DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL INVESTIGATIONS, MYPONGA DAM

CONSTRUCTION PHASE

Progress Report No. 4

STABILITY AND WATER TIGHTNESS OF FAULTED LIMESTONE ON THE LEFT ABUTMENT

by

W. Johnson, B.Sc.(Hons.)
Senior Geologist

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7th August, 1959.

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ABSTRACT

The exploration of the limestone on the left abutment has revealed an extensive series of bedding faults with associated shears and shear tension joints occurring in blocks K to V. The cracking, brecciation and fracturing caused by the fault movements has allowed easy access for meteoric water percolating down to the water table and solution and deep weathering has taken place along joint, shear and fault planes with the formation of clay seams and open cracks and cavities. The principal openings and clay seams are along bedding plane faults and joints at right angles to the river. The openings form a continuous leakage path under the abutment.

The limits of severe weathering and of open cracks have been defined by exploration and treatment by grouting within these limits is suggested.

INTRODUCTION

In the previous progress report on the dam site proper it was intimated that further excavation of the left abutment foundations and completion of the drilling proposed in that report would probably reveal further faulting. This was proved correct and an extensive system of faults along bedding planes, and divergent shears from these faults, was discovered in Blocks P to T during excavation. The original fault found in Block 5 was a minor part of this system. Several more cavities along this and parallel shears were found and the drill holes showed that openings capable of taking large flows of water extended to depths well below the bed level of the Myponga River at the dam site.

The first programme of drill-holes gave some indication of the limits, laterally and in depth, for the permeable rock and it was decided to drill one more hole in the critical area to determine the level below which permeable openings do not occur.

Prior to this driving of a long exploratory adit under the abutment and through the fault zones into comparatively sound limestone at the limits of the abutment, was commenced.

The present report describes the results of all this exploration and discusses implications of the findings. Exhaustive descriptions of the geology have been omitted in an attempt to give the essential details on which the conclusions are based.

EXPLORATION

Exploration has been by means of diamond drilling and driving of underground openings. Excavation for the abutment foundations has provided a clear geological picture of near surface conditions.

DRILLING

The diamond drilling programme consisted of five holes located as shown on Plan 59-282. Four of these were drilled during the period Nov./Dec. 1958, and one in July 1959. One was also deepened in July 1959. Of the first four holes, WTs. 2, 3 and 4 were originally drilled to a level of RL 519 or 125 feet below river bed level and WT 1 was drilled to the contact of the phyllite and the limestone. WT 2 was deepened to RL 414' in July 1959. During and subsequent to drilling, all four holes were extensively tested with water under pressure to determine flow capacities of the various cracks encountered. Since completion of testing water levels in the four holes have been measured periodically to examine the behaviour of the water table. Diamond drill hole WT 5 was taken to a depth of 312 feet, representing a level of RL 450' and WT 2 was deepened to RL 414'. Extensive water testing of WT 5 was also done. The first four holes were closely supervised by project engineering staff of the E. & W. S. Dept. WT 5 and the deepening of WT 2 were supervised by a Department of Mines resident geologist, P.W. Goscombe, in conjunction with E. & W. S. Dept. engineering staff.

UNDERGROUND OPENINGS

The long adit in the left abutment commences in Block K and extends to co-ordinate 9517N for a total length of 528 feet. Under the abutment its course is roughly that of the curve of the dam and beneath Blocks Q to V it was driven directly along the downwards projection of

the main faulted zone. Crosscuts north-west, and south-east were driven at chainage 260', the upstream crosscut being 42 feet long and the downstream being 20 feet. From the face of the upstream crosscut a percussion drill hole was put out under geological supervision for a depth of 10 feet horizontally.

The main adit was turned at co-ordinates 9727N 10104E and driven approximately grid south to co-ordinate 9517N.

Invert RL of the adit, 676', was chosen so that it can be connected later to the gallery in the dam proper and used for grouting and inspection.

GEOLOGICAL

All surface and underground openings have been mapped in detail and an area surrounding the abutment re-mapped on a scale of 80 feet to 1 inch. Detailed logs of the diamond drill cores have been prepared. Maps and logs, together with details of the water testing, are attached as appendices to this report. The mapping and supervision of the drilling of WT 5 were done by Mr. P.W. Goscombe under the writer's direction.

GEOLOGY

Since the previous report a great deal more information is available on the geology of the left abutment and this has enabled recognition of a complex fault pattern in the limestone which may be traced at depth in the adits and drill holes. The formation of open cracks and cavities in the limestone is believed to be primarily controlled by the faulting and its associated fracturing. Information has also been obtained on water table behaviour and lithology.

LITHOLOGY

A detailed study of the limestone and calcareous shales or argillaceous limestones as revealed in boreholes WTs. 1 to 5 has been made for the purpose of determining whether lithological differences exerted any control on the formation of solution cavities. Included in the study was an analysis of samples at 10 feet intervals of depths from WTs. 1 to 4 to determine the variable of carbonate percentage. This revealed that, megascopically, rocks with similar appearance have considerable differences

in carbonate content; and that it is impossible to detect by visual examination which rock is a limestone and which a calcareous slate or shale with a low percentage of carbonate.

It further showed that solution of the limestone is more strictly controlled by ease of access of meteoric waters than by carbonate percentage. No statistical evidence could be found of an overall difference in carbonate content of the rocks in which abundant cavities occur and that in which no solution was evident.

STRUCTURES

The faulting and joint pattern revealed by various excavations is a complex one. Jointing was described in Progress Report No. 2 but the single fault discovered at that date has proved to be only one of a whole complex of shears related to a major strike thrust.

This major thrust fault dips parallel to the bedding planes and passes transversely through the abutment excavation in Block P at the former design level. It has been traced in the spillway excavation, in bores WT 1 and WT 5, in the exploratory adit and in the gallery adit. A deeply weathered crush zone showing in the lower access road upstream of the dam site is also correlated with this major structure. At design level the fault zone was a regular seam of crushed rock, 27 feet wide, almost wholly converted to clay. Excavation below this level showed a progressive diminution in the degree of crushing and weathering and in the gallery adit the fault is represented by two thin crush zones of a minimum thickness of a few inches.

Branching out from this major structure to the south-west are a large number of closely spaced parallel, and almost planar, shears, along some of which horizontal displacement of up to 18" can be measured. These shears appear to die out within the limits of the abutment and spillway excavations.

In Block M to S other bedding fault zones occur. These are smaller than the major fault zone in Block P and at the RL 760' level consisted of clay seams from a few inches to two and three feet thick. They also persist in depth and lenticular clay seams which could be correlated with them have been cut in the gallery adit and crosscut. Laterally these fault zones

extend downstream into the spillway cut and beyond. In an upstream direction they appear to be cut off by the multiple south-west trending shears.

Two even thinner bedding faults with crushed rock zones and clay lenses up to 9' thick in them were uncovered in Block M. These too are present in the gallery adit.

The contact between the limestone and phyllite in Block L is also a faulted one and the phyllite is much sheared and contorted adjacent to the fault. The dolomite band at the contact is evidently due to secondary dolomitisation following the faulting and incorporates mostly the phyllite and a lesser thickness of limestone.

Other faults are present in the limestone south of the abutment excavation limits. The cores from WT 3 and WT 4 and the gallery adit show that solution and severe weathering associated with these faults are confined to a shallow depth below the surface.

All the bedding plane faults are shown by diamond drilling to persist in depth, with the secondary effects of the faulting such as crushing and shearing varying in intensity and generally diminishing downwards.

The positions of the faults as interpreted in the drill cores suggest that the faults do not conform strictly to the bedding planes and dip at a flatter angle so that they appear at shallower depths in the drill holes than would be predicted by projecting them downwards at the dip of the bedding.

As the cavities and open cracks occur along and at the intersection of the various geological structures it is important to know their attitudes. These are as follows:-

Joints	(i)	Strike	357° T.M.
		Dip	80°-85° E.
	(ii)	Strike	72°-82° T.M.
		Dip	10°-50° N.
	(iii)	Strike	307°-320° T.M.
		Dip	80°-85° E.
Shears		Strike	245° T.M.
		Dip	88° S.E.
Bedding and bedding faults		Strike	285° T.M.
		Dip	50°-56° S.

CAVITIES AND OPEN CRACKS

The distinction between cavities and open cracks is purely an arbitrary one and the term cavity is reserved for those openings which are non-tabular in form.

In the earlier report (Progress Report No. 2) it was observed that the one cavity uncovered at that date was located at the intersection of a major joint and a fault and that it was likely that such intersections would be the preferred locations for cavities. These observations have been abundantly confirmed by subsequent exploration and it is clear that solution and the formation of openings in the limestone in general has been controlled by faulting and other stress-caused discontinuities such as joints and shears.

By corollary the largest and most extensive openings might be expected in the areas where faulting is most intense and this has also been proved correct by the surface excavation, diamond drilling, and excavation of the two adits.

Cavities found in the excavations are most abundant in Blocks P to T where the Block P bedding thrust fault and subsidiary faults and shears have cut the limestone into a number of disjointed tabular blocks. Minor cavitation is present in Blocks M and N where minor bedding thrusts cross the excavation. Similarly the less spectacular, but quantitatively more important, open cracks, which are joints and shears enlarged by solution, are more abundant where the faulting movements are most intense.

In depth these findings are confirmed by drilling and by driving of the gallery adit and cross cuts. Of the drill holes the worst core losses and water losses under test were experienced in WT 5 which traversed the main Block P thrust fault and associated faults between 20 feet and 170 feet depth. In this section core recovery was 77%, and high water losses were obtained in tests every few feet of advance of the hole. The presence of clay and solution cavities in the core and the occasional dropping of the core barrel during drilling were other indications of faulting and its associated increase in weathering.

In WTs. 1 and 2, on either side of WT 5, the sections of high core and water loss were much shorter. In WTs. 3 and 4, negligible core and water losses below the badly weathered surface material showed that laterally the cracks and cavities rapidly die out or tighten south of WT 3.

In depth the drill hole evidence also gives the limits of the significant openings. Core and water losses were negligible below a depth of 252 feet in WT 2 and 170 feet in WT 5 and few signs of weathering were observed below 252 feet in WT 2 and 236 feet in WT 5. The former figures represent reduced levels of 575 feet and 593 feet respectively and it can be reasonably concluded that the few cracks which occur below a reduced level of 550 feet are practically tight.

With the above information it is possible to outline with some degree of confidence the limits laterally and in depth of that section of the left abutment which contains cavities and large open joint cracks. The limits are approximately; the phyllite/limestone contact to the north, grid 9500N to the south, and RL 575 in depth.

The zone of potential leakage will of course continue up and downstream to the limits of the limestone band so long as it is badly cracked and crushed by faults. However, providing the leakage is properly cut off under the abutment for the full width of the zone, its extensions up and downstream are not important.

WEATHERING AND WATER TABLE BEHAVIOUR

Deep excavation and driving of the underground openings has shown that general decomposition and weathering of the limestone is confined to a comparatively narrow zone at the surface. Below this zone weathering is related to joint cracks, fault zones and shears.

Weathering has extended very deeply along these features and is particularly severe in the fault zones where much brecciation and crushing of rock has occurred. The main effects of weathering have been the solution of limestone along faults and joints, formation of clay in situ in the fault zones, and transport of clay into open cracks and cavities. Transported clay is usually red in colour and distinguishable from the yellow or grey clay formed in situ. Samples of the two types of clays were examined in the Australian Minerals Development Laboratories with surprising results. The red clay thought to have been washed in from the surface consists mainly of silica and mica particles with only a minor percentage of clay and some calcite. The grey and yellow clay found mainly at greater depths again contains only a small percentage of clay minerals in a bulk consisting of mica and silica particles with a high (25%) proportion of calcite. The

red clay has been observed up to 90 feet below the surface. The clay formed in situ extends to a depth of at least 150 feet in WT 1, probably 220 feet in WT 2 and 235 feet in WT 5. These depths are well below the existing water table and show that at some earlier stage in the history of the area the water table stood at a much lower level than at present. The practical importance of determining this older water table lies in the fact that solution cavities could have formed in its vicinity providing it stood at the lower level for a sufficient length of time and flow of water was facilitated by abundant cracks.

In an effort to determine the old water table the lowest level, in each drill hole, of observed limonite, which normally does not form in quantity much below water level, was plotted. The line joining these levels in the respective drill holes is an irregular one and may be taken as an upper limit for the old water table. The irregularity is due to the fact that the fabric of the limestone is relatively impermeable and water in it moves principally in cracks and hence limonite is formed only in the cracks at deep levels. Unless the cracks are freely interconnecting water may stand at irregular levels in individual cracks and a water table, in the normal sense in which it occurs in permeable or semipermeable sands and gravels, does not exist.

The open cracks at lower levels in the limestone of the left abutment are sparse and show evidence of only limited solution and it appears that water moved only in a restricted fashion through them. Hence it is considered that the possibility of abundant solution at the older water table position is not great.

ENGINEERING GEOLOGY

The two main problems associated with the presence of fault zones weathered to clay and soft rock, and open joint cracks and cavities in the left abutment are stability of the foundations and leakage under the dam.

FOUNDATION STABILITY

Early excavation to design level removed all of the narrow zone of wholly weathered limestone and it was then obvious that weathering extended deeply down joint cracks and fault zones. Subsequent exploration

quantity in the end of upstream crosscut from the adit and water injected into WT 5 at a depth of 20 feet very quickly flowed out in the adit 65 feet below.

Of much more importance in the leakage problem than the more spectacular cavities are the numerous open cracks, perhaps only slightly enlarged by solution, occurring along bedding plane faults and shears and along the north and west trending major joint systems. As the joints and the faults persist laterally for distances up to hundreds of feet the cracks may be expected to persist with them and thus provide leakage paths extending from the upstream to the downstream side of the dam.

Extent of Potential Leakage Zone

Though the zone of cavities and open cracks in the limestone possesses length, breadth and depth and must be thought of in three dimensions it is with its breadth and depth that we are chiefly concerned, for if treatment can form an impermeable membrane, connected to the dam, across its breadth and to its greatest depth under the dam then its extension up and downstream is not significant.

The breadth of the zone is fairly well defined by drill hole evidence. Both WT 3 and WT 4 recovered sound cores of practically fresh rock with a minimum of open cracks and few clay seams over the full depth below the surface zone of severe weathering. Water losses in both holes, under high pressures at the collars, were also small, confirming the core evidence, and therefore the limestone in this region is tight and impermeable. In the gallery adit the section between ch 360' and 526' contained only one substantially open crack, at ch 490' along a minor bedding plane fault. This fault is completely tight where intersected in WT 3. It is thus reasonable to place the southerly limit of the zone of open cracks between drill holes WT 2 and WT 3 from the surface down to the bottom of WT 3 at RL 520.

The extent in depth is a little more uncertain owing to the fact that the worst cracking and largest openings are associated with bedding faults which dip between 45° and 56° to the south, and the drill holes do not fully cover the projection down dip of each zone of open cracks and high water loss.

Three drill holes WTs. 1, 2 and 5 traverse zones of very badly cracked and broken rock with clay seams, cavities and openings along joints and bedding planes. These zones can be related to bedding plane faults exposed in the excavations and the exploratory and gallery adits. When the zones are traced down dip from the surface or from one drill hole to another they show a marked diminution in severity of cracking and water loss. Thus in WT 5, which penetrates the middle of the zone of severest cracking and cavitation, the section of hole between the depths of 20 and 170 feet gives evidence of strong weathering, of clay seams, wide openings, and high water loss. Projecting this zone down dip to WT 2 we find that the badly faulted and strongly weathered section, showing high water loss, is reduced to 12 feet in length at 226 feet depth. In the 56 feet of hole extending below 252 feet depth to a depth of 308 feet (reduced level of 518 feet) the core recovered was sound and fresh and only 4% was lost. Water losses in this section of the hole were negligible. In the 104' below 308 feet depth no evidence of weathering or open cracks and cavities was found and the overall water loss for the 160 feet of hole below 252 feet was 8 g.p.m. at a collar pressure of 55 p.s.i. This evidence alon gives grounds for the belief that the cracks diminish in number and become tighter and that the larger openings disappear in depth.

The other holes yield evidence confirming this belief. In WT 5 water losses were negligible below 170 feet to the bottom at 312 feet in a section covering the down dip projection of the Block P major bedding thrust; several bedding plane cavities found in the gallery adit and most of the zones of high water loss penetrated in WT 1. The water loss test at a depth of 236 feet is particularly significant. Here the drill encountered clay seams and open cracks and 3 feet 3 inches of core was lost yet the water loss was only 25 gallons per minute at a collar pressure of 60 pounds per square inch (representing approximately 110 p.s.i. at the crack).

Similarly the faulted zone penetrated from 60 to 110 feet in WT 2 can be identified in the adit and in the core of WT 3. In the latter hole the water loss below the surface zone of weathering was 28 g.p.m. at a collar pressure of 30 p.s.i. and in the adit the zone is represented by a single bedding fault 1 inch to 6 inches wide.

It is considered therefore that there are strong grounds for the

conclusion that the fault zones diminish in size and severity of effect downwards, and that below a level which varies between RL 550 and 575 the cracks are substantially tight and there are no open cavities. This level is taken as the downward limit of the zone of serious potential leakage.

Placing the northerly limit of the zone at the contact between the limestone and the phyllite, we have an area, 240 feet wide at the base, and 380 feet wide at the top, with an average depth of 220 feet, within which open cracks and cavities are abundant. The frequency of occurrence of the openings and their size is not constant throughout this area. The worst section is a rhomb shaped one outlined by the Block P major thrust zone and its subsidiary thrusts. Diamond drill hole WT 5 is situated almost in the middle of this section

Leakage Capacity

The individual capacity of the cracks for transmitting water is large. In water tests made on the diamond drill holes flows greater than 300 g.p.m. have been measured in a five foot length of drill hole in sections where there is no evidence of a large cavity. Though this loss was probably through a number of cracks the loss through each individual crack must have been substantial.

The capacity of the zone of potential leakage as a whole to transmit water cannot be assessed. Even if it were possible to give a figure for the number of cracks and the average width and length of the openings along them, other imponderables would prevent a quantitative estimate of leakage. The chief of these would be the effect of sealing by clay and soil on the entrance and exit of leakage water. However the evidence strongly supports the opinion that the zone, if untreated, will pass a large volume of water through the abutment foundation. An instructive example is that of Aroona Dam where water is leaking through a quartzite ridge forming one abutment. The leakage paths are relatively tight joints, minor faults and bedding plane cracks. An amount estimated at 5,000,000 gallons per month passes through a ridge along a path of minimum length 600 feet, through a zone whose cross sectional area is 600 feet by 26 feet under a maximum head difference between reservoir level and exit point of 46 feet.

Comparable figures for Myponga are an average maximum head of 35 feet, a cross sectional area of 300 feet by 100 feet and an average direct

path length of 250 feet. The mass permeability of the Myponga leakage is more difficult to compare. It is estimated that it would be at least 20 to 50 times that of the Aroona section.

While such a comparison must be treated with caution it reinforces the other evidence showing that leakage through the left abutment will be serious if not prevented by treatment.

REMEDIAL MEASURES

Foundation Stability

Providing the Design Engineers are satisfied that the vertical compressive stresses are too low to cause any settling due to squeezing of the clay lenses then stability of the foundation in Blocks P to T should be ensured by thorough grouting to the normal B depth below the finished excavation levels together with "dental treatment" of the clay and soft rock seams exposed in the excavations and filling of the visible cavities with mortar or concrete.

Leakage

In the previous sections it has been shown that a zone of cavities and abundant open cracks, with a wide cross sectional area, transverse to the river, occurs in the left abutment of the dam; so as to ensure that serious leakage beneath the abutment does not occur it will be necessary to treat this zone.

Remedial treatment measures which have been discussed by the Foundation and Grouting Committee comprise grouting by various methods and with various materials, and excavation of a cut-off trench to be backfilled with concrete. The magnitude of the cut off trench required, its probable high cost, and the problems of constructing it in broken, faulted ground, containing clay seams, dissuaded the Committee from recommending it as a method of treatment. Consequently discussions have centred on grouting as the preferred method and while the actual design of the grout curtain and its method of construction are matters for engineering decision there are geological factors which will affect both design and construction.
The principal ones are, the extent of the cavities and those cracks which are sufficiently open to permit easy passage of water along them, the nature of the openings, their size and attitude, the spacing and degree of continuity

between them, and the nature and amount of material filling them.

Extent of the cavities and cracks has been thoroughly discussed in earlier sections of this report and the limits of the cross sectional area which it is considered necessary to grout are shown on Plans 59-278 and 59-279. It is the area between the limestone/phyllite contact on the north, grid 9525N to the south and RL 550 at depth. Cracks continue below this depth but are much tighter and it is thought that in view of their depth and the long path which leakage would be forced to take that serious leakage below a curtain whose base is at RL 550 is unlikely. Should leakage occur in sufficient quantity to warrant further action it could be adequately remedied by grouting from the gallery adit.

Within the zone of open cracks and cavities the concentration of openings and their size vary widely and experience during the initial stages of grouting may show that it is possible to reduce the scale of treatment in certain parts of the zone where cracking is less severe and the cracks are narrower. These parts consist of the relatively little disturbed beds between faults and are shown on Plan 59-278.

The large water losses recorded in the drill holes under test show that good intersections of the major cracks and cavities may be expected in vertical holes. However the attitude of the cracks is such that sloping holes should give the best intersections and the recommended compromise between vertical holes and holes sloping at the optimum angle is a slope of 10° from the vertical in a direction bearing grid 270°.

A grid of grout holes rather than a single line is recommended and it is realised that if this is to be attempted from the gallery adit it will require different inclinations on the various lines of the grid. Recommended alternative attitudes for the holes are vertical and sloped 10° in a direction bearing grid 90°. By reason of the fact that interconnections between the major cracks are numerous and that the most extensive system dips at 50°-55° south, grout travel from all three sets of holes should be satisfactory.

The larger cavities are of such dimensions that ordinary cement - water grout will not be suitable to fill them and where possible mortar and concrete should be placed in them. The presence of clay containing

calcite in some of the cracks and cavities and of a number of finer cracks which will not admit mortar grout, will necessitate careful final grouting with the normal water -cement mixtures.

Abundant interconnections between cracks will allow a wide spacing of the initial grout holes.

Further solution of the limestone during any reasonably anticipated life of the dam will not be significant particularly if water flow through it is reduced to very small proportions by thorough grouting.

Lining of the Gallery Adit

Beyond chainage 360' the gallery adit is in sound massive blue grey unweathered limestone with the exception of the narrow bedding plane fault encountered at ch 490'. The only other discontinuities in the walls back and floor are a very few, largely tight cracks along joints. Apart from the bedding fault at ch 490' it will not be necessary to support the adit with a concrete lining for structural reasons and consideration can be given to leaving the major part of the section between ch 360' and 526' unlined.

FUTURE EXPLORATION

With the completion of D.D.H. WT 5, of the deepening of WT 2, and driving of the gallery adit it is considered that no further exploration of the cracked and cavernous zones in the limestone of the left abutment is required for the present. Results in the early stages of grouting the left abutment may indicate the necessity for some further drill holes, and the efficacy of grouting will need to be checked by water tests on paired holes and one or two of the cored holes for which provision has been made in the contract.

Although not concerned with the left abutment it is suggested that the cored hole verbally discussed with the Chairman of the Foundation and Grouting Committee, to be drilled at the base of the right abutment slope be commenced soon. This hole will show whether the cracks in the phyllite are, as anticipated, mostly tight below river bed level.

Apart from this no further exploration, by drilling, shaft sinking or driving adits, is recommended.

CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the solution cavities and wide open cracks in the limestone in the left abutment are related to bedding plane faults and their associated shearing and jointing. Drilling and the driving of underground openings has shown that the degree of cracking and faulting and the number and size of the openings decrease to the south and in depth. It has also shown that larger cavities of the type exposed in the excavations for Blocks P to T are relatively small in number and the main leakage paths will be cracks enlarged by solution along joints and shears and bedding faults. The limits of the zone, in a direction at right angles to the river, in which the openings are such as to allow serious leakage under the dam if untreated, have been defined by the exploration as being the area between grid 9525N, the limestone/phyllite contact to the south and north and RL 550 in depth. Cracks extend southwards and downwards beyond these limits but are incapable of transmitting large flows of water and it is concluded that if the area as defined above is adequately treated then no serious leakage will occur under the dam through the left abutment.

It is recommended that the normal grout curtain, as specified in the contract, be replaced by a special grid of holes as suggested in earlier sections and such other special forms of remedial treatment as are required, in and under the section of the left abutment foundation within the limits as defined above, to fill the cavities and open cracks and prevent leakage.

W. Johnson
SENIOR GEOLOGIST

WJ:AGK
7/8/59

APPENDIX A

DETAILED LOGS OF DIAMOND DRILL HOLES
WT 1 TO WT 5

			Collar RL		Co-ordinates		Depth	
					N	E		
6527- 298	D.D.H. WT1	20/12/58	767.54	233.95	9830.27	10115.03	207'3"	63.17
-293	D.D.H. WT2	13/1/59	826.50	251.92	9614.84	10077.73	412'0"	125.58
-294	D.D.H. WT3	16/12/58	839.88	256.0	9465	10093.19	320'10"	97.79
-295	D.D.H. WT4	6/1/59	817.13	249.06	9338.77	10096.86	298'9"	91.06
-337	D.D.H. WT5	16/6/59 17/1/59	763.22	232.63	9727.23	10103.98	312'0"	95.10

Department of Mines
South Australia

DIAMOND DRILL LOG

Engineering Geology

Project: MYPONGA DAM SITE Hd.: MYPONGA Sect.: 621 D.M.: 63/58 Hole Serial No. DD 73/59
Casing 0-35' 766.61
Bore No.: W.T. 1. Depth: 207'3" Collar Co-ord.: 9830.27N 10115.03 E Depressed: Vertical R.L.: 35-207'3" 767.54

Date Drilling Commenced: 26/11/58 Completed: 20/12/58 Driller: G. Speldewinde Logged by: M.N. Hiern on 23/12/58

Depth Runs From Ft.	From Ins.	To Ft.	To Ins.	Core Recovered Ft.	Core Recovered Ins.	Lithological Changes Ft.	Lithological Changes Ins.	Description	Depth Structures Ft.	Depth Structures Ins.	Description
0	0	2	8	0	2	0	0	Soil. 2" of travertine	0	0	NX Core.
2	8	8	0	0	6	2	8	Fragments of white limestone. Weathered and kaolinised.	2	8	
8	0	15	0	0	6	8	0	Fragments of limestone and clay.			
15	0	25	0	3	0	15	0	Broken core. 1" weathered argillitic limestone. 1'3" grey limestone 6" weathered limestone with irregular solution cavities ½". Note at 18' loss of water. Water test = Maximum capacity of pump at 00 pressure at casing head. Casing placed to 25' and press tested O.K.	15	0	Joints parallel bedding and jointing dip 15°.
25	0	26	10	1	6	25	0	9" of slightly weathered blue limestone and 6" grey limestone. Note Water lost at 26'10" = 9 gal. min. 9" of badly weathered limestone. Porous clayey and micaceous. Sparse 1/16" solution bands along bedding.	25	0	Evenly jointed at 1' intervals parallel to bedding. Cross joints dip 50° parallel Bedding S.

Bore No. W.T. 1.

Depth Runs From Ft.	Depth Runs From Ins.	Depth Runs To Ft.	Depth Runs To Ins.	Core Recovered Ft.	Core Recovered Ins.	Lithological Changes Ft.	Lithological Changes Ins.	Description	Depth Structures Ft.	Depth Structures Ins.	Description
26	10	28	10	1	0	26	10	A pronounced vertical boundary between rel. unweathered grey limestone and well weathered brown argillitic limestone. Narrow (1/16") solution band at 28'8". N.B. Very soft drilling. Water lost = 12 gall./min.	26	10	Irregular vertical fracture for 10" of core. Smooth joints parallel to bedding.
28	10	30	8		11	28	10	6" of grey limestone grading to buff argillitic limestone.	28	10	Joint parallel to bedding.
30	8	31	6		6	30	8	Fragments only. Extremely weathered limestone with clay. Brecciated zone with sec. calcite matrix.			
31	6	33	6			31	6	No core.			
33	6	34	2			33	6	" 1¼ bags Cement Fondu filled hole to 31'4"			
34	2	35	0		9	34	2	Buff limestone with thin grey bands.	34	2	Joints parallel to bedding at 3" intervals.
35	0	40	1	5	9	35	0	Blue grey limestone and buff limestone. Soft clay 39'7" - 40'1". Water lost 14 gall./min. Return water pale blue to rich yellow then lost.	35	0	Sub vertical frs. at 37' and 39'6". Irregular joints along bedding.
40	1	41	2			40	1	Buff banded limestone fragmented.			
41	2	43	0			41	2	No core. Water lost at 43'. Rich yellow water return. 41'2" - 42'2".			

Bore No. W.T. 1.

Depth Runs From Ft.	Depth Runs From Ins.	Depth Runs To Ft.	Depth Runs To Ins.	Core Recovered Ft.	Core Recovered Ins.	Lithological Changes Ft.	Lithological Changes Ins.	Description	Depth Structures Ft.	Depth Structures Ins.	Description
43	0	45	4	2	0			Soft drilling - penetrated under weight of bit and rods to 45'.	43	0	
45	4	46	0					Hard and soft seams. Buff and grey limestone. Clay along joints.	45	4	Closely jointed throughout and uneven fractures. Cross joint dip 45°.
46	0	48	0	1	10	46	0	Blue limestone changing to buff limestone at 47'9". Small weathered zone at 47'4". along bedding plane.	46	0	Sparse joints parallel to bedding.
48	0	51	9	3	9	48	0	Interbedded grey and buff limestone. Badly broken at 50'7".	48	0	Joints dip 60° parallel to bedding. Cross joint at 50'9". Irregular frs. at 51'2".
51	9	55	1	2	0	51	9	Grey limestone weathered to clay along fractures. Grind at 55'1". Water return yellow white.	51	9	Irregular fractures. Dip varies from 60° - 90°.
55	1	60	2	4	10	55	1	Grey and buff limestone	55 57 58 59 to 60	7 4 8 7 2	Two fractures. ½" apart with clay and calcite Joint parallel to bedding. Joint parallel to bedding. " " " " Irregular fractures at 60'2" & 61'2".
60	2	64	0	3	4	60 63	2 10	Buff argillitic limestone with solution cavities ⅛" wide along bedding. Water lost at 63'6" 20 g.p.m. Porous argillitic limestone.	63 63 63	4 5 10	Fractures parallel to bedding. Irregular fracture. Fracture parallel to bedding.
64	0	67	0	1	4	64	0	Grey banded limestone laminated. Water lost 64'8". Barrel dropped 65'8" to 66'4".	64' to ? ? to 67' 66'8" to 66'10"		Weathered zone. Weathered zone probable clay lens. Weathered zone and solution cavities parallel to bedding plane.

Bore No. W.T. 1.

Depth Runs From Ft.	Ins.	To Ft.	Ins.	Core Recovered Ft.	Ins.	Lithological Changes Ft.	Ins.	Description
67	0	70	0	3	0	67	0	Grey banded limestone. 68' - 68'6" No water return. 68'6" - 69'0" Slight water return.
70	0	75	0	2	0	70 70	0 6	Grey limestone. Quartz calcite vein.
75	0	77	0	1	4	75	0	Broken core. Soft weathered limestone.
77	0	81	2	3	10	77	0	Grey limestone some weathered bands around B.P. cracks.
81	2	85	2	3	10	81	2	Laminated dark blue-grey limestone. Some signs of weathering. No evidence of core loss.
85	2	87	2	2	0	85	2	Laminated dark blue-grey limestone. Some signs of weathering. No evidence of core loss.

Depth Structures Ft.	Ins.	Description
68	4	Two tight limonite filled joints. Dip 30° at 150° to B. Dip.
71	8	Weathered and cracked rock.
to		Probable clay seam.
75	0	Few pieces of ground core showing secondary calcite, limonite and solution cavities. Driller's Note: 72'4" to 74'8" barrel dropped rapidly. 74'8" to 75' Soft ground.
75	0	Numerous joints.
77	0	Joint and b.p. crack.
78	2	B.P. crack
78	5	" "
81	2	" "
82	6	" parting
83	6	Tight limonite filled B.P. partings - some calcite. Three light calcite filled joints 1" to 2" apart - normal to B.P. dip.
84	11	B.P. parting
85	2	" "
		V joint between them.
85	8	
to		Joint filled with 1 mm. thick calcite vein
86	$1\frac{1}{2}$	traverses core. Strike 30° to B.S.
85	11	$\frac{1}{8}$" thick calcite vein parallel to previous
to		joint
86	3	
86	8	Joint - dip 60° at 160° to bedding dip.
87	0	Fragments of quartz veins. Driller's Note - water lost at 87'0".

Bore No. W.T. 1.

Depth Runs From Ft.	Ins.	To Ft.	Ins.	Core Recovered Ft.	Ins.	Lithological Changes Ft.	Ins.	Description	Depth Structures Ft.	Ins.	Description
87	2	89	8	2	0	87	2	Laminated blue grey limestone and biege weathered blue-grey limestone.	87	2	Quartz, calcite vein and much jointing. Strong evidence of solution.
									87'2"-88'6"		Many B.P. partings and quartz, calcite veins parallel to bedding.
									88'9"-89'5"		Much broken core - remnants of quartz, calcite veins and limonitic clay. No sign of core lost in this section.
89	8	93	8	3	9	89	8	Blue-grey laminated limestone weathered in bands.	89'8"-92'9½"		B.P. partings and incipient partings limonite filled.
93	8	97	5	3	8	93	8	Blue-grey laminated limestone - slightly weathered.	93'8"-96'2"		Numerous tightly cemented B.P. partings or incipient partings.
									96	11	Zone of jointing and quartz veins. Highly weathered band.
97	5	101	3	3	10	97	5	Blue-grey limestone.	99	11	¼" quartz calcite vein parallel to bedding - some limonite.
									100'9"-101'1½"		Joint with 1/32" calcite and limonite traverses core. Dip 45° to B.D. (R.H.)
									97'5"-101'9"		Some bedding plane partings and incipient partings.
											Driller's note - Casing reamed to 98' Chopped bore from 99' - 101'3" - no water return.
101	3	105	3	3	10	101	3	Blue-grey limestone	102	7	Short shear tension joints, normal to B.P. partings, filled with calcite.
105	3	109	3	3	8	105	3	Blue-grey limestone			No evidence of core loss from 97'5" onwards.
109	3	111	1	2	2	109	3	Blue-grey limestone	109	3	Some limonite cemented B.P. partings in this run.
111	1	112	9	1	6	111	1	Limestone becomes shaly and phyllitic. Sheared parallel to bedding.	111	9	B.P. parting with trace of limonite

Depth Runs From Ft.	Ins.	To Ft.	Ins.	Core Recovered Ft.	Ins.	Lithological Changes Ft.	Ins.	Description	Depth Structures Ft.	Ins.	Description
112	9	116	9	3	10	112	9	Limestone becomes shaly and phyllitic. Sheared parallel to bedding.	114	0	Horizontal joint
									114' - 114'3"		Ptygmatic quartz, calcite vein, sub-parallel to bedding (replacement vein) $1\frac{1}{2}$" true thickness.
									115'5½" - 116'0"		Quartz/calcite vein $\frac{1}{8}$" to $\frac{1}{4}$" thick. Dip 80° at 45° to bedding direction. Displaced 1/16" at 115'7" by thin calcite filled joint, dip 30° in direction 200° to bedding direction.
											Driller's note: - no water return.
116	9	120	9	3	11	116	9	Limestone becoming micaceous and phyllitic. Perhaps more of a calcareous phyllite or slightly sheared calcareous shale.			
120	9	123	7	2	8	120	9	Limestone becoming micaceous and phyllitic. Perhaps more of a calcareous phyllite or slightly sheared calcareous shale.	122	9	Horizontal joint - some limonite.
											Driller's Note - Casing pulled, replaced and reamed to 107'0" - no return. Water test - pump = 20 g.p.m. hose = 12 g.p.m. only spasmodic rise and fall in casing. Chop bit at 106'0" - would not clear obstruction in casing. Casing pulled and replaced to 100'. BX casing placed to 123'7", seal, water tested - O.K.
123	7	127	2	3	6	123	7	BX core	123	10	Horizontal joint & B.P. parting - some limonite.
								As above	125	8	Quartz, calcite replacement vein - limonite and pyrite. Driller's note: water lost at 125'9" Water test 13 g.p.m. at 30 lb./sq.in. on casing head.

Depth Runs From Ft.	Ins.	To Ft.	Ins.	Core Recovered Ft.	Ins.	Lithological Changes Ft.	Ins.	Description	Depth Structures Ft.	Ins.	Description
127	2	128	6	1	2	127	2	Blue-grey limestone with micaceous shaly bands.	128	6	Joint dip 70° in direction 270°.
128	6	132	9	4	1	128	6	Blue-grey limestone with micaceous shaly bands.	129'7"-131'0"		Numerous B.P. partings showing evidence of solution - grinds.
									132	1	Grind.
132	9	136	3	2	6	132	9	Blue-grey limestone with micaceous shaly bands.	133	6	Joint or joints, grind and weathered limestone
									134'1" to 135'10"		Jointed and cracked highly weathered.
136	3	139	7	3	3	136	3	Fresh limestone.	138	2	Joint - dip 50° in direction 315° and irregular V. joint.
									138	8½	Grind and joint dip 50° in direction 315°
139	7	141	8	1	5	139	7	Fresh limestone	140	3	Clean joint V at 90° to B.D.
									141	8	Grind.
											Driller's Note:- No water return 123'7" - 141'8".
141	8	145	10	3	8	141	8	Fresh limestone.	143	2	Joint, dip 90° in direction 190°
									143	7	Clean joint, dip 15° to B.D.
									145	10	Grind.
145	10	148	2	2	2	145	10	Fresh limestone	146	9	Joint with limonite dip 50° in direction 270° to B.D.
									147	4	Similar joint.
									147	11	S/V joint.
									148' - 148'2"		" "
148	2	151	4	3	2	148	2	Finely laminated limestone with syngenetic ? pyrite	148'8", 149', 150'3", 151'		Grinds.

Bore No. W.T. 1.

Depth Runs From Ft.	From Ins.	To Ft.	To Ins.	Core Recovered Ft.	Core Recovered Ins.	Lithological Changes Ft.	Lithological Changes Ins.	Description	Depth Structures Ft.	Depth Structures Ins.	Description
151	4	153	3		10	151	4	Finely laminated limestone with syngenetic ? pyrite.	151	6	Joint with pyrite, dip 30° in direction 120° to B.D.
									152	11	Ground - core missing here.
153	3	157	7	3	11	153	3	Finely laminated limestone with syngenetic ? pyrite	155	3	Grind. B.P. parting and badly weathered zone.
									155	0	Joint - dip 45° in direction 180°.
									154'0"-155'3"		Numerous limonite cemented B.P. partings.
157	7	164	2	5	3	157	7	Finely laminated limestone with syngenetic ? pyrite	156	0	Grind
									159	11	Joint
									161	2	Joints and badly weathered section, some solution cavities.
									163'-164'2"		Core broken and ground but no evidence of weathering.
164	2	168	9	4	3	164	2	Finely laminated limestone with syngenetic ? pyrite.	164	2	Numerous B.P. partings cemented with limonite Core broken and ground near botton of run.
									166	11	Joint normal to B.P.
168	9	169	11	0	6	168	9	Finely laminated limestone with syngenetic ? pyrite.	168	9	Core ground. Solution cavities parallel to B.Ps. Driller's note - soft drilling, no water return 141'8" - 169'11".
169	11	175	7	4	5	169	11	Finely laminated limestone with syngenetic ? pyrite	169	11	Driller's note:- at 174'7" very soft, rods washed down under own weight to 175'7". Numerous bedding plane partings. Joints of all sets.
									173	7	Quartz calcite vein with vughs - dip 45° in direction 315°. Vein is ½" true thickness.

Depth Runs From Ft.	Ins.	To Ft.	Ins.	Core Recovered Ft.	Ins.	Lithological Changes Ft.	Ins.	Description	Depth Structures Ft.	Ins.	Description
175	7	180	4	3	0	175	7	AX Core First 3" broken weathered buff limestone. Remainder blue grey limestone weathered in places. Core frequently pitted by solution. Some B.P. partings.	176 180	3 0	Joint dip 90° in direction 180°.
									176	8	Irregular walled calcite vein ¾" wide, parallel to bedding.
									179	9	Limonite filled joint, dip 70-80° in direction 90° - 100°.
180	4	184	10	4	4	180	4	Blue-grey limestone. Some B.P. partings limonite filled. Weathered band with some evidence of solution 180'6" - 180'7".	181	1	Calcite vein parallel to B.P.
									181	2	Joint, dip 90° to bedding, either 140° or 320°.
									181	4	Joint, dip 70° in direction 215-220 - limonite band.
									181'3" - 181'7"		Thin calcite vein parallel to core axis normal to bedding strike. Terminates along calcite filled vein at 181'6", dip 80° in direction 230°.
									181	6	181'6" dip 90° in direction 140°.
									182' - 182'10"		Joints dip 90° in direction 180°.
									183	10	Again at 183'10".
184	10	186	10	1	0	184	10	BX Core Blue-grey limestone, relatively fresh with some small calcite gashes. Some grinding.	185	4	Joint - dip 70° in direction 180°
									185	4	Joint - dip 80° in direction 220°.
186	10	191	9	4	6	186	10	Blue grey dense laminated limestone.	186	10	Frequent joints along following directions. 80° at 230°, 90° at 170° (calcite filled) in limonite.
						187	4	Broken core.			
191	9	196	4	4	4	191	9	Ditto - no weathering apparent.	191	9	Frequent joints as above.

Depth Runs From Ft.	Depth Runs From Ins.	Depth Runs To Ft.	Depth Runs To Ins.	Core Recovered Ft.	Core Recovered Ins.	Lithological Changes Ft.	Lithological Changes Ins.	Description	Depth Structure Ft.	Depth Structure Ins.	Description
196	4	200	10	4	6	196	4	Light green grey laminated slate - phyllite.	196	4	Joints not so abundant - mainly 90° at 170° and with calcite faces. After 198'10" frequent calcite veins ($\frac{1}{8}$") parallel to bedding.
200	10	202	6	1	8	200	10	Ditto	201	1	Joint 80° at 170°. Frequent calcite veins parallel to bedding.
202	6	205	8	3	1	202	6	Ditto - core slightly broken, mainly along bedding planes.	202	6	Occasional joints dip 80° at 170°.
205	8	207	3	1	7	205	8	Ditto - a few small pyrite cubes.	205	8	Occasional joints with calcite facings.

END OF HOLE.

DEPARTMENT OF MINES, ADELAIDE

DIAMOND DRILL LOG

Project: MYPONGA DAM SITE | Hundred: MYPONGA | Section: 621 | D.M. 63/58 | Hole Serial No. D.D.: 84/59

Co-ordinates: 9614.84N 10077.73E | R.L. of Collar: 826.50 | Depressed: Vertical | Hole No. WT2

Commenced: 18/12/58 | Completed: 13/1/59 | Driller: W. Inglis | Logged by: P.W. Goscombe & M. N. Hiern.

LOG

DEPTH RUNS From Ft.	From Ins.	To Ft.	To Ins.	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins.	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins.	DESCRIPTION
0		4	0		3	0		3½" Special core. Broken core - travertine and weathered limestone.			
4	0	7	5	1	5	4	0	Buff weathered limestone. Core broken at 4'0" & 7'5"	4	0	Irregular joint - dip 5° downwards to B.P. in direction parallel to B.P.
7	5	9	0		11	7	5	Broken core. Ditto.			
9	0	11	0		3	9	0	Very broken core. Ditto.			
11	0	15	6	No core							
15	6	18	2	2	1	15	6	Core broken.	15	6	Joint parallel to core axis and parallel to B. Strike with limonite and black dendritic facings. In places pitted with small solution cavities.
						18	2	" " . Some grind surfaces. Buff tending to grey limestone - weathered.	to 19	7	
						17-17'2		Weathered band parallel to bedding with vughy texture. Vughs 1/16"-⅛" deep. some up to ¼".	16		Joint dip 80-90° to bedding in direction 180-200 - a little limonite.
18	2	23	0	4	5			Blue grey dense limestone - little weathering.	22	9	Joint 80-90° to bedding in direction 180-200°.
						18	9-	Broken	22	7 -	Joint - dip 2-3° to core axis. Strike 45° to B.S.
						19	0		23	5	

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
						18	2	Grinds			
						18	9	"			
						19	0	"1			
						19	7	"			
						21	6-	B.P. partings . ¼" Q. calcite vein			
						21	9	19'5" parallel to bedding. Bedding contorted below vein.			
23	0	25	0	1	10	23	0	Buff limestone (probably argillaceous) with bands of similar coloured weathered limestone. (parallel to bedding) with vughy texture.	23	9	½" quartz calcite vein parallel to bedding.
						24	3	3" true width. Weathered and pitted.			
						24	7				
						25	0	Grind 24'1", 24'8"			
25	0	27	0	2	3			NM size core.	25	6	Weathered B.P. parting (some material lost) calcite facing.
						25	0-	Buff weathered limestone.			
						25	7-	Grey limestone dip 45° -50° to core	26	6	Joint - then with limonite facing, 90° to bedding. in direction 200°
						27	0	axis.			
								Drillers note: Full water return (yellow) to 29'5",			then lost.
27	0	30	2	3	2	27	0	Grey tending to blue-grey limestone. Zone slight weathering.	27	3	B.P. parting with limonite facings and thin (⅛") weathered borders.
						29	4-	Little evidence of solution.	27	8	Joint - limonite facings. 35-40° to B.P. in direction 280°
						30	1		28	7	B.P. parting with slight limonite staining.
30	2	34	5	4	3	30	2	Grey limestone with weathered bands parallel to bedding as described opposite. Core slightly broken in places.	30	10	Joints dip 90° to bedding, in direction 180°, limonite and black dendritic facings.
									31	5	
									32	5	
									32	6	
									33	0	
									33	7	
									31	8-	Weathered zone with evidence of solution.
									31	9	

Hole No WT2.

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURE Ft.	DEPTH STRUCTURE Ins	DESCRIPTION
43	10	47	6	3	5	43	10	Blue-grey limestone.	43	10	Joints, dip 90° at 180° to bedding.
						47	6	Core lsightly broken	44	0	Limonite facings.
						43	10	Weathered B.P. zone with slight solution ($\frac{1}{2}$" wide)	44	3	
									44	5	
						45	7	Weathered zone, up to $\frac{1}{2}$" wide with irregular walls, almost normal to core axis.	43	10-	Joint parallel to core axis, normal to B.S. with limonite facing. Stops abruptly at 44'2".
									44	2	
									46	1	B.P. parting or joint parallel to bedding with faint limonite staining.
47	6	49	6	1	1	47	6	Broken and weathered and dissolved limestone.	47	6	Joint, dip 90° in direction 180°, 2" from 47'6".
						47	6	For 8" blue grey limestone. Remainder - buff coloured clay - begins from weathered and pitted B.P. parting.			
								Drillers note: - clay 48'3"-50'0".			
49	6	51	6	1	11	49	6-	Clay - finishing against weathered and pitted face. dip 45° in direction 270°	50	4	Quartz calcite vein $\frac{1}{2}$" true thickness. parallel to bedding.
						50	0				
						50	0-	Blue-grey limestone.			
						51	6				
								Drillers note: Water test, sheet 2.			
51	6	52	11	1	7	51	6	Blue-grey laminated limestone. very broken core at 51'6".	51	6	Remnants of quartz, calcite vein, right at end of run.
52	11	54	4	1	1	52	11	Core divided along axis. One half relatively fresh blue-grey limestone, the other half extensively weathered and dissolved calcite? vein - belonging to the set, dip 80° in direction 90-110°.			
54	4	56	6	1	5	54	4	First 8" brown clay - still displaying some remnants of bedding, therefore extremely weathered limestone. then 2" relatively fresh blue-grey limestone. Remainder extremely weathered limestone (now mainly clay) still showing joint face, dip 90° to bedding, in direction 00. ?			

DEPTH RUNS From Ft.	Ins	To. Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURE Ft.	Ins	DESCRIPTION
56	6	57	9		5	56	6	Light brown clay.			
57	9	59	3		7	57	9	Ditto.			
59	3	60	9		6	59	3	Very broken core. Mainly relatively fresh blue-grey limestone with limonite stained joint faces on some fragments.			
60	9	61	7		8	60	9	Extremely weathered buff limestone. some remnants of bedding.	60	9	Fine joint parallel to core axis visible in some pieces of core.
61	7	62	9		10	61	7	Broken core. Mainly relatively fresh blue-grey limestone with limonite stained joint faces on some fragments Also some clay.			
62	9	64	9		9	62	9	First 3" relatively fresh blue-grey limestone. Terminated by weathered B.P. Remainder of core - mainly clay. Remnants of quartz, calcite vein, parallel to bedding. Drillers note: lost water at 63'3".	62	9	Limonite stained and slightly pitted joint face, dip 60° in direction 250°
64	9	67	3	1	10	64	9	Unweathered blue-grey limestone, bedding dip 40°. Some slumping over first 6". 64'9"- remnants of dissolved calcite vein parallel to bedding. Drillers note: water return variable to nil Water test sheet 3. Casing reamed to 67'0".	65 65 65 65 65 65	6 2 5 9 11 7	Limonite stained B.P. Very thin calcite vein, dip 5-10°, flatter than bedding. Limonite filled cracks parallel to calcite vein above. Joint dip 90° in direction 180°
67	3	70	0	2	7	67	3	Grey to dark grey irregularly bedded finely laminated limestone showing some slumping. Core presents a fresh appearance. Some pyrite on broken surfaces. Driller note: lost water at 67'6".			

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
70	0	75	0	4	10	70	0	Ditto. Slumping more noticeable here.	72	9	Vughy texture Deep solution cavities (1 cm) for ½" conforming to B.P.
						74	6	Calcite veins 170° dip 10° to	73	1-	Core broken.
						74	7	B.P. 1-2 mm. thick.	73	5	
						74	11		73	11-	Joint, 290° dip 50°
									74	7	to B.P. Core broken along this joint.
75	0	80	0	4	11	75	0	Ditto	75	0-	Core broken
						75	6	Two calcite veins irregular	75'	2	
								walled, 2-4 mm. 190° dip 10° to B.P.	76	11	Joint 190° dip 80° to B.P.
						76	2	Grey to buff grey slightly weathered	77	0-	Vughy texture. Weathering and deep
								laminated limestone, showing much	78	2	leaching along irregular discontinuous
								slumping.			joint, 90-270° dip parallel to core axis.
						79	6	Calcite veins 1-2mm. thick.	79	0-	Vughy texture. Deep solution cavities.
						79	10	150° dip 40° to B.P.	79	2	(½") Some calcite replacement to form a
						79	11				vein parallel to B.P.
									79	5	Slight vughy texture.
80	0	85	0	4	4	80	0	Ditto rock type	80	3-	Irregular joint, 90-270 dip parallel to
						80	2	Calcite vein.	80	10	core axis. Core broken along joint.
								5mm. thick. 170° dip 10° to B.P.	82	0	Joints 10-190° dip 90° to B.P.
						80	7	Calcite vein 5mm thick. 170° dip	82	1	
								10° to B.P.	82	4	Vughy texture. Core very soft and broken
						81	9	Calcite veins 2-4mm.			½" solution cavities. Leaching parallel
						81	10	thick. 170° dip 10° to B.P.			to B.P.
									82	7-	Vughy texture with cavities from 1mm to
									83	1	3mm.
									83	0-	Core crumbled
									83	1	
									84	5-	Vughy texture leaching parallel to B.P.
									84	8	Cavities (¼" to ½") thick. Some crumbled
									84	10-	core
								Drillers note: soft patch 83-83'6".	84	11	
85	0	90	0	4	9	85	0	Grey to dark grey laminated limestone	85	7	Joint, 190° dip S/V to B.P.
								with some slumping. Very slight weath-	87	1	Joint, 190° dip S/V to B.P.
								ering to buff coloured limestone around	89	0-	Broken core
								joints and some B.P. partings.	90	0	
						85	2	Calcite veins 1-2mm thick. 170° dip			
								10° to B.P.			
						88	4	Calcite vein 2mm. thick. 10° dip			
								70° to B.P.			

DEPTH RUNS				CORE RECOVERED		LITHOLOGICAL CHANGES		DESCRIPTION	DEPTH STRUCTURE		DESCRIPTION
From Ft.	Ins	To Ft.	Ins	Ft.	Ins	Ft.	Ins		Ft.	Ins	
90	0	94	6	4	1	90	0	Ditto rock type	90	3-	Core broken.
						90	11-	Grey to buff grey limestone.	90	8	
						91	8		90	11-	Core broken.
						93	9-	Buff coloured limestone.	91	7	
						95	8		91	4	Joints 190°, dip S/V to B.P.
									91	7	
									93	4	
									94	3	Joint, 170°, dip S/V to B.P.
94	6	98	3	3	9	95	8	Grey to dark grey, laminated limestone Slump structures. Core presents fresh appearance.	94	8	Irregular joint, 190° dip S/V to B.P, Some leaching along joint. Vughy texture.
									95	6	Joint, 190° dip, S/V to B.P.
98	3	100	10	2	7	98	3	Ditto rock type.			
100	10	102	3		10	100	10	Grey and dark grey dense laminated limestone showing slump structures.	101	2	Joint 170° dip S/V to B.P.
102	3	105	3	2	11	102	3	Core presents fresh appearance.	103	0-	Joint, 70° dip, 35°
									103	7	
									103	10	Discontinuous joint, 180° dip 90° to B.P.
									104	4	Discontinuous joint, 190° dip 90°
									104	11-	Joint, 80° dip, 35° Limonite stained.
									105	3	
105	3	109	0	3	0	105	3-	Buff and grey interlaminated lime-	107	2-	Vuggy texture.
						105	7	stone. Slightly weathered appearance.	108	4	Deep weathering and leaching possibly originating along joint. dip 90° to B.P. Core very crumbled.
						105	7	Grey and dark grey laminated lime-stone showing slump structures and having a fresh appearance.			
						108	4	Buff and grey laminated limestone.	108	4	Joint 170° dip 80. Weathered zone ends at this joint.
						108	8	Calcite vein. 1mm thick 170° dip 10°	108	8-	Joint 70° dip 90° to B.P. limonite
						109	0	Fresh grey and dark grey laminated limestone.	109	0	stained. Dendritic markings. Core broken along this joint.
109	0	112	8	3	8	109	4	Calcite vein. 170° dip 90°	109	0	Grind surface.
						111	2-	Zone of calcite veins. eg.	110	4	Joint 200 dip 85°.
						112	8	200° dip 85° B.P. partings. Several gash and tie veins.			

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURE Ft.	Ins	DESCRIPTION
112	8	116	9	3	10	112	8	Grey and dark grey laminated limestone showing slump structures and having a fresh appearance.	112	8	Grinding
									114	3-	Joints 190° dip 80°
									114	6	
									114	7-	Irregular joint 90° dip 90°
									115	0	
									116	1-	Joint 90° dip 90°
									116	4	
116	9	120	6	3	10	116	9	Ditto rock type	116	7-	B.P. Partings only
									120	6	
120	6	124	4	3	9	123	5	Calcite vein irregular walls. 3-4mm. thick 160° dip 20°	124	0-	Some grind surfaces.
									124	4	
124	4	128	3	3	11	124	4	Ditto rock type.	124	9	Joint 150° dip 80° limonite filled.
						127	10-	Zone of calcite veins,	125	3	Limonitic filled B.P. parting.
						128	6	1mm to 1cm thick. 210° dip 80° common also 320° dip 60° Gash veins and ties.			
128	3	132	0	3	9	128	3	Ditto rock type	129	4-	Irregular joint pattern. 90° dip 90°
									130	4	
132	0	135	9	3	9	135	4-	Several whispy calcite veins.	132'	7-	Irregular joint 90° dip 90° to B.P.
						135	9	190° dip 80°	133	2	
									134	10	Joint 20° dip. 80°.
									135	0	Joint 190° dip 80°.
135	9	139	8	3	9	135	9	Ditto rock type. More massive than above.	135	9	Joint 210° dip 60°.
									138	3	Joint, 190° dip 80°.
						136	1	Limonite filled B.P. parting.			
139	8	143	4	3	8	139	8	Ditto rock type. Slump structures pronounced.	139	8	Joint 170° dip 90°.
									143	1	Joint 30° dip 70° Core broken along this joint.
						141	7	Calcite vein 1mm thick 150° dip 60°			
143	4	147	3	3	9	143	4	Ditto rock type	145	11-	Joint 250° dip 50°. Irregular limonite stained. Core broken along joint.
						145	5	Calcite vein 1mm thick 170° dip 10°	146	11	
						147	3	Calcite vein 0.5mm thick 170° dip 80°.	146	8	Joint 170° dip 80°

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURE Ft.	DEPTH STRUCTURE Ins	DESCRIPTION
147	3	151	1	3	10	147	3-)	Zone of brown limonite.	147	3	Joint 190° dip 80°
						148	5)	Filled joints and B.P.s. Joints	148	5	Joint 140° dip 80°
								190° dip 80° Some gash and tie veins	150	4-)	Joint 70° dip 90° to B.P.
						148	9-)	Zone of calcite veins 0.5 mm. to 1cm.	150	6)	Limonite stained Core broken along joints.
						150	2)	thick. of the types eg.	150	6	Joint 70° dip 70°
								180° dip 10° (mostly)	151	1	Joint 160° dip 80°.
								90° dip 30°			
								280° dip 50°			
								80° dip 90°			
								Gash and tie veins common.			
151	1	153	7	2	5	151	1	Ditto rock type. Fresh, massively bedded.	152		Joint 165° dip 90°
									153		Joint 180° dip 90° pyrite on face.
153	7	155	0	1	4				154	3-)	Irregular joint, generally 90° dip 90°
									155	5)	
									155	10	Joint 190° dip 80°
									158	4-)	Joint 270° dip 60°. Joint irregular.
									159	4)	Much weathering and leaching along joint. Core crumbled.
158	11	162	1	3	1	161	10	Calcite vein 170° dip 10°			
162	1	164	3	2	1½	162	1	Grey and dark-grey laminated, massively bedded, dense limestone. showing slump structures. Occasional whispy brown limonite in B.Ps.	164	3	Joint, 10° dip 85°.
164	3	167	8	3	8	164	3	Ditto rock type. Marker wrongly placed.	164	5	Joint 190° dip 90° Some calcite infilling.
						167	5	Calcite vein 170° dip 10° 2mm. to 1 cm. thick.	165	7-)	Irregular joint 90° dip 90°. Some
									167	2)	limonite staining.
167	8	171	5	3	6	167	11	Calcite vein. 170° dip 10° 2mm. thick.			
						168	4	Calcite veins 1-2mm thick. conforming to bedding.			
						168	9	Calcite vein irregularly walled 1 cm thick conforming to B.P.			
						169	5-)	Whispy calcite veins 190° dip 90°	169	9	Joint 190° dip 90°
						169	10)				

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURE Ft.	DEPTH STRUCTURE Ins	DESCRIPTION
171	5	175	2	3	9	171	5	Ditto rock type.			
						174	3	Calcite vein 4mm thick 180° dip 10°			
175	2	179	0	3	10	175	2	Calcite vein 3mm thick parallel to B.P.	175	10	Joint 190° dip 30°
									176	1	Joint, 190° dip 85°
						175	5-)	Calcite veins 100° dip 90°	176	8-)	Joint, 0° dip 45°
						175	9)		177	0)	
						177	5	Calcite vein 3mm thick. 180° dip 10°	177	5	Joint 0° dip 45° Calcite lined.
									178		Joint 190° dip 90° Pyrite on face.
						177	6	Calcite vein. 1mm thick 180° dip 10°.	178	5	Joint 225 dip 45° pyrite on face.
						178	8	Calcite vein 170° dip 10° mm thick.			
						178	11	Calcite vein 170° dip 10° 2-3 mm thick.			
179	0	182	11	3	9	179	0	Zone of calcite veins. 1 mm thick and less . Mostly in B.P. partings and 170° dip 10°.	179	7-)	Irregular discontinuous joint. 90° dip 90°.
									180	2)	
									180	2-)	Irregular joint, generally 90° dip 80°.
						181	9	Calcite and weathered material in B.P. parting.	180	8)	
									180	9-)	Joint 90° dip 45°
									181	2)	
									182	11	Joint 170° dip 90°
									182	8-)	Core broken.
									182	11)	
182	11	186	9	3	8	182	11	Ditto rock type	183	0	Joint 0° dip 75°
186	9	190	8	3	11	189	2)	Calcite veins. 180° dip 10°	190	0	Irregular joint 90° dip 90°
						189	9)	1mm to 5mm thick.	190	6	Joint 180° dip 10°
						190	2)				
						188	10-)	Calcite vein 280° dip 45°			
						189	8)	1mm thick.			
190	8	193	0	2	3	190	8	Ditto rock type.	190	8-)	B.P. partings only.
						191	3)	Calcite veins 180° dip 10°	193	0)	
						191	5)	1mm to 6mm thick.			
						191	7)				
						192	5)				
						192	9)				
						192	8	Irregular calcite vein 260°dip 70°			

DEPTH RUN				CORE RECOVERED		LITHOLOGICAL CHANGES		DESCRIPTION	DEPTH STRUCTURE		DESCRIPTION
From Ft.	Ins	To Ft.	Ins	Ft.	Ins	Ft.	Ins		Ft.	Ins	
193	0	195	4	2	6	193	0	Blue grey and dark grey laminated limestone showing slump structures. Core presents fresh appearance.	193	10	Joint 220° dip 80°
									195	4	Slight grinding.
						193	1	Calcite vein 350° dip 10° 1mm.			
						194	0-	Zone of calcite veins.			
						195	0	180° dip 10° 340° dip 30° 210° dip S/V. Marker incorrectly placed.			
195	4	200	1	4	9	196	6-	Calcite veins	198	1	Joint, 160° dip 60°
						197	3	180° dip 10° both 1mm.			
						197	8	Calcite vein, 0.5mm. 210° dip 45°			
						198	2	Calcite veins, 0.5 mm, 1mm. 180° dip 10°			
						199	6	Calcite vein, 1mm, 340° dip 45°.			
200	1	205	0	4	11	200	6	Calcite vein, 0.5mm. 215° dip 45°	200	4	Joint, 340° dip 45°
						201	2	Calcite vein, 0.5mm. 180° dip 10°	203	6	Joint, 200° dip 80°
						201	6	Calcite vein, 0.5mm. 135° dip 70°	204	8	Joint, 200° dip 80°
						201	10	Calcite vein, 190° dip 10° 1 mm.			
						202	9	Calcite vein, 180° dip 10° 0.5mm.			
						203	1	Calcite vein, 170° dip 10° 0.5mm.			
						203	10	Calcite vein, 215° dip 45° 1 mm			
						204	1	Calcite vein, 180° dip 10° 3mm.			
						204	6	Ditto, 1mm.			
						205	0	Calcite vein, parallel to bedding 1mm.			
205	0	208	6	3	5	205	6	Calcite vein, 225° dip 45° 2mm.	205	2-	Core broken
						205	9-	Zone of calcite veins.	205	4	
						208	6	190° dip 10° 0.5 mm. to 3mm. parallel to bedding. irregularly walled, 3mm to 5mm.	205	3	Joint , 200° dip 80°
									205	3-	Core broken
									205	9	
									206	1	Joint, 200° dip 80°
									208	3-	Irregular joint, 270° dip 80°
									208	6	
208	6	213	6	5	0	208	6	Blue-grey and dark grey laminated limestone, showing slump structures - and presenting a fresh appearance.	208	6-	Core broken.
									208	11	

DEPTH RUN				CORE RECOVERED		LITHOLOGICAL CHANGES		DESCRIPTION	DEPTH STRUCTURE		DESCRIPTION
From Ft.	Ins	To Ft.	Ins	Ft.	Ins	Ft.	Ins		Ft.	Ins	
									228	8-	Vuggy texture. Solution cavities 1"
									228	10	
									229	1-	Very strongly weathered zone. Core much crumbled and broken, in places friable and vuggy. Limonite staining throughout. Several joints, which cannot be determined because of broken core. but one 90° dip 90° is persistent. This would be very porous zone.
									236	3	
233	0	238	0	2	6	236	3	Blue grey and dark-grey laminated limestone showing slump structures and presenting a fresh appearance.	233	0	Much core lost in weathered zone.
									237	4	Joint, 160° dip 75°
238	0	243	0	4	9	238	5-	Zone of Calcite veins. 170° dip 80°	238	0	Joint, 135° dip 60°
						239	11	parallel to bedding 180° dip 10° 190° dip 10°			Joint, 180° dip 10°
						239	11-	Zone of irregularly walled			
						240	6	contorted calcite veins and ties generally 0.5 cm to 1 cm not conforming to anything in particular.			
						240	8-	Zone of calcite veins, ties and			
						243	0	gash veins. Veins same as above.			
243	0	248	0	5	0	243	3	Blue-grey and dark-grey laminated limestone showing slump structures and presenting a fresh appearance.	243	0-	Strongly weathered zone identical to that at 233 etc.
									243	3	
									247	0	Joint, 190° dip 70°
						243	4	Calcite vein 180° dip 10° 2mm.			
						243	4-	Ties and gash veins.			
						243	8				
						243	8	Calcite veins 180° dip 10° 1-2mm.			
						243	11-	Calcite veins, parallel to bedding,			
						244	0	1mm.			
						244	5	Calcite vein, 180° dip 10° 2mm.			
						246	0	Ditto.			
						247	0	Calcite vein, 160° dip 10° 3mm.			
						247	4	Calcite vein, 190° dip 10° 2mm.			
						247	8	Calcite vein, 170° dip 10° 1mm.			

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION
248	0	252	6	4	9	248	0	Marker incorrectly placed. Ditto rock type. Prolific slump structures.
						248	6	Irregular walled calcite vein. 180° dip 5° 3mm.
						248	9	Irregularly walled calcite vein. paraliel to bedding. 1 cm.
						249	0-	Irregularly walled calcite vein,
						249	4	parallel to bedding and 170° dip 10° 1mm. to 1 cm.
						249	9½	Calcite vein, 170° dip 10° 1mm.
						249	10	Calcite vein, 180° dip 10° 1mm.
						250	9	Calcite vein, 170° dip 10° 3mm.
						251	7	Irregularly walled calcite vein, 170° dip 10° 1mm to 6 mm.
252	6	257	2	4	7	252	6	Ditto rock type
						254	4	Irregularly walled calcite vein, 170° dip 10° 3mm to 1 cm.
257	2	262	2	4	6			
						259	5-	Calcite vein 315° dip 40° 1mm
						260	3	
						261		Calcite vein 180° dip 80° 3mm.
262	2	267	0	4	7			
						265	6	Calcite vein 170° dip 10° 1mm.

DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
249	6	Joint, 190° dip 80° Much pyrite on joint plane.
252	6	Joint, 180° dip 90° to B.P.
252	6	BX Core
252	6-	Slightly vuggy texture.
252	7	
252	7	Joint, 180° dip 90°
253	7	Joint, 190° dip 90°
256	10	Discontinuous limonite filled joint. 190° dip 90°.
257	8	Joint, 180° dip 90°
257	8	Ditto
258	0-	Irregular joint, 340° dip 50°
258	5	
259	4	Limonite filled joint 170° dip 90°
264	9-	Irregular joints 90° dip 90°
264	11	Limonite stained joints, and B.P.s. Incipient leaching.
265	1	Limonite filled discontinuous joint 160° dip 80°.
265	8-	Irregular limonite.
266	3	filled joint 90° dip 90°

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
						266	3	Calcite vein, 190° dip 80° 1mm			
						266	7	Ditto.	266	7-)	Discontinuous, joint, 90° dip 90°
									266	9)	
267	0	271	6	4	5	267	0	Ditto rock type			
						267	0-)	Zone of discontinuous calcite			
						267	9)	veins all 180° dip 90° 0.5mm.	267	11	Joint, 270° dip 80°
									267	9-)	Irregular joint, 90° dip 90° limonite
									267	11)	stained vuggy surface.
						268	1	Calcite vein parallel to bedding. 3mm	268	1-)	Joint 90° dip 80° limonite stained
									269	3)	and with a vuggy surface. Cavities up to 3mm.
						270	7	Calcite vein parallel to bedding. 1mm.	271	4-)	Irregular joint.
									271	6)	0° dip 0° to 30°
271	6	276	0	4	6	272	5	Calcite vein 180° dip 10° 1mm.	275	10-)	Irregular joint,
									276	0)	0° dip 0° to 30°.
276	0	280	4	4	4	278	8	Irregularly walled quartz and calcite vein, 1 inch, not conform- into to anything in particular.	278	8½	Slight grinding.
						278	10	Irregularly walled calcite vein, 180° dip 10° 5mm.			
280	4	285	0	4	4	280	4	Grey and dark grey laminated lime- stone showing slump structures and presenting a fresh appearance.	281	3	Joint, 180° dip 90°
						281	2½	Calcite vein, 190° dip 90° 1mm.			
						281	9	Calcite vein, 180° dip 90° 0.5mm.			
						282	5	Calcite vein. 180° dip. 10° 1½.			
						282	9	Ditto, 7mm.			
285	0	289	7	4	5	286	6	Irregularly walled calcite vein, 180° dip 10° 1cm.			
						287	3	Calcite vein, 180° dip 10°, 1mm.			
						288	4	Calcite vein, 170° dip 10°, 2mm.			
									288	11	Joint, 190° dip 80°

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
289	7	294	6	4	7	289	7	Ditto rock type			
						290	3-	Zone of irregular walled quartz			
						290	8	and calcite veins, mostly conforming to bedding or 170°-180° dip 10°			
								from 2mm -3cm thick.	290	6-	Irregular joint, 80° dip 90°
									290	11	
						291	4	Irregularly walled calcite vein parallel to bedding 5mm. to 1 cm.			
						293	4	Irregularly walled quartz and calcite vein generally parallel bedding. 2".			
									293	7	
									293	9	
									293	10	Slight grinding.
									294	1	
									294	3	
294	6	299	0	4	4	294	6	Ditto rock type	296	4	Joint, 350° dip 90°
									296	6	Joint, 350° dip 80°
									298	3	Joint, 180° dip 80°
									294	6-	Core frequently broken along bedding
									308	3	planes which often show slight grinding.
299	0	303	7	4	7	301	5	Calcite vein. 135° dip 45° 1mm			
303	7	308	3	4	7	303	7	Ditto rock type. Surface of core from approx. 300' onwards shows peculiar pitting. This is confined to the surface only. Rock possibly softer. Laminations, slump structures still present.			
									307	9	Joint, 190° dip 90°
											Irregular joint. 0° dip 35°
						305	9	Calcite vein, 180° dip 10°	304	11-	Irregular joint parallel to core axis.
									305	8	

WT 2 extended 103'7" between 27.7.59 and 31.7.59. Driller B. Strempel. Logged by P. Goscombe.

DEPTH RUNS				CORE RECOVERED		LITHOLOGICAL CHANGES			DEPTH STRUCTURES		DESCRIPTION
From Ft.	Ins	To Ft.	Ins.	Ft.	Ins.	Ft.	Ins.		Ft.	Ins.	
308	3	315	10	7	2	308	3	Fresh blue-grey to dark-grey laminated limestone, showing abundant minor slumping. Core very clean, with no evidence of limonite staining. Pyrite in some partings.			
						308	10	Calcite vein, irregular walled, 1 cm. thick, 0° dip 30°			
						310	4	Ditto. 5 mm. thick	310	7	Joint, 45° dip 70°, clean
									310	10	Ditto.
									312	0	Joint, 160° dip 60°, clean
									314	2	Grind
315	10	326	1	9	10	315	10	Calcite vein, 1 cm. thick, 0° dip 30°			
						317	9	Ditto, 3 cm. thick	318	1	Joint, 180° dip 60°. Very slight, very dark stain.
									318	7	Slight grind
									321	8	Joint, 150° dip 45°, clean.
						322	3	Calcite vein, par. to B.P., 1 cm. thick	322	6	Joint, 180° dip 10°, pyrite film
									322	9	Joint, 0° dip 10°, pyrite film
									324	4	Joint, 180° dip 45°, pyrite film
						324	9	Calcite vein, 180° dip 45°, 0.5 mm. thick.	325	1	Joint, 50° dip 25°, pyrite and calcite film.
									326	1)	Grinds
326	1	335	10	9	11	331	10	Some calcite along B.P. parting	326	3)	
						334	10	Pyrite on B.P. parting			
335	10	345	2	9	10	339	1	Very irregularly walled calcite vein, 1" thick.	335	10	Slight grind
						339	4	Ditto, 1 cm. thick			
						342	4	Quartz, calcite vein, 1" thick, par. B.P.	341	11	Joint, 315° dip 45°, clean
						342	6	Ditto.			
						345	2	Ditto.			

DEPTH RUNS				CORE RECOVERED		LITHOLOGICAL CHANGES			DEPTH STRUCTURES		DESCRIPTION
From Ft.	Ins	To Ft.	Ins.	Ft.	Ins.	Ft.	Ins.		Ft.	Ins.	
									345	2	Slight grind
345	2	348	9	3	7				348	7)	Slightly broken and ground core
									348	9)	
348	9	354	8	5	11	348	9	Dark grey slaty, brittle limestone. This rock has tendency to break up during drilling.			
						349	7	Calcite vein, 30° dip 45°, 3 mm. thick			
						350	3	Irregularly walled calcite vein 1½" thick, 30° dip 45°.	352	7	Joint, 120° dip 15°, calcite film.
354	5	356	0	1	0				354	5)	Core broken and ground.
									356	0)	
									355	0	Joint, 270° dip 75°, green material coating faces (chloritic?)
356	0	362	0	6	0				356	6)	Broken, slightly ground core.
									357	0)	
						357	8	Fresh blue-grey laminated limestone.	357	11	Joint, 90° dip 75°, clean
									358	4	Slight grind
						360	8)	Dark-grey, brittle, very slaty	360	2)	
						361	2)	limestone.	360	7)	
						361	2)	Fresh blue-grey laminated limestone	361	1)	Very slightly ground.
						362	0)		361	7)	
									362	0)	
362	0	372	2	4	6	362	0	Dark-grey, brittle, very slaty limestone.	362	5)	Joint, 90° dip 90°, calcite lined.
									364	0)	
						364	9	Fresh blue-grey laminated limestone	364	9)	
						365	7	Calcite vein, 1" thick, approx. 30° dip	365	2)	Slight grinding
									365	5)	
									365	5	Joint, 120° dip 20°, clean.
						366	0	Dark-grey, brittle, slaty limestone	365	11)	Joint, 50° dip 85°, clean
									366	4)	
									366	4)	Much broken, ground, lost core.
									372	0)	

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins.	CORE RECOVERED Ft.	CORE RECOVERED Ins.	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins.		DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins.	DESCRIPTION
372	2	382	0	7	6	372	9	Fresh blue-grey laminated limestone, with pyrite film on some partings.			
						373	1	Calcite vein, ½ cm. thick, 30° dip 45°			
						373	3	Ditto.	373	8	Joint, 135° dip 30°. Very slight, dendritic, limonite stain.
									373	8	Core broken into 1", 2", 3" pieces and breaks
382	0	383	6	1	4				382	0	well ground. Core lost here.
									382	6	Broken and ground core
									383	6	
383	6	385	0	1	0	384	0	Dark-grey, brittle, slaty limestone.	384	0	Broken and ground core
									385	4	
385	0	390	0	4	5	385	4	Fresh blue-grey laminated limestone	385	0	BM Core
390	0	395	0	4	5	391	10	Dark grey, brittle, slaty limestone	390	5	Joint, 270° dip 70°, clean
						392	6				
						392	6	Fresh blue-grey laminated limestone	392	6	Core somewhat broken and ground
									395	0	
395	0	397	6	2	0	395	0	Greenish-grey, very slaty laminated limestone.	395	0	Many grinds and broken core
									397	6	
397	6	402	0	4	2	397	6	Fresh blue-grey laminated limestone			
402	0	412	0	9	9				402	0	BX Core
									409	4	Joint, 280° dip 70°, some specks of limonite staining.
						410	2	Calcite vein, 1" thick, par. B.P.			
								END OF HOLE WT 2 AT 412'.			

DEPARTMENT OF MINES, ADELAIDE

DIAMOND DRILL LOG

Project: Myponga Dam Site DM 63/58 Bore No. W.T.3. Bore Serial No. DD 74/59 Hundred: Myponga

Section: 621 Co-ordinates: 9465N 10093.19E R.L. of Collar: Top of casing 839.88 Depressed: Vertical

Driller: W. Inglis Date Drilling Commenced: 2.12.58 Date Drilling Completed: 16.12.58.

Depth Runs From Ft.	From ins.	To Ft.	To ins.	Core Recovered Ft.	Core Recovered ins.	Lithological Changes Ft.	Lithological Changes ins.	Description	Depth Structures Ft.	Depth Structures ins.	Description
0	0	3	8	0	0'	0	0	Lateritic L.S. soil.	0	0	NX Core
3	8	4	0	0	0'	3	8	Fragment of unweathered L.S.	3	8	
4	0	5	0	0	0	4	0	Grey L.S.	4	0	Evenly fractured at 60° 11B.
5	0	7	6	1	9	5	0	Grey L.S.	5	0	Uneven frs. at 5'9", 6', & 7'3".
7	6	10	3	2	6	7	6	Buff and grey L.S. 9'3"-10'3" broken L.S. weathered to porous argillitic material.	7	6	
10	3	13	3	2	9	10	3	Buff and grey L.S. Cross bedded?	10	3	Joints 11B at 12' & 12'6".
13	3	22	9	7	0	13	3	Grey and buff L.S. Cave broken from 22'-22'9".	13	9	Joint 11B.
									14	0	Irregular joint dip 70° at 80° B.S. Clay and calcite along joint plane.
									14	3	Cross joint dip 50°.
									19	0	Uneven horizontal joint.
22	9	25	6	2	2	22	9	Grey compact L.S. $\frac{1}{8}$" calcite seams at 23'9".	23	9	Irregular frs. Joints 11B.
25	6	26	9	1	3	25	6	Grey L.S. with 1/16" calcite seams.	26	9	Joints 11B.
26	9	30	0	3	0	26	9	Grey and buff L.S.	29	9	Joints 11B. Irregular joint-sub vertical with little clay.
30	0	34	3	3	3	30	0	Grey and buff L.S. Broken weathered band at 34'-34'3".	30	0	Some joints 11B and others dip 30°.

Note Symbols: B = bedding 11 = parallel BS = bedding strike
B.P. = bedding plane S/V = sub-vertical St = strike

Depth Runs				Core Recovered		Lithological Changes		Description	Depth Structures		Description
From Ft.	ins.	To Ft.	ins.	Ft.	ins.	Ft.	ins.		Ft.	ins.	
34	3	37	1	3	5	34	3	Grey banded L.S.	34	0	Jointed throughout 11B.
37	1	40	11	4	11	37	1	Regularly jointed L.S.	37	1	
40	11	44	10	4	0	40	11	L.S. with clay along joints. ½" calcite seam at 41'5".	40	11	Jointed 11B.
44	10	48	1	3	3	44	10	Grey L.S. with 1/16" calcite seams.	44	10	Jointed 11B.
48	1	52	1	4	0	48	1	Grey L.S. 51' badly weathered seam 2" wide.	48 48	1 9	Joints generally 11B. Joint dip 45°.
52	1	56	0	4	6	52	1	Grey L.S.	52	1	Joints 11B.
56	0	59	11	3	6	56	0	" "	56	0	" "
59	11	63	3	3	4	59	11	" "	59	11	" "
63	3	66	8	2	5	63	3	Grey L.S.	63	3	64'-64'4" joint dip30° and calcite band.
66	8	67	5	1	9	66	8	Grey L.S.	66	8	
67	5	71	8	3	9	67	5	" "	68	6	Two B.P. cracks - limonite and possibly some clay.
71	8	75	1	3	7	71	8	Grey L.S. Bedding dip 45°.	72 74 74	7 1 7	Hor. joint. Tight grind. Joint dip 30° at 80° to B.P. Tight B.P. Crack.
75	1	78	10	3	8	75	1	" " " " "	78 78	0 10	B.P. crack. " "
78	10	82	6	3	8	78 81	0 6	Dark grey calcite shale. Grey L.S.	80	6	1½" thick calcite vein. 82'-82'6" numerous tight joints and B.P. cracks.
82	6	86	4	3	9	82	6	Grey L.S.	83	0	B.P. crack. 83'2" to 83'8" - crack and weathered. Some soln. Vert. joint ending in B.P. crack.

Depth Runs				Core Recovered		Lithological Changes		Description	Depth Structures		Description
From Ft.	ins.	To Ft.	ins.	Ft.	ins.	Ft.	ins.		Ft.	ins.	
									84	4	B.P. crack.
									84	10	Tight joint.
									85	5	Two joints - tight.
									85	9	Dip 45° at 180° to B.P.
86	4	90	2	3	5	86	4		86	4	B.P. crack.
									87	0	" "
									88	8	Joint, tight. 30° at 180° to B.P. dip.
									89	4	Ditto and B.P. crack.
90	2	94	2	4	0	90	2	Grey L.S.	90	8	B.P. cracks.
									93	0	" "
94	2	97	7	3	2	94	2	" "	95	7	" "
97	7	99	8	2	4	97	7	Water lost and then recovered.	97	9	" "
									98	6	Tight joint dip 50° at 90° to B. dip.
99	8	103	7	3	10½	99	8		99	8	Joint dip 30° at 150° to B. dip.
									100	4	Ditto.
									100	5	Joint dip 90° and 30°. Also B.P. cracks.
									to		
103	7	107	5	3	10	103	7	Grey Lst.	110	10	
107	5	111	3	3	9	107	5		108	3	Joint and B.P. crack.
									108	8	Ditto.
									109	3	Ditto.
111	3	115	1	3	9	111	3		114	4	Ditto.
115	1	118	11	3	9	115	1	Water test at 116' and then recovered.	115	10	Irregular hor. joint. Some soln, along intersection of joint and B.P.'s.
118	11	122	8	3	9	121	0	Weathered Lst. yellowish grey comparatively sound.	116	6	Tight joint dip 30° at 180° to B.P.
											115'10" to 116'6" Tightly cemented calcite filled joint vertical.
									121	7	1¼" thick quartz calcite vein 11 to bedding-crushing along both edges.

Depth Runs From Ft.	ins.	To Ft.	ins.	Core Recovered Ft.	ins.	Lithological Changes Ft.	ins.	Description
122	8	124	6	1	11	122	8	Weathered Lst.
124	6	125	9	1	6	124	6	Ditto.
125	9	129	0	2	9	125	9	Grey Lst. from 126'3".
129	0	131	0	1	11	130	8	Weathered Lst.
131	0	132	10	2	2	132	2	Grey Lst.
132	10	136	8	3	8	132	10	
136	8	140	6	3	10	136	8	
140	6	144	4	3	10	140	6	
144	4	148	2	3	10	144	4	
148	2	152	0	3	10	148	2	
152	0	155	10	3	10	152	0	
155	10	159	9	3	11	155	10	
159	9	164	9	5	0	159	9	

Depth Structures Ft.	ins.	Description
121	10 to 122 2	Joint dip 60° at 90° to B.P. dip.
123	1	B.P. crack.
123	8	Joint open dip 68° at 100° to B.P. dip.
125	6 to 126 3	Joints and clay.
129	11 to 132 10	Numerous joints and B.P. cracks.
132	10	B.P. cracks.
133	2	
133	7	
134	1	
134	0	Joint dip 70° at 100° to B.P. dip.
135	1 to 135 8	5 Joints and B.P. cracks.
137	0	Joint dip 60° at 180° to B.P. dip.
137	4	Joint dip 80° at 90° to B.P. dip.
137	10	Joint dip 80° at 10° to B. dip.
142	10	Two irregular joints flat dipping.
160	3	Tight calcite filled vert. joint which extends to 166'2" before passing out of cave.

Depth Runs				Core Recovered		Lithological Changes		Description
From Ft.	ins.	To Ft.	ins.	Ft.	ins.	Ft.	ins.	
164	9	169	9	4	9	164	9	
164	9	174	10	5	1	164	9	
174	10	176	4	1	7	174	10	
176	4	181	4	5	0	176	4	
181	4	184	6	3	1	181	4	
184	6	189	6	4	8	184	6	
184	6	194	6	5	0	184	6	Many irregular replacement veins in this section.
194	6	199	4	4	11	194	6	
199	4	203	2	3	6	199	4	
203	2	207	10	4	7	203	2	
207	10	212	8	4	10	207	10	Grey and dark grey laminated limestone.

Depth Structures		Description
Ft.	ins.	
163	6	Joint meets another and for 7" is limonite lined.
170	0	Flat limonite lined joint.
174	8	Replacement quartz calcite vein.
175	10	Limonite lined joint.
177	0	Replacement quartz calcite vein. Limonite staining at base.
183	0	Joint dip 60° at 100° to B.P. dip. Limonite lined.
184 to 185	0 0	Replacement quartz calcite vein.
185 to 185	1 8	S/V joint limonite lined traverses core. Strike 90° to B.P.
188	6	Flat dipping joint limonite lined.
194	6	Tightly cemented calcite filled joints sub.hor. and S/V.
199 to 202	4 4	S/V joint calcite filled traversing cave.
202	4	Grind.
203 to 204	6 6	S/V joint traverses cave mostly calcite filled. Faint trace of limonite.
209	7	Joint. Strike 11 bedding dip normal to bedding.
211	9	Limonite filled crack. Frequent B.P. partings.

Depth Runs From Ft.	ins.	To Ft.	ins.	Core Recovered Ft.	ins.	Lithological Changes Ft.	ins.	Description	Depth Structures Ft.	ins.	Description
212	8	217	6	4	10	212	8	Grey and dark grey laminated lime-stone.	212	8	212'11", 215'2", joints - St 11 B.P. dip S/V to B.P.
									213	0 to 213 8	Joint - St 11 B.P., dip 45° to B.P.
									216	6	Thin calcite gash veins.
									217	3	Thin calcite vein, sub-parallel to bedding.
217	6	222	4	4	10	217	6	Ditto. Bedding dip 45-50° to core axis.	218	6	Calcite vein St 45°, dip 45°.
											218'6", 218'7", 218'8", 220'6", 222'0" - calcite veins St 11, dip sub 11 to B.D.
									219	5 to 220 5	Joint St 45°, dip S/V to B.D.
									219	9	Joint St 11, dip S/V.
									222	0	Weak joint, dip 80° in direction 45° to B.D.
222	4	227	4	5	0	222	4	Ditto.	224	3 to 225 1	Irregular joint producing broken core. St 11 to B.P. limonite staining.
									225	2 to 226 6	As above.
227	4	232	4	5	0	227	4	Ditto with some small scale slumping.	227	4	Core broken along B.P.'s every 6"-12".
232	4	237	2	4	10	232	4	Ditto.	234	0	Joint S/V to bedding at 135°.
237	2	240	7	3	5	237	2	Ditto.	238	6 to 238 11	Minor joint, dying out at 238'11" - dip 70° to bedding in direction 290°.
									240	3	¼" calcite vein sub 11 to B.D.
240	7	245	7	4	11	240	7	Dark and dark grey laminated lime-stone with some minor dump structures.	241	6 to 243 0	Irregular joint with limonite facing St. normal to bedding, dip steep.

Depth Runs From Ft.	ins.	To Ft.	ins.	Core Recovered Ft.	ins.	Lithological Changes Ft.	ins.	Description	Depth Structures Ft.	ins.	Description
									242	5	½" calcite vein sub ll to bedding.
									245	2	Joint dip S/v at 180°.
245	7	250	5	4	6	245	7	Ditto.	247	4	¼" calcite vein sub ll to bedding.
									249 to 250	4 5	Only 9" core - very broken.
									248 to 248	7 10	¼" calcite vein sub ll to bedding - cut off against bedding at 248'10". Some pyrite in B.P. partings.
250	5	254	8	4	0	250	5	Ditto.	252 to 252	3 10	Core broken.
									250	5	Joint? Dip 60° in direction 315°.
									253 to 253	4 5	Quartz, calcite vein parallel to bedding.
254	8	259	2	4	6	254	8	Ditto.	255	4	Joint with thin pyrite facing - dip 40° at 110° to B.D.
									257	2	Joint 80° at 180-190° to B.D.
									256	4	Thin calcite vein 270° sub ll.
									256	8	" " " 30° sub ll.
									257	1	" " " slightly flatter than bedding.
									258	3	⅛" calcite vein " " " "
									258	11	Irregular quartz, calcite vein ½ to 1" thick, ll to bedding.
259	2	262	2	3	0	259	2	Light to dark grey laminated limestone.	259 to 259	0 7	Joint - dip S/V at 280° to B.D.
									259	9	Joint - dip 50° at 30°.

Depth Runs				Core Recovered		Lithological Changes		Description	Depth Structures		Description
From Ft.	ins.	To Ft.	ins.	Ft.	ins.	Ft.	ins.		Ft.	ins.	
									261	5 to 261 11	Joint, sub parallel to core axis, near normal to bedding.
									261	11 to 262 2	Broken core.
262	2	265	8	3	4	262	2	Ditto.	262	2 to 262 8	Continuation of joint. Walls have thin calcite facing - $\frac{1}{8}$" to $\frac{1}{4}$" sludge filling joint - may be fault gauge, may be drilling sludge.
265	8	270	6	4	7	265	8	Ditto - bedding 45° to 50° to core axis.	269 269 270	8 11 0	Thin calcite veinlet dip 5° flatter than bedding. Also 2 or 3 small calcite filled gashes.
270	6	275	4	4	8	270	6	Ditto.	275	0	Slightly broken. Pyrite facings along B.P. partings.
275	4	279	0	3	8	275	4	Ditto.	277 277 277	0 3 4	Thin calcite veins, dip 5° flatter than bedding in limestone.
279	0	283	10	4	10	279	6	Ditto.	279 to 279	2 9	Irregular patches of quartz and calcite.
									279	11	Sub 11 calcite vein $\frac{1}{4}$" to $\frac{1}{2}$".
									280	5	" " " vein - $\frac{1}{8}$".
									280 282	11 10	Calcite vein 1", flatter than bedding.
									280 to 280	6 8	Core slightly broken.
									282	2	Joint dip S/V at 190° to B.P.

Depth Runs From Ft.	ins.	To Ft.	ins.	Core Recovered Ft.	ins.	Lithological Changes Ft.	ins.	Description	Depth Structures Ft.	ins.	Description
283	10	288	8	4	10	283	10	Blue-grey limestone (no change from previous).	285 to 285	3 8	¼" to ½" seam of gouge and broken rock traverses core. Dip 45° to B.P. Similar to section 262'2"-262'8".
288	8	293	6	4	10	288	8	Ditto.	289 to 290	5 6	Calcite filled joint - dips 315° to B.P.
293	6	298	4	4	8½			Ditto.	293 to 294	6 8	Joints, calcite filled. (1) normal to bedding. (2) dip 45° at 280° to B.P. (3) dip 85° at 45° RH to B.P.
									297 to 298	3 9	S/V joint. Strike 80° to B.P. and downwards. Also joint dip 190° to B.P. with trace of limonite.
298	4	303	2	4	9½	298	4	Ditto.			
303	2	308	0	4	9½	303	2	Ditto.	305 to 308	9 6	Number of irregular S/V joints.
									307	6½	Thin pyrite vein dip 25° at 110° to B.D.
308	0	312	10	4	10	308	0	Blue-grey limestone.			
312	10	316	10	4	0	312	10	Ditto - numerous quartz, calcite veins.			
316	10	320	10	4	0	316	10	Blue-grey limestone.	316	10	Core badly broken - probably by action of drill on shaly partings in limestone.
								END OF HOLE			Numerous calcite cemented joints.
								Water test - whole hole.			
						Time of Test		12 min. 5½ gpm. at zero 16/5 in. at casing top. 25 min. 8 gpm. at 10 " " " " 27 min. 10 gpm. at 20 " " " "			
								All constant dissipation.			
								R.L. Bottom of hole 519.41.			

Bore logged by W. Johnson.

Date: 18/12/58.

DEPARTMENT OF MINES, ADELAIDE

DIAMOND DRILL LOG.

Project: MYPONGA DAM SITE | Hundred: MYPONGA | Section: 621 | D.M. 63/58 | Hole Serial No. D.D.: 88/59

Co-ordinates: 9338.77N 10096.86E | R.L. of Collar: 817.13 | Depressed: Vertical | Hole No. W.T. 4

Commenced: 27/12/58 | Completed: 6/1/59 | Driller: G. Speldewinde | Logged by: P.W. Goscombe and M.N. Hiern.

LOG

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins.	DESCRIPTION
		12	0	1	4	0		Clay and weathered limestone.			
12	0	18	0	No Core.							
18	0	21	0	2	6	18	0	3½" Special size core. First 9" - buff weathered limestone with 2. 1" bands relatively fresh blue-grey limestone. Remainder relatively fresh blue-grey limestone. Drillers note - water return 0.K.	18	0	Weathered bands parallel to bedding which is at 40-45° to core.
21	0	22	6	1	6	21	0	Blue-grey limestone - some small scale slump structures. Little or no weathering.			
22	6	25	0	2	0			Ditto. Drillers note:- casing placed with diamond shoe. Water seal O.K.	22 24	6 6	One or two narrow bedding plane partings Two paper thin calcite felled joints which do not extend right across core 8,p normal to B.P. in direction 180°-200°.
25	0	28	10	3	9	25	0	Reduction in core size to N.K.? Blue grey laminated limestone, bedding dipping at 40° to core axis. Frequent narrow limonite filled bedding plane partings, otherwise rock is fresh.	25 to 25'	3 8	Several paper thin calcite joints, usually not extending right across core. Dip normal to B.P. in direction 180° - 200°
									27 28	0 4	Similar joint, limonite filled. Limonite filled irregular joint, dip normal to B.P. in direction 0°.

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES. Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURES. Ft.	Ins.	DESCRIPTION
28	10	32	7	3	9	28	10	Blue grey laminated limestone with frequent narrow limonite filled B.P. partings.	29	4	Irregular limonite filled joint, near vertical to B.P. in approx. direction 340°.
									29 to 30	8 9	Irregular joint, vertical to B.P. in direction 00° - core is unbroken and calcite filled to 30'3", then core is broken and joint is faced with limonite
									29 to 30	4 4	Numerous irregular short and discontinuous cracks, all limonite filled. Usually approximately normal, to bedding.
									30	8	Joint, dipV in direction 325°, partly limonite filled, partly open.
									30	10	Joint, limonite faced dip V in direction 20°.
									32	6	Joint, limonite faced, dip V in direction 180-200°.
32	7	36	5	3	9	32	7	As above, but B.P. partings, although present, are not so frequent.	32 to 33	7 3	Joints, limonite faced, dip V in direction 180°-200°.
						35 to 36	6 4	Core broken.	32 to 34	9 3	Irregular joint, limonite filled, subparallel to core axis, and at 45° to strike of bedding. Dries out occasionally.
									35 to 36	4 3	Similar joint.
									33 36	4- 5	Zone of calcite veinlets normal to bedding in direction 100° or 180°.
									33 34	4- 7	General thin and short length gashes.
									34 36	7- 5	Veinlets become wider (up to ½") and have numerous thin, irregular stringers running out from them.
									34	7	Calcite has been dissolved and B.P. part-

Hole No. W.T. 4

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION.	DEPTH STRUCTURES. Ft.	Ins.	DESCRIPTION.
											ings are deeply weathered. This coincides with maximum development of calcite.
36	5	39	2	2	7	36	5	Blue-grey laminated limestone with frequent narrow limonite filled B.P. partings.	36	6	Thin irregular joint, with calcite in places and limonite in others, dip V to B.P. in direction 135°.
									36	10	Similar joint, dip V in direction 00°.
								Drillers Note: Water return milky blue.	36	5-)	Calcite veinlets as for 33'4" to 34'7".
									37	8)	Quartz calcite veins following bedding at 37'3" ($\frac{1}{8}$"), 37'7" ($\frac{1}{2}$-$\frac{3}{4}$"), 37'8"($\frac{1}{8}$").
									38	9	Joint, limonite faced and pitted by solution parallel to bedding, dip V in direction 170°.
39	2	42	7	only 10" core, remainder mud.		39	2-)	Blue-grey laminated limestone with frequent limonite filled B.P. partings. Last $\frac{1}{4}$" core is deeply weathered along bedding plane.	39	2	Abundant short thin calcite filled gashes, normal to bedding in direction 00° or 180°.
						40	0)				
						40	0-)	Buff deeply weathered limestone for first few inches, then mud - brown clay.			
						42	7)				
								Driller's Note: Water changed to light brown at 40'2", lost water at 42'6".			
42	7	46	11	4	3	42	7-)	Blue-grey limestone.	45	5-)	Irregular faint, limonite faced with black dendritic staining, sub parallel to core axis, approx. normal to strike of bedding.
						42	8)		46	11)	
						42	8-)	Buff weathered limestone.			
						43	2)				
									46	1	Joint with a little limonite, dip V in direction 160-170°.
						43	2-)	Blue-grey laminated limestone with very occasional limonite filled B.P. partings. Water return, milky blue from 43'0"			
						46	11)				
46	11	47	3		3½	46	11	Blue-grey limestone.			

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES. Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURES. Ft.	Ins.	DESCRIPTION.
47	3	52	5	5	0	47	3	Blue-grey laminated limestone with some small scale slumping. Frequent limonite filled B.P. partings.	47 49	4-) 0)	Irregular joint sub-parallel to core axis, in places with calcite in places limonite, occasional open. Strike at 45° to bedding strike.
									50 50	0-) 4)	Some short calcite filled gashes, normal to bedding.
									52	3	Quartz, calcite vein ($\frac{1}{8}$") sub-parallel but flatter (to core axis) than bedding.
52	5	57	5	5	0	52	5	Blue grey laminated limestone with small limonite filled B.P. partings.	52	5	Occasional very thin (1 m.m. and less) calcite veins, normal to bedding.
57	5	62	0	4	7	57	5	Blue-grey laminated limestone as before.	57 60	5 6	Calcite filled gash veins as before. Joint, with limonite and a little green facing, normal to bedding in direction 45°.
62	0	64	11	2	9	62	0	As above but no limonite in B.P. partings.	62 64	11 5	Abundant calcite filled gash veins, all approx. normal to bedding, some in direction 00-180°, others 240°.
64	11	67	1	2	0	64 66	11-) 1)	As above.			
						66 67	1-) 1)	Broken blue-grey limestone and buff weathered limestone. Weathering is in irregular zone, not parallel to bedding.	66 67	1-) 1)	Limonite filled irregular joint sub-parallel to core axis.
67	1	72	0	4	11	67	1	Blue-grey laminated limestone with limonite filled B.P. partings.			
						68 68	3-) 6)	Deeply weathered zone as intersection of two joints and B.P. parting.	67	1	Limonite faced joint, dip vertical to bedding in direction 10°.
									67 67	1-) 6)	Irregular joint continued from 66'1" to 67'1".
									67 67	5-) 7)	Some short length irregular joints running away from B.P. partings - some limonite filled, some open on core edges.
									68 68	3-) 6)	Joint, dip V in direction 70-90°.

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES. Ft.	Ins.	DESCRIPTION.	DEPTH STRUCTURE. Ft.	Ins.	DESCRIPTION.
									70	0-)	Frequent calcite veinlets in 2 sets.
									72	0)	1 - gashes normal to bedding. 2 - veins dipping flatter than bedding (relative to core axis).
72	0	75	9	3	8	72	0	Blue-grey laminated limestone, bedding dip at 30-35° to core axis. Limonite filled B.P. partings.	74	4-)	Zone of many calcite gash veins normal to
									74	9)	bedding.
									75	5	Joint with calcite facing. Dip vertical in direction 170-180°.
75	9	80	9	4	10	75	9	As above but very few limonite filled B.P. partings. Driller's note:- water return milky blue and at 75%.	75	10	Limonite faced joint dip V in direction 00°.
									75	11	Calcite vein, dip V in direction 200°.
									77	5	Joint, dip 60° to bedding in direction 210°.
									79	3	Joint, dip V in direction 170°.
80	9	84	10	4	1	80	9	As above. No limonite or B.P. partings. A little pyrite in places.	81	9-)	Quartz, calcite veins 70° to core axis, strike
									82	0)	parallel to bedding.
									83	4-)	Clean joint, nearly parallel to core axis
									84	10)	approx. normal to bedding strike.
84	10	89	10	4	11	84	10	As above with pyrite and occasionally limonite in B.P. partings.	84	10-)	Clean joint, sub-parallel to core axis, nor-
									85	7)	mal to bedding strike.
									86	6-)	Joint with thin calcite facing, dip 30° to
									87	1)	bedding in direction 00°.
									86	8-)	Calcite joint, dip 30° in direction 340°.
									87	2)	
									87	3	Clean joints, dip V in direction 200°.
									87	4	As above with calcite.
									89	3	As above, clean with a little pyrite.
89	10	94	10	5	0	89	10	Blue-grey laminated limestone with pyrite and occasionally limonite filling B.P. partings.	90	7-)	Thin calcite filled joint, dip V, in direc-
									91	0)	tion 200°.
									91	10,	Calcite veins parallel to bedding strike
									91	11,	and 60° to core axis.
									92	2,	
									92	4.	
94	10	98	1	3	3	94	10	As above abundant limonite on bedding plane. 97' 6".	96	9	Irregular break, normal to core axis con-
											taining limonite.

DEPTH RUNS From Ft.	From Ins.	To Ft.	To Ins.	CORE RECOVERED Ft.	CORE RECOVERED Ins.	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins.	DESCRIPTION.	DEPTH, STRUCTURE. Ft.	DEPTH, STRUCTURE. Ins.	DESCRIPTION.
98	1	9	10	1	8	98	1	As above.	98 98 98 98 99	2-) 9) 7 8 8	Limonite faced joint, sub parallel to core axis. Strike, sub parallel to bedding strike. Irregular calcite joint with limonite dip V, in direction 20°. Similar joint - not calcite filled. Quartz, calcite vein, sub parallel to bedding.
99	10	104	10	5	0	99	10	As above. Some pyrite? in B.P. partings.	100 100 101 101 101 102 102 102 102	1, 10, 4, 7, 10, 1. 3 6-) 9)	All dip V in direction 180°-200°. All pyrite filled - very fine film. Thin calcite joint, dip 60° in direction 20°. Three thin calcite joints, dip V in direction 200° ½" calcite vein, sub-parallel to bedding 101'11".
104	10	109	10	4	11	104	10	Blue-grey laminated limestone.	105 107 109	3 8-) 8)	⅛" calcite vein sub parallel to bedding (flatter relative to core axis.). Frequent calcite gashes all normal to bedding in direction 00° or 180°, usually feather out at each end after 1".
109	10	114	10	5	0	109	10	As above with pyrite in places altering to limonite in B.P. partings.	110 113	8-) 6)	Zone with abundant calcite filled gash veins with feathering and sometimes inter-connecting stringers. Veins have generally dip V to bedding in direction 00° or 180°. Bedding displaced by ⅛" along some of longer gashes in reverse fault movements.
114	10	116	10	2	0	114	10	As above	115	7	Irregular pyrite filled joint, dipping 60° to bedding plane in direction 40°.
116	10	118	3	1	3	116	10	Grey to dark grey laminated limestone with bands showing slump structures. The core presents a very fresh appearance. There is no limonite staining.			

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins.	DESCRIPTION.
118	3	123	3	4	9	119	4	Calcite vein 1 m.m. thick. 175° dip 15° to B.P.	119	2	Joint, 40° dip 70° to B.P.
						121	1	Calcite vein ¼" thick, irregularly walled. Conforms to B.P. Driller's note:- 80'9" to 123'4" water return milky blue.	122 123	6-) 4)	Joint, 40° dip 75° to B.P. Core broken along joint. Limonite staining.
123	3	127	9	4	5	123	3	Ditto rock type. Core very fresh. No staining.			
127	9	132	7	4	9	127 132	9-) 7)	Many whispy gash veins mostly less than 1 m.m. thick. Calcite veins appear to belong to two sets, e.g. 315° dip 70° to B.P. 200° dip S/V to B.P.	131 131 132 132	2-) 7) 0 7	Irregular joint 0-180°, dip par. to core axis. Slight limonite staining. Joint, 190° dip S/V to B.P. Joint, 190° dip S/V to B.P.
132	7	133	7	1	0	132 132 133	7 9-) 1)	Ditto rock type. Calcite veins, 1 m.m. thick. par. and conforming to B.P.			
133	7	137	7	3	9	131 134 137	5-) 7-) 7)	Calcite veins conforming to B.P. 2 m.m. and 1 m.m. respectively. Zone of calcite veins parts B.P. In particular 136'9" ½" thick 137'0" 1½" thick 137'4" ½" thick.	134 137	4 7	Joint, 180° dip S/V to B.P. Joint, 135° dip S/V to B.P.
137	7	141	1	3	6	137 137 140	7 11-) 8)	Ditto rock type. Calcite veins par. to B.P.	137 140	6 10	Irregular joint 120° dip 90° to B.P. Slight limonite staining. Joint, 170° dip 80° to B.P.
						137 141	7-) 1)	Occasional small gash vein.	139 141	11-) 6)	Irregular joint 120° dip 90° to B.P. Slight limonite staining.
141	1	146	1	5	0	141 141 142	1 3 1	Ditto, rock type Pyrite on B.P. Parting Calcite vein 2 m.m. thick, parallel to B.P.	141 142 142 143	1 4 7-) 3)	Joint, 170° dip 80°. Joint, 190° dip S/V. Irregular joint 90°-270° dip parallel to core axis. Limonite stained.

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES. Ft.	Ins.	DESCRIPTION.	DEPTH STRUCTURE. Ft.	Ins.	DESCRIPTION.
									142	5,	
									142	9,	Joints 170° dip 80° to B.P.
									143	6,	
									144	0.	
									144	0-)	Irregular joint 90°-270°, dip par. to core
									144	9)	axis. Core broken along joint.
						144	11	Calcite vein. 160° dip 10°, 1 m.m. thick.	145	4-)	Irregular joint. 90-270° dip parallel to
									146	2)	core axis. Core broken along joint.
146	1	151	0	4	10	146	1	Ditto rock type.	147	1	Joint 200 dip S/v.
						146	1-)	Many gash veins of varying	147	2-)	Irregular joint 90-270; dip parallel to core
						150	0)	size. Whispy veins. Generally these conform to the two sets 315° dip 70° to B.P. : 200° dip S/V to B.P.	147	6)	axis.
									147	8-)	Irregular joint 0-180 dip parallel to core
									148	0)	axis.
									149	10	Displacement along tight calcite filled joint of 7/16" 315° dip 70° to B.P.
151	0	156	0	4	10	151	0	Ditto rock type.	151	0-)	B.P. partings only.
156	0	160	11	4	8	151	0-)	Calcite veins are a feature.	168	5)	
						168	5)				
160	11	165	6	4	7	160	11	Thickness varies. Whispy ones conform to types 315° dip 70° to B.P. 190° dip S/V to B.P. 170° dip 10° to B.P. 10° dip 10° to B.P. Occasional gash veins.			
						155	2	¾" calcite veins irregular walls. Conforms to B.P.			
						155	10	Ditto ¼" vein.			
						156	3	Ditto ½" vein.			
						160	0	Ditto ½ - 1" vein. Occasional pyrite on B.P. partings. Slumping spectacular in places.			
168	5	170	7	2	2	168	5	Blue grey slightly laminated limestone.	168	11	Paper thin calcite filled joint, dip V in direction 00.
									169	7	Similar joint - no calcite.

DEPTH RUNS From Ft.	Ins.	To ft.	Ins.	CORE RECOVERED. Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION
170	7	175	4	4	9	170	7	Blue grey laminated limestone Bedding dip 35-40°. Some pyrite along B.P. partings.
175	7	178	7	2	10	175	7	Ditto - some minor slumping.
178	7	183	8	5	1	178	7	As above but laminations not so frequent - i.e. dense limestone.
178	7					181	9+	Core broken (probably from vibration in drill.).
183	8	185	6	1	9½	183	8	Laminated blue-grey limestone some limonite on B.P. partings.
185	6	188	0	2	1	185	6	Blue grey dense limestone. Core broken at bottom of run.
188	0	192	8	4	8	188	0-	Blue-grey laminated limestone
						190	0	
						190	0-	Similar but with fewer laminations.
						192	8	

DEPTH STRUCTURE. Ft.	Ins.	DESCRIPTION.
169	10	Thin calcite vein, 5° flatter than bedding.
172	1, 4	Paper thin calcite filled joints, dip V in direction 00-340°
172	7	⅛" calcite filled joint dip V in direction 20°.
172	1-	Two paper thin calcite veins, sub parallel to core axis and normal to bedding strike.
172	6	
173	1	Quartz calcite vein, sub-parallel to bedding ¼" - ⅜" true thickness.
173	2	Joint, dip V in direction 270°.
176	0	Quartz calcite vein, 5° flatter than bedding (i.e. 45° to core axis.)
178	8	Two calcite quartz veins (⅛" true thickness) 5° flatter than bedding.
178	10	Irregular joint, dip S/V in direction 00°.
179	3	Joint with a little limonite facing, dip V in direction 180-190°.
179	4	Joint, dip 40° in direction 220°.
181	1	Quartz calcite vein, ⅛" thick dipping 5° flatter than bedding.
181	11, 4	Joints, dip V in direction 180-190°
184, 184	8	Joints with limonite, dip V in direction 180-190°.
188	3-	Irregular joint, clean, dip V in direction 270°.
188	7	
189	5-	As below quartz calcite veins with irregular walls, but parallel to bedding at 189'5" (½" t.t.)
190	0	
189	10	(½")
190	0	(⅛")

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES. Ft.	Ins.	DESCRIPTION.	DEPTH STRUCTURE Ft.	Ins.	DESCRIPTION.
									142	5,	
									142	9,	Joints 170° dip 80° to B.P.
									143	6,	
									144	0.	
									144	0-	Irregular joint 90°-270°, dip par. to core
									144	9	axis. Core broken along joint.
						144	11	Calcite vein. 160° dip 10°, 1 m.m. thick.	145	4-	Irregular joint. 90-270° dip parallel to
									146	2	core axis. Core broken along joint.
146	1	151	0	4	10	146	1	Ditto rock type.	147	1	Joint 200 dip S/v.
						146	1-	Many gash veins of varying	147	2-	Irregular joint 90-270; dip parallel to core
						150	0	size. Whispy veins. Gener-	147	6	axis.
								ally these conform to the two sets 315° dip 70° to B.P. : 200° dip S/V to B.P.	147	8-	Irregular joint 0-180 dip parallel to core
									148	0	axis.
									149	10	Displacement along tight calcite filled joint of 7/16" 315° dip 70° to B.P.
151	0	156	0	4	10	151	0	Ditto rock type.	151	0-	B.P. partings only.
156	0	160	11	4	8	151	0-	Calcite veins are a feature.	168	5	
						168	5				
160	11	165	6	4	7	160	11	Thickness varies. Whispy ones conform to types 315° dip 70° to B.P. 190° dip S/V to B.P. 170° dip 10° to B.P. 10° dip 10° to B.P. Occasional gash veins.			
						155	2	¾" calcite veins irregular walls. Conforms to B.P.			
						155	10	Ditto ¼" vein.			
						156	3	Ditto ½" vein.			
						160	0	Ditto ½ - 1" vein. Occasional pyrite on B.P. partings. Slumping spectacular in places.			
168	5	170	7	2	2	168	5	Blue grey slightly laminated limestone.	168	11	Paper thin calcite filled joint, dip V in direction 00.
									169	7	Similar joint - no calcite.

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURE. Ft.	Ins.	DESCRIPTION.
											Between these are numerous irregular interconnecting veinlets and joints. Also a little pyrite, altering slightly to limonite.
									191	10	Joint with thin pyrite smear, dip V in direction 200°.
192	8	197	5	4	4	192	8	Generally dense blue-grey limestone, in places laminated. A little limonite on B.P. partings.	193 193 195	0-) 5) 9	Joint, with a thin smear of pyrite, dip V in direction 180-200°. Quartz, calcite vein parallel to bedding ¼" true thickness.
197 ?	5	202	0	5	0	197	5	Blue grey dense limestone, laminated in places. Some pyrite in B.P. partings.	197	5	Irregular joint with calcite and in places, pyrite, dip 70° in direction 30°.
(197	0)								198	5	Irregular joint with pyrite and limonite dip 30° in direction 225°.
									199	4	Calcite joint, dip V in direction 160°.
202	0	207	0	5	0	202	0	Grey laminated limestone with pyrite and limonite in B.P. partings.	202 202 205	4 10-) 0)	Calcite joint, dip 30° in direction 315°. Frequent paper thin calcite joints, dip V in direction 200°.
									205 205	0-) 5)	Several calcite veins, dip 30-40° in direction 220 interconnected by irregular veinlets.
									206	2	Irregular walled quartz calcite vein parallel to bedding.
207	0	212	0	4	11	207	0	Grey laminated limestone with pyrite and limonite in B.P. partings.	208 209	9 6	Joint dip 70° in direction 230°. Quartz, calcite vein, ¼" thick parallel to bedding.
									210 210 211	0 6,) 0)	Joint, dip 30° in direction 135°. Quartz, calcite veins (⅛") parallel to bedding.
									211 211	6,) 9)	Joints, dip 90° in direction 200°.
212	0	217	0	5	0	212	0	Grey, well laminated limestone (calcareous slate).	212	0	Occasional thin calcite joints, sub-parallel to bedding.
									214	6	Joint, dip V in direction 220°.
217	0	219	7	2	6	217	0	Ditto.	217	0	Joint, dip V in direction 200°. Occasional calcite joints, dip 70-80° in direction 220°.

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERY Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURE Ft.	Ins.	DESCRIPTION.
									219	1	Joint, dip 30° in direction 270°.
219	7	222	0	2	4	219	0	Grey to blue grey well laminated limestone.	220	3	Joint, dip 90° in direction 190 - pyrite filled.
									221	3-	Irregular joint with some limonite facing, strike sub parallel to B.S.
									222	0	
222	0	227	0	5	0	222	0	Grey and blue grey laminated limestone with some slumping.	222	0-	Continuation of irregular joint sub parallel to core axis, strike sub parallel to bedding strike.
									223	3	
									224	0-	Similar limonite faced joint, sub parallel to core axis.
									225	9	
									226	9-	Core broken - limonite stained joint fragments.
									227	0	
227	0	231	5	4	5	227	0	Grey and blue grey fairly well laminated limestone - occasional slumping.	227	4,	Quartz calcite veins parallel to bedding ½" true thickness.
									229	7	
									228	0-	Limonite stained joints in two sets. 1 - S/V in direction 180°. 2 - S/V in direction 00°. Core broken 230'9" - 231'5" probably by drill action.
									229	0	
231	5	236	5	5	0	231	5	Grey, fairly well laminated limestone with some B.P. partings with pyrite and limonite.	231	7-	Band of calcite veins. One parallel to bedding, several others, dip V in direction 230° and some thin interconnecting veinlets.
									232	0	
									233	1	Joint with calcite limonite pyrite facing, dip 70° in direction 230°.
									233	3-	Joint, dip 70° in direction 00°.
									233	11	
									234	5	Quartz, calcite vein parallel bedding.
									234	10-	Calcite joint, dip 70° in direction 260°.
									235	2	
									234	11	Quartz, calcite vein, 5° flatter than bedding.
									235	7-	Joint with some pyrite and limonite, sub parallel to core axis and normal to bedding strike. Core broken 235'7" to 236'0".
									236	5	
236	5	241	5	5	0	236	5	Ditto	236	7	Calcite vein up to ½" thick dip V in direction 320°.
									236	7-	Some paper thin calcite veins parallel to above.
									236	9	

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURE Ft.	Ins.	DESCRIPTION.
									237	1	Joint, dip V in direction 00°.
									237	11-	Calcite veins, sub parallel to core
									238	7	axis, strike parallel to bedding strike.
									238	2-	Numerous thin calcite veins, dip V in
									238	10	direction 30°.
									239	1-	Ditto.
									239	9	
									239	7	Joint, parallel to core axis, normal to
									240	1	bedding strike - very thin.
									241	0	Quartz, calcite vein, ¼" true thickness, dip 5-10° flatter than bedding dip.
241	5	246	5	4	11	241	5	Grey fairly well laminated limestone, B.P. partings infrequent.	242	1	Quartz calcite vein, dip 5° flatter than B.P.
									243	0	Clean joint, dip V in direction 200°.
									244	7	Calcitevein (⅜" true thickness, sub parallel to bedding.
246	5	251	4	5	0	246	5	Ditto	246	5-	Thin clean joint sub parallel to core axis
									247	5	strike parallel to bedding strike.
									251	2-	Clean joints, dip S/V in direction 20°.
									251	4	
251	4	254 (254	4 0?)	2	8	251	4	Ditto	251	4-	Clean joint, fading at both ends, parallel
									251	8	to core axis, strike approximately normal to B.S.
									252	6	Quartz calcite vein, 5° flatter than bedding.
									253	0	Clean joint dip V in direction 200°.
254 (254	4 0)	256	4	2	3	254	4	Ditto	256	3	Clean joint, dip V in direction 220°.
256	4	259	10	3	5	256	4	Ditto	256	5-	Irregular joint, sub parallel to core axis
									256	9	strike at 45° to bedding strike.
									257	0-	Clean joints, dip V in direction 190°.
									257	2	
									257	11	Thin calcite vein sub parallel to bedding.

DEPTH RUNS From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURE Ft.	Ins.	DESCRIPTION.
									258	6,)	Clean joints, dip V in direction 200°.
									258	11,)	
									259	5.)	
									259	1	Calcite filled joint, dip 40° in direction 240° - ? bedding indistinct.
									259	4-)	Core broken by two sets of joints - indistinct.
									259	10)	
259	10	264	8	4	10	259	10	Ditto	259	10-)	Calcite faced joint parallel to bedding, dip
									260	1)	5° flatter (relative to core axis)i.e.this joint is steeper than bedding'in situ'
									260	7	Quartz, calcite vein, dip steeper than bedding (relative to core axis) i.e. vein is flatter than bedding in situ.
									261	7	Similar vein, ½" wide.
									262	0	Similar vein, ⅛" wide.
									262	9	Calcite vein, dip parallel to bedding in direction 320°.
									262	4,)	Joints, with calcite facing, dip S/V in
									262	10,)	direction 20°.
									263	5.)	
									264	1	Calcite vein to 262'0".
									264	2	Calcite vein
									264	3	Joint, dip S/V in direction 00.
									264	3	Joint, dip 40° in direction 240° with limonite facing.
									264	4-)	Quartz, calcite vein, irregular walled but
									264	8	parallel to bedding.
264	8	269	8	4	10	264	8	Ditto - grey laminated limestone or calcareous slate.	264	8	Calcite faced joint, dip V in direction 00
									264	9-)	Thin calcite joint, sub parallel to core axis,
									265	4)	normal to bedding strike. Fades out at 265'4".
									265	4	Calcite joint, sub parallel to bedding.
									266	10	Joint, dip S/V in direction - 00°.
									266	10	Joint with limonite - dip 60° in direction 240°.
									267	2	Quartz calcite vein dip 5° steeper than bedding (relative to core axis). ¾" wide.
									267	8-)	Similar vein.
									267	9)	

DEPTH RUN From Ft.	Ins.	To Ft.	Ins.	CORE RECOVERED Ft.	Ins.	LITHOLOGICAL CHANGES. Ft.	Ins.	DESCRIPTION	DEPTH STRUCTURE. Ft.	Ins.	DESCRIPTION.
									267	8-)	Joint with a little limonite sub parallel to
									268	8)	core axis, approximately normal to bedding strike.
									269	8	Quartz calcite vein, sub parallel to bedding.
269	8	271	3	1	7	269	8	Ditto	269	9,)	Quartz, calcite veins, dip 3° steeper than bed-
									270	7)	ding, (nil to core axis.).
271	3	274	8	3	4	271	3	Ditto with some dark bands.	271	0-)	Thin quartz calcite veins, 5° steeper than bed-
									272	1)	ding.
									271	7	Quartz, calcite vein, ½" thick parallel to bedding.
274	8	279	8	5	0	274	8	Grey laminated limestone or calcareous slate.	275	3	Quartz, calcite vein, dip 10° to bedding in direction 240°.
									275	4-)	Quartz calcite vein, 1" true thickness, parallel
									275	5)	to bedding.
									276	0	Joint, dip V in direction 190°.
									276	5	Quartz, calcite vein, parallel to bedding.
									277	0-)	Quartz calcite veins, dip 5° steeper than
									277	4)	bedding (relative to core axis.)
									277	0)	Calcite filled joints, dip S/V in direction 00°.
									277	5)	
279	8	284	8	5	0	279	8	Ditto	282	5	Joint, dip S/V in direction 00°.
									282	8-)	Irregular calcite filled joint, sub parallel
									283	3)	to core axis, strike parallel to bedding strike. Dries out at 282'8".
									283	11	Thin quartz calcite vein, dip 5° steeper than bedding.
284	5	289	2	4	6	284	5	Ditto	284	9,)	Quartz calcite veins 5° to 10° steeper than
									287	3,)	bedding.
									287	6.)	
									288	3	Joint, dip S/V in direction 00°.
									288	10-)	Several thin calcite joints, dip S/V in direc-
									289	2)	tion 20°.
289	2	293	9	4	5	289	2	Grey laminated limestone or calcareous slate.	289	6	Calcite, quartz joint sub parallel to bedding.
									289	5-)	Zone of calcite joints. One set, dip S/V to
									290	0)	bedding in direction 340°-20° other set, thinner and irregular, sub parallel to core axis and strike parallel to B.S.

DEPTH RUNS From Ft. Ins.	DEPTH RUNS To Ft. Ins.	CORE RECOVERED Ft. Ins.	LITHOLOGICAL CHANGES. Ft. Ins.	DESCRIPTION	DEPTH STRUCTURE Ft. Ins.	DESCRIPTION.
					290 1	Joint, dip V in direction 200°.
					292 0- 292 6	Zone with three thin irregular joints, dip S/V in direction 240°.
					293 8	Joint with a thin calcite facing, dip S/V in direction 00°.
293 9	298 9	4 11	293 9	Ditto.	293 9- 294 0	Joint, sub parallel to core axis, strike normal to B.S.
					296 9- 297 9	Two joints, ½" apart, calcite filled, sub parallel to core axis and normal to B.S. Fade out at 297'9".
					298 0- 298 4	Joint with calcite facing, dip S/V in direction 240°.
				END OF HOLE.		

DEPARTMENT OF MINES, ADELAIDE

DIAMOND DRILL LOG

Project: MYPONGA DAM SITE Hd. MYPONGA Section: 682/622 D.M. 63/58 Hole Serial No DD 1/60

Collar Co-ord: N9727.23: E10,103.98 Angle Vertical R.L. 763.22' Depth 312'

Commenced: 30/6/59 Completed ~~16/6/59~~ 17/7/59 Drillers R. Strempel & T. Jarvis Logged by: P. W. Goscombe 30/6/59-17/6/59

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
0	0	1	1	Top of working platform taken as zero. Surface 1'1" below this.							
											NX Special size core.
1	1	1	11		10	1	1	Blue-grey very dense laminated lime-stone. Laminations show abundant minor slump structures.	1	6	Joint, 10° dip 75, clean.
									1	9	Joint, 10° dip 75, clean.
									1	11	Slight grind.
1	11	4	6	2	7				2	1	Joint, 10° dip 50, clean.
									2	7	Joint, 20° dip 60° clean.
									3	1	Joint, 20° dip 50° clean.
									3	11	Joint, 335° dip 50° clean.
									4	5	Joint, 30° dip 60° clean.
4	6	7	0	2	6				4	6	Slight grind.
									5	1	Joint, 335° dip 50° clean.
									5	2½	Slight grind.
						6	0	Calcite vein, 5mm thick 350° dip 60°			
									6	10	Joint; 150° dip 65°, tight red limonite stained.
											Joint; 330° dip 45° clean.
7	0	8	11	1	9				7	2	Joint; 320° dip 45° clean.
									7	5	Core ground, showing slight deflection.
									7	6	Joint, 20° dip 50° slight stain.
											Joint, 190° dip 60° slight stain.
						7	9	Calcite vein, 5mm thick 20° dip 50°	8	1	Water lost.

HOLE NO: WT5

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
8	11	12	1	3	2				8	11	Slight grind
									8	11	Vughy texture, 3mm into core.
									9	3	
									9	6	Vughy texture, rod limonite staining. This
									11	0	along joint, 315° dip 90°, ie parallel to core axis. Some calcite along this joint face.
									10	5	Joint, 170° dip 40° clean.
									10	10	Slight grind.
									11	3	Vughy texture with cavities up to 1" into
									15	11	core. Weathering appears to be along joint approx. 315° dip 90° which is almost certainly the same as that above.
									11	4	Joint, 25° dip 45° clean.
									11	11	Joint, 25° dip 45° clean.
12	1	15	5	1	5				12	4	Joint, 25° dip 45° clean.
									12	4	Some grinding and broken core.
									12	10	Ground and broken core. Core loss possibly
									15	8	occurs here.
15	5	19	3	2	4	15	5	Calcite vein, 1 cm thick, parallel to B.P.			
						16	8	Irregular calcite gash vein cutting across B.P.			
						16	8	Dark grey, slightly weathered dense laminated limestone.			
									16	10	Broken core.
									17	0	
						17	0	Buff-yellow soft clay. Approx. 6" recover-			
						19	0	ed using bottom discharge bit. Core loss here.			
						19	0	Blue-grey, dense, laminated limestone. Laminations show abundant minor slump structures.			
									19	3	Water test 19,200 g.p.h. at suction equal to 20" Ug. water entered adit.

HOLE NO: WT5

DEPTH RUNS From Ft.	From Ins	To. Ft.	To. Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
19	3	22	2	1	3				19	2)	Vughy texture, Cavities 1½" into core and
									19	9)	solution appears to have taken place along B.P.s
22	2	25	11	3	6	22	8	Calcite vein, 5mm thick, par to B,P. and conforming to slump pattern.			
									24	0	Slight grind.
									24	1	Joint. 180° dip 70° clean.
									24	3	Joint, 20° dip 50° tight; red limonite stained.
									24	5	Ditto.
									24	7	Joint 170° dip 70° tight, red limonite stain.
									25	0)	Several discontinuous red limonite veins.
									25	11)	
25	11	27	8	1	7				25	11)	Core broken. Loss possibly here.
									26	4)	
									26	4	Slight grind.
									26	4	NX Special size (3½") core.
									27	0	Some calcite on stained B.P. partings.
27	8	28	5	0	9	27	11)	Slightly weathered to buff limestone each			
						28	3)	side of B.P. parting at 28'1".	28	1	B.P. parting, stained and with some calcite
									28	5	Slight grind.
28	5	29	0	0	7				28	6	Stained B.P. parting with up to 2mm. calcite.
									28	8	Stained B.P. parting.
									29	0	Slight grinding.
29	0	31	3	2	2	30	0	Calcite vein, 1cm thick, 25° dip 45°			
									30	10	Joint, 330° dip 45° clean.
									31	3	B.P. parting with very slight calcite film.
31	3	34	2	2	9	31	4	Very slightly weathered, grey tending to buff coloured limestone.			
									31	7	Joint, 20° dip 40° clean.
									31	7)	Broken core. Some calcite veins amongst
									31	10)	pieces 0° dip 30° 1-2mm thick.

HOLE NO: WT 5

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION
						31	11	Blue-grey dense, laminated limestone, showing abundant minor slump structures.
						31	10½	Calcite veins, 1-2mm thick, 0° dip 30°
						31	11½	
						32	1	
						32	1½	
34	2	36	9	2	2			
						35	1	Slightly weathered buff coloured limestone band.
						35	2	
						35	7	Slightly weathered, buff coloured limestone.
						35	11	
						36	6	Some discontinuous red limonite staining parallel to B.P.
						36	9	
36	9	38	10	2	0			
38	10	41	9	1	4	39	2	Calcite vein, 1cm thick parallel to B.P.
						39	6	Grey tending to buff, very slightly weathered limestone.
41	9	42	5?	0	10			

DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
32	9	Slight grind.
33	4	Ditto.
33	10	B.P. parting with very slight calcite film
33	10	Slight grind.
35	0	Slight grind.
35	1	Joint, 0° dip 30°, slight stain.
35	3	Slight grind
35	8	Broken core, some grinding.
35	10	
36	6	Slight grind.
36	9	Slightly stained B.P. parting. Slight grind.
37	4	Limonite stained B.P. parting. Slight grind.
37	7	Joint, 270° dip 35° faces coated with calcite 1mm thick, slight grind.
38	2	Slight grind.
38	5	Slight grind.
39	6½	Very slightly weathered B.P. parting.
41	9	Slight grinding.
42	1	Ditto.
42	4	Yellow limonite stained B.P parting.
42	4	Slight vughy texture, 1mm into core.

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
42	5	43	10	1	0	42	5	Most of the pieces are grey tending to buff coloured, slightly weathered limestone.	42 43	5) 10)	Core very broken - not possible to piece together. Most pieces show a vughy texture, with cavities up to a max. of 1 cm into core. Clay adheres to some pieces.
						43	8	Blue-grey dense, laminated limestone.			
43	10	46	0	2	2				43	10	Slight grind.
						44	1	Calcite vein, 1 cm thick, 30° dip 45			
						44	3	Ditto.			
									44	8	Ditto
						45	0	Calcite vein, 3mm thick 0° dip 45°	45	0)	Joint 80° dip 90° tight, red iron stain
						44 45	10) 8)	Core within 1" of joint, 80° dip 90° slightly weathered to grey, tending to buff limestone. Otherwise fresh blue-grey limestone.	45 45	8) 3	Slight grind.
									45	7	Ditto.
						45	9	Calcite vein 1 cm thick, irregular and roughly parallel to B.P.			
						45	10	Slightly weathered limestone dark grey tending to buff colour.			
									46	0	Slightly weathered and stained B.P. parting.
46	0	50	5	0	8	46	0	The pieces of solid core are all weathered to a dark grey to buff coloured limestone	46 50	0) 5)	Core very broken and not possible to piece together. All pieces show vughy texture, with cavities varying up to 1cm into core. Clay adheres to some pieces.
50	5	52	2	1	4	50	5	As above	50	5)	As above.
						50	11	Fresh blue-grey dense laminated limestone	50 50 50 50	11) 7 7) 9)	Stained B.P. parting. Vughy texture, with cavities 1 cm into core. Some calcite deposited in vughs.
									50	10	Slight grind.
						50	11	Calcite vein, 1 cm thick, parallel to B.P.			

HOLE NO: WT5

DEPTH RUNS				CORE RECOVERED		LITHOLOGICAL CHANGES		DESCRIPTION	DEPTH STRUCTURES		DESCRIPTION
From		To									
Ft.	Ins	Ft.	Ins	Ft.	Ins	Ft.	Ins		Ft.	Ins	
52	2	53	8	1	6	52	2		52	2)	Slightly vughy, and core broken.
									52	3)	
									52	3)	
									52	7)	Grinds
									52	11)	
						53	3	Calcite vein, 1cm thick, 0° dip 45°			
						53	7	Ditto.			
53	8	54	10	0	11				53	10	Vughy texture, cavities up to 1cm into core and parallel to B.P.s
						53	11	Calcite vein, 3mm thick, 0° dip 45°			
						54	0	Ditto.	54	1	Vughy texture ends on very weathered B.P. parting , and have start of clay seam.
						54	1)	Greenish grey, sticky fine clay, containing small rock chips - in particular a chocolate red, slaty rock.			
						54	10)				
54	10	56	2	1	4	54	10	Grey, tending to buff, slightly weathered limestone.	54	10	Slightly weathered B.P. parting.
									54	11	Ditto.
									55	0	Ditto, with some calcite on faces.
									55	3	Slight grind.
									55	5	Slight vughiness, cavities up to 3mm into core.
									55	5	Slight grind.
									55	8	Very slight vughiness, yellow limonite staining along B.P. parting. Slight grind.
									55	10	Yellow limonite stained B.P. parting.
									55	11	Vughiness, 1cm into core.
						56	0	Calcite vein, 1 cm thick, parallel to B.P.	55	11½	Stained B.P. parting with some calcite.
						56	1	Ditto.			
56	2	58	0	1	5	56	2	Fresh blue-grey dense laminated limestone	56	2	Slight grind.
									56	4)	Broken core, some grinding.
						57	6)	Grey tending to buff, slightly weathered limestone.	57	9)	
						57	10)				
						57	10	Fresh blue-grey limestone.			
58	0	58	10	0	7				58	0	Slight grind.
									58	3)	B.P. clay seam. Upper face shows some staining. Lower face very weathered. Some clay adhering. Vughy between 58'8"-58'9". Cavities 2cm into core.
									58	9)	

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION
58	10	61	4	2	1			
61	4	62	10	1	6	62	9	Grey tending to buff, very slightly weathered limestone.
62	10	63	10	1	0			
63	10	65	0	0	6			
65	0	67	4	2	4			
						66	4	Fresh blue-grey dense laminated limestone showing abundant minor slumping
67	4	68	9	1	4	67	10	Calcite vein, 3mm thick, 0° dip 45°
						68	4	Buff, weathered limestone.

DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
58	10	Yellow limonite stained B.P. parting.
58	10	Slight vughiness along B.P. parting.
59	1)	Vughiness along one side of core. Vughs
59	7)	extend parallel to B.P. up to 2mm into core.
59	2	Joint, 0° dip 45° slight calcite film.
60	7	Ditto, very slight red limonite stain.
61	4	Slight red limonite staining on B.P. face.
62	10	Weathered B.P. parting.
63	3	Joint, 225° dip 80° stained.
63	6	Joint, 40° dip 30° yellow limonite stain.
63	9	Yellow limonite stained B.P. parting. Some vughiness, 5mm into core, ½" either side of B.P.
63	10	Joint, 225° dip 75° stained.
63	10)	Most of this core lost. Two pieces recovered
64	7)	are slightly ground, and stained. Joint 210° dip 45° yellow limonite stain.
65	4	Joint, 270° dip 20° stain.
65	7	Stained B.P. parting.
65	9	Joint, 270° dip 20° stain.
66	0	Stain B.P. parting.
66	4	Slight grind.
66	4	Joint 190° dip 30° stain.
66	7)	Slight grinds
66	10)	
67	4	Slightly stained, weathered B.P. Some broken core.
68	2	Joint, 190° dip 30° clean.
68	4	Vughy texture.
68	5	Weathering parallel to B.P. Core broken
68	6	Vughy texture, cavities halfway across core.

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURE Ft.	DEPTH STRUCTURE Ins	DESCRIPTION
68	9	69	0	0	3	68	10	Whispy calcite vein, 180° dip 20°	68	9	Joint, 180° dip 20°, stain, slight clay.
						68	10	Calcite vein, 1mm parallel to B.P.			
						68	11	Ditto. Note. Minor faulting			
								Veins parallel B.P. displaced	69	0	Joint, 180° dip 20° stain.
								1mm - overthrust to the south	69	0	Weathered B.P. parting.
69	0	70	10	1	2				69	0)	Vughy, broken core.
									69	2)	
						69	2	Calcite vein, 1mm parallel to B.P.	69	2	Joint, 180° dip 20° stain.
						69	4	Ditto	69	6	Grind.
									69	8	Ditto.
									70	0	Weathered B.P. parting.
						70	2	Calcite vein 1mm 200 dip 60°	70	0)	Some isolated vughs, 1cm into core
									70	4)	
									70	4	Joint, 200° dip 60° stain.
									70	4)	Broken, ground, stained, vughy pieces -
									70	10)	much missing.
70	10	73	0	0	10				70	10)	All core recovered is broken, slightly
									73	0)	ground, vughy and stained. No positive structure observed.
73	0	76	0	0	2				73	0)	One piece of core recovered. Very vughy
									76	0)	cavities half-way across core. Stained.
76	0	78	1	1	11				76	0	NX ordinary core.
									76	0)	Excremely weathered zone, possibly mostly
						76	5	Blue-grey dense laminated limestone.	76	5)	clay, 3" core only - very vughy stained.
						76	11	Calcite vein, 1mm thick, 160° dip 20°	77	0	B.P. parting, stained.
						77	9	Slightly weathered, buff coloured lime-	77	7	Joint 190° dip 45° stained.
								stone.			
									77	11	Slumping on 2" scale.
									78	1	Joint, 180° dip 45°, stained.
78	1	81	0	2	11			(Note: approx. 6" broken core fallen in			
								from higher in hole.)	78	1	Joint, 160° dip 45° clean.
									78	6	Ditto.

HOLE NO: WT5

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
						78	8	Fresh blue-grey, dense, laminated limestone.			
						78	8)	Whispy, calcite veins parallel to B.P.s			
						79	2)				
						79	2)	Buff slightly weathered limestone approximately ½" either side of B.P partings.			
						79	5)				
						79	10)				
									80	2	Stained B.P. parting.
									80	2	Joint 0° dip 25, stained.
									80	5	Joint 200° dip 60°, stained.
						80	8	Buff slightly weathered limestone.			
									80	9	Joint, 170° dip 60° stained.
									80	11	Ditto, tight, red limonite stain.
									81	0	Ditto.
81	0	85	0	2	6	81	2	Blue-grey, dense, laminated limestone			
									81	5	Weathered B.P. parting.
									81	9	Ditto.
						82	2	Calcite vein, 1mm thick, 20° dip 45°			
									83	2)	Some red limonite staining along tight B.P.s
									83	6)	Core lost below this.
									85	0	NX Special size core.
85	0	87	10	1	8				85	0)	Core very broken, ground, vughy, some
									86	4)	lost.
									86	4)	Vughy texture, cavities, half-way across
									87	0)	core. Some red limonite staining parallel to B.P.s (tight)
									86	6	Joint, 200° dip 60° tight, red limonite stained.
									86	9	Joint, 200° dip 60° red limonite stained. Slight grinding.
									86	11)	Slight grinding.
									87	5)	
									87	8)	
									87	8)	Core broken
									87	10)	

HOLE NO: WT5

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
87	10	88	9	0	11				87	10)	Core very broken, slightly ground, and
									88	2)	vughy.
									88	3	Weathered B.P. parting.
									88	5	Joint, 200° dip 60°, stained.
									88	7	Slight grind.
									88	9	Weathered B.P. parting.
88	9	90	9	1	0				88	9	NX ordinary core.
									88	8)	Core very broken, vughy, and much lost.
									89	4)	
									89	7	Joint, 225° dip 50° clean.
									89	10	Joint, 210° dip 85° stained.
									89	10)	Very broken core, much lost.
									90	9)	
90	9	94	8	3	11				90	9	NX Special core.
									90	9	Slight grind.
									90	9)	Vughy texture, 3mm into core.
						91	0	Fresh blue-grey dense, laminated lime-stone.	91	0)	
									91	4	Stained B.P. parting.
									91	6	Ditto
									92	7	Joint, 0 dip 45°, stained.
						93	5	Calcite vein, 0° dip 45°, 2mm thick.	93	3	Joint, 340° dip 45°, clean, slight grind.
						93	6	Ditto	93	8	Slight grind.
									94	8	Ditto.
94	8	100	0	4	1	94	8	Calcite vein, 1mm thick, 0 dip 45°	95	7	Joint, 0 dip 45° clean.
									96	0	Ditto.
						96	8	Irregular walled calcite vein 1-3 cms			
						97	1	Calcite vein, 0 dip 45°, 1cm thick.	97	1	Stained B.P. parting - red limonite
						97	5	Calcite vein, 2cm thick irregular walled	97	5	Slight grind.
								0 dip 45° Buff weathered limestone close	97	5)	Red limonite staining parallel to B.P.
								to this.	100	0)	
											Stained, weathered B.P. parting, ½" Buff limestone either side.
									99?	0)	Joint, 190° dip 80° stained. Core broken -
									100?	0)	loss possibly occurs here.

HOLE NO WT5

DEPTH RUNS				CORE RECOVERED		LITHOLOGICAL CHANGES		DESCRIPTION	DEPTH STRUCTURES		DESCRIPTION
From Ft.	Ins	To Ft.	Ins	Ft.	Ins	Ft.	Ins		Ft.	Ins	
100	0	102	0	0	5	100	0	Very soft, weathered zone.	100	0	Core broken, ground and vughy - most lost.
						101	8		102	0	
102	0	106	0	0	8	102	0	Extremely weathered limestone.	102	0	No structure.
						106	0	Some solid buff limestone, but never-the-less very weathered. Some clay recovered - yellow, buff coloured, sticky when wet, but very soft and crumbly when dry.	106	0	
106	0	106	7	0	3	106	0	Some pieces of dark-grey limestone	106	0	Core broken, and most lost. Core recovered,
						106	7	with buff-yellow clay adhering.	106	7	slightly vughy and slightly ground.
106	7	107	4	0	7	106	7	Very weathered but solid buff-yellow	106	7	No structure.
						106	10	limestone.	107	4	
						106	7	Several calcite veins, 1mm-5mm thick,			
						107	4	parallel to B.P.			
107	4	108	3	0	10	107	4	Very weathered limestone, Some pieces	107	4	Core very broken and slightly ground.
						107	7	quite soft and with buff-yellow clay adhering. Remainder of pieces are dark grey.	107	7	
						107	8	Calcite vein, 2mm thick 0 dip 45°			
									108	3	Water test. Hole at 108'3"; casing at 107'6"
108	3	110	9	2	6	108	3	Dark-grey, slightly weathered limestone	108	3	Core broken and very ground.
						108	5		108	9	
						108	5	Fresh blue-grey dense laminated lime-stone	109	4	Joint, 180° dip 45° clean.
						109	8	Slightly weathered blue tending to	109	7	Weathered B.P. parting.
								dark-grey limestone. Some red limonite staining parallel to B.P.	109	11	Joint, tight red limonite stained, 180° dip 45°.
									109	11	Vughy texture. Cavities up to 3mm into core
									110	6	
									110	3	Joint, stained. 270° dip 87°
									110	7	Joint, 180° dip 45°, stained.
									110	7	Joint, 300° dip 70°, slight stain.
									110	9	Water test. Casing at 108'3". At 20 p.s.i. on casing top 6,000 g.p.h. At 38-39 p.s.i. on casing top valve full open, 17,600 g.p.h.

DEPTH RUNS				CORE RECOVERED		LITHOLOGICAL CHANGES		DESCRIPTION	DEPTH STRUCTURES		DESCRIPTION
From Ft.	Ins	To Ft.	Ins	Ft.	Ins	Ft.	Ins		Ft.	Ins	
110	9	111	10	0	8	110	9	Slightly weathered dark-grey limestone.	110	9)	Core very broken. Some pieces vughy
									111	7)	and weathered to buff yellow colour and friable. Slightly ground.
											Joint 190° dip 45°, tight red limonite stained.
											Joint, 315° dip 70° irregular, yellow limonite stained. Core slightly vughy close to this joint.
									111	7)	Some red limonite staining parallel to
									111	10)	B.P.
									111	10	Weathered B.P. parting. Some clay adhering.
111	10	113	10	1	3				111	10)	Core loss possibly occurs here. Some
									112	9?)	broken, very vughy and weathered pieces only recovered. Clay adheres to some. Possibly a B.P. clay seam.
									113	0	Joint, 0° dip 40° slight staining.
									113	1	Joint 180° dip 50° stained.
									113	2)	Vughy texture, 1 cm into core, and
									113	4)	along into weathered B.P. parting at 113'4".
									113	9	Joint, 70° dip 90° yellow limonite stained. and slightly vughy.
									113	8	Slight grind.
									113	10	Water test, casing at 110'9". At vacuum equal to 20" Hg. at casing top, with valve full open. 18,000 g.p.h.
113	10	115	2	1	3	114	1	Blue-grey dense, laminated limestone.	114	0	Joint, 180° dip 45°, slight stain.
									114	3	Slightly stained B.P. parting.
									114	3	Joint 330° dip 80° tight red limonitic staining.
									114	8	Slightly stained B.P. parting.
									115	2	Ditto.
115	2	116	10	1	8				115	2)	Core broken, ground, very slightly stained.
									115	9)	
									116	2	Joint, 180° dip 45° yellow limonite stained.
									116	4	Ditto.

HOLE NO: WT5

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
									116	6	Joint, 120° dip 45°; slight stain.
									116	9	B.P. parting, slight stain.
									116	9	Vughy texture, rock weathered buff-yellow. Cavities 5mm into core.
									116	10	Weathered stained B.P. parting.
									116	10	Water test; casing at 113'6"
											At 20 p.s.i. on casing top, 4,800 g.p.h.
											"36-40 " " " " 5,700 "
											" 60 " " " " 7,700 "
											" 74 " " " " valve full open, 9,600 h.p.h.
116	10	118	2	1	0	116	10	Dark-grey slightly weathered lime-	116	10	Slightly vughy texture, cavities 1-3mm.
						117	0	stone.	117	4	into core. Weathered buff-yellow. Core
						117	0	Fresh blue-grey, dense, laminated			possibly lost here.
								limestone.	118	2	Slight grind.
118	2	121	4	2	8				120	1	Ditto.
									120	6	Slightly weathered B.P. parting.
									120	6	Vughy texture, cavities 1cm into core and
									121	1?	along B.P.s. Some slight grinding. Generally fresh core.
121	4	126	0	0	10	121	4	The core recovered is generally dark	121	4	Broken core weathered to buff-yellow col-
								grey, slightly weathered limestone.	125	3	our and vughy. Slightly ground.
						125	5	Calcite vein, 1mm thick, 0° dip 50°			
						125	6	Grey, tending to buff coloured			
								limestone.	125	9	Joint, 170° dip 45°, stained.
									126	0	Water test; casing at 118', Valve full open,
											vacuum equal to 21" Hg; 17,500 g.p.h.
126	0	129	6		11	126	0	Very weathered, soft, buff-yellow	126	0	About 3" of broken core weathered to
						128	10	coloured zone.	128	10	yellow-buff colour and vughy, friable.
											Some clay adhering and slight grinding.
						128	10	Fresh, blue-grey, dense, laminated	128	10	Vughy texture, 2cm into core, and parallel
								limestone.	129	2	to B.P.
129	6	133	0	2	11				129	6	2" of broken core, weathered yellow-buff
						130	0	Dark grey slightly weathered limestone.	130	0	colour and slightly vughy. Some grinding.
						130	1	Fresh blue-grey limestone.	130	10	Vughy texture. Cavities almost right across
						131	7	Dark-grey slightly weathered limestone.	131	7	core and parallel to B.P. Rock so weather-ed as to tend to buff-yellow clay.

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
						131	11	Calcite vein, 2mm thick, 0° dip 45°	131	9	Joint, 180° dip 45°, stained.
									132	0	Joint, 180° dip 60°, yellow limonite and calcite stained; slightly weathered.
									132	2	Joint, 270° dip 90°, weathered and yellow limonite stained. Some core broken along this joint.
									132	5	Joint, 180° dip 30°, stained.
									132	5½	Vughy, friable texture; rock weathered to buff-yellow colour.
									132	9	
									132	9	Joint, 270° dip 45° Very weathered, some clay adhering.
									132	9	Core broken, weathered to buff-yellow colour, vughy, friable, slightly ground.
									133	0	
									133	0	Water test. Casing at 130'. At vacuum equal to 20" Hg. at casing top and with valve full open; 13,600 g.p.h. (Note H.W.H sluicing)
133	0	136	0	1	10	133	0	Fresh blue-grey dense laminated limestone.	133	0	Vughy texture along one side of core.
									133	8	Cavities 2-3 cms into core and along B.P.
									133	5	Weathered B.P. parting.
									133	10	Very slightly vughy
									134	1	
									134	1	Very vughy, core broken and much lost.
									136	0	Cavities parallel to B.P. and almost right across core.
136	0	139	0	0	9	134	1	Soft, extremely weathered buff yellow coloured zone.	136	0	Core very broken, soft and much weathered.
						139	3		139	0	to buff coloured, friable rock. Cavities parallel to B.P.
									139	0	Water test: Casing at 134'. At vacuum equal to 20" Hg. at casing top, and with valve full open; 18,000 g.p.h. Pump pressure = 55 p.s.i.

HOLE NO: WT5

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
148	4	154	2	3	6				149	4	Stained B.P. parting.
									149	9	Joint, 180° dip 45°, tight clean.
									150	0	Joint, 270° dip 90°, limonite stained.
						150	8	Calcite vein, 1mm thick, 0° dip 45°	150	7	
									150	11	Joint, 0° dip 70°, stained.
									151	0	1' of broken core, slightly ground in
									154	2	places. Core appears to be broken along above joint, which must steepen to dip 90°.
									154	2	Water Test; Casing at 148' At vacuum equal to 22" Hg. at casing top. Valve full open. 17,300 g.p.h. Pump pressure = 55 psi.
154	2	158	3	0	6				154	2	2 pieces = 6" core, only. Very vughy,
									158	3	weathered, cavities parallel to B.P.
								Calcite vein, 1-2 cm thick, 0° dip 45°			N.B. Rods dropped 2'6" under own weight - possibly 2'6" cavity between these limits.
158	3	161	3	2	8				158	3	Weathered B.P. parting.
						159	5	Dark-grey slightly weathered limestone.	159	1	Joint, 200° dip 50°, Stained.
						159	10	Buff-yellow, friable, very slightly vughy, limestone.	159	11	Grind.
						160	3	Dark grey dense slaty limestone.			
						160	9	Calcite vein, 1mm thick, 0° dip 45°			
						160	11	Calcite vein, 3mm thick, 0° dip 45° slight yellow limonite staining.			
161	3	165	3	4	0				161	3	Broken very weathered, buff-yellow,
									161	4	vughy, friable core.
						161	4	Dark-grey slaty limestone.	161	4	Slight grind.
						161	7	Calcite vein, 1mm thick, 0° dip 30°			
						161	9	Ditto.			
									161	11	Joint, 45° dip 80°, stained.
									162	1	Joint, 200° dip 60°.
						162	3	Calcite vein, 2mm thick, 0° dip 45°	162	3	Slight grind.
									162	9	Slight grind.
						162	7	Calcite vein, 2mm thick, 0° dip 50°			

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
						162	11	Fresh blue-grey dense laminated limestone.			
									163	2	Joint, 180° dip 45°, tight clean.
									163	11	Joint, 200° dip 60°.
						164	0	Calcite vein, 3mm thick, 0° dip 45° Slight stained.	164	0	Grind.
									164	2	Stained B.P. parting.
						164	2)		164	2)	3" of broken, slightly weathered, slightly
						164	7)	Several calcite veins, 1mm to 1 cm	164	7)	ground core.
						165	3)	thick, either parallel to B.P. or 0° dip 45°.			
165	3	170	0	3	4	165	3	Fresh blue-grey dense laminated lime-stone.	165	3	Slight grind
									165	10	Stained B.P. parting.
						165	3)	Many calcite veins, as above,			
						167	8)	167'0" Very irregular.			
						167	8)	Buff-yellow, soft, weathered	167	8)	Vughy, friable texture. Cavities parallel
						169	10)	zone.	169	10)	to B.P. Core lost.
						169	10	Blue-grey dense laminated limestone.			
									170	0	Water test: Casing at 160'. At vacuum equal to 16" Hg. at casing top and with valve full open. 17,800 g.p.h. (Water lost at 167'9"). Pump pressure = 60 psi.
170	0	174	4	5	0 (+8")	170	2)	Buff-yellow coloured, weathered zone.			
						170	4)		170	3	Weathered B.P. parting, slightly vughy.
						171	4	Calcite vein, 2-4 cm thick, irregularly walled, 0° dip 45°.			
						172	2	Calcite vein, 3mm thick, 0° dip 45°			
						172	9)	Quartz, calcite vein. Very irregularly			
						173	2)	walled, approximately 5" thick.			
						173	8	Calcite vein, 270° dip 80°			
						174	6?	Quartz, calcite vein, irregular walled, 1-2 mm thick, 0° dip 45° approx.			
						174	5)	Irregular mass of quartz and calcite.			
						174	10)?				

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION
174	4	175	6	1	2	174	4	Fresh blue-grey limestone
175	6	179	6	3	9			
						177	11)	Occasional whispy discontinuous
						179	6)	calcite and red limonite veins.
						179	4	Calcite vein 2mm thick, 0° dip 45°
179	6	188	0	8	5			
						182	6)	Calcite veins, 180° dip 50°, 1mm thick
						182	8)	
						182	10)	
						187	3	Calcite vein, 0° dip 45°, 1cm thick.
188	0	195	10	7	9	188	0)	Some red limonite staining parallel to
						195	10)	B.P. and in some discontinuous joints - all tight.

DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
174	4	Slight grind.
174	4)	Occasional red limonite staining parallel
175	6)	to B.P.
175	6	Slight grind.
175	9	Ditto.
176	9	Slightly stained B.P. parting.
176	9)	Occasional red limonite staining parallel
178	0)	to B.P.
177	3	Joint, 180° dip 75°, tight red limonite staining.
177	3	Slightly stained B.P. parting.
178	9	Joint, 270° dip 75°, clean.
179	6	Joint, 290° dip 75°, clean.
181	10	Joint, 0° dip 30°, very slight stain.
183	0	Ditto, tight, possibly movement along this joint.
182	2	Joint, 330° dip 60° red limonite stained part. tight.
182	7	Joint, 0° dip 10°, slight pyrite stain.
185	9	Joint, 290° dip 70°, very slightly stained.
187	7	Slight grind.
189	5)	Broken core.
189	8)	
189	8	Slight grind.
190	0	Joint, 0° dip 10°, slight stain.
190	9	Joint, 30° dip 10°
191	0	Slight grind.
191	8	Joint, 240° dip 60°, clean.
192	9)	
193	6)	Slight grinds.
193	8)	
193	11)	

HOLE NO: WT5

DEPTH RUNS From Ft.	From Ins	To Ft.	To Ins	CORE RECOVERED Ft.	CORE RECOVERED Ins	LITHOLOGICAL CHANGES Ft.	LITHOLOGICAL CHANGES Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	DEPTH STRUCTURES Ins	DESCRIPTION
195	10	201	8	5	10	196	3)	Calcite vein, 180° dip 70°, 1mm.	195	11	Grind.
						196	6)				
						196	8)				
						197	10)	Some buff, very slightly weathered			
						198	4)	limestone, one side of core.	198	6	Grind.
						198	10)	Some buff slightly weathered limestone	198	10)	
						199	2)	close to the B.P. partings opposite.	199	1)	Stained B.P. partings.
									199	3)	
									199	10)	
									199	2	Irregular joint, 225° dip 75°, core broken stained, slightly ground along this joint.
									200	1	Grind.
									200	5	Joint, 60° dip 75°, limonite stained.
									200	9	Slight grind.
						201	8	Quartz calcite vein, 2cm thick parallel to B.P.	201	8	Water Test: Casing at 188' At 42 psi at casing top; 1,320 g.p.h. " 60 " " " " 1,500 " " 80 " " " " 1,680 " " 92 " " " " 1,800 " Pump pressure = 145 psi.
201	8	207	9	6	1	202	3	Calcite vein, 0° dip 50°, 1mm thick.	201	9)	
									202	0)	Grinds.
									204	9)	
									207	2	Joint, 45° dip 60°; clay and limonite stained.
									207	9	Joint, 315° dip 60°, stained.
207	9	218	1	10	3	208	3	Calcite vein, 0° dip 50°, 3mm thick.	210	11	Joint, 315° dip 70°, clean.
									211	11	Grind.
									216	0	Very slightly stained B.P. parting.
									217	6)	6" of broken core.
									218	1)	
218	1	227	10	9	10				218	1	Grind.
									218	1)	Irregular tight joint, 0° dip 90°
									218	8)	

HOLE NO: WT5

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION
275	11	280	7	4	8			
280	7	288	2	7	7			
						287	0	Calcite vein parallel to B.P. 2 cm thick.
288	2	295	6	7	4			
						290	9	Calcite vein, 5mm thick, 0° dip 45°
295	6	299	2	2	11			

DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
275	9	Broken and ground core
275	11	
277	0	Joint, 100° dip 90°, clean.
277	7	
277	0	Joint, 100° dip 40°, clean.
277	7	Joint, 315° dip 20°, clean.
278	0	Broken core.
278	4	
279	2	Weathered B.P. parting with $\frac{1}{8}$" of buff-yellow weathered rock - tending to clay adhering.
279	9	Broken, slightly ground core.
280	0	
280	2	Limonite stained B.P. parting.
280	2	Joint, 90° dip 90°, limonite stained.
280	7	
280	7	Slight grind.
281	2	Joint, 315° dip 30°, clean.
284	11	Ditto.
285	4	Ditto.
285	8	Slight grind.
286	0	
286	7	Ditto
287	4	
288	2	Core broken
288	9	
288	9	Slight grind.
291	5	Ditto.
291	10	Ditto.
293	2	Yellow limonite stained B.P. parting.
293	3	Grind.
295	0	Broken core.
295	6	
295	6	Ditto
297	2	
298	10	Slight grind.

HOLE NO: WT5

DEPTH RUNS From Ft.	Ins	To Ft.	Ins	CORE RECOVERED Ft.	Ins	LITHOLOGICAL CHANGES Ft.	Ins	DESCRIPTION	DEPTH STRUCTURES Ft.	Ins	DESCRIPTION
299	2	304	7	4	6				299	2	Ditto
									299	10	Joint, 315° dip 45°, yellow limonite stain.
									302	2	Joint, 90° dip 75°, clean.
									302	5	Slight grind.
									302	6	Joint, 270° dip 20°, limonite stain.
									304	4	Joint, 180° dip 45°, clean.
									304	4	Broken core
									304	7	
304	7	312	0	4	4				304	7	Mostly broken and slightly ground core.
									312	0	
									312	0	Water Test. Casing at 244'. At 76 psi at casing top; 800 g.p.h. Estimated water loss between meter and pressure gauge, 1+ g.p.m. Pump pressure = 145 psi.
								End of Hole WT5 at 312'0"			

HOLE NO: WT5

APPENDIX B

CORE LOSS ANALYSIS

D.D.H. WT1

Overall core recovery 75.5%

Sectional core recovery

0 - 25 feet	16%
25 - 46 "	59%
46 - 67 "	81%
67 - 77 "	63%
77 - 123 "	97%
123 - 146 "	88%
146 - 153 "	79%
153 - 175 "	83%
175 - 207 "	88%

D.D.H. WT2

Overal core recovery 88%

Sectional core recovery

	0'0" - 18'2"	27%
	18'2" - 109'0"	87%
	109'0" - 205'0"	95%
	205'0" - 252'6"	88%
Losses caused by grinding of core due to parting along tight joints. sub-parallel to core axis.	252'6" - 308'3"	96%
	308'3" - 412'0"	89%

D.D.H. WT3

Overall core recovery 95%

Sectional core recovery

0'0" - 25'6"	63%
25'6" - 320'10"	97%

D.D.H. WT4

Overall core recovery 93%

Sectional core recovery

0'0" - 21'0"	18%
21'0" - 298'9"	98%

2'7" lost at 39'2".

D.D.H. WT5

Overall core recovery 82%

Sectional core recovery

0'0" - 19'3"	76%
19'3" - 100'0"	77%
100'0" - 170'0"	62%
170'0" - 312'0"	95%

Note on WT2 there was not evidence of weathering or clay seams below 308 feet depth and core loss is believed to be due entirely to grinding in the barrel of core parting along tight joints.

APPENDIX C

WATER LEAKAGE TESTS WT 1-5

Hole Identification	Depth Drilled	Depth Casing.	Water lost at	Length of test (minutes)	Pressure at pump (psi)	Pressure at casing top (psi)	Leakage (g.p.m.)
WT1	25'0"	Nil	18'0"	-	max.	zero	-
	26'10"	25'	26'10"	-	-	zero	9
	28'10"	25'	26'10"-28'10"	-	-	zero	12
	41'2"	35'	41'2"	-	-	zero	14
	43'0"	35'	43'0"	-	max.	zero	20
	46'1"	35'	41'2" -46'1"	-	max.	zero	29
	64'0"	48'	63'6"	-	max.	zero	20
	77'0"	68'	72'8"	-	max.	zero	-
	127'2"	123'7"	125'9"	-	-	30	13
	207'0"	123'7"	-	60.00	105	20	310
	Ditto	Ditto	-	60.00	107	10	299
	Ditto	Ditto	-	60.00	120	zero	237
	207'0"	100'	-	20.00	95	8	336
	Ditto		-	20.00	105	zero	323
	207'0"	15'	-	85.00	90	5-10	290
	Ditto		-	220.00	70	Vacuum, 28" Hg.	306
WT2	40'7"	30'	34'8"	40	135	12	43.8
	51'6"	40'	43'0"	17	135	35	29.4
	Ditto	Ditto	Ditto	12.20	135	20	20.2

Hole Identification	Depth Drilled	Depth Casing.	Water lost at	Length of test (minutes)	Pressure at pump (psi)	Pressure at casing top (psi)	Leakage (g.p.m.)
WT2	Ditto	Ditto	Ditto	13	135	zero	11.5
	67'3"	51'6"	63'3"	22.40	135	30	30.8
	Ditto	Ditto	Ditto	16	135	20	25
	Ditto	Ditto	Ditto	23.15	135	10	18.9
	Ditto	Ditto	Ditto	19.15	135	zero	18.2
	94'6"	67'0"	67'6"	22.25	135	zero	44.6
	94'6"	70'6"	-	26.34	135	zero	48.8
	94'6"	80'0"	-	22.45	135	12	44.3
	Ditto	Ditto	-	38.15	135	12	44.1
	Ditto	Ditto	-	29.30	135	zero	37.4
	94'6"	89'6"	-	18.30	135	58	16.2
	Ditto	Ditto	-	18.00	135	29	16.6
	Ditto	Ditto	-	22.30	135	zero	8.0
	102'3"	89'6"	95'	24.30	135	10	40.8
	Ditto	Ditto	Ditto	10.30	135	zero	38.0
	102'3"	95'	-	21.15	135	5	42.3
	158'11"	102'	104	20.00	120	38	188
	Ditto	Ditto	Ditto	20.00	120	20	151
	Ditto	Ditto	Ditto	5.00	120	zero	120
	252'6"	125'	226'	13.00	max.	-	300
	308'0"	252'	-	60.00	135	58-70	Nil
	308'0"	220'	-	25.00	140	Suction, 28" Hg.	46 ($1\frac{1}{2}$" meter)
	308'0"	125'	-	85.00	140	Suction, 20" Hg.	322

Hole Identification	Depth Drilled	Depth Casing.	Water lost at	Length of test (minutes)	Pressure at pump (psi)	Pressure at casing top (psi)	Leakage (g.p.m.)
WT2	308'0"	88'	-	60.00	140	Suction, 27" Hg.	320
	412'0"	252'	Not lost	33.00	Brooks tank	55	8.3
WT3	99'8"	25'	97'7"-99'8"	-	-	30-40	8
	118'11"	25'	116'(tree)	-	-	25-30	11
	283'10"	25'	265'8"-279'	-	max.	-	14
	320'10"	Nil	Whole hole	12.00	135	zero	5.5
	Ditto	Ditto	Ditto	25.00	135	10	8
	Ditto	Ditto	Ditto	27.00	135	20	10
	Ditto	Ditto	Ditto	252.00	135	30-45	28.6
WT4	298'9"	25'	Not lost	60.00	140	70	Nil
	Ditto	Ditto	Ditto	120.00	140	60	14
WT5	108'3"	107'6"	100'-108'3"	43.00	140-145	84-86	110
	110'9"	108'3"	108'3"-110'9"	5.00	-	20	100
	Ditto	Ditto	Ditto	36.00	-	38-39	290
	113'10"	110'9"	110'9"-113'10"	15.00	145	Suction, 20" Hg. (Valve full open)	290
	116'10"	113'10"	45'10"	5.00	145	20	80
	Ditto	Ditto	Ditto	5.00	Ditto	40	95
	Ditto	Ditto	Ditto	5.00	Ditto	60	130
	Ditto	Ditto	Ditto	15.00	Ditto	74 (Valve full open)	160

Hole Identification	Depth Drilled	Depth Casing	Water lost at	Length of test (minutes)	Pressure at pump (psi)	Pressure at casing top (psi)	Leakage (g.p.m.)
WT5	126'	118'	120'6"	10.00	145	Suction, 21" Hg. (Valve full open)	290
	133'	130'	130'10"	5.00	55	Suction, 20" Hg. (Valve full open)	225
	139'	134'	134'1"-136'	15.00	55	Suction, 20" Hg. (Valve full open)	300
	142'	140'	142'	5.00	145	20	56
	Ditto	Ditto	Ditto	5.00	Ditto	42	70
	Ditto	Ditto	Ditto	5.00	Ditto	60	72
	Ditto	Ditto	Ditto	15.00	Ditto	88(Valve full open)	86
	148'4"	140'	-	10.00	95	20	285
	Ditto	Ditto	-	15.00	Ditto	30(Valve full open)	300
	154'2"	148'	-	20.00	55	Suction, 22" Hg. (Valve full open)	290
	170	160'	167'9"	15.00	60	Suction, 16" Hg. (Valve full open)	293
	201'8"	188'	196'	5.00	145	42	22
	Ditto	Ditto	Ditto	5.00	Ditto	60	25
	Ditto	Ditto	Ditto	5.00	Ditto	80	28
	Ditto	Ditto	Ditto	20.00	Ditto	92	30
	236'	231'	231'9"	5.00	-	20	15
	Ditto	Ditto	Ditto	5.00	-	39-40	20
	Ditto	Ditto	Ditto	5.00	-	72	28
	312'	244'	-	38.00	145	76	13.3

APPENDIX D

MINERALOGY & PETROLOGY SECTION

REPORT NO. N.P.N.C. 157/59.

MATERIAL:	Clays
SUBMITTED BY:	Mr. W. Johnson (Geologist)
DATE RECEIVED:	22nd June, 1959
MARKS or NOS:	P.301/59 (W.J. 28); P.302/59 (W.J. 29).
SOURCE or LOCALITY:	Section 621, Hundred of Kyponga
INFORMATION REQUIRED:	Identification of minerals; swelling properties, if any.
METHODS OF EXAMINATION:	X-ray diffraction.

RESULTS OF EXAMINATION:

X-ray diffractographs were taken of these samples using filtered cobalt radiation.

P.301/59 (W.J. 28), an off white coloured sample, which from the diffractograph consists of the following minerals:-

Illite (including all muscovite type micas such as hydro-muscovite, sericite, etc.)
Calcite
Quartz
Feldspar ? trace only, if present.

There is also present a small amount of an unknown mineral, (we shall call X), whose major diffraction peak is at 15.3Å.

The amount of calcite present was determined approximately by drying the sample, leaching with dilute hydrochloric acid, drying and weighing the residue. The percentage of calcite thus obtained is 35-40%.

None of the above minerals have any appreciable swelling characteristics.

P.302/59 (W.J. 29). This iron stained sample consists of the following minerals:-

Illite (including muscovite type micas such as hydromuscovite etc.)
Quartz
Mineral X
Felspar - small amount only
Calcite - small amount only.

Mineral X, presumed to be the same mineral as in P.301/59, remained unidentified. The major line of this mineral recorded on a diffractograph of this sample was 14.9Å. No trace of this line could be detected after heating the sample in air at 500°C for 2 hours, or after leaching the sample with dilute hydrochloric acid. The percentage of this mineral X present could not be calculated, but it is suspected to be in the order of 10-15%.

This sample after saturation in ethylene glycol did not produce any detectable change in the X-ray pattern. Thus the sample has little or no swelling properties.

Swelling properties; In addition to the glycol test reported several grams of each sample were puddled in water and then dried in air at 70-75°C for 60 hours. Sample P.302/59 showed no shrinkage cracks and P.301/59 only minor shrinkage cracking.

Benzidine tests were carried out on both samples.

9800 N 9000 N 9200 N 9400 N 9600 N 9800 N 10 000 N 10 200 N

9800 E — 10.000 E — 10 200 E — 10.400 E — 10.600 E — 10.800 E

Well obscured by rubble

Mostly surface weathering

Dark greenish grey shales and slates

Dark red brown clay

UPPER ACCESS ROAD

LOWER ACCESS ROAD

Weathered material along this part of wall appears to be limited to the zone of surface weathering

This part of wall obscured by rubble

Face obscured by dirt and rubble

Ruhble and surface weathered material

Covered with rubble appears to be weathered rock

Dark red brown clay

Green chloritic phyllite with interbedded small lenses of white dolomitic limestone or dolomite. Thin bedding is very considerably drag folded towards the contact with the dolomite

MYPONGA RIVER

Right hand drag folds plunging 15° S.W. associated with fault, strike 136° dip 85° SE

Shear zone. Rock very soft. Dolomitic limsne weathered buff yellow. Phyllitic material contorted on west side of shear

Some outcrops of blue-grey limestone

Blue-grey laminated limestone

Greenish-white dolomite. Bedding very much dragged and contorted

PM 1A PM 2 PM 14

WT 1 WT 2 WT 3 WT 4 WT 5

T.1

LEGEND

LITHOLOGY

MARINOAN

"Purple" Slate (Phyllite, shales and mudstones)

Dolomite

STURTIAN

"Brighton" Limestone (Blue-grey limestone, dark brown argillaceous limestone, some shale interbedded.)

"Tapley Hill" Slate (Shale and calcareous shale)

STRUCTURE

Extremely weathered rock (Generally solid and showing some structure though often tending to clay. Always soft and usually buff-yellow coloured. In many cases of only shallow extent)

Bedding plane clay (Mostly buff-yellow, soft and crumbly. Also greenish-grey sticky clay)

Weathered Joints (Containing buff-yellow extremely weathered rock and clay)

Fault zone

Spot height .816

Contours from E.&W.S. Plan No 56-303
Datum AWOST Port Adelaide

S.A. DEPT. OF MINES

600—7.58 2917

MYPONGA DAM
GEOLOGICAL INVESTIGATION
SURFACE GEOLOGY OF DAM SITE AND ENVIRONS

Req. No.
D.M.
Compiled from

Associated Drawing No. | No. | Amendment | Init. | Date

Approved | Passed

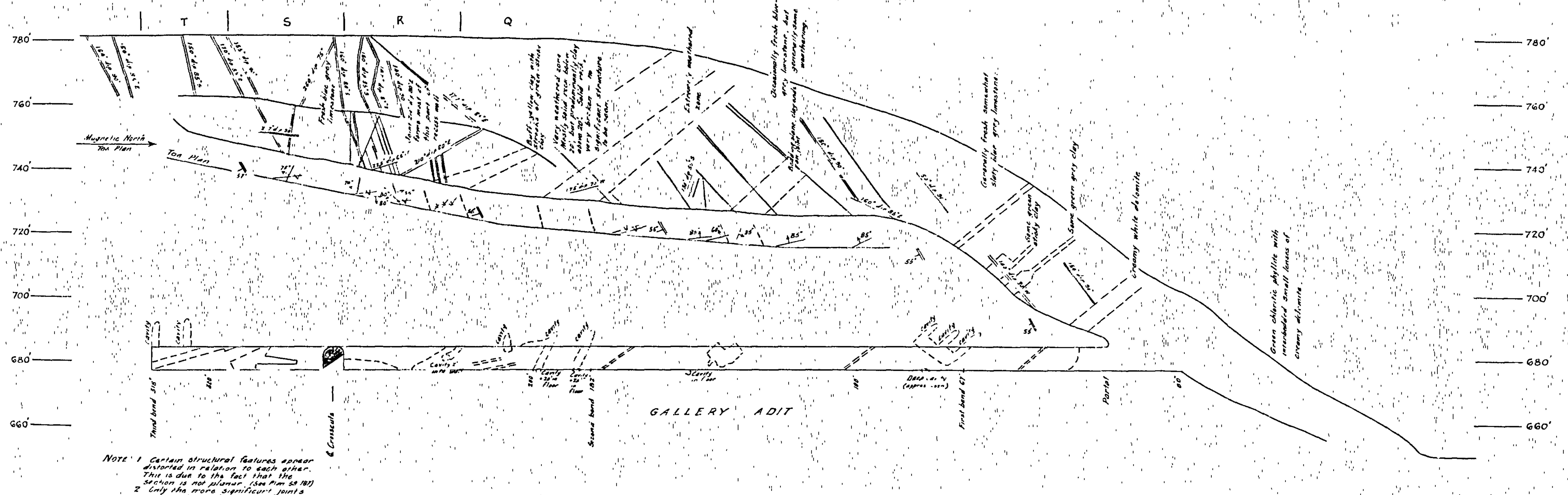
Director of Mines

Dsn.
Tcd. R.R.
Ckd.
Exd.

Scale: 80 feet to 1 inch

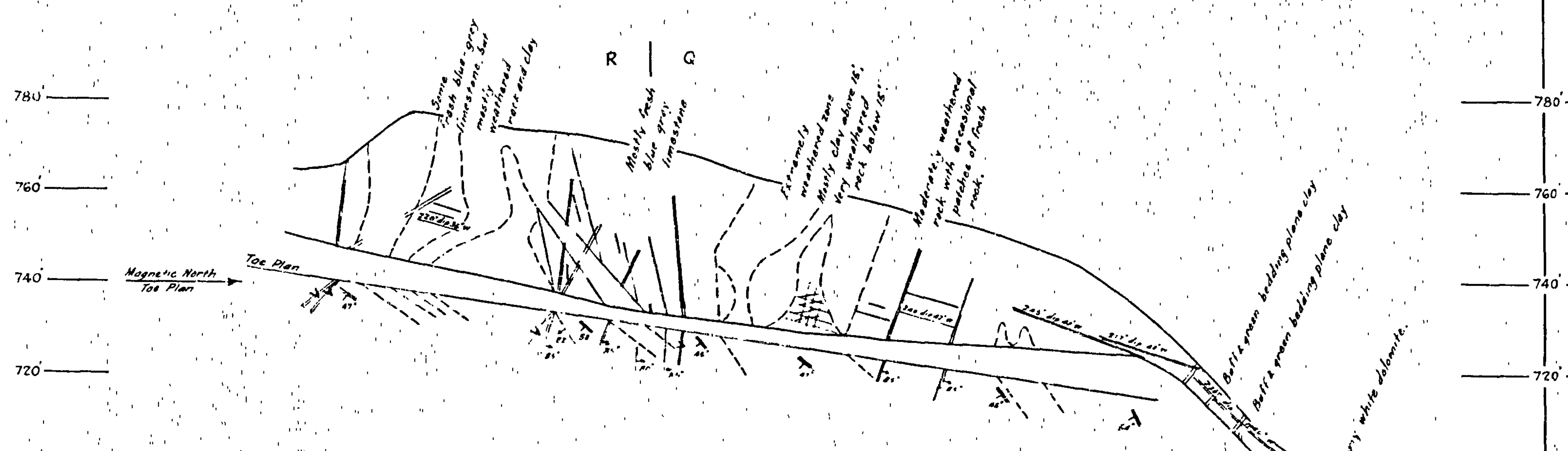
59 - 282
Hc 4

Date 30 - 7 - 59



NOTE: 1 Certain structural features appear distorted in relation to each other. This is due to the fact that the section is not planar. (See Plan 59 187)
2 Only the more significant joints as regards weathering are shown.

LONGITUDINAL SECTION APPROXIMATING TO THE LINE OF SECTION OF THE GALLERY ADIT – LOOKING DOWNSTREAM



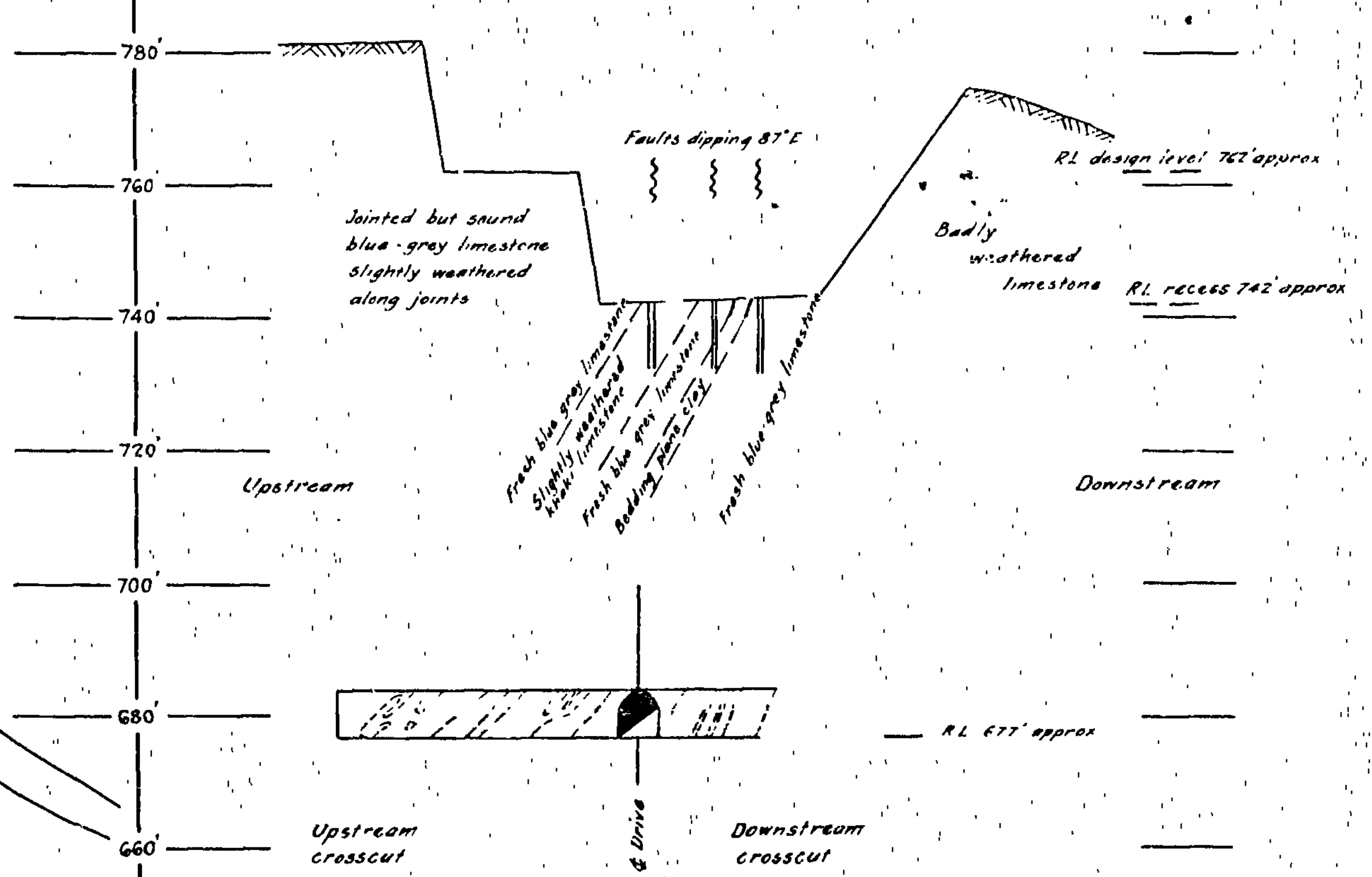
WEST WALL OF LEFT ABUTMENT – LOOKING DOWNSTREAM

LEGEND

Phyllite	☐	Extremely weathered rock	☐
Dolomite	☐	Bedding plane clay	☐
Limestone	☐	Clay in joints and Faults	☐

Lithological boundaries - - - -
Joints ———

To accompany report by W Johnson.



CROSS SECTION ALONG LINE OF CROSS CUTS IN GALLERY ADIT – LOOKING SOUTH

S.A. DEPT. OF MINES

MYPONGA DAM
GEOLOGICAL INVESTIGATION
LONGITUDINAL SECTION ALONG GALLERY ADIT AND EXCAVATION FACES LEFT ABUTMENT

Associated Drawing	No.	No.	Amendment / Exd. / Date
Req. No.	D.M.	Compiled from	
Approved	Passed	Director of Mines	
Drn.	Tcd.	Ckd.	Exd.

Scale: 20 Feet to 1 inch
59 - 281
Hc 4
Date 30 - 7 - 59

10200E

Well jointed but no obvious joint families Bedding most prominent feature

This wall has solid fresh rock.

B.P. Shear 3" clay

Predominantly clay with some very weathered limestone.

Generally solid rock in this zone Very close bedding and abundant jointing in many families are features.

Joint face in wall strike 190° dip 85°W clay covered

Predominantly bedding planes

Massively bedded blue-grey limestone

Cream very hard dolomitic limestone

Green chloritic phyllite interbedded with lenses of cream and dolomitic limestone, mostly less than 1cm thick

Steel Pin * 9,367 5GN 10,288 16E RL 676.61

cavity

Predominantly clay with very little solid rock. Bedding trend only structural feature

Many cavities 5'-6' radius 1'-3' deep

10250E

Extremely weathered buff yellow coloured rock generally solid but often tending into patches of soft buff clay.

9750N

10050N

9950N

10000N

Soft friable buff yellow clay and some extremely weathered rock No structure Streaks of greenish-grey sticky clay.

Extremely weathered rock & buff yellow friable clay.

Solid rock in places fresh but generally weathered to some extent.

Fresh solid dense blue grey limestone

Predominantly clay where coloured with occasional patches of extremely weathered but solid rock There is some fresh solid limestone, however, as shown

10300E

10100E

This joint forms the entire east wall of the cavity between these points it is covered with up to 6' of clay but behind this the rock is solid and fresh

Generally solid although extremely weathered in places

Downstream Cross-cut

Almost entirely clay, buff yellow in colour and friable. Some bands of grey-green sticky clay. Occasional patches of solid but extremely weathered rock structure in this zone of a minimum.

Upstream Cross-cut

10150E

Cross-cuts 200'

Shear zone, Greenish-light grey sticky clay with occasional boulder pockets of concentrated rock Mostly buff yellow clay

Extremely weathered rock with much clay.

Mostly buff yellow clay

Fresh blue-grey limestone.

Mostly clay with some extremely weathered rock in places The back is relatively solid

Fresh blue grey limestone.

10' jack-hammer hole

Closely bedded limestone, tending to clay limestone. Generally rock has been weathered, and clay along bedding and joint planes is common. Bedding planes most prominent structural features.

cavity 2' into wall

cavity 5' into wall

cavity 20' in floor

cavity 20' in floor

cavity 5' in floor

200'

SCALE

FEET 10 5 0 10 20 30 FEET

To accompany report by W. Johnson.

S.A. DEPT. OF MINES

MYPONGA DAM

GEOLOGICAL INVESTIGATIONS

GEOLOGY OF GALLERY ADIT AND CROSS CUTS

59-280

Ho4

D.D.H. WT 4
4538.17 N
10096.86 E

D.D.H. WT 3
4465.4
10095.19 E

D.D.H. WT 2
5818.84 N.
10077.73 E

D.D.H. WT 5
5727.63 N
10145.46 E

D.D.H. WT 1
4630.27 N
10115.03 E

Collar 817.13

Collar 839.86

Collar 876.5

Collar 763.22

Collar 765.54

800'

700'

600'

500'

Limonite generally absent below this level. Some limonite staining along joints filled with calcite

Approximate level of stream bed in N.S reach upstream of dam. grid

Most joint cracks limonite lines above this level and calcite filled below

¼" thick clay seam

¼" thick clay seam

Lowest level of limonite observed in core

Lowest level of limonite observed in core.

Lowest level of limonite observed in core.

Lowest level of limonite observed in core.

298'9"

336'in"

312'

207'

44 g.p.m at 12 p.s.i

20 g.p.m at 20 p.s.i.

25 g.p.m at 20 p.s.i.

Greater than 42 g.p.m (meter capacity) — no pressure developed. 44 g.p.m at 12 p.s.i.

42.5 g.p.m. at 5 p.s.i.

5' Core lost

Solution Cavities Driller reports clay

Clay

Clay

8' Clay

2" Core lost

2" Solution cavities

Salt

5' Core lost

5" " "

Solution cavities Deep weathering

3" Core lost

6" Core lost

310 g.p.m at 20 p.s.i. va. connected to gallery adit

This section not water tested

Solution cavities

Clay

Cavity more than 20' Deep in Adit floor

Zones of severe weathering evidence of Cav. forces & Solution of limestone

Solution along joint

100 g.p.m at 20 p.s.i.
200 " " 40 p.s.i
95 " " 40 p.s.i
290 " " 21" vac

230 " " 20" vac
300 " " 30 " "
300 " " 30 p.s.i.
290 " " 22" vac

No solution or deep weathering.

295 " " 16" vac

Solution cavities strongly weathered zones

Solution

22 " " 42 p.s.i

Limonite stained solution cavities along joint

Lowest level of limonite observed in core

25 g.p.m at 60 p.s.i

No weathering

No weathering

15 g.p.m at 76 p.s.i.

Core losses due to grinding during drilling, rock jointed but no weathering negligible water loss.

4'12"

Barrel dropped 5'6"

Slight weathering

Red limonite

Limonite slightly vuggy

Solution & clay

3" core lost

Barrel dropped 5" (clay)

Barrel dropped 2'6" (clay)

EXPLORATORY ADIT (projected)

GALLERY ADIT (Projected to 9728 N)

Water Table as at 27-7-59

Highly weathered schists exposed below this level

Bands weathered section

Solution cavities.

Barrel dropped 10" (clay)

Weathered limestone

6" clay

12" Clay

2" core lost

4" Core lost

2" core lost

309 g.p.m at 70 p.s.i.

336 g.p.m at 80 p.s.i.

PROPOSED LIMIT FOR GROUTING

To join with designed 'A' Grout Curtain (E. & W.S Drg. 56-305)

9500 N

9600 N

9550 N

9750 N

9900 N

9800 N

10,000 N

NOTE: Pressure quoted for water loss test are lbs. per sq. inch at collar of bore.

Zones of high water loss ———— 1

S.A. DEPT. OF MINES

MYPONGA DAM SITE GEOLOGICAL INVESTIGATION

SECTION THROUGH D.D. HOLES WT 1 TO 5

Showing Water Test Results, Water Table & Proposed Grouting Limits.

Req. No.
D.M.
Compiled from

Associated Drawing No.

No. Amendment Exd. Date

Approved Passed

Director of Mines

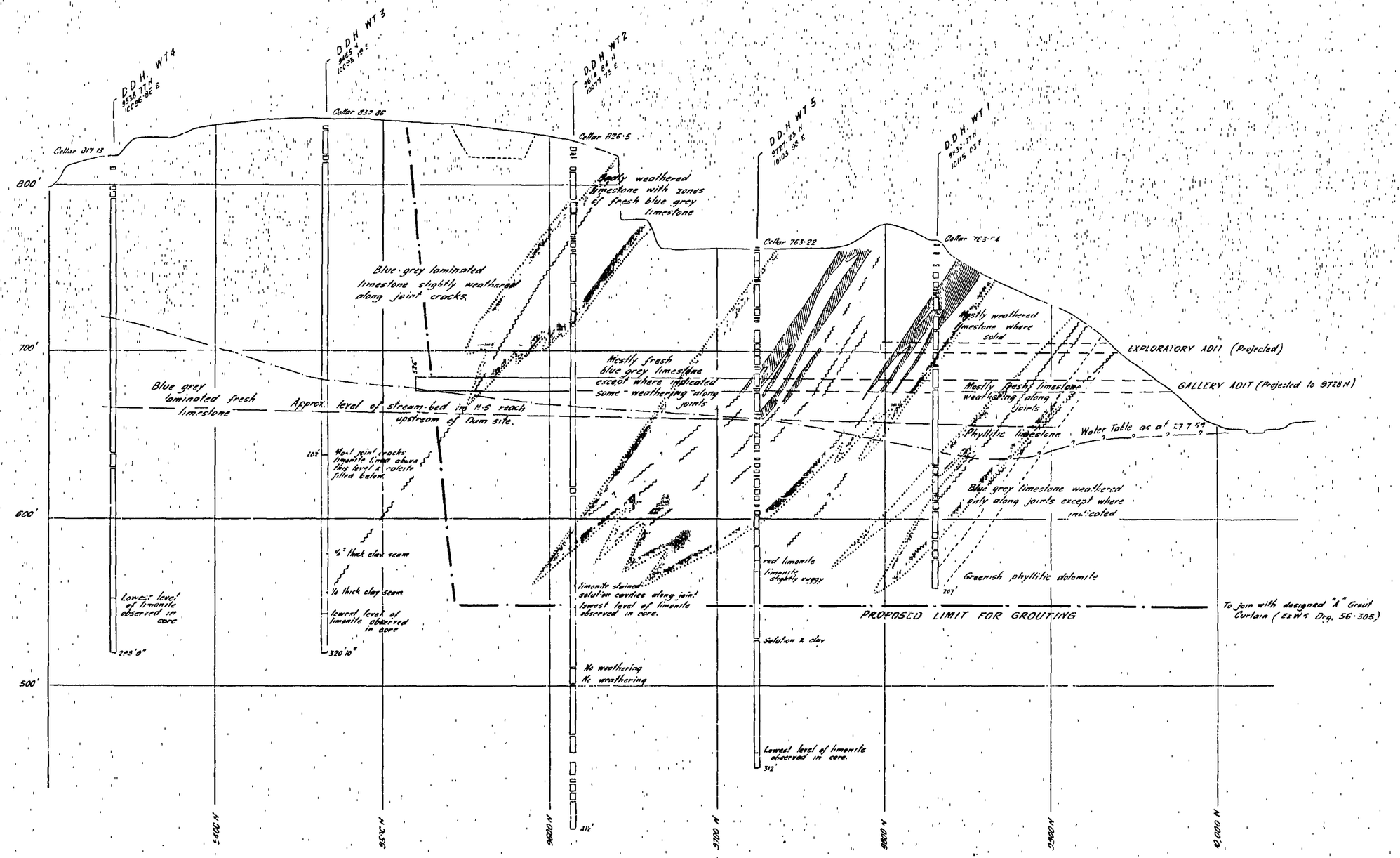
Drn.
Tcd.
Ckd.
Exd.

Scale: 40 Feet to 1 inch

59 · 279

Hc 4

Date 30 - 7 - 59



Faults & faulted areas somewhat diagrammatic _____

Zones of most severe fracturing, crushing & weathering _____

S.A. DEPT. OF MINES

400—7 56 2917

Associated Dr. & Mng. No.	No.	Amendment	Exd.	Date

Req. No.
D.M.
Compiled from

MYPONGA DAM SITE GEOLOGICAL INVESTIGATION

GEOLOGICAL SECTION THROUGH D.D. HOLES WT1-5

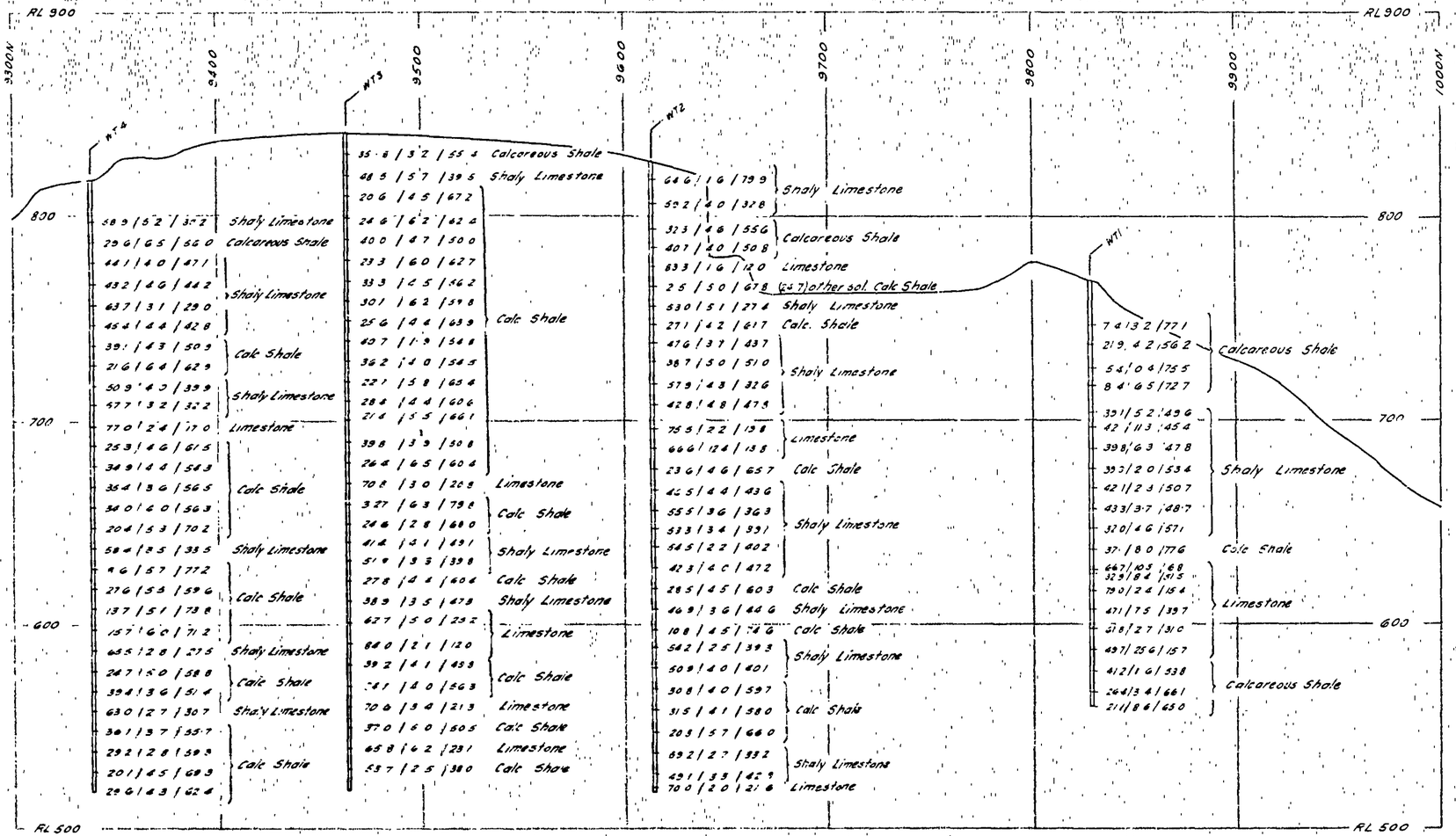
Approved	Passed
Director of Mines	

Drn.
Tcd. MS
Ckd.
Exd.

Scale: 40 Feet to 1 inch.

59 · 278 Hc 4

Date 30 · 7 59



706 / 3·5 / 65·7
$CaCO_3$ $MgCO_3$ Insoluble

Limestone < 25% Insoluble .....
Shaly limestone 25% – 50% Insoluble .....
Calcareous shale > 50% Insoluble .....

To accompany report by W Johnson

S.A. DEPT. OF MINES

MYPONGA DAM
GEOLOGICAL INVESTIGATIONS
CARBONATE ANALYSIS OF LIMESTONE IN LEFT ABUTMENT

Associated Drawing No. | No. | Amendment | Exd. | Date

Req. No.
D.M.
Compiled from

Approved | Traced
Director of Mines
Drn. A.D.W
Tcd.
Ckd. P.R.
Exd.

Scale: 40 FEET TO 1"
59-277
Hc 4
Date 8-7-59

600—7.58 L217

GEOLOGY OF EXCAVATION
AS AT 12-2-59

GEOLOGY OF DEEP EXCAVATION
AS AT 16-7-59

9700N 9800N 9900N 10000N

10100E
← To 9515N

10200E

10300E

W V T S R Q P N M L K J

CUTS CROSS GALLERY ADIT

SHAFT 20' Deep

Adit Floor approx. RL 700'

Base of additional excavation

Covered with rubble

Covered with rubble

Steel Pin RL 676

Buff Hard weathered rock showing structures

Buff Soft weathered rock showing structure

Buff Soft weathered rock not showing structure in clay

Red Brown clay

cavity

STRUCTURE

- Clay in joints and bedding plane fault zones
- Fault
- Approximate outline of abutment excavation
- Extent of additional vertical excavation
- Solution Cavity

LITHOLOGY

STURTIAN
- Limestone
- Argillaceous & weathered limestone

NARAWORN
- Phyllite & calcareous shale
- Dolomite

NOTE: The whole of the left abutment is heavily jointed. For the sake of clarity, only the more prominent are shown.

SCALE
20 0 20 40 60
FEET

S.A. DEPARTMENT OF MINES

MYPONGA DAM

GEOLOGICAL PLAN OF LEFT ABUTMENT
AS AT 12-2-59
& 16-7-59

Scale: 20' to 1"
59-187
Hcd
Date 19-6-59

Drn. Tcd. A.W. Ckd. Exd.

Approved Director

Passed

No. Amendment Exd. Date