PROSPECTS	ALTITUDE IN METRES	UNIT AT SURFACE	DEPTH TO TOP OF MAJOR OBJECTIVE IN METRES	MAJOR OBJECTIVE(S)	EXPECTED HYDRO-CARBONS	DEPTH TO BASE OF MAJOR OBJECTIVE IN METRES	POSSIBLE SECONDARY OBJECTIVE(S)	DIMENSIONS OF CLOSURE IN KM	EXPECTED CLOSURE IN METRES	ADVANTAGES	DISADVANTAGES
HIGH PRIORITY											
1. Rodinga Anticline (Bluebush)	360	Pzr	1350	(?)€a+	wet gas or gas	(?)1550	€l_1/Pu	8 x 7	50 probable; 100 likely; may be 250 - 300	May be part of major anticline approximately beneath Rodinga Ranges; outlined by seismic Lines MCF-81-01/10/15/18/19; section appears complete and undisturbed at Station 1010 on Line 10; overlying salt thin; Alcoa bore near.	Closure on West probable but not assured; access roads cross sand dunes.
MEDIUM PRIORITY											
2. Limestone Anticline (Oaks, 1980, Ooraminna Sheet F)	450	€s_{2B}	1100	€k/€l	oil or wet gas	1400		2½ x 1 50 x $10^6 m^3$ (40,000 acre ft.)	100 - 200	Relatively simple structure; easy access and terrain; near BMR bore with oil shows in Chandler; updip fault probably sealed by salt; shallow reservoir rocks; above Chandler salt.	Downdip portion of potential reservoir lies in Permit 175; nearby sacred site; poor results on seismic lines MLA-82-01/02/03; fault complications likely westward.
3. West Graben	460	Pzm	1300	€k/€l	oil or wet gas	1600		3 to 7 x ½ to 1 > 36 x $10^6 m^3$ (>30,000 acre ft.)	250 - 300	Easy access; near BMR bore with oil shows in Chandler; bounding faults probably sealed by salt; shallow reservoir rocks; above Chandler salt.	Terrain limits optimum drilling location; poor results on existing seismic; fault complications.
LOW PRIORITY											
4. Gap Anticline	360	Pul	1400	Pua/ Pue/ Pug	gas	1900	Pum/ Pug_3	3 x ½	20 - 30	Easy access and terrain; relatively simple structure; fault on East flank probably sealed by salt; shallow reservoir rocks.	No present seismic control; fault may interfere with seismic; structure may be complex at depth near strike-slip fault; nearest bore is salty.
5. North Carrier Anticline	360	Pur	500	Pua/ (?)Pue/ Pug	gas	900	Pug_3	3 x 2 uncertain along North and East; may reach as much as: 5 x 3	50 - 100 200 - 250	Easy access and terrain; simple structure; very shallow reservoir rocks.	No present seismic control; reservoir rocks so shallow that gas may have escaped and/or ground water may have flushed.
6. South Bore Anticline	380	Pum	1050	Pua/ Pug	gas	1350	Pug_3	5 x 4	60 - 70	Easy access; simple structure; nearby bore.	Terrain limits optimum drilling location and seismic equipment; no present seismic control.
STRONG LEADS											
7. Pillar Anticline*											
A. Middle*	340	€k	1250	(?)€a+	wet gas or gas	(?)1450	€l_1/Pu	9 x 8	80 minimum 250 possible	Part of major anticline beneath Pillar Range; larger structure may extend more than 25 km ENE, and may connect with large structure to North (South Rodinga); outlined by seismic Lines MCF-81-13/14/15/18/19.	Closure on South likely but not assured; up to 1100 metres of Chandler salt in Diapir above objective; access roads cross sand dunes; no nearby bores unless Middle Hills bore can be used.
B. East*	320	Pzm	1100	(?)€a+	wet gas or gas	(?)1300	€l_1/Pu	8 x 3	50 - 100		
C. West*	340	Pzm	1230	(?)€a+	wet gas or gas	(?)1430	€l_1/Pu	5 x 3	50 - 100		
8. Steele Gap Anticline*	300	€l	1500	(?)€a+	wet gas or gas	(?)1700	€l_1/Pu	5 x 5 minimum	300 if closed on East	May be part of major anticline approximately beneath Rodinga Ranges; outlined by seismic Lines MCF-81-01/04/05; good access and drilling site.	Closure on East not assured; up to 1400 metres of Chandler salt in diapir above objective; crest may be faulted; sacred site close to nearby (disused) Kay bore.
9. Centenary West Anticline*	320	Pzb	1900	(?)€a+	wet gas or gas	(?)2100	€l_1/Pu	2 x 2 minimum	200 if closed laterally	May be part of a major anticline beneath Centenary Hills and Mereenie in Train Hills anticline; shown on seismic Line MCF-81-05 near Station 1320; may be same structure on Line 07 near Station 1610 and Line 04 near Station 1370; good access; Centenary and East bores near.	Closure on East and West not assured; up to 1000 m of Chandler salt above objective; sparse seismic control and poor results on seismic at North end of Line MCF-81-04; North flank may be faulted.
LEADS											
10. Train Hills Anticline	380	Pzm	750	€k/€l	oil or wet gas	1150	(?)€a+	3 x 2 minimum	40 (surface) may increase with depth	Simple structure; shallow reservoir rocks; good access; three nearby bores; may be part of a major anticline along North side of Train Hills; may be continuous with Centenary West anticline; may involve Arumbera.	Terrain limits optimum drilling location (and seismic equipment across crest); no present seismic control; units above Chandler salt may be flushed by ground water.
11. Amunga Anticlinorium	500	€s_2	400	€k/€l	oil or wet gas	700	(?)€a+	4 x 3 minimum	60 - 80	Shallow reservoir rocks; Arumbera may be involved in fold; nearby bore.	Moderately difficult access; may have salt diapir at crest or disharmonic folds at depth; no present seismic control; rough terrain and outcrops limits use of seismic; units above Chandler salt may be flushed by ground water.
12. North Old Station Pinchout	380	€s_1	1000 (to 2100)	€a+	wet gas or gas	1100(?)		unknown; entirely subsurface	unknown; needs to pinch out South of axis of synclinorium at John Dam	Good access; near a bore; existence of pinchout North of Old Station uplift probable; low terrain and gentle dips at surface except in West and South.	Other structural interpretations less likely but possible; may be too complex at depth for good seismic results; may lack closure laterally; no present seismic control.
13. John Dam Overthrust	400	Pzm	600	Pzm+/€Op+	oil or wet gas	unknown; beds may be steep	(?)€a+	7 x 4 maximum	unknown; surface folds have 40 - 50 m closure	Shallow reservoir rocks, yet flushing unlikely below Chandler salt; high primary porosity and fracturing possible; good access; Bulldust bore near.	Inferred from younger beds (Pzm) thrust over older beds (€s_2), so that subsurface configuration may be complex; no present seismic control; poor seismic results possible.
14. Rodinga Fault	370	€l	200	(?)Pzm+/ €k+	oil or wet gas	600	€l_1/ (?)€a+	10 x ½ estimated from outcrops near seismic Lines 15/18/19	50 - 300 beds may be steep	Drag syncline at surface with lateral closure; upturn also visible in seismic Line MCF-81-07 on South side of Rodinga fault; highest point on syncline, near Line 07, appears to be covered by overthrust salient of Chandler; Gypsum bore near Line 07; high primary porosity and fracturing possible.	Poor results on seismic Lines MCF-81-15/18/19 near Rodinga fault; difficult access due to sand dunes and Mereenie outcrops; thick Chandler salt just North of fault; Mereenie crops out and is probably flushed near Lines 15/18/19; few outcrops near fault near Line 07, so drilling site difficult to select; steep dips and faults and salt are drilling problems.
15. Cockatoo Fault	340	Pue	1000 (to 2500)	(?)€a	wet gas or gas	1200(?)	€l_1/Pu	unknown; entirely subsurface	unknown; beds may be steep	Good access; low terrain and few outcrops well suited to seismic operations; near Star, Cockatoo, and Johnson bores; fault probably sealed by salt.	Upturn of units below Chandler salt not established; thick salt, tight folding, or steep dips may give poor seismic results; no present seismic control; lateral closure not assured.
16. West Allambi Fault	400	Pue	500 (to 2300)	€a	wet gas or gas	800(?)	€l_1	unknown; entirely subsurface	unknown; beds may be steep	Good access; fault probably sealed by salt; shallow reservoir rocks.	Lateral closure not assured; thick salt and steep dips likely to give poor seismic results; no present seismic control; rough terrain with steep hills restricts sites for seismic lines; bore near West end only; may be flushed by ground water.
17. Joker Fault	420	Pup	1200	€a	wet gas or gas	1800	€l_1	unknown; entirely subsurface	unknown; beds may be steep	Fair access; fault probably sealed by salt.	Lateral closure not assured; structural complexity likely to give poor seismic results; no present seismic control; steep slopes and high ridges restrict seismic lines.
18. Alcoa Bore Diapir	350	Pzb	1560	(?)€a+	wet gas or gas	(?)1660	€l_1/Pu	5 on seismic Line 09; does not cross other lines	125 on south side; more on north; greater with depth	Distinctive diapir shape in section and not present in adjacent lines, so probably closed laterally; good access via road to Desert bore; very near Alcoa bore; near Desert bore.	May not be closed to West at crest (but lower reflectors have greater closure); stratigraphic-type traps may be difficult to locate.
19. East Bluebush Diapir	370	Pzb	1840	(?)€a+	wet gas or gas	(?)2040	€l_1/Pu	5½ on seismic Line 11	140 on NE side; may be more on SW; greater with depth.	Distinctive diapir shape in section, so may be closed laterally; good access; Mereenie bore nearby.	Crest appears to be breached; traps may be difficult to locate.
PROVISIONAL LEADS											
20. East Rodinga Anticline	340	€k	1550	(?)€a+	wet gas or gas	1750(?)	€l_1/Pu	22 x 2 (surface anticline)	200 - 300 maximum estimated from strong "leads"	Simple surface structure; may be similar to Steele Gap anticline.	Likelihood of closure inferred from area of strong "leads"; thick bulldust on poor roads; N-S sand dunes on South limit access; steep slopes restrict seismic equipment across most likely location of a crest; no present seismic control; bore near East end only.
21. Southeast Rodinga Anticline	300	€l	1500	(?)€a+	wet gas or gas	1700(?)	€l_1/Pu	11 x 2 (surface anticline)	200 - 300 maximum estimated from strong "leads"	Surface structure asymmetric; may be similar to Pillar anticline; gaps and failure of outcrops on South permit seismic access to axis of structure.	Likelihood of closure inferred from area of strong "leads"; fair access on North but N-S sand dunes on South limit access; no present seismic control; no nearby bore.
22. Athernita Anticline	300	(?)Pzb	1500 maximum	(?)€a+	wet gas or gas	1700(?)	€l_1/Pu	15 x 10 probable maximum	200 - 300 maximum estimated from strong "leads"	May be part of major anticline approximately beneath Rodinga Ranges; suggested by seismic Lines MCF-81-01/04/05/07; good access on North side of Rodinga Ranges; near Athernita and Gypsum bores.	Closure on south not assured; no present seismic control across inferred crest or south flank; steep terrain in Rodinga Ranges and complexity near Rodinga fault and N-S sand dunes on South side limit access, restrict seismic lines, and may give poor seismic results; optimum well site may be in area of steep terrain or steep dips and thick salt.
23. Plains Faulted Anticline	400	Pup	1000	Pua/ Pue/ Pug	gas	1400	Pug_3	2½ x ½ minimum	unknown; beds steep	Good access; low terrain and few outcrops well suited to seismic operations; Allambi and Phillipson #2 bores near.	Inferred from surface faults along both flanks and apparently insufficient width for stratigraphic sequence along north side; no present seismic control; steep dips and faults likely to give poor seismic results near crest of structure.
24. Eagle Faulted Anticline	380	Pup	(?)300	Pue/ Pug	gas	(?)600	Pug_3	7 x 2	180	Simple surface structure; shallow reservoir rocks; good access to area; Allambi bore near.	Closure on East by Eagle bore fault required; reservoir rocks so shallow that gas may have escaped and/or ground water may have flushed; no present seismic control; steep dips and rugged terrain restrict seismic lines, and may give poor seismic results; salt diapir may be present along axis; optimum drilling site may require construction of road across bedrock.
25. Sunset Faulted Anticline	420	€l	200 - 450	€a/ Puj	wet gas or gas	825 - 1075	Pua/ Pue/ Pug	5 x 1	50	Simple surface structure with flanks faulted; good access; near "Sunset" bore.	No surface evidence proves two faults offset and seal Arumbera; reservoir rocks so shallow that gas may have escaped and/or ground water may have flushed; downdip portion lies outside Permit 189; no present seismic control; Chandler salt near surface at updip end, and may be thick at optimum drilling site.
26. Mt. Rodinga (?)Diapir	420	Pzm	≥ 350 Pzm 1700 (?)€a	(?)Pzm+/€Op+	oil or wet gas	≥ 700 Pzm (?)2000 (?)€a	(?)€a+	(?)Diapir 1 x 1	unknown; beds may be steep along flanks	If a diapir, Mereenie may be widely distributed in the subsurface beneath the Chandler; high primary porosity and fracturing possible; fair access.	Other structural interpretations possible; no present seismic control; rough terrain limits seismic equipment; Chandler salt near surface; nearest bore disused.
27. North Margin of Autochthon (Olympic Thrust Sheet)	Fairly flat multiple reflectors between 0.9 and 1.3 seconds extend northward on seismic line MCF-81-07 through at least 3 km north of nearly vertical Arumbera outcrops at Wallaby Gap. About 3000 m of south-dipping Late Proterozoic is present northward between the Arumbera and the Gillen (geologic section G-F). Isopachous evidence suggests southward translation of units above Border fault into Phillipson thrust sheet and Olympic thrust sheet through more than 15 km. The zone along the south margin of the Olympic thrust sheet where the thrust cuts upsection southward from the Bitter Springs to the Chandler (or higher) may lie north of the Larrier Hills. The truncated autochthonous rocks just beneath this buried thrust-fault surface may extend as far north as Core Anticline. Any truncated reservoir rocks at the base of a thrust are likely to be upturned by drag to form a potential trap. A cover of Bitter Springs salt and carbonates could form both seal and source rock. Lateral closure and sealing at the major fault are required. Until the reflectors beneath the Chandler salt in the Camel Flat area and southward are identified by drilling, the subsurface structure beneath the Olympic thrust sheet is uncertain and speculative. Except for seismic records with poor results near the north end of seismic line MCF-81-07, no seismic control exists for the Olympic thrust sheet.											

* Defined or suggested by seismic; entirely subsurface; data from Gibson (1982) map showing depths to top of "Brown" unit.

\+ Seal and source rock believed to be provided by salt and foetid limestones of Chandler Formation; identification of Arumbera tentative, based on south-dipping outcrops in Centenary Hills, at Todd River at North end of seismic line MCF-81-04, on South side of Star Bore thrust complex (5 km SW of Wallaby Gap), and in Eagle Anticline. Outcrops of Arumbera in Larrier Hills were disregarded because they overlie a thick sequence of Proterozoic rocks and probably belong to the Olympic thrust sheet.

DETAILED DESCRIPTIONS OF PROSPECTS AND LEADS

NORTHERN TERRITORY GEOLOGICAL SURVEY

TABLE 2

PR 84/25