GROUNDWATER PROSPECTS - INDIANA STATION

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30/9/63
INTRODUCTION

Advice has been requested by the District Engineer, Water Resources Branch, on groundwater prospects on Indiana Station, where pastoral areas are required in three areas. The station was visited on 23rd - 29th May, 1963.

GEOLOGY

The area is underlain by Precambrian metamorphic rocks whose structure is complex and largely unknown. The strata generally have steep or vertical dips which are the result of intense folding, but individual fold areas can rarely be traced. Faults and major joints sometimes cause a distinct linear pattern on the aerial photographs, particularly in areas of poor outcrop. Most of these joints appear to be vertical.

Each of the areas is covered by Quaternary alluvial deposits and windblown sand, but these deposits are very thin (less than 50 feet).

Sediments of probable Tertiary age are known from subsurface information in two areas. Along Buckit Creek (east of Armona Bore), these sediments are up to 200 feet thick and consist of variagated sandy clay with some sandstones. The second area is in the vicinity of Didgo Bore (P33/15-52), where 340 feet of green and grey clay with beds of magnesite, chalcedony and travertine was penetrated.

HYDROLOGY AND PREVIOUS DRILLING

(a) Quaternary

No supplies of groundwater can be expected from these deposits, which are not known to extend below the water table.

(b) Tertiary

No useful supplies have been obtained from the
Tertiary sediments along the Hackitta Creek. Most of the
holes which penetrated these sediments obtained a small supply:
some of these were of good quality, but some were highly
saline. The small supplies, and possibly the high salinity,
are thought to be due to low permeability of the aquifers. It
is unlikely that useful supplies of groundwater will be avail-
able from the Tertiary sediments in this area.

A good supply of good quality water (1500gph,
1700ppm) was obtained from the Tertiary sediments at Gidyea
Bore, from 340 feet. More saline supplies were also obtained
at 230 feet (200gph, 3500ppm) and at 220 feet (less than 100gph,
6000ppm) from this bore. It is apparent that the useful aquifers
within the Tertiary sediments are deep, and that the failures
along Hackitta Creek are due to a lack of sufficient thickness
of these sediments. The limits of the thick Tertiary sediments
in the area around Gidyea bore are not known, but it is
considered likely that they occur in a belt which trends west-
north-west and east-south-east from Gidyea bore.

(c) Precambrian

Results of previous drilling in the Precambrian
metamorphic rocks have been variable. Eringa bore (1800ppm,
950gph) and Black Diamond bore (1500ppm, 300gph) produced
useful supplies. These are both in areas where recharge could
be expected to be efficient. Bore FS/15-50 produced a very
small supply of moderate quality (4000ppm), and bore FS/15-59
and 60 had good supplies of highly saline water (10,000 to
12,000ppm). These are all well away from any apparent major
source of recharge. It is considered that moderate to good
supplies of stock quality water should be available from the
metamorphic rocks in areas where a recharge source from major
cracks coincides with permeability caused by faults and large
joints.
PROPOSED SITES

1. F53/15-91

Seven miles south-south-west of Brahms Bore (see Plate 1). This site is at the intersection of a fault, and
a joint indicated by a photoline feature. The photo pattern
indicates that there are several other major joints in the
area, and there will probably be adequate joint permeability
below the piezometric surface. The bore should penetrate
quartz biotite schist with some quartz feldspar biotite gneiss.
A moderate supply of stock quality water is expected from a
total depth of 150 to 200 feet.

2. F53/15-92

Seven miles west-north-west of Gidyea bore (see Plate
1). This site has been selected to test the west-north-westerly
extent of the Tertiary sediments penetrated by Gidyea bore.
If there is a sufficient thickness of sediments (i.e. about
350 feet), a similar bore to Gidyea bore should result. Drilling
should cease if metamorphic basement rocks are encountered at
less than 350 feet; drilling should continue until either a
satisfactory supply is obtained or metamorphic basement is
reached. Depth to basement is more than 340 feet at Gidyea
bore (which bottomed in Tertiary sediments), so a total depth
of 400 to 450 feet may be necessary.

3. F53/15-93

Fifteen miles east-north-east of Gidyea bore (on
east bank of Hackitta Creek) (see Plate 2). This site has been
selected at the intersection of two photoline features (which
are interpreted as major joints), and close to the intersection
of two others. It is possible that there is sufficient intensity
of jointing below the piezometric surface at this locality to
cause significant permeability. Argo recharge is available
from Hackitta Creek. Therefore a moderate to good supply of
stock quality water is anticipated, from a total depth of 150
to 200 feet. There is no outcrop in the immediate vicinity of
the site, but it is expected that the hole will penetrate quartz mica schist and gneiss, probably with a weathered zone extending down from the surface.

4. P53/15-94

Two miles east-north-east of P53/15-93 (see Plate 1). This site was selected as a second attempt for P53/15-93. It would intersect brown coarse quartz mica schist which is intersected by a swarm of well jointed quartz veins of up to 3 feet thick. Total depth would be 150 to 200 feet, and a small to moderate supply of moderate to poor quality water could be expected.

All sites have been marked by steel pegs, and have been shown to the pastoralist.