 20 30 40

MILES

Reference

- Show of oil
- Show of gas
- Show of oil and gas
- Oil well
- Gas well

148° 30' 149° 00' 149° 30' 150° 00' 150° 30'

26° 00' 26° 30' 27° 00' 27° 30' 28° 00'

Sleepy Creek No. 1
Pine Ridge No. 1
Roshe No. 1
Conlon No. 1
ROMA
Beaufort No. 1
Warooby South No. 1
Blyth Creek No. 1
Pickanjinnie No. 1
Lamen No. 1
Coolibah No. 1
Bungil No. 1
Richmond No. 1
Dirinda No. 1
Apple Grove No. 1
Duarran No. 1
Bardloming No. 1
Bony Creek No. 1
Maffra No. 1
Back Creek No. 1
Tarrawonga No. 1
Anabranch No. 1
Snake Creek No. 1
Trinidad No. 1
Oberina No. 1
Sunnybank No. 1
Myall Creek No. 1
SURAT
Bennett No. 1
Leichhardt No. 1
Cabawin No. 1
Major No. 1
Wunger No. 1
Moonie No. 1
Alton No. 1

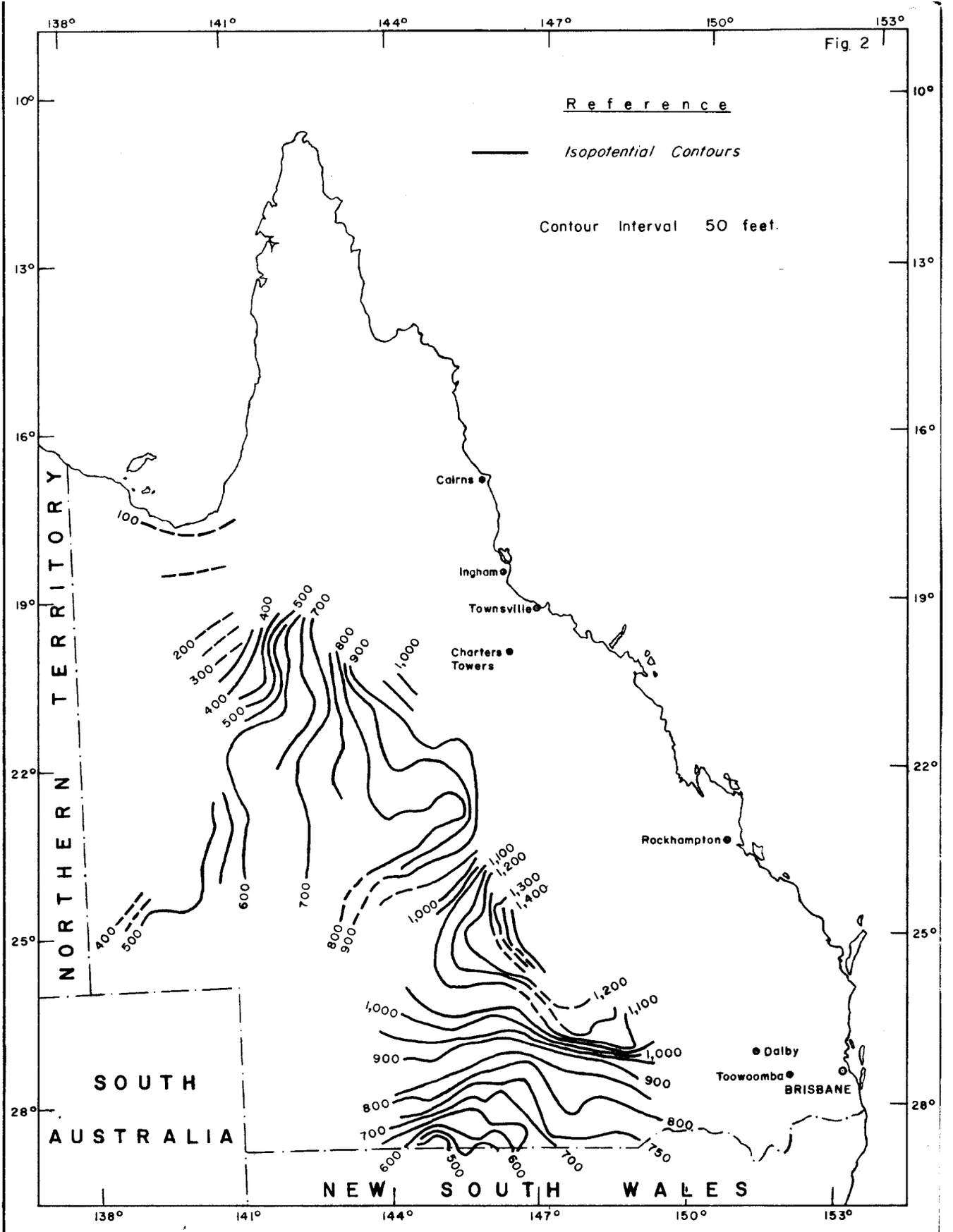
LOCALITY MAP

QUEENSLAND

Bureau of Mineral Resources, Geology and Geophysics July 1966

To accompany Record No. 1966/102

X AUS-1-31
R.K.



QUEENSLAND

ISOPOTENTIAL DIAGRAM AS AT END OF 1948

SHOWING

HYDRAULIC SURFACE IN FEET ABOVE MEAN SEA LEVEL

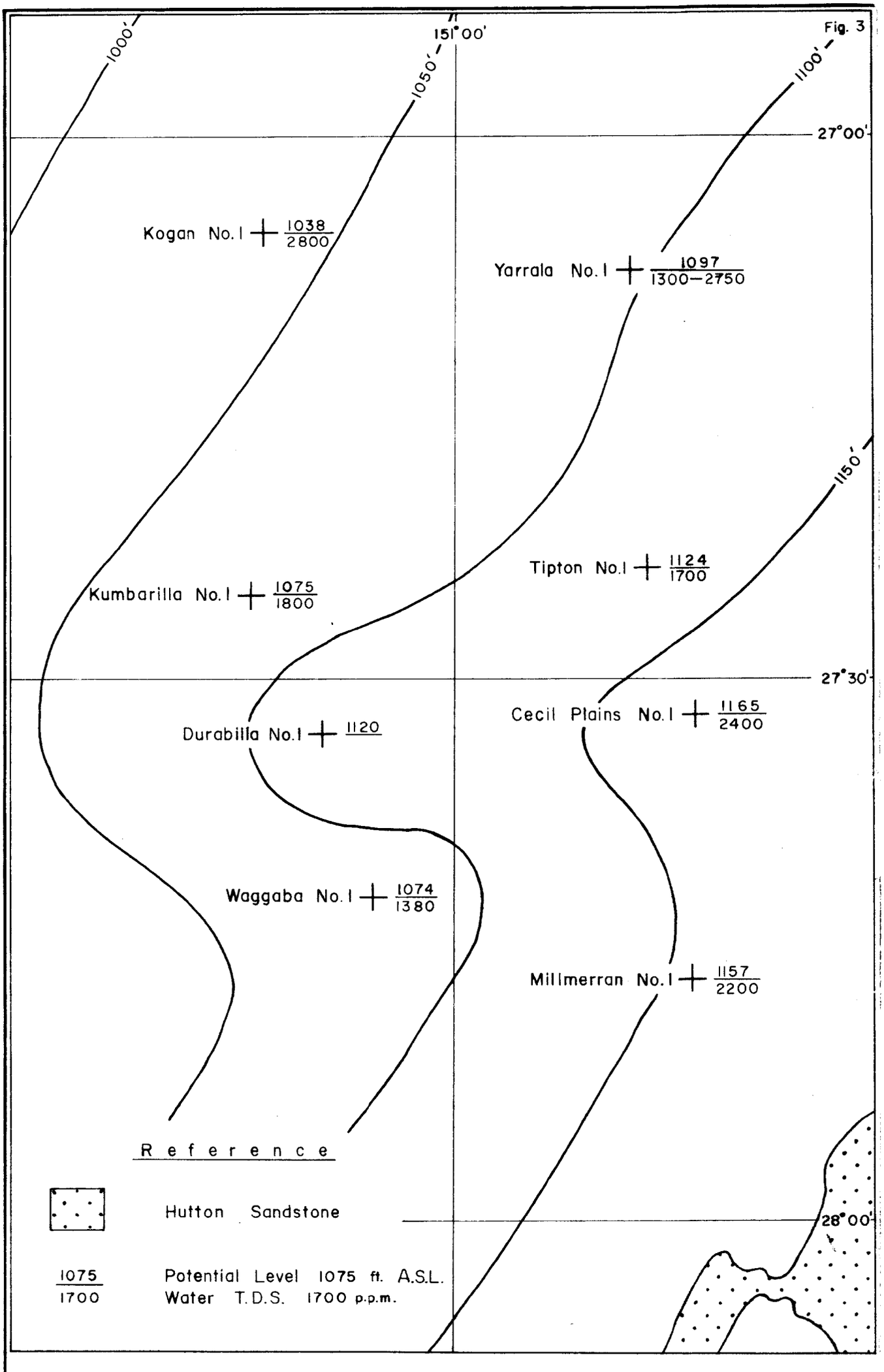
REDRAWN FROM OGILVIE (1954)

240 0 240 480

Miles

Bureau of Mineral Resources, Geology and Geophysics, July 1966 *To accompany Record Nº 1966/102*

X AUS—1—32
R.K.



ISOPOTENTIALS ON HUTTON SANDSTONE

10 0 10 20
Miles

Contour Interval 50 feet.

Bureau of Mineral Resources
Geology and Geophysics, July 1966

To accompany Record No. 1966/102

X AUS—1—33
R.K.

Fig 4

148 00' 149 00' 150 00' 151 00' 151 30'
24 30'
25 00'
26 00'
27 00'
28 00'
28 30'

0 Warrinilla
515 Warrong
260+ Glenhaughton
340 Crystalbrook
385 Westgrove
300+ Cockatoo Creek
254 Kildare
250 Glentullach
230 Tooloom Hills
140 Killoran
115 Rosewood
150 Kalima
101 Kooringa
205 Meleebee
Mooga
430 Burunga
518 Weringa
371 Wandoan
422 Cherwondah
440 Gilgulgul
530 Corinya
350 Tinhut
Conloi 499
484 Gurulmundi
300 Canaan
270 Dulacca
383 Dogwood
239 Columboola
Belbri 43
75 Pleasant Hills
41 Dolmuir
Quibet 39
15 Sleepy Creek
54 Wyena
Coolibah 51
Raslie 80
28 Sawpit Creek
74 Yangtah
Tineen 21
AA06 74
Wattanooka 14
62 Timbury Hills
36 Boreview
25 Beaufort
Bella Farm 19
29 Warooby South
20 Latemore
70 Pickanjinnie
Blyth Creek 57
21 Bindoora
Bungil 21
21 Ingle
Arbroath 145
Durinda 0
81 Richmond
Apple Grove 84
51 Coolibah
Lorne 202
52 Binya
Duarran 43
Blythwood 41
43 Bardloming
Bony Creek 54
62 Winnathoola
Back Creek 87
35 Wallabella
110 Lorelle
18 Glenroy
20 Snake Creek
75 Camborngo
Beaufort 25
95 Brucedale
42 Boondara
Yalebone 17
31 Sunnybank
77 Mycll Creek
Colgoon 30
Weribone 15
10 Lynebrook
Glenearn (undiff)
Balonne (undiff)
Baggo Creek 66
83 Bidgil
Elgin (undiff)
100 Coomrith
70 Wunger
317 Kooroon (undiff)
Moombah (undiff)
166 Flinton
30 Alton
0 St George
30 Talwood
Picurda 171
Miles Creek 158
332 Condamine
Cooloomala 268
Wieambilla 313
Cabbareena 318
296 Lawson
314 Wambo Creek
451 Kogan
354 Tey
Kogan South 318
Humbug Creek 372
Davidson 408
258 Undulla
Tara 220
Tara South 281
381 Rock Creek
Tipton 404
Mormadua 208
0 Kumberilla
0 Piebald
Paget 308
Cabawin 502
479 Cabawin East
Toombilla 404
275 Toombilla East
Durabilla 154
Durabilla East 45
Cecil Plains West 395
383 Cecil Plains
336 Cecil Plains South
278 Liddell
298 Brigalow Creek
Tartha 542
357 Middle Creek
Southwood 340
161 Mundagai
Waggaba 139
Moonie 255
220 Retreat
177 Timber Creek
Millmerran 0
286 Dockerill
Crowder 199
Iminbah 194
184 Crowder East
109 Crowder South
0 Zig Zag
Minnabilla 175
Warrigabie 136
96 Wybar
304 Minimd
300 Tingan

Reference

- ● *Data supplied by operators*
- ▲ *Based on Palynological Determinations by P.R. Evans*
- —— *Isopach Contours*
- 300 *300 ft of Sandstone*

SURAT BASIN

ISOPACH MAP OF PRECIPICE SANDSTONE

20 15 10 5 0 20 40 60
MILES

Contour Interval 100 feet

Bureau of Mineral Resources, Geology and Geophysics July 1966

To accompany Record No. 1966/102

X AUS-1-28 B
R.K.

Fig. 5

Reference

- Hutton Sandstone
- Evergreen Shale
- Precipice Sandstone
- } Undifferentiated
- Auburn Complex — Granite and Extrusives
- Extrusives
- Isopotential Contours
- Well Location
- Category 'A' reading in Precipice Sandstone.
- Category 'B' reading in Precipice Sandstone.
- 747 / 1500 — Isopotential 747 feet A.S.L. Water T.D.S. 1500 p.p.m.
- E — Evergreen Shale
- P — Precipice Sandstone
- W — Wandoan Formation
- M — Moolayember Formation
- S — Showground Sandstone

SURAT BASIN

ISOPOTENTIAL MAP OF PRECIPICE SANDSTONE

20 15 10 5 0 20 40 60
MILES

Contour Interval 50 feet

Bureau of Mineral Resources, Geology and Geophysics June 1966

To accompany Record No 1966/102

x AUS—1—28A
R K