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ENG. GEOLOGY SECTION

RB 52/76

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

URANIUM & FUEL SECTION

GEOLOGICAL REPORT ON TANK SITE, TOWN BLK. A, MELROSE, HD. WONGYARRA

- E. & W. S. DEPARTMENT -

by

W. Johnson
Senior Geologist

61-7

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22nd March, 1961

D.M. 440/61

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The site was inspected and test pits logged on 6/3/61.

LOCATION AND TOPOGRAPHY:

The site is on a spur of a ridge overlooking the township of Melrose from the south. The spur falls away at a moderately steep grade below the site and the fall across the tank foundations is five feet. The spur on which the tank is to be built forms part of a low range of hills extending south and south-eastwards from the elevated quartzite mass of Mt. Remarkable.

ENGINEERING GEOLOGY:

The rocks forming this low range are sandy shales, shaly sandstones, siltstones, and perhaps some tillitic beds, partly converted to quartzites, slates and phyllites by metamorphism. In the area around Melrose they have been affected to depths of 50 or more feet by weathering, with a consequent alteration to soft sandstones and shales. A considerable amount of folding and faulting has also taken place and numerous joints break the rock mass into interlocking angular blocks.

At the tank site each test pit has penetrated a cream to yellowish grey and grey moderately hard shaly sandstone. In Pit No. 2, on the low side, this was entered at a depth of 1 foot 9 inches or approximately 1 foot above the level of the underside of the tank floor. It is therefore apparent that the foundation ring will be everywhere resting in, and on, moderately hard and sound rock.

In Pit No. 1 a brecciated fault zone was cut. This zone is approximately 2 feet to 3 feet wide and appears to dip steeply to the southwest. It consists of a compacted mass of fine to coarse sand grains, small angular fragments of rock, and some quartz fragments. It trends towards Pit No. 4, without appearing in it, and could be avoided by shifting the site around the contours 20 feet towards the fence. However the fault breccia does not appear to be unstable and does not introduce the danger of differential settlement.

The question of whether a rock or soil design should be used, as always when weathered rock is involved, cannot be definitely answered. The foundation materials would act as rock in the individual blocks into which the rock mass is divided by joint and bedding planes cracks. These cracks all appear sufficiently tight to prevent settlement or lateral movement by closure under imposed vertical or lateral loads. The probability is then that a "rock" design can be used.

If the use of a "soil" or "rock" design is a critical factor then some testing, preferably in the field, would be advisable.

CONCLUSIONS AND RECOMMENDATIONS:

The Melrose tank site is underlain at foundation level by moderately hard weathered sandstone with a steep dipping zone of compacted, essentially clay free, breccia on the south western side. The breccia can be avoided by shifting the tank 20 feet southwest towards the road, but this would not be necessary if a soil design is used. The foundation material should act as rock but if any doubt is felt or if the cost difference between a "rock" and "soil" design is critical, testing of the rock is recommended.

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WJ:AGK
22/3/61

MELROSE TANK SITE.

Test Pit Logs.

Pit No.1

0'0" to 1'3"	Grey sandy soil.
1'3" to 2'6"	Red brown clay. Thickest and most persistent in this pit although it is almost missing from S.W. corner.
2'6" to 7'0"	Grey yellow weathered argillaceous sandstone. Most of the pit is in a gritty breccia consisting of quartz grains and rock fragments ranging from fine sand size up to blocks 2" x 3". Compact and well consolidated. Breccia zone dips very steeply S.W. and trends towards Pit. No. 4
7'0"	Bottom of Pit.

Pit No.2

0'0" to 1'2"	Grey brown sandy soil
1'2" to 1'9"	Chocolate brown sandy clay
1'9" to 7'6"	Light yellow brown flaggy argillaceous sandstone jointed and moderately hard.
7'6"	Bottom of Pit.

Pit No.3

0'0" to 1'0"	Grey sandy soil with small angular argillaceous sandstone rubble at base.
1'0" to 1'5"	Chocolate brown sandy clay.
1'5" to 6'0"	Purplish mauve very argillaceous flaggy sandstone softer than that in Pit 4. Strike 335° W Dip 65° W
6'0"	Bottom of Pit

Pit No.4

0'0" to 1'0"	Greyish brown sandy soil with plentiful angular sandstone rubble.
1'0" to 2'6"	Red brown sandy clay - very lenticular - present only as seams in joints in sandstone in north end of pit.
2'6" to 5'6"	Cream, yellowish grey and grey weathered argillaceous sandstone. Quite hard and jointed with some seams of red clay in joint cracks in upper two to three feet.
5'6"	Bottom of Pit.