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DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES

GEOLOGY AND GEOPHYSICS.

RECORDS.

RECORDS 1958/21.

PRELIMINARY REPORT ON THE GROUND WATER RESOURCES OF CABBAGE GUM BASIN, TENNANT CREEK, NORTHERN TERRITORY.

by

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PLATES

SUMMARY

The Cabbage Gum Basin is a sand covered depression on a Tertiary Peneplain and contains an underground layer of fresh water above the characteristic saline water of Tennant Creek area. The basin appears suitable as a source of fresh water for Tennant Creek, but much more information is needed before expenditure on permanent equipment can be advised. It is recommended that pumping tests be continued, and that a geophysical team be sent into the area to carry out a resistivity survey.

INTRODUCTION

The Cabbage Gum Basin, 10 miles south of Tennant Creek (see plate 1), was selected by the Director of Mines as a possible source of fresh water for the town of Tennant Creek. A preliminary favourable report on the basin was submitted by Jones (1955), who recommended that testing by wells, started by the Director of Mines, be continued.

Tennant Creek requirements are between 100,000 and 250,000 gallons daily (from 100 million gallons to 300 million gallons in storage to cover a three year drought), the higher figure being based on the assumption that industrial use will be made of the water.

There is no information available on run-off, loss by transpiration and evaporation, infiltration, and porosity and specific yield of the rocks concerned. Rainfall figures dating back to 1874 are available (Table 2), and certain information has been collected from 14 wells which have been excavated in the basin (Plate 3, Tables 3 - 19). Logging of the wells was restricted to that portion above the water levels indicated in Table 18.

Pumping tests carried out to date have been inconclusive but it is the intention of the Director of Mines to carry out further tests: Tables 1 to 17, showing the results of the tests, have been supplied by the courtesy of the Director of Mines. From these tables, it is clear that pumping at No. 9 well and No. 10 well, individually and collectively, each at a rate of approximately 3,200 gallons an hour has had no lasting effect upon either the level of the water table or salinity. No. 9 well was tested at its maximum yield, 3,200 gallons which gave a draw down of 14 feet 5.5 inches, representing a capacity of approximately 220 gallons for each foot of draw-down. No. 10 well was not tested at its maximum yield but at 3,400 gallons an hour had a draw-down of 13 feet 6 inches representing a capacity of more than 250 gallons for each foot of draw-down. Recovery to within one foot of the original water level took 24 hours for each well at each test. No. 13 well was not tested because it was still being deepened, but its output has been estimated to be 3,500 gallons an hour at a depth of 106 feet. (Figures supplied by the Director of Mines) The three most productive wells (Nos. 9. 10. and 13) have a combined yield of more than 10,000 gallons an hour, and a safe yield of between 5,000 and 8,000 gallons an hour (50% - 80% of yield). Even if the lower figure is accepted, the tests indicate that minimum requirements for Tennant Creek may be available. Unfortunately the wells are too far apart for any deductions on cones of depression to be made, nor can any estimate of the storage capacity of the basin be made. A favourable feature of the tests is that they were carried out at a time when the water table could be expected to be at its lowest level.

GEOLOGY

The only rocks exposed in the basin are travertine limestone and silicified fault rock. In the wells, rocks correlated with those known in the Tennant Creek area have been encountered. These include gneissoid granite, fault breccia, and vein breccia or conglomerate (Table 18).

All these rocks are extensively weathered and overlain by a complete lateritic profile upon which rests a thin layer of windblown sand, derived from reworked laterite. The wind-blown sand is restricted to the centre of the basin, occupying a gentle depression, and has a maximum thickness of eight feet, near the wells. The lateritic profile is best developed over the granite and the breccias. An upper layer of pisolitic and nodular ironstone grades downwards into a mottled, red and white layer which is well developed 15 to 20 feet from the top of the laterite. The mottled layer grades very gradually into a pallid layer, which is rich in kaolin and grades into weathered rock at about 60 feet. The depth of weathered rock is not known. Original textures of the parent rock can be identified in both the mottled and pallid zones. The profile over the Warramunga Group rocks is not so well developed and includes silicified material near the base of the profile.

GEOMORPHOLOGY

Jones (1955) has described the Tennant Creek area as showing clear evidence of a dissected laterite surface, the Cabbage Gum Basin being a broad valley eroded on that surface and filled with alluvium. This view, which cannot be supported by field evidence, seems to be based upon a suggestion by Woolnough (1934, p.3), repeated by Owen (1940, p.3) and Ivanac (1954, p.36), that the mesas in the Tennant Creek area, which rise 200 feet above general plain level, are remnants of the Miocene Peneplain.

Ivanac (p.54) states that at the Eldorado Mine "the base of the "laterite profile" water-table level in country rock is approximately 250 feet below the present surface, whereas the present water table level is at 306 feet" As the Eldorado Mine is situated on a hill 200 feet above the plain, the base of the lateritic profile can be expressed as 50 feet below main plateau level. This agrees with observations made in the wells at Cabbage Gum and hence one may suppose that the lateritisation of both plain and mesas is of one age. Noakes (1949) has attributed laterite cappings on flat topped hills in the northern part of the Northern Territory to a mid-Tertiary lateritisation. It is assumed that the lateritisation in the Tennant Creek area is of approximately the same age. The mesas are residuals of a pre-Tertiary surface.

It may be noted that the general drainage direction from the Cabbage Gum bore westwards is parallel to the regional strike which swings from west-north-west to north-north-west. The Cabbage Gum Basin is thus seen as a relic of early Tertiary mature drainage, fully adjusted to structure, persisting into and beyond senility and forming the nucleus of a new drainage system in the present cycle of erosion.

HYDROLOGY

Data collected from the wells show gradients to the west of 10 feet per mile for the ground surface and 5 feet per mile for the fresh water table (Table 1). Only one well (Number 13) has reached a depth known to be beyond the base of the lateritic profile. This well, at 106 feet, contains fresh water, and it is clear that Jones' idea of a perched fresh water table above the base of the laterite is not fully justified. The Cabbage Gum bore, 136 feet deep, is 2 miles east of number 13 well and contains saline water.

Local, unverified reports say that the bore encountered poor supplies of fresh water at an unknown depth and was stopped at 136 feet when salt water (2160 p.p.m. total dissolved solids) was encountered. Adjusting for height differences between No.13 well and Cabbage Gum bore, the top of the saline water at number 13 well can be expected between 106 feet and 126 feet. If this does not prove to be the case, number 13 well could tap a sub-laterite fresh water basin within decomposed granite; saline water, if present, being restricted to rocks of the Warramunga Group, as is the case north of Tennant Creek at Seven Mile, the present source of township water. It is noteworthy that all the high-yielding wells are associated with granitic rocks, vein material, or fault breccia and the low-yielding wells are associated with Warramunga slate and sandstone. If number 13 well does not tap fresh water from a restricted granitic area, the fresh water must occur as a layer upon the saline water, as there is no reason to anticipate an impervious layer between 106 feet and 126 feet in the wall. Further information is needed to clarify this point which is of importance in deciding the underground storage capacity.

With a perched water table, storage is restricted to 20 feet of material in the pallid zone of lateritisation. This material includes abundant kaolin, and specific yield is likely to be low. With a fresh water layer resting upon a saline layer, storage is increased by at least 30 feet of decomposed rock, probably of higher porosity and higher specific yield than the laterite, lying beneath the pallid zone of lateritisation. For such material a porosity of 10% and specific yield of 50% would be within the bounds of possibility. Two square miles of a saturated layer 30 feet thick would be capable of yielding approximately 500 million gallons of water. On the other hand, kaolinitic, lateritic material could have a specific yield of less than 5% so that a vastly increased area would be needed to store the same amount of available water and more draw points would be necessary to offset the slow yield. Variations in the gradient of the saline water table, about which little is known, could influence the available storage in both types of rock.

A complicating factor is that no data are available from No's. 9 and 10 wells below water level. It is not known what proportion of the total yield is derived from the lateritic profile and what proportion, if any, from weathered rock below the profile. According to verbal reports by the Director of Mines, the maximum flow of water in these wells was near the bottom.

A seasonal lake, 14 miles west of the Cabbage Gum bore (see plate 2), is reported locally to contain fresh water for at least 8 to 10 months each year. The lake dries up early in the wet season (before January) and refills before the end of the wet season (before March). Its area is approximately 400 acres and its mean depth 2 feet. As evaporation from open water in tropical desert climates may be as much as 12 feet per year, and the lake persists during the hottest and driest months, it must be replenished by underground flow. The observed gradients of ground surface and water table are such that, if they continue without variation, they may be expected to meet near the lake which may be regarded as a window in the fresh water table. If the information available about the lake is reliable, wastage of fresh water at the window could be the order of 1000 million gallons per annum, although much of this would be derived from parts of the basin which do not feed the existing wells. There is reason to suppose that flow continues beyond the lake, and a second lake is said to exist further west. This was not visited because of transport difficulties. The existence of the lakes implies that the modern water table is constant (apart from minor, seasonal fluctuations), and that surplus water is available for diversion without depleting reserves stored in the basin. The point to be decided is whether that part of the basin feeding the existing wells has a sufficiently large surplus to supply the needs of Tennant Creek.

The average annual rainfall (Table 2) is 14.49 inches and drought periods are common. The longest recorded period of effective drought is 3 years, and any scheme must be able to supply water for the whole of that period - 300 million gallons at present maximum requirements - without replenishment. Transpiration and direct evaporation loss over the whole area must be high, but run off is low. Percolation and infiltration are high in areas of windblown sand but elsewhere may be low. The area feeding the wells (Plate 2) is between 30 and 50 square miles and, in an average year, between 5000 million and 8500 million gallons of rain will fall on this. Taking the lower figure, 6% of the rainfall must be available for recharge if the area is to be utilised. This figure is of the order to be expected but may not be reached. For that reason, geophysical delineation of the true limits of the basin is important.

CONCLUSIONS AND RECOMMENDATIONS

Superficially, there appears to be an excellent chance of obtaining adequate fresh water supplies from the Cabbage Gum Basin. If quantity were the only consideration, it is probable that wells near the seasonal lake would yield more water than is needed. Unfortunately the high cost of piping makes distance from Tennant Creek almost as important as quantity of water, and it is necessary to aim at a balance between capital expenditure, expected yield, and expected requirements. Much more information is needed before such a balance can be reached and it is recommended that a geophysical team be sent to the area as soon as possible.

A resistivity survey of the area combined with data from control bores should delineate the contact between fresh and salt water, confirm the presence, or otherwise, of a perched water table, and perhaps permit a geological map to be constructed. The probable lateral limits of fresh water storage could be mapped. Control bores should be drilled at sites recommended, and be supervised, by the geophysicist. Although such factors as porosity and specific yield could not be determined until laboratory tests on core samples are done, an approximate theoretical evaluation of the potential of the area could be made. Work should start 1 mile west of number 1 well and progress eastwards. As soon as the depth of the base of the fresh water is ascertained, the Director of Mines should be informed so that producing wells can, if necessary, be deepened.

A scheme which has to be capable of producing 250,000 gallons per diem should be tested at a rate of between 300,000 and 500,000 gallons per diem, and it is necessary for the wells to be developed to a stage where such a yield is possible. Development at depth is to be preferred to lateral drives, wherever possible, so that greater reserves of water can be tapped. Because of the danger of tapping saline water, deepening should not be undertaken until the advice of a geophysicist is available. Even so, a conservative estimate of the maximum possible depth is desirable, to ensure that there is a safe margin between the top of the saline layer and the bottom of each well. Upon completion of pumping tests, continuous readings of the recovery rate at all wells during the first 6 hours must be taken if the value of the tests is to be utilised in full.

Finally, if the area is deemed suitable for installation of permanent equipment, consideration should be given to contour ridging of the catchment, in order to increase infiltration and decrease run off.

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3rd February, 1958.

TABLE I.

SURVEY DATA FOR WELLS OF TENNANT CREEK WATER SUPPLY

Well No	R.L. Bench Mark	R.L. Water Level	R.L. Well Bottom	Well Depth Feet	Depth to Water Level	Water Depth Feet	Ground Fall Feet	Water table Fall. Feet
6	1092.16	1045.14	1014.00	78.16	47.02	31.14	0	0
7	1087.28	1037.82	1014.32	72.96	49.46	23.50	4.88	7.32
5	1089.95	1040.62	1025.78	64.17	49.33	14.84	2.21	4.52
4	1089.40	1038.00	1018.95	70.45	51.40	19.05	2.76	7.14
3	1089.63	1032.97	1028.72	60.91	56.66	4.25	2.53	12.17
8	1083.59	1038.17	1020.52	63.07	45.42	17.65	8.57	6.97
9	1079.67	1036.33	1015.89	63.78	43.34	20.44	12.49	8.81
10	1075.76	1034.85	1011.10	64.66	40.91	23.75	16.40	10.29
12	1072.14	1033.39	1011.83	60.31	38.75	21.56	20.02	11.75
13	1071.95	1033.75	1004.75	67.20	38.20	29.00	20.21	11.39
11	1072.59	1031.77	1008.52	64.07	40.82	23.25	19.57	13.37
14	1068.74	-	-	-	-	-	-	-
1	1062.84	1023.95	1019.90	42.94	38.89	4.05	29.32	21.19

TABLE 2.

TENNANT CREEK RAINFALL

Year	Jan.	Feb.	Mar.	Apl.	May.	June	July	Aug.	Sept	Oct	Nov	Dec	Total
1874	322	522	48	122	310	15	113	2	89	12	39	40	1634
1875	405	798	2	166	7	12				33	101	298	1822
1876	532	169	618	74	50				3	42	52	161	1701
1877	689	337	808	11					279		172	315	2611
1878	55	556	140	155	20				73	90	80	603	1772
1879	25	288	305	167	196	26	326	116	62	244	134	92	1979
1880	842	17		11						306	21	120	1317
1881	298	605									102	250	1255
1882	726		104	140	389	25				67	255	472	2178
1883	36	85							7	263	416	95	900
1884	27	54	226			2				90	226	93	720
1885	559	471	750	51				42	16	28	8	397	2322
1886	277	611	38	105	12			328	80	3	37	749	2240
1887	167	565	452	18	21	105		122		9	86	94	1639
1888	468	316		5	14			1	30	5	62	863	1764
1889	1110	168	22	16	57	54			76	10	159	84	1756
1890	165	340	91	648	32	90		3	250	90	45	38	1792
1891	231	233	155	156	50	194				165	46	17	1247
1892	47	31	344							89		170	681
1893	184	11	62	36	18			72			120	147	650
1894	667	1067	484	21				2	134	5		236	2616
1895	627	810	10	53	28		371				269	81	2249
1896	390	342	79	773	15		117		12	3	108	296	2135
1897	19	199				11			1	130		95	455
1898		598	177		32	23			85		92	45	1052
1899	606	157	101	50		6				56		26	1002
1900	100	9	143		126	17	217	15		5	46	61	739
1901	30	389	128			37		10	3		2	61	660
1902	311	85				5				38	149	168	756
1903	57	90	979	101						19	208	519	1973
1904	776	480	247	55	220					56	62	183	2079
1905	269	15	262			33				56	46	181	862
1906	493	21	7	42	1	2			92	108	60	591	1417
1907	195	477			44	122	13			100	61	606	1618
1908	316	669	172	198	16						26	15	1412
1909	28	49	10	15	5			58		69	146		380
1910	33	1181	419	6		39				7	83	236	2004
1911			57	198					109		211	75	650
1912	212	285	43			9	15			9	108	27	708
1913	750	892	161			9					15	291	2118
1914	602									48	52	369	1071
1915	985	107		35	52							32	1211
1916	630	198	10	32			62			51	265	459	1707
1917	354	358	154			21		53	122		234	93	1389
1918	448	1238						29		53	105	65	1918
1919	764	1495									69	19	2347
1920	429	91	154	55			68		21	62	305	437	1622
1921	588	614	481			35				37	72	20	1847
1922	31	394			53	49				133	93	308	1061
1923	82	153	560	19	16	164				56	29	154	1233
1924	21	558	9				22		2	18	212	9	851
1925	354	136	200	4			25				75	75	869
1926	672	10	306	22	6				3		93	239	1351
1927	597	287	14	36				1		12	103	95	1145
1928	209	94	38	63		23	2		4	50	12	184	679
1929	635	51	235	4						37	22	366	1350
1930	262	959	1695				8		3	220	133	122	3402
1931	127	5	440	189	31				15		243	89	1139
1932		6	765		269	23				50	40	171	1324
1933	133	554	87	57	70	145		11			35	123	1215
1934	49	31	51	15		84	206	58	3	53	214		764
1935	151	56	67	6		45				38	4	5	372
1936	170	624	101	15	140					23	117	98	1288
1937	844		32	9		275				32	137	47	1376
1938	68	586				6	112			151	17		940
1939	1100	322	57	288		160	211	22	46	77	102	53	2438
1940	860	526	514	7						7	91	148	2153
1941	295	249	1467		217	106				32	287	134	2787

TABLE 2. (cont).

Year	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1942	396	170	38	92	157	9			2	213	391	239	1707
1943	7	144	73	11					15	53	32	74	409
1944	421	473	33			254	12		42	39	78	265	1617
1945	160	169	4				2			81	2	461	879
1946	684	1042									44	289	2059
1947	75	175	73			7		72	182	52	205	142	983
1948	66	264	85	7			45			1	8	392	868
1949		331	421						18	17	94	623	1504
1950	173	31	24		4	173			62	199	176	443	1285
1951	1155	368	14	2		33				47	54	31	1704
1952	215	76		9	55			2		48	204	222	831
1953	637	558	45	112	4			8	5	5	58	415	1847
1954	126	2	8	50		4		8	3	293	116	216	826
1955	111	467	46	352	132	20	88	24		99	100	2	1441
1956	44	1105	5	25	49	36	140		94	57	53	168	1776
1957	1535	179	171	2		16	23			138	6	231	2301
Average	361	348	192	58	35	30	26	13	24	57	103	202	1449

TABLE 3

TENNANT CREEK WELLS

No. 9 WELL PUMP TEST.

No. 9 WELL RECORDING

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches	Back Pressure P.S.I.	Pumping Rate Seconds/50 gal
8/11/57	9.10 a.m.	-	42	9¾	5	50
	9.20 a.m.	10	46	1½		
	9.30 a.m.	20	48	9		
	9.40 a.m.	30	50	1		
	9.55 a.m.	45	51	7¾		
	10.10 a.m.	60	52	6		
	10.40 a.m.	90	53	7		
	11.10 a.m.	120	54	1		
	12.10 p.m.	180	54	8½		
	5.11 p.m.	481	54	10½		
	9.40 p.m.	750	54	10		
9/11/57	9.08 a.m.	1438	54	10½	4½	52
	3.00 p.m.	1790	54	10¾		
	9.00 p.m.	2150	56	1		
10/11/57	8.20 a.m.	2870	56	3½	4½	52
	2.24 p.m.	3194	56	5¼		
	9.15 p.m.	3605	56	8½	4½	52
11/11/57	8.58 a.m.	4308	56	10¼	4½	52
	4.32 p.m.	4762	54	10¾		
12/11/57	9.15 a.m.	5765	57	2	4	53
	4.40 p.m.	6205	57	2½	4	53
13/11/57	8.55 a.m.	7185	57	5		
	4.10 p.m.	7620	57	1		
14/11/57	4.30 p.m.	9080	57	2½	4	53
15/11/57	4.20 p.m.	10500	57	4½	4	53
16/11/57	4.25 p.m.	11945	57	4	4	53
17/11/57	4.00 p.m.	13360	57	4	4	53
18/11/57	9.07 a.m.	14397	57	4	4	53
	9.10 a.m.	14400	57	4		Pump shut down

Approximate average time to pump 50 gallons 52½ Seconds

Approximate gallons pumped per hour 3400

Approximate total gallons pumped 810000

TABLE 4

TENNANT CREEK WELLS

No. 9 WELL PUMP TEST

No. 9 WELL RECOVERY RECORDINGS

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches	
18/11/57	9.10 a.m.	0	57	4	Pump shut down
	9.15 a.m.	5	56	7½	
	9.20 a.m.	10	56	0	
	9.25 a.m.	15	55	1	
	9.30 a.m.	20	53	10	
	9.36 a.m.	26	52	6½	
	9.41 a.m.	31	51	7½	
	9.50 a.m.	40	49	11	
	10.00 a.m.	50	49	5	
	10.10 a.m.	60	48	9½	
	10.20 a.m.	70	48	2¾	
	10.30 a.m.	80	48	0	
	10.45 a.m.	95	47	5½	
	11.00 a.m.	110	47	2	
	11.15 a.m.	125	46	11	
	11.31 a.m.	141	46	8	
	12.00 a.m.	170	46	4	
	12.30 p.m.	200	46	0½	
	1.02 p.m.	232	45	10¼	
	2.03 p.m.	297	45	7	
	4.00 p.m.	410	45	3	
	10.35 p.m.	805	44	10	
19/11/57	9.50 a.m.	1480	44	7	
	10.20 a.m.	1510	44	6½	
	3.25 p.m.	1815	44	1½	
	10.15 p.m.	2165	44	0	
20/11/57	7.12 a.m.	2762	43	11	
	3.55 p.m.	3285	43	7⅝	
21/11/57	4.10 p.m.	4740	43	5	
22/11/57	4.07 p.m.	6177	43	3¾	
23/11/57	4.16 p.m.	7626	43	2	
24/11/57	3.58 p.m.	9048	43	0¾	
25/11/57	3.46 p.m.	10476	43	0⅞	

TABLE 5

TENNANT CREEK WELLS

No. 9 WELL PUMP TEST

WATER LEVEL VARIATION IN ADJACENT WELLS

Date	No. 5 Well Time	No. 5 Well Variation Inches	No. 8 Well Time	No. 8 Well Variation Inches	Remarks
8/11/57			8.37 a.m.	0	No.9 Well pump started 9.10 a.m.
	5.03 p.m.	0	5.08 p.m.	÷1	
	10.00 p.m.	÷¼	9.35 p.m.	÷½	
9/11/57	8.56 a.m.	0	9.05 a.m.	0	
	2.50 p.m.	÷2	2.56 p.m.	÷1	
	8.45 p.m.	÷2¼	8.50 p.m.	÷1	
10/11/57	8.11 a.m.	÷1	8.13 a.m.	÷½	
	2.16 p.m.	÷2¼	2.20 p.m.	÷1	
	9.05 p.m.	÷1¼	9.10 p.m.	÷1	
11/11/57	8.45 a.m.	÷¾	8.52 a.m.	÷½	
	4.23 p.m.	÷2¼	4.27 p.m.	÷1¼	
12/11/57	8.55 a.m.	÷¾	9.00 a.m.	÷½	
	4.25 p.m.	÷2	4.30 p.m.	÷1	
13/11/57	8.45 a.m.	÷½	8.50 a.m.	÷½	
	4.23 p.m.	÷1½	4.05 p.m.	÷1	
14/11/57	4.12 p.m.	÷2¼	4.17 p.m.	÷1¼	
15/11/57	4.13 p.m.	÷2⅛	4.16 p.m.	÷1	
16/11/57	4.12 p.m.	÷2¼	4.20 p.m.	÷1	
17/11/57	4.25 p.m.	÷2⅛	3.55 p.m.	÷1¼	
18/11/57	8.53 a.m.	÷⅛	8.57 a.m.	0	Pump shut down 9.10 a.m.
	1.35 p.m.	÷1¼	1.40 p.m.	÷½	
	4.27 p.m.	÷1¾	4.22 p.m.	÷1	
	10.10 p.m.	÷1	9.25 p.m.	÷1	
19/11/57	8.40 a.m.	0	8.45 a.m.	0	
			3.20 p.m.	÷1	

TABLE 6

TENNANT CREEK WELLS

No. 9 WELL PUMP TEST.

WATER LEVEL VARIATION IN ADJACENT WELLS

Date	No. 10 Well		No. 11 Well		No. 12 Well	
	Time	Variation Inches	Time	Variation Inches	Time	Variation Inches
8/11/57	8.41 a.m.	0	8.54 a.m.	0	8.47 a.m.	0
	5.17 p.m.	+2½	5.25 p.m.	-¼	5.22 p.m.	+⅛
	9.45 p.m.	+1¾	9.52 p.m.	-1	9.49 p.m.	0
9/11/57	9.21 a.m.	+1½	9.30 a.m.	-1½	9.25 a.m.	0
	3.05 p.m.	+4¼	3.15 p.m.	+1¼	3.10 p.m.	0
	9.05 p.m.	+3	9.15 p.m.	+1	9.19 p.m.	0
10/11/57	8.34 a.m.	+2½	8.45 a.m.	+¾	8.40 a.m.	0
	2.30 p.m.	+4½	2.38 p.m.	+1⅜	2.35 p.m.	0
	9.20 p.m.	+3¾	9.30 p.m.	+1	9.25 p.m.	0
11/11/57	9.15 a.m.	+3¼	9.20 a.m.	+½	9.17 a.m.	+⅛
	4.40 p.m.	+4½	4.50 p.m.	+¼	4.45 p.m.	+⅛
12/11/57	9.20 a.m.	+3	9.32 a.m.	-1	9.25 a.m.	0
	4.45 p.m.	+4	4.55 p.m.	+½	4.50 p.m.	+⅛
13/11/57	9.06 a.m.	+3¼	9.15 a.m.	-⅝	9.12 a.m.	0
	4.15 p.m.	+5	4.26 p.m.	+½	4.20 p.m.	0
14/11/57	4.36 p.m.	+6	4.50 p.m.	+1	4.45 p.m.	0
15/11/57	4.45 p.m.	+6	4.55 p.m.	+½	4.50 p.m.	0
16/11/57	5.00 p.m.	+6	4.57 p.m.	+1	4.49 p.m.	0
17/11/57	4.07 p.m.	+6½	4.15 p.m.	+1¼	4.20 p.m.	0
18/11/57	8.35 a.m.	+4½	8.45 a.m.	0	8.40 a.m.	0
	1.13 p.m.	+5⅛	1.25 p.m.	+½	1.17 p.m.	0
	4.04 p.m.	+6¼	4.25 p.m.	+1¼	4.10 p.m.	0
	9.55 p.m.	+5¼	9.45 p.m.	+¾	9.50 p.m.	0
19/11/57	8.50 a.m.	+4	9.40 a.m.	0	9.20 a.m.	0
	3.27 p.m.	+6½	3.40 p.m.	+1	3.33 p.m.	0

TABLE 7

TENNANT CREEK WELLS

No. 10 WELL PUMP TEST

No. 10 WELL RECORDINGS

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches	Back Pressure P.S.I.	Pumping Rate Seconds/50gals
30/10/57	9.20 a.m.	0	40	7	5½	51
	9.35 a.m.	15	44	4½		
	9.40 a.m.	20	45	0		
	9.50 a.m.	30	47	2		
	10.05 a.m.	45	49	0		
	10.20 a.m.	60	50	1½		
	10.50 a.m.	90	50	8		
	11.20 a.m.	120	50	3½		
	12.20 p.m.	180	50	3½	6½	51
	2.20 p.m.	300	50	3		
	5.20 p.m.	480	51	7½		
	9.35 p.m.	733	51	9⅜		
31/10/57	9.22 a.m.	1442	51	5¾	5½	56
	3.13 p.m.	1793	52	11⅜	6½	51
	9.10 p.m.	2150	53	1		
1/11/57	9.05 a.m.	2865	52	9	6½	52
	2.32 p.m.	3192	52	8		
	9.17 p.m.	3597	52	10¾		
2/11/57	9.24 a.m.	4324	52	9¼	6¼	53
	6.27 p.m.	4867	52	9½		
3/11/57	8.11 a.m.	5681	52	11	5½	53
	8.13 p.m.	6413	52	11¾		
4/11/57	8.21 a.m.	7141	52	11¼	5¼	53
	5.00 p.m.	7861	52	5		
5/11/57	1.30 a.m.	8371				Pump broke down

Approximate average time to pump 50 gallons 52½ seconds

Approximate gallons pumped per hour 3400

Approximate total gallons pumped 470000

TENNANT CREEK WELLS

No. 10 WELL PUMP TEST

No. 10 WELL RECOVERY RECORDINGS

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches	
4/11/57	5.00 p.m.		52	5	
5/11/57	1.30 a.m.	0			Pump broke down
	3.30 a.m.	120	41	9	
	3.40 a.m.	130	41	8¼	
	4.00 a.m.	150	41	7¾	
	4.15 a.m.	165	41	7	
	4.30 a.m.	180	41	7	
	5.07 a.m.	217	41	6½	
	5.30 a.m.	240	41	6½	
	6.00 a.m.	270	41	6	
	7.00 a.m.	330	41	5¾	
	9.18 a.m.	468	41	5	
	11.15 a.m.	585	41	3½	
	1.15 p.m.	705	41	1¼	
	4.12 p.m.	872	41	1	
6/11/57	7.42 a.m.	1812	41	2	
	2.26 p.m.	2216	40	11¾	
7/11/57	2.27 p.m.	3656	40	9	
8/11/57	8.41 a.m.	4751	40	10½	

TABLE 9

TENNANT CREEK WELLS

No. 10 WELL PUMP TEST

WATER LEVEL VARIATION IN ADJACENT WELLS

Date	No. 8 Well Time	No. 8 Well Variation Inches	No. 9 Well Time	No. 9 Well Variation Inches	Remarks
30/10/57	8.40 a.m.	0	8.48 a.m.	0	No.10 pump started 9.20 a.m.
	5.29 p.m.	÷$1\frac{1}{8}$	5.23 p.m.	÷$3\frac{1}{4}$	
	9.18 p.m.	÷$\frac{3}{4}$	9.30 p.m.	÷2	
31/10/57	9.18 a.m.	0	9.17 a.m.	÷$1\frac{3}{8}$	
	3.48 p.m.	÷$\frac{3}{4}$	3.44 p.m.	÷$3\frac{1}{4}$	
	9.22 p.m.	÷$\frac{1}{4}$	9.17 p.m.	÷$1\frac{1}{2}$	
1/11/57	8.52 a.m.	$-\frac{1}{8}$	8.57 a.m.	÷$1\frac{1}{4}$	
	2.20 p.m.	÷$\frac{1}{2}$	2.27 p.m.	÷$3\frac{1}{4}$	
	9.06 p.m.	÷$\frac{1}{4}$	9.10 p.m.	÷$1\frac{1}{2}$	
2/11/57	9.13 a.m.	0	9.17 a.m.	÷$1\frac{1}{2}$	
	6.21 p.m.	÷$\frac{1}{2}$	6.24 p.m.	÷$2\frac{3}{4}$	
3/11/57	8.00 a.m.	0	8.05 a.m.	÷$1\frac{1}{2}$	
	8.00 p.m.	÷$\frac{3}{8}$	8.05 p.m.	÷2	
4/11/57	8.11 a.m.	0	8.14 a.m.	÷$1\frac{3}{4}$	
	4.47 p.m.	÷$\frac{5}{8}$	4.53 p.m.	÷$3\frac{1}{4}$	
5/11/57	5.13 a.m.	0	5.20 a.m.	÷$2\frac{1}{4}$	No.10 pump broke down 1.30 a.m.
	6.20 a.m.	0	6.15 a.m.	÷$2\frac{1}{4}$	
	9.10 a.m.	0	9.13 a.m.	÷$2\frac{1}{4}$	
	4.00 p.m.	÷$\frac{3}{4}$	4.05 p.m.	÷$4\frac{1}{4}$	
6/11/57	7.30 a.m.	0	7.37 a.m.	÷$1\frac{3}{4}$	
	2.13 p.m.	÷$\frac{1}{2}$			
7/11/57	2.17 p.m.	÷$\frac{1}{2}$	2.20 p.m.	÷$3\frac{1}{2}$	
8/11/57	8.37 a.m.	$-\frac{1}{2}$			

TENNANT CREEK WELLS

No. 10 WELL PUMP TEST

WATER LEVEL VARIATION IN ADJACENT WELLS

Date	No. 11 Well Time	No. 11 Well Variation Inches	No. 12 Well Time	No. 12 Well Variation Inches	Remarks
30/10/57	8.56 a.m.	0	9.05 a.m.	0	No.10 pump started 9.20 a.m.
	5.05 p.m.	$+1\frac{1}{8}$	5.10 p.m.	$+\frac{1}{4}$	
	9.43 p,m.	$+\frac{1}{2}$	9.48 p.m.	$+\frac{1}{8}$	
31/10/57	9.27 a.m.	$-\frac{1}{2}$	9.32 a.m.	0	
	2.48 p.m.	$+\frac{1}{2}$	5.05 p.m.	$+\frac{1}{4}$	
	9.03 p.m.	0	8.57 p.m.	0	
1/11/57	9.31 a.m.	$-\frac{1}{2}$	9.20 a.m.	0	
	2.44 p.m.	$+\frac{1}{2}$	2.38 p.m.	$+\frac{1}{4}$	
	9.30 p.m.	0	9.25 p.m.	$+\frac{1}{8}$	
2/11/57	9.48 a.m.	$-\frac{1}{2}$	9.43 a.m.	$+\frac{1}{8}$	
	6.37 p.m.	$+\frac{1}{4}$	6.32 p.m.	$+\frac{1}{8}$	
3/11/57	8.36 a.m.	$-\frac{1}{2}$	8.31 a.m.	$+\frac{1}{4}$	
	8.25 p.m.	0	8.19 p.m.	$+\frac{1}{4}$	
4/11/57	8.40 a.m.	$-\frac{1}{4}$	8.39 a.m.	$+\frac{1}{4}$	
5/11/57	4.45 a.m.	0	4.40 a.m.	$+\frac{1}{4}$	No.10 pump broke down 1.30 a.m.
	6.35 a.m.	$-\frac{1}{4}$	6.30 a.m.	$+\frac{1}{4}$	
	9.30 a.m.	$-\frac{1}{4}$	9.25 a.m.	$+\frac{1}{4}$	
	4.20 p.m.	$+\frac{3}{4}$	4.17 p.m.	$+\frac{1}{4}$	
6/11/57	7.52 a.m.	$-\frac{3}{4}$	7.47 a.m.	$+\frac{1}{8}$	
	2.37 p.m.	$+\frac{1}{4}$	2.32 p.m.	$+\frac{3}{8}$	
7/11/57	2.45 p.m.	$+\frac{1}{2}$	2.40 p.m.	$+\frac{3}{8}$	
8/11/57	8.45 a.m.	$-\frac{3}{4}$	8.49 a.m.	$+\frac{1}{8}$	

TENNANT CREEK WELLS

DUAL PUMP TEST 9 AND 10 WELLS

DECEMBER 1957

No. 9 WELL RECORDINGS

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches	Back Pressure	Barometer	Pumping Rate Seconds/ 50 gals
7th	10.26 a.m.		42	9½	4½	29.98	50
	11.25 a.m.	59	52	9½			
	12.26 p.m.	120	55	3			
	1.30 p.m.	184	55	9¼			
	2.28 p.m.	242	56	½			
	3.27 p.m.	301	56	2			
	4.26 p.m.	360	56	4½		29.85	
	9.03 p.m.	637	56	8¾		29.92	
8th	8.50 a.m.	1344	57	3½	4½	30.04	51
	4.02 p.m.	1776	57	3		29.86	
	9.22 p.m.	2156	57	6⅝		29.97	
9th	8.53 a.m.	2787	58	6	4½	30.02	50
	4.50 p.m.	3264	58	5½		29.83	
	9.05 p.m.	3519	59	6		29.92	
10th	8.55 a.m.	4229	60	11	4½	30.05	53
	3.20 p.m.	4614	58	11½		29.96	59 Ø
	9.07 p.m.	4961	58	2		30.03	
11th	9.12 a.m.	5686	57	3	3½	30.09	57
	2.52 p.m.	6026	57	3		30.02	
	9.21 p.m.	6415	57	3		30.02	
12th	8.55 a.m.	7109	57	5	3½	30.06	58
	2.55 p.m.	7469	56	11½		29.92	
	9.55 p.m.	7889	56	11		30.03	
13th	9.05 a.m.	8559	56	9½	3½	29.99	58
	9.50 p.m.	9324	56	8½		29.89	
14th	8.35 a.m.	9969	56	8½	3½	29.96	58
	9.35 p.m.	10749	56	11½		29.87	
15th	9.30 a.m.	11464	57		3½	29.92	58
	10.05 p.m.	12219	57	1½		29.86	58
16th	9.05 a.m.	12879	57		3½	29.95	58
	9.37 p.m.	13631	57	1½		29.90	
17th	9.50 a.m.	14364	57	2½	3½	29.93	59
	10.30 a.m.	14404	57	3		29.93	Pump shut down

Ø Engine speed was reduced at 10 a.m. on 10th as foot valve was showing.

Foot valve was 18 inches from well bottom.

Approximate average time to pump 50 gallons	55 seconds
" gallons per hour pumped	3200
" total gallons pumped	768000
Reduced level of measuring point	1079.10 feet

TENNANT CREEK WELLS

DUAL PUMP TEST 9 AND 10 WELLS DECEMBER 1957.

No. 9 WELL RECOVERY RECORDINGS

PUMP SHUT DOWN 10.30 a.m. 17/12/57

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches	Barometer
17/12/57	10.30 a.m.	-	57	3	29.93
	11.30 a.m.	60	48	8	29.20
	12.10 p.m.	120	47	1¼	29.86
	1.30 p.m.	180	46	5½	29.86
	2.30 p.m.	240	46	-	29.83
	3.30 p.m.	300	45	8	29.81
	9.18 p.m.	648	45	-	29.86
18/12/57	8.50 a.m.	1340	44	5	29.96
	3.05 p.m.	1715	44	0½	29.78
	9.30 p.m.	2100	44	0½	29.90
19/12/57	8.36 a.m.	2766	43	10½	29.92
	4.26 p.m.	3236	43	7¾	29.76
	9.30 p.m.	3540	43	8⅝	29.90
20/12/57	4.00 p.m.	4650	43	5	29.72
21/12/57	4.15 p.m.	6105	43	2¾	29.72
22/12/57	3.30 p.m.	7500	43	2	29.79
23/12/57	3.56 p.m.	8966	43	0¼	29.80
24/12/57	3.45 p.m.	10395	42	11¾	29.77
25/12/57	10.41 a.m.	11531	43	0¾	29.88
2/1/58	9.12 a.m.	22962	42	9¾	30.03

TABLE 13

TENNANT CREEK WELLS

DUAL PUMP TEST 9 AND 10 WELLS
DECEMBER 1957.

No. 10 WELL RECORDINGS

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches	Back Pressure P.S.I.	Pumping Rate Seconds/50 gals
7th	10.40 a.m.		41	$1\frac{3}{8}$	$4\frac{1}{2}$	50
	11.40 a.m.	60	51	9		
	12.40 p.m.	120	53	1		
	1.40 p.m.	180	53	$3\frac{1}{2}$		
	2.38 p.m.	238	53	$4\frac{1}{2}$		
	3.26 p.m.	296	53	$5\frac{3}{4}$		
	4.36 p.m.	356	53	6		
	9.17 p.m.	637	53	9		
8th	9.04 a.m.	1344	53	$10\frac{1}{2}$	5	53
	4.10 p.m.	1770	53	$8\frac{1}{2}$		
	9.55 p.m.	2115	53	11		
9th	9.12 a.m.	2792	54	$0\frac{1}{2}$	5	53
	3.45 p.m.	3185	53	$10\frac{1}{2}$		
	9.15 p.m.	3515	54	$2\frac{3}{4}$		
10th	9.13 a.m.	4233	54	-	5	53
	3.25 p.m.	4605	53	11		
	9.20 p.m.	4960	54	2		
11th	9.27 a.m.	5687	54	$1\frac{1}{2}$	5	53
	2.57 p.m.	6017	54	4		
	9.27 p.m.	6407	54	$1\frac{1}{2}$		
12th	9.08 a.m.	7108	54	4	5	53
	3.02 p.m.	7462	53	$11\frac{1}{2}$		
	9.07 p.m.	7827	54	$3\frac{3}{4}$		
13th	9.20 a.m.	8560	54	2	5	53
	10.02 p.m.	9322	54	$1\frac{3}{4}$		
14th	8.48 a.m.	9968	53	$8\frac{1}{2}$	5	53
	9.42 p.m.	10742	54	4		
15th	9.45 a.m.	11465	54	7	5	53
	10.10 p.m.	12210	55	$5\frac{1}{2}$		
16th	9.16 a.m.	12876	54	7	5	53
	9.40 p.m.	13680	54	7		
17th	9.57 a.m.	14357	54	$7\frac{1}{2}$	5	53
	10.45 a.m.	14405	54	$7\frac{1}{2}$		Pump shut down

Approximate average time to pump 50 gallons	53 seconds
Approximate gallons per hour pumped	3400
Approximate total gallons pumped	816000
Reduced level of measuring point	1075.59 feet

TENNANT CREEK WELLS

DUAL PUMP TEST 9 AND 10 WELLS

DECEMBER 1957

No. 10 Well Recovery Recordings

Pump shut down 10.45 a.m. - 17/12/57

Date	Time	Elapse Minutes	Water Level Feet	Water Level Inches
17/12/57	10.45 a.m.	-	54	7½
	11.45 a.m.	60	44	5
	12.45 p.m.	120	42	11
	1.45 p.m.	180	42	8
	2.45 p.m.	240	42	7
	3.45 p.m.	300	42	5
	9.22 p.m.	637	42	3½
18/12/57	8.55 a.m.	1330	42	2
	3.10 p.m.	1705	41	10½
	9.35 p.m.	2090	42	0
19/12/57	8.41 a.m.	2756	41	10¼
	4.41 p.m.	3236	41	8¼
	9.35 p.m.	3530	41	9½
20/12/57	4.06 p.m.	4641	41	8½
21/12/57	4.21 p.m.	6096	41	6¼
22/12/57	3.55 p.m.	7940	41	5⅝
23/12/57	4.02 p.m.	8957	41	4⅜
24/12/57	3.49 p.m.	10384	41	4
25/12/57	10.46 a.m.	11521	41	4¾
2/1/58	9.17 a.m.	22952	41	3½

TABLE 15

TENNANT CREEK WELLS

DUEL PUMP TEST 9 AND 10 WELLS
DECEMBER 1957

Date	No. 5 Well Time	Variation Inches	No. 3 Well Time	Variation Inches
7th	10.03 a.m.	0	10.07 a.m.	0
	3.57 p.m.	+1¾	3.53 p.m.	+1¼
	8.50 p.m.	+½	9.33 p.m.	+½
8th	8.39 a.m.	0	9.30 a.m.	+¼
	3.50 p.m.	+1¾	4.30 p.m.	+1¼
	9.02 p.m.	+½	10.47 p.m.	+½
9th	8.42 a.m.	+⅜	9.38 a.m.	+½
	4.06 p.m.	+1¾	4.00 p.m.	+1¾
	8.50 p.m.	+¾	9.45 p.m.	+1¼
10th	8.43 a.m.	0	9.40 a.m.	+¼
	3.10 p.m.	+1¼	3.47 p.m.	+1¼
	8.55 p.m.	+½	9.45 p.m.	+¾
11th	9.00 a.m.	0	9.52 a.m.	+⅜
	2.40 p.m.	+1¼	3.15 p.m.	+1
	9.07 p.m.	+1	9.50 p.m.	+1
12th	8.40 a.m.	+¼	9.30 a.m.	+¾
	2.45 p.m.	+1½	3.20 p.m.	+1½
	8.47 p.m.	+1	9.30 p.m.	+1¾
13th	8.55 a.m.	+¼	9.40 a.m.	+¾
	9.35 p.m.	+1	10.20 p.m.	+1¼
14th	8.25 a.m.	+¼	9.15 a.m.	+¾
	9.30 p.m.	+1	10.08 p.m.	+1½
15th	9.20 a.m.	+¼	10.10 a.m.	+¾
	9.55 p.m.	+½	10.27 p.m.	+1⅛
16th	8.50 a.m.	0	9.45 a.m.	+½
	9.20 p.m.	+¾	10.00 p.m.	+1⅛
17th	9.00 a.m.	+¼	9.30 a.m.	+¾
	9.05 p.m.	+¾	9.38 p.m.	+1¼
18th	8.40 a.m.	0	9.10 a.m.	+¾
19th	8.30 a.m.	+⅜	9.03 a.m.	+¾
20th	3.47 p.m.	+1⅜	4.25 p.m.	+2
21st	4.01 p.m.	+1¾	4.35 p.m.	+1¾
22nd	3.23 p.m.	+1½	4.05 p.m.	+1½
23rd	3.46 p.m.	+1½	4.20 p.m.	+1⅝

TENNANT CREEK WELLS

DUAL-PUMP TEST 9 AND 10 WELLS
DECEMBER, 1957
No. 11 Well

Date	No. 12 Well Time	Variation in Inches	No. 11 Well Time	Variation in Inches	No. 8 Well Time	Variation in Inches
7th	10.18 a.m.	-½	10.14 a.m.	-¼	10.32 a.m.	+⅜
	3.41 p.m.	-¼	3.45 p.m.	+1	4.03 p.m.	+1⅛
	9.23 p.m.	-½	9.27 p.m.	+¼	8.55 p.m.	+1
8th	9.19 a.m.	-½	9.23 a.m.	0	8.43 a.m.	+⅜
	4.15 p.m.	0	4.20 p.m.	+1	3.57 p.m.	+1⅛
	10.30 p.m.	0	10.37 p.m.	+¼	9.09 p.m.	+1
9th	9.25 a.m.	0	9.31 a.m.	+¼	8.47 a.m.	+½
	3.50 p.m.	0	3.55 p.m.	+1¼	4.11 p.m.	+1¼
	9.30 p.m.	0	9.35 p.m.	+¾	8.54 p.m.	+1¼
10th	9.30 a.m.	0	9.33 a.m.	-¼	8.47 a.m.	+⅜
	3.38 p.m.	0	3.40 p.m.	+½	3.15 p.m.	+1
	9.35 p.m.	0	9.50 p.m.	0	9.02 p.m.	+⅝
11th	9.40 a.m.	0	9.45 a.m.	0	9.04 a.m.	+⅜
	3.08 p.m.	0	3.06 p.m.	+¼	2.46 p.m.	+¾
	9.37 p.m.	0	9.40 p.m.	+⅜	9.15 p.m.	+¾
12th	9.15 a.m.	0	9.20 a.m.	0	8.50 a.m.	+⅝
	3.07 p.m.	0	3.10 p.m.	+¾	2.50 p.m.	+1¼
	9.16 p.m.	0	9.22 p.m.	+½	8.52 p.m.	+1
13th	9.30 a.m.	0	9.35 a.m.	0	9.00 a.m.	+½
	10.10 p.m.	0	10.15 p.m.	+½	9.47 p.m.	+1½
14th	9.00 a.m.	0	9.45 a.m.	0	8.30 a.m.	+½
	9.47 p.m.	0	9.53 p.m.	+½	9.35 p.m.	+1
15th	10.00 a.m.	0	10.05 a.m.	0	9.25 a.m.	+½
	10.15 p.m.	0	10.20 p.m.	+⅜	10.00 p.m.	+1
16th	9.30 a.m.	0	9.37 a.m.	0	9.08 a.m.	+½
	9.45 p.m.	0	9.50 p.m.	+¼	9.25 p.m.	+1⅛
17th	9.20 a.m.	0	9.25 a.m.	+0	9.05 a.m.	+¾
	9.25 p.m.	0	9.30 p.m.	-⅜	9.10 p.m.	+1
18th	9.00 a.m.	0	8.55 a.m.	0	8.45 a.m.	+⅝
19th	8.45 a.m.	0	8.55 a.m.	0	8.33 a.m.	+⅝
20th	4.10 p.m.	0	4.16 p.m.	+½	3.52 p.m.	+1
21st	4.27 p.m.	0	4.31 p.m.	+¾	4.09 p.m.	+1¼
22nd	3.40 p.m.	0	3.57 p.m.	+⅝	2.27 p.m.	+1

TENNANT CREEK WELLS

Salinity tests of daily water samples conducted by the Director of Water Use with resistivity apparatus during pumping tests of Nos. 9 and 10 wells. The apparatus gives results in micromhos per centimetre at 25° Centigrade from which salinity in parts per Million is derived on the basis that a conductivity of 1000 micromhos per Centimetre equals approximately 640 parts per million of contained solids.

Date	No. 9 Well		No. 10 Well	
	Mm/cm	p.p.m.	Mm/cm	p.p.m.
17/11/57	800	512		
18/11/57	800	512		
7/12/57	810	518	700	448
8/12/57	800	512	710	454
9/12/57	800	512	700	448
10/12/57	800	512	690	442
11/12/57	800	512	690	442
12/12/57	810	518	690	442
13/12/57	810	518	690	442
14/12/57	810	518	690	442
15/12/57	820	525	710	454
16/12/57	820	525	690	442
17/12/57	Broken in Transit			

TENNANT CREEK WATER SUPPLY

LOGS OF WELLS DOWN TO WATER LEVEL.

WELL No. 1. 43 FEET DEEP. LOGGED TO 39 FEET.

0 feet - ± 4 feet	Wind blown sand
± 4 feet - ± 12 feet	Concealed by tank
± 12 feet - 39 feet	Pisolitic and nodular ironstone grading into pallid zone of lateritisation.

Remarks: Some travertinous limestone was seen in the spoil and this is stated to have occurred between 4 feet and 11 feet. The well started caving at 43 feet and had to be abandoned before the base of the lateritic profile was reached. Some of the spoil was similar to the vein breccia from number 5 well.

WELL No. 2. Not visited - dry well in Warramunga Group rocks on N.E. edge of basin.

WELL No. 3. 61 FEET DEEP. LOGGED TO 56 FEET.

0 feet - ± 6 feet	Wind blown sand
± 6 feet	Regolith on laterite
± 6 feet - ± 20 feet	Pisolitic and nodular ironstone grading into
± 20 feet - 56 feet	pallid zone of lateritisation. Mottled zone poorly developed.

Remarks: Base of laterite not seen. Country rock doubtful but may be granite. There is abundant kaolin in the pallid zone.

WELL No. 4. 70 FEET DEEP. LOGGED TO 51 FEET.

0 feet - 7 feet	Wind blown sand
7 feet - 20 feet	Pisolitic and nodular ironstone grading into
20 feet - 51 feet	mottled and pallid zones of lateritisation containing recognisable fault breccia and shales.

Remarks: Base of lateritic profile not seen.

WELL No. 5. 64 FEET DEEP. PUMPED OUT TO 40 FEET FOR LOGGING.

0 feet - ± 5 feet	Wind blown sand
± 5 feet - ± 20 feet	Pisolitic and nodular ironstone grading into
± 20 feet - 45 feet	mottled and pallid zones of lateritisation. Country rock may be vein breccia.

WELL No. 5. - (Continued)

Remarks: Country rock contains angular and subangular to rounded pebbles up to ½ inch in diameter, in a ferruginous matrix. The matrix itself shows signs of lateritisation. Unlateritised rock was not seen in situ and it is difficult to decide whether there is an occurrence of vein breccia resembling the quartz haematite ore bodies of Tennant Creek area or whether the rock is sedimentary. Base of lateritic profile not seen but thought to be exposed below water .

WELL No. 6. 78 FEET DEEP. LOGGED TO 16 FEET.

0 feet	- ± 6 feet	Wind blown sand
± 6 feet	- ± 16 feet	Nodular and pisolitic ironstone.

Remarks: Not logged in detail because of crumbling lip of well. From 16 feet the well is in the mottled and pallid zones. At 78 feet the well had not reached the base of the lateritic profile. Fragments of spoil suggest that the country rock may be granitic. Pegmatite fragments recognised.

WELL No. 7. 73 FEET DEEP. LOGGED TO 49 FEET.

0 feet	- ± 6 feet	Wind blown sand
± 6 feet	- ± 16 feet	Pisolitic and nodular ironstone grading into
± 16 feet	- 49 feet	mottled and pallid zones.

Remarks: Base of laterite thought to be near water level. Spoil included weathered but unlateritised Warramunga Group slate and shale.

WELL No. 8. 63 FEET DEEP. LOGGED TO 45 FEET.

0 feet	- 7 feet	Wind blown sand
7 feet	- ± 20 feet	Pisolitic and nodular ironstone grading into
± 20 feet	- 45 feet	mottled and pallid zones.

Remarks: Kaolinised fault breccia and recognisable Warramunga Group slates in spoil. Base of laterite not seen.

WELL No. 9. 63 FEET DEEP. PUMPED TO 48 FEET FOR LOGGING.

0 feet	- ± 5 feet	Wind blown sands
± 5 feet	- ± 20 feet	Pisolitic and nodular ironstone grading into
± 20 feet	- 48 feet	mottled and pallid zones.

Remarks: Base of laterite not exposed by pumping but thought to be near bottom of well. Spoil includes breccia similar to No. 1 and 5 wells.

TABLE 18.

WELL No. 10.		65 FEET DEEP.	PUMPED TO 45 FEET FOR LOGGING.
0 feet -	± 5 feet	Wind blown sand	
± 5 feet -	± 20 feet	Pisolitic and nodular ironstone grading into	
± 20 feet -	45 feet	mottled and pallid zones.	

Remarks: Caving at bottom. Country rock doubtful - may be granitic. Base of laterite not exposed.

WELL No. 11.		64 FEET DEEP.	LOGGED TO 40 FEET.
0 feet -	± 6 feet	Wind blown sand	
± 6 feet -	± 15 feet	Pisolitic and nodular ironstone grading into	
± 15 feet -	40 feet	mottled and pallid zones developed in quartzite and slate.	

Remarks: Base of laterite profile thought to be near 40 feet.

WELL No. 12.		60 FEET DEEP.	LOGGED TO 38 FEET.
0 feet -	± 5 feet	Wind blown sand	
± 5 feet -	± 20 feet	Pisolitic and nodular ironstone grading into	
± 20 feet -	38 feet	mottled and pallid zones developed in granite.	

WELL No. 13.		106 FEET DEEP.	PUMPED DRY FOR LOGGING.
0 feet -	± 8 feet	Wind blown sand	
± 8 feet -	± 25 feet	Pisolitic and nodular ironstone grading into	
± 25 feet -	± 60 feet	mottled and pallid zones	
± 60 feet -	106 feet	Gradual transition into very weathered granite - gneissoid with kaolin and chlorite and shattered phenocrysts of felspar. Ferruginised brecciated vein and kaolinised joints.	

WELL No. 14.		± 50 FEET DEEP.	LOGGED TO 40 FEET.
0 feet -	± 8 feet	Wind blown sand	
± 8 feet -	± 20 feet	Pisolitic and nodular ironstone grading into	
± 20 feet -	40 feet	mottled and pallid zones. Silification at 40 feet.	

Remarks: Warramunga group slate and shale recognisable in spoil. Caving at bottom. Base of laterite not seen.

TENNANT CREEK WATER SUPPLY

WELLS AND BORES - CABBAGE GUM BASIN

PURITY OF WATER

WELL/BORE	TOTAL DISSOLVED SOLIDS P.P.M.	REMARKS
1	628	Chemical analysis
3	511	" "
4	631	" "
5	846	" "
6		Not yet available
7		
8		
9	790	Calculated from conductivity
10	554	Chemical Analysis
11	700	Calculated from conductivity
12	760	"
13	760	"
Perry No. 1	1325	Chemical Analysis Results awaited
Perry No. 2	---	Fresh tasting
Cabbage Gum Bore	2160	Chemical Analysis
Seasonal lake	430	Tested in October 1957 - Conductivity.

NOTE : Chemical Analyses by Chief Analyst, Animal Industries Division, Alice Springs.

Conductivity tests by Director of Water Use.

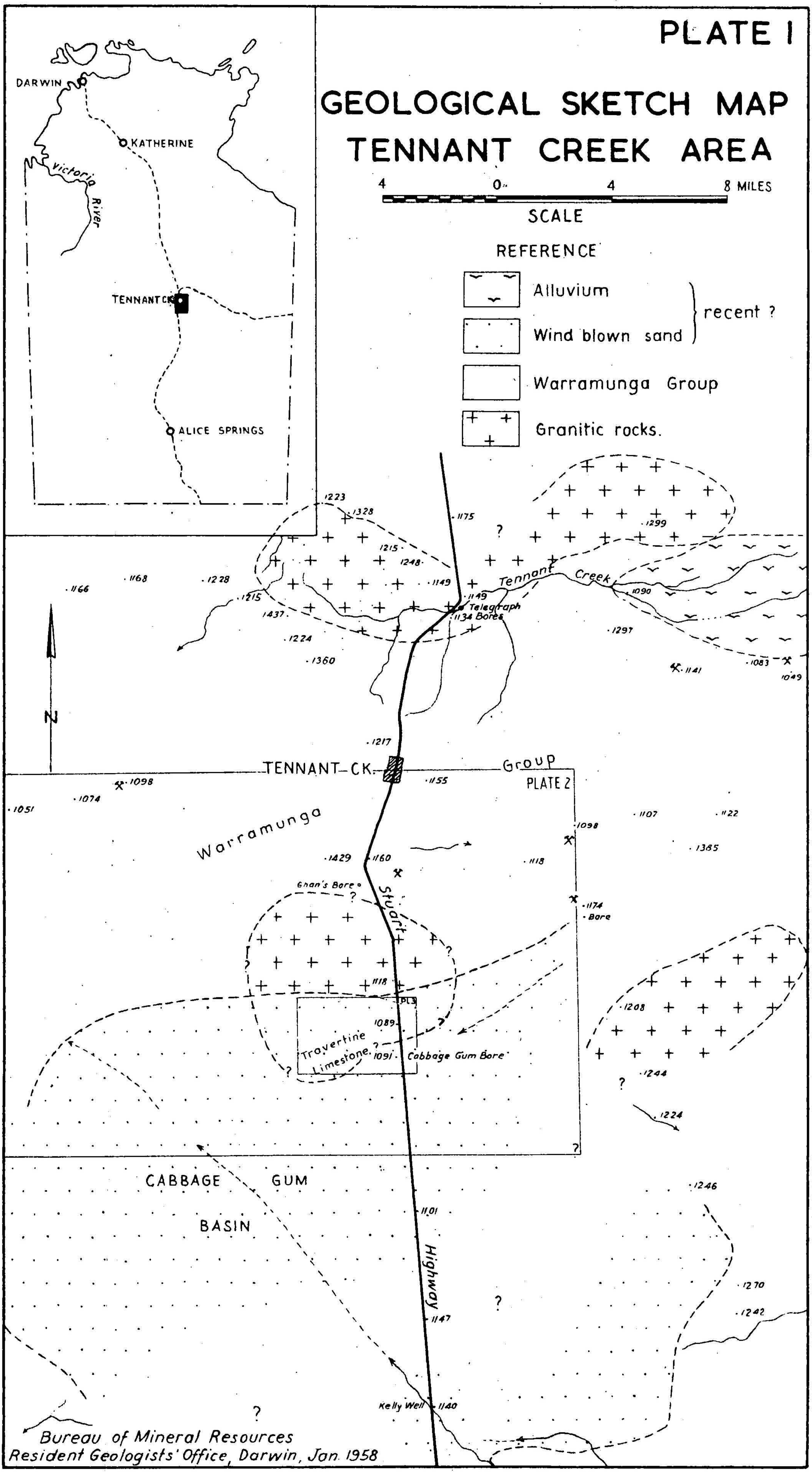
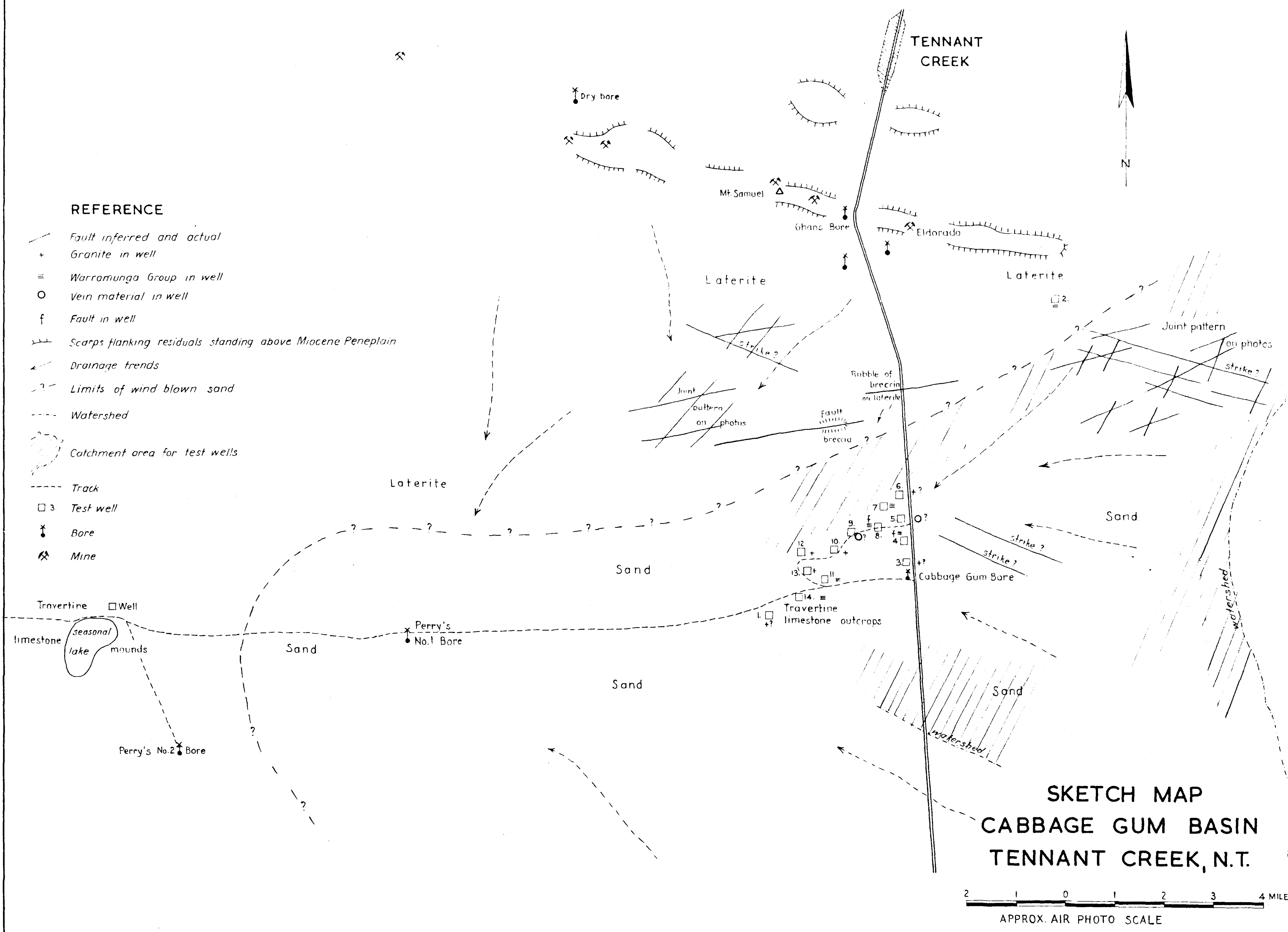


PLATE I
GEOLOGICAL SKETCH MAP
TENNANT CREEK AREA
4 0 4 8 MILES
SCALE
REFERENCE
Alluvium
Wind blown sand
recent ?
Warramunga Group
Granitic rocks.
DARWIN
KATHERINE
Victoria River
TENNANT CK.
ALICE SPRINGS
N
Tennant Creek
Telegraph
1134 Bores
TENNANT CK.
Warramunga Group
PLATE 2
Ghan's Bore
Stuart Highway
Bore
PL3
Travertine Limestone
Cabbage Gum Bore
CABBAGE GUM BASIN
Kelly Well
Bureau of Mineral Resources
Resident Geologists' Office, Darwin, Jan. 1958

PLATE 2

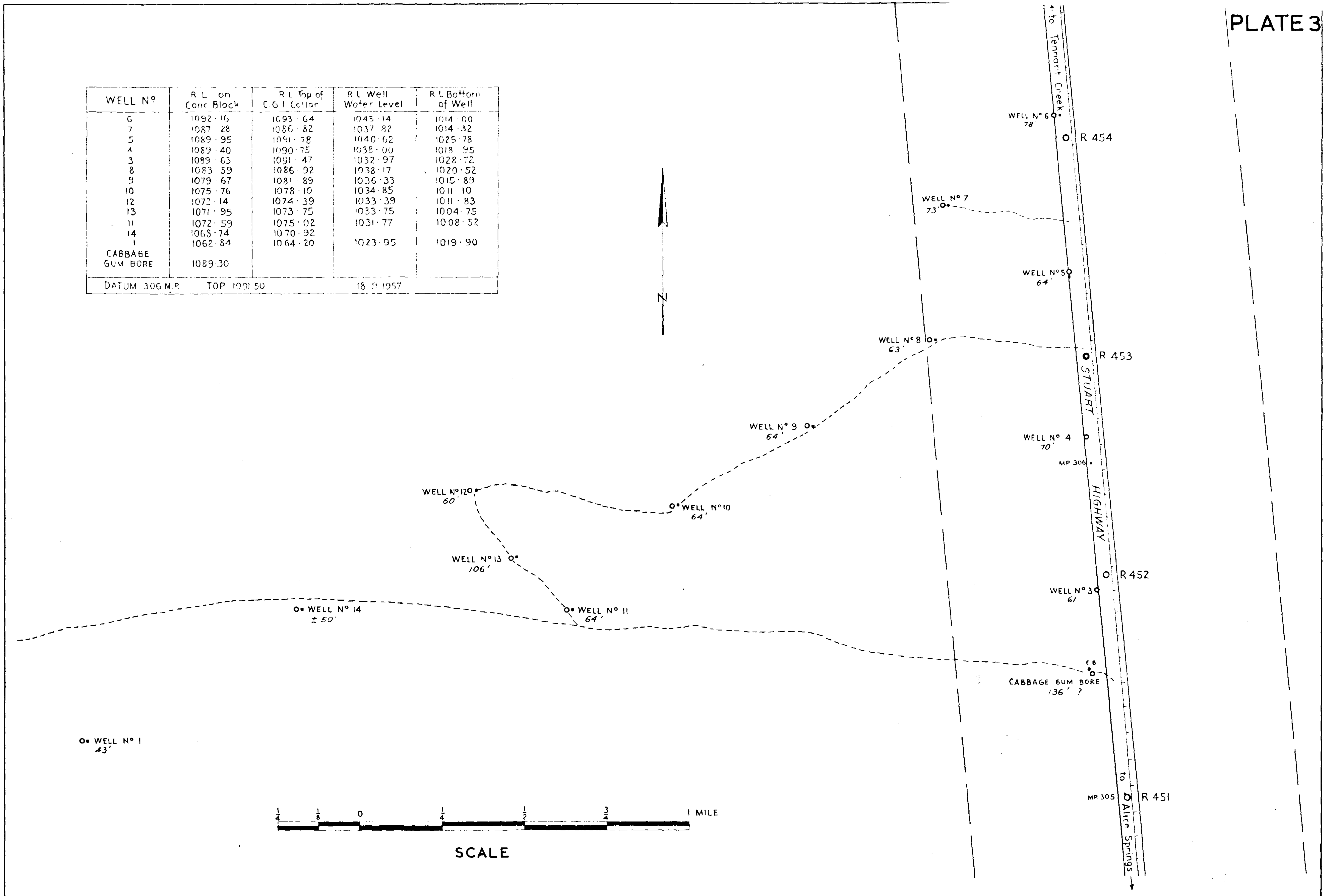


SKETCH MAP
CABBAGE GUM BASIN
TENNANT CREEK, N.T.

Bureau of Mineral Resources, Resident Geologists' Office, Darwin, January 1958

PLATE 3

WELL Nº	R L on Conc Block	R L Top of C G I Collar	R L Well Water Level	R L Bottom of Well
6	1092·16	1093·64	1045·14	1014·00
7	1087·28	1086·82	1037·82	1014·32
5	1089·95	1091·78	1040·62	1025·78
4	1089·40	1090·75	1038·00	1018·95
3	1089·63	1091·47	1032·97	1028·72
8	1083·59	1086·92	1038·17	1020·52
9	1079·67	1081·89	1036·33	1015·89
10	1075·76	1078·10	1034·85	1011·10
12	1072·14	1074·39	1033·39	1011·83
13	1071·95	1073·75	1033·75	1004·75
11	1072·59	1075·02	1031·77	1008·52
14	1068·74	1070·92		
1	1062·84	1064·20	1023·95	1019·90
CABBAGE GUM BORE	1089·30			
DATUM 306 M.P.	TOP 1091.50		18.9.1957	



REFERENCE

64' Depth of well below ground surface.

Track

Survey road peg

Concrete block

WELLS AT CABBAGE GUM BASIN
TENNANT CREEK, N.T.

Bureau of Mineral Resources, Resident Geologists' Office, Darwin, January 1958

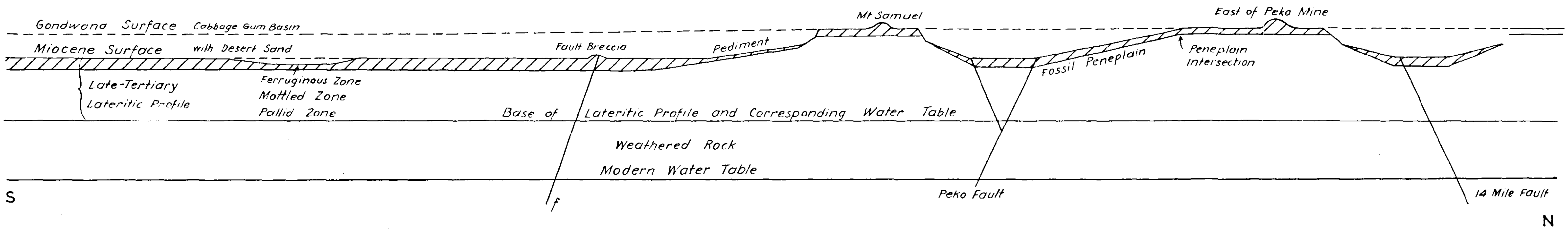
PLATE 4

TENNANT CREEK WATER SUPPLY

DIAGRAMMATIC SECTIONS SHOWING THREE STAGES IN THE DEVELOPMENT OF THE MODERN LAND SURFACE - TENNANT CREEK AREA

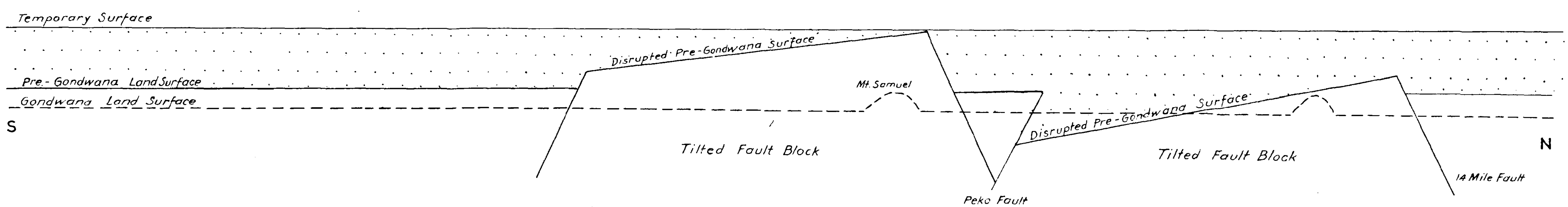
STAGE 3

COMPOUND SECTION OF MODERN SURFACE THROUGH CABBAGE GUM BASIN, MT. SAMUEL, AND EAST OF THE PEKO MINE.



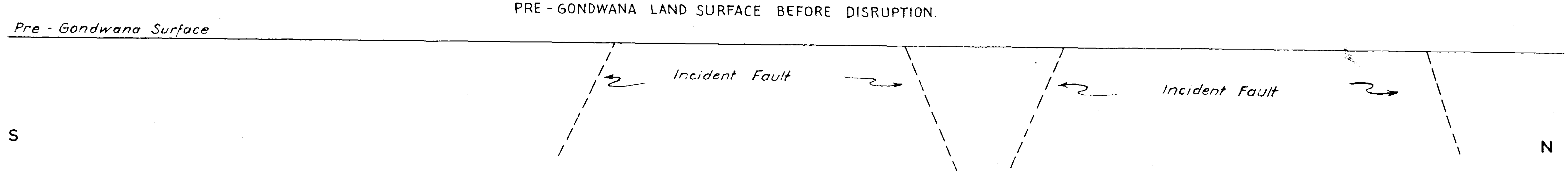
STAGE 2

GONDWANA LAND SURFACE SUPERIMPOSED UPON BURIED OLDER SURFACE DISRUPTED BY FAULTING.



STAGE 1

PRE - GONDWANA LAND SURFACE BEFORE DISRUPTION.



Bureau of Mineral Resources, Resident Geologist's Office, Darwin, Jan. 1958.