Airservices Australia

Alice Springs Airport

Preliminary Site Investigation

July 2019

Executive summary

Airservices Australia (Airservices) engaged GHD Pty Ltd to conduct a Preliminary Site Investigation (PSI) at the Alice Springs Airport (ASA) with particular regard to the potential for contamination from per- and poly-fluorinated alkyl substances (PFAS).

Based on the review of available site history information, site inspection and site interviews, the following potential sources of PFAS have been identified:

- The FTG – routine discharge of foam in this area from 1980 to 2010
- The MFS and surrounding area – wash down of vehicles and hoses, drainage associated with the bunded areas that contained foam, the daily and six-monthly foam discharges adjacent to the current AFFF fire station from 1992 to 2010
- Existing and former surface water drainage channels
- Areas where soil from FTG has been (including historically) relocated and stockpiled

The desktop review identified the following potential sensitive receptors:

- Site workers whose activities may result in exposure to site soils and surface water
- Terrestrial fauna consuming impacted plant material e.g. grasses. This in turn may impact their predators

Based on the data reviewed in this study and the conceptual site model (CSM) the following summary is made:

- The primary source (use of AFFF containing PFASs) no longer exists. Secondary sources include residual soil, sediment, stockpile and minor surface water contamination.
- Soil results reported concentrations of PFASs which exceeded the adopted ecological guidelines, indicating that in the areas sampled, soils may present an unacceptable risk to ecological receptors.
- Given the elevated PFAS concentrations reported in the stockpile to the south east of the FTG and the and soil in the vicinity of the FTG, it would be prudent to develop a management strategy for this soil (possible options involve excavation and containment).

This report should be read in accordance with the limitations set out in Section 10.

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Appendices

1. Introduction

Airservices Australia (Airservices) engaged GHD Pty Ltd (GHD) to conduct a Preliminary Site Investigation (PSI) at the Alice Springs Airport (ASA) with particular regard to the potential for contamination from per- and poly-fluorinated alkyl substances (PFAS).

1.1 Background

Aqueous film-forming foam (AFFF) has been used for fire-fighting purposes around Australia for decades. On airports, AFFF has been used at fuel depots, hangars and for operational and fire training purposes.

AFFF has not been used in the provision of aviation rescue and fire-fighting (ARFF) services by Airservices since 2010 but continues to be used around fuel depots, hangars etc, at many airports. AFFF products historically used on airport sites contained PFAS. Depending on the type of AFFF used, the principal PFAS constituents could have included perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) or fluorotelomers such as 6:2 fluorotelomer sulfonate (6:2FtS) and 8:2 fluorotelomer sulfonate (8:2FtS).

1.2 Objectives

The objective of this PSI is to identify where there is potential for PFAS contamination to be present at the ASA as a result of previous activities by ARFF and other AFFF users. A preliminary and targeted soil, groundwater and surface water sampling program was undertaken to validate and further investigate the desktop findings of the PSI.

The report also seeks to identify potential sensitive receptors and stakeholders that may be impacted by possible PFAS contamination rising from activities (both historic and current) utilising AFFF at ASA.

1.3 Scope

The scope of work for the PSI included:

- Review of historical aerial photographs to gain an understanding of site development over time and identify potential areas where AFFF may have been used
- Review of current certificates of title and key lessees to identify site activities that may have included the use of AFFF
- Review of published data on geology, hydrology and hydrogeology to gain an understanding of site conditions and identify sensitive receptors
- Search of the groundwater bore database to understand beneficial uses for groundwater in the area
- Review of historical reports provided by Airservices to provide some background to previous investigations and site conditions
- A detailed site inspection to gain an understanding of site condition and inspect areas where there is potential for AFFF to have been used
- Interviews with personnel who have an understanding of current and historical site activities to identify areas where AFFF may have been used
- Preliminary and targeted soil, sediment and surface water sample collection
- Development of a Conceptual Site Model (CSM) and potential source, pathway, receptor linkages
- Conclusions

2. Data quality objectives

The Data Quality Objective (DQO) process was applied to the PSI as described below, to ensure that data collection activities were appropriate and achieved the stated objectives. The DQO steps defined above have been addressed as follows.

Table 1 Data quality objectives

Step		Description
1	**State the problem to be resolved**	Where was AFFF historically used on the Airport site? Do possible source, pathway, receptor linkages present an unacceptable risk?
2	**Identify the decision/s to be made**	To address the problem set out in Step 1, the following decisions are required to achieve the task objective and to identify data gaps and additional information that may be required: • What activities have occurred at the site which may have involved the use of AFFF? • What types of AFFF have been used? • Where was AFFF stored on site? • What is the nature of the contaminant migration pathways, particularly leading off the site? • What sensitive receptors are present at and surrounding the site?
3	**Identify the inputs to the decision**	To inform the decisions and identify key data gaps and needs, the following information is considered necessary: • Review of site conditions • Review of available history information • Interviews with site personnel • Detailed site inspection • Development of a Conceptual Site Model.
4	**Define the boundaries of the study**	The study boundary comprises soil and surface water within the on-site areas in the vicinity of the identified potential PFAS sources as shown in Figure 3. This investigation does not include the former airport terminal area located at 7-Mile.
5	**Develop a decision rule**	The key decision rules are: Are there areas of the site, outside the current and former fire station and training areas, where PFAS may be present and does this pose: 1) a potential unacceptable risk; or 2) a risk that contamination may be migrating off-site? • If NO – further investigations can be targeted in these known (source) areas. • If YES – more extensive investigations may be required to target broader areas of the site and understand the potential for off-site contamination.

Step		Description
6	**Specify the tolerable limits on decision errors**	There is potential for anecdotal information to not always be accurate or to be limited in nature, and it is also difficult to assess site activities from historical aerial photographs based on poor resolution. Where possible, any potential sources of PFAS contamination will be cross checked through multiple lines of evidence. The two decision errors that exist include: • False positive – an area identified as potentially containing PFAS does not. • False negative – Areas containing PFAS are not identified. • These can be managed through the implementation of a sampling program to confirm the PSI findings.
7	**Optimise the design for obtaining the data**	The CSM design will be optimised through: • Identification of potential PFAS sources from existing information and investigations conducted by others. • A review of the surface water pathways (hydrology) across and leaving the site.

3. Site information

3.1 Site location

The ASA is located approximately 5 km south east of the township of Alice Springs, Northern Territory. The site location is outlined in Figure 1 in Appendix A and location details are provided in Table 2.

Table 2 Site identification

Street Address	Santa Teresa Road, Alice Springs, Northern Territory, Australia
Site Area	415 ha
Local Government Area	Town of Alice Springs
Current Land Use	Airport and associated commercial enterprises
Land Use Zoning	Commonwealth Land (no planning scheme controls)

3.2 Lease information review

The current operating lease holder for the ASA is Alice Springs Airport Pty Ltd with portions of the site leased by Airservices. The current properties within ASA and relevant lessees are summarised in Table 3 and the certificates of title are provided in Appendix B.

Table 3 Certificate of title lessee summary

Owner	Parcel/ Plan	Lessee / Date
Federal Airports Corporation	NTP429 S80/149 NTP1025 S80/149 NTP806 S80/149 NTP3840 90/001B NTP3838 90/001A NTP995 S80/149 NTP3839 90/001D	Airservices Australia Term: 6 July 1995 – 10 June 2034
Commonwealth of Australia	NTP3840 LTO90/001D NTP3839 LTO90/001D NTP1025 S80/149 NTP995 S80/149 NTP806 S80/149| NTP429 S80/149 NTP4437 S91/035 NTP428 S80/149 NTP569 S80/149 NTP4005 S91/34&35B NTP4004 S91/34B&C NTP4054 S91/034 NTP5238 S97/049	Alice Springs Airport Pty Limited Term: 11 June 1998 – 10 June 2048

3.3 Site description

A site inspection was completed by GHD (accompanied by Airservices) on 20 and 21 July 2016. A summary of the findings is provided below. Site photographs taken during the inspection are included in Appendix C.

Key site features are outlined on Figure 2a and Figure 2b in Appendix A. They included:

- Runway
- Terminal
- Control Tower
- Main Fire station (MFS)
- Fire training ground (FTG)
- Fuel farm
- Surface water drainage channels
- Light aircraft hangars
- Car rentals and parking areas
- Aircraft storage area and hangers
- 7 Mile former terminal and runway

The areas around the terminal building are planted with mainly native grasses and shrubs. The surrounding land is typical of arid regions – grassland and sparse woodland.

Runway

The ASA includes one major runway that runs approximately from northwest to southeast. On the north side there is a taxiway that leads from the runway to the apron in front of the main terminal building.

Terminal

The terminal is located to the north of the runway. Public terminal parking and car hire parking is located to the north of the terminal building. Staff parking is located to the east and west of the Terminal building.

The terminal and car parking areas are characterised by hardstands with some planted areas of garden beds located in both areas.

Control tower building

The control tower is located immediately east of the MFS. The building also accommodates a rental car company.

Aircraft hangars

Two areas of aircraft hangars are located on the ASA – one in the north western end of the ASA and one to the east of the main terminal building. Both have associated hardstand aprons.

The hangars are leased by light aircraft and helicopter operators including Royal Flying Doctors Service. Inspection of this area was not undertaken, however, it is understood that the hangars do not contain sprinkler systems for firefighting or stormwater collection. Firefighting equipment within the hangars is understood to be limited to handheld fire extinguishers.

One hangar (SkyPort Building) is located immediately north of the main airport apron. This was the scene of an incident in 1977 (refer to Section 5.4.2).

Main fire station (MFS)

The MFS is located adjacent to the control tower, which is directly north of the runway apron. The MFS includes a single storey building, fire truck garage, workshop, smoke hut, wash down bay, hose drying rack, hardstand, fuel bowser and bunded storage areas for firefighting foams.

The fire truck garage, a hose drying rack and wash down bay are surrounded by hard stand which drains to a surface water collection system. The system includes a collection trench and triple interceptor trap. All water from the hardstand that passes through the treatment system is discharged to an unlined surface drain which in turn discharges to a main surface drain that runs parallel to the main runway.

A bunded foam storage area is located adjacent to the main building. This includes a brick constructed bund and smaller HDPE bunds. The fuel bowser is housed in a dedicated metal container with an associated above ground fuel storage tank (AST).

A two storey smoke hut is situated immediately west of the main building.

Fire training ground (FTG)

The main aspects of the FTG include:

- A bunded hardstand with replica airplane
- Bunded kerosene tank plus underground distribution pipes
- A bund constructed of brick, which contains bulk 1000L storage tanks and 200L drums. The bund has signage indicating “Waste water contaminated with AFFF”. Other bulk storage tanks are located adjacent to the bund.
- Waste water treatment system including underground tank, with oil-water separator and shed
- Open drainage line for water discharge
- Car bodies and a small aircraft body
- Soil biofarm area

Fuel farm

The fuel farm is located between the MFS and the terminal building. Hand held extinguishers were observed.

Light aircraft hangars including Royal Flying Doctors Service

The RFDS and a number of commercial light aircraft companies (including Alice Springs Aero Club, Alice Springs Helicopters) are housed in hangars and buildings to the west of the MFS. The area is built on hardstand with a wide apron for aircraft parking.

Surface water drainage channels

A number of drains cross the ASA and surrounding area. The main airport drain runs parallel and north of the main runway. This picks up water from a series of minor drains originating from the MFS, terminal and other parts of the airport and appears to discharge to surface drains beyond the eastern boundary of the ASA.

Another drain runs along the dirt road that leads from the airport to the FTG in the east. This intersects a number of smaller drains, in particular one that leads east of the FTG and discharges off-site to the east.

Aircraft storage area (Asia Pacific Aircraft Storage)

An area of land to the south-west of the main terminal has been designated for aircraft storage. Large jets are located there awaiting deployment and the area also contains aircraft that is no longer in use.

7 Mile former terminal

7 Mile was the site of the first airport in Alice Springs. It was opened in 1940 as a staging base for RAAF aircraft during the Second World War. It remained in use until 1965 when the current airport terminal was built.

The area consists of a north-south orientated runway and old wooden buildings including the former control tower and terminal buildings. A petrol bowser was located near the centre of the site. A pump station connected to a groundwater bore was observed. Part of the site is used by an asphalt company to manufacture road material and significant stockpiles of soil and asphalt were present.

Airport operations vacated 7-mile at least a decade before ARFF began operations at the current ASA, and this is not considered a source of PFAS.

3.4 Surrounding land uses

The land immediately surrounding the airport is largely vacant with native vegetation and some constructed vehicle tracks. The airport has built a solar farm to the north of the airport that provides power to the terminal building.

A major drainage line of the Todd River is located approximately 4 km to the east of the ASA.

3.5 Key stakeholders

The following key stakeholders have been identified at the site:

- NT Airports
- Site lessees

4. Site conditions

4.1 Topography

Regional topography tends to slope to the south-east toward the Todd River. However, the site is relatively flat.

4.2 Geology

4.2.1 Regional geology

Regional geology is identified as Holocene-aged alluvium characterised by channel and flood plain alluvium; sand, silt, clay, alluvial terrace deposits, some black soil and sandy soils (NTGS, 2003). A geological map is included in Appendix A (Figure 3).

4.2.2 Soil profile

Bore logs from previous reports indicated soils at the site typically consisted of natural soils. Surface soils consisted of silts and clay. The underlying soils consisted of clays with variable amounts of silt and gravel. River gravels were encountered at 2.0 meters below ground level (mbgl) (GHD, 2008).

4.3 Hydrology

This site sits within the Todd River catchment, which covers an area of 445 km^2. The climate of the catchment is typically arid continental with large daily temperature variations. The mean annual rainfall is approximately 260 mm, based on an average monthly rainfall of 40 mm in February to 9 mm in September. The summer months usually have higher than average rainfall.

The main hydrological issues of the region include high sediment load in streams when they do flow, flash flooding and high levels of total dissolved solids in many bores.

Groundwater is sourced from the large sedimentary basins including the Georgina, Wiso, Eromanga, Ngalia and Amadeus Basins. The Amadeus Basin is the main source of water for the pastoral industry of the arid zones, the local tourist industry and major aboriginal settlements. The Alice Springs water supply is mainly obtained from production bores in the Mereenie Sandstone Aquifer of the Amadeus Basin, 15 km south of the town (GHD 2008).

4.4 Hydrogeology

A search of the online Natural Resource Maps Northern Territory (http://nrmaps.nt.gov.au) and Water Data Portal (http://www.lrm.nt.gov.au/water/water-data-portal) identified nine bores within 1 km of the site. A summary of these bores is shown in Table 4.

Table 4 Groundwater bores within 1 km of the site

Bore ID	Bore depth (mbgl)	Year drilled	SWL (mbgl)	Direction from site	Purpose
RN003421	123.1	1942	78.01	On site	-
RN003563	119.5	1959	70.41	On site	-
RN017548	106.1	1959	68.6	On site	Production
RN003598	148.7	1961	-	West	-
RN003602	117.9	1962	93.51	West	Observation
RN003450	98.5	1956	66.9	North	-
RN003609	194.8	1962	116	South	Observation
RN004481	182.9	1964	53.913	South east	Observation
RN017598	468	2002	44.116	North east	Monitoring

NOTES

' – ' = Information not available

The lithological logs confirmed the regional geology of alluvium consisting of sand, silt and clay as outlined in Section 4.2. Groundwater was encountered beneath the site at around 75 to 85 m depth, in sand with clay lenses.

It is important to note that unregistered and private bores may also exist.

Groundwater bore data and search results are provided in Appendix D, groundwater bore locations and bore IDs are included in Appendix A, Figure 3.

Groundwater was not encountered at the ASA in previous soil investigations.

The groundwater bore at 7 Mile (RN003421) was observed during the site inspection.

5. Site history

5.1 Aerial photographs

A review of historical aerial photographs between 1980 and 2016 was completed. A summary of the key findings is outlined in Table 5 and a copy of the photographs is provided in Appendix E.

Table 5 Historical aerial photograph summary

Date	Description
1980	Two runways are visible on the site, consistent with the current runway layout. A number of buildings are visible where the main airport buildings now stand. A number of buildings are also visible to the west of the smaller runway. The drill ground area is visible to the north east of the site as rectangular area cleared of vegetation. A number of structures are visible in the area however the nature of these structures is not clear. Roger Vale Drive / Santa Teresa Road is visible to the north of the site.
1991	A large building is now visible where the main airport buildings now stand. The tarmac to the west of this building appears to have been extended including the construction of additional sheds running along Roger Vale Drive / Santa Teresa Road. The configuration of Roger Vale Drive / Santa Teresa Road appears to have been altered.
2004	A large car park is now visible to the north of the large building. The drill ground area is visible in its current configuration.
2016	Additional car parking is visible to the east of the large building.

5.2 Previous reports

A number of reports were provided by Airservices to GHD for review and consideration as part of the PSI. The scope and key outcomes of these are summarised below.

5.2.1 MGT Environmental Consulting, 2003

Soil and water sample analysis results from ARFF drill ground, June 2003

- Analysis of two soil samples and one water sample was completed in 2003, analysis was limited to Total Recoverable Hydrocarbons (TRH). Analysis indicates that no exceedance of *Airport (Environment Protection) Regulations 1997* for water and soil were reported. No information regarding the locations or depths of sampling has been provided.

5.2.2 Darwin Airport, 2006

Technical Letter – Re: Soil Sample Results taken on the 2nd November 2006, Alice Springs Airport, Northern Territory, Darwin International Airport, 2006

- Three water samples were collected from the FTG, a sample was retrieved from the separator and two samples were collected at distances of 3 m and 40 m from the separator.
  - In total, six soil samples were collected from the FTG. Samples were analysed for Total Petroleum Hydrocarbons (TPH) only. None of the reported concentrations exceeded the adopted soil and groundwater guideline criteria - *Airport (Environment Protection) Regulations 1997*.

5.2.3 GHD, 2008

Preliminary Site Contamination Assessment, Alice Springs ARFF Drill ground, Alice Spring Airport, GHD, September 2008

- The Alice ARFF drill ground predated 1978.
- Since establishment of the ARFF drill ground, training activities comprised live fire drills (practiced a minimum of twice a week). Live fire drills at the time of reporting were undertaken two to three times per week.
- Reportedly live fire training prior to 2002 included the combustion of kerosene and unleaded petroleum on the ground and on a mock plane.
- Prior to 2002, fuel was stored in 204 L drums on a trailer and transported for fire training activities.
- Firefighting training included use of AFFF and Dry Chemical Powder (DCP). The selected DCP product was Purple K – Potassium Bicarbonate, and the selected AFFF product was 3M Light Water ™ AFFF, which was used until 2003.
- Soil samples were collected in 2000 to investigate the original training pad for petroleum hydrocarbon contamination - the sampling results reported no exceedances of the adopted guideline criteria - *Airport (Environment Protection) Regulations 1997*.
- The initial configuration of the drill pad did not include the concrete training pad or wastewater and drainage structures; training was previously undertaken on bare soil. Site refurbishment in 2001/02 included:
  - Excavation (to a depth approximately 1 mbgl) and stockpiling of 5 m^3 of contaminated soil from below the original training area.
  - Construction of a concrete pad, mock plane, a 5000 L AVTUR (kerosene) AST and underground kerosene distribution pipes, a wastewater UST and associated pipe work, an oil-water separator and a clean water discharge open drain line.
- Soil was removed from the original training area and stockpiled in the 'soil farm', 100 m southeast of the drill pad area. Turning and aeration of the stockpiled soils occurred at least twice between 2002 and 2008.
- In 2006, an investigation of spills and monitoring of stockpiles pre and post removal from the training pad was undertaken by the Darwin International Airport Environmental Officer.
- Remediation of a waste oil pit that had caused some surface hydrocarbon contamination was undertaken by Low Ecological Services Pty Ltd in 2006.
- Sampling and analysis of soil samples was undertaken in order to ascertain the existence of contamination at the site due to former and current land use as a FTG and the potential contamination associated with AFFF use.
- Sampling of seven soil bore locations included collection of samples from depths of between 0 and 2 m. A total of 17 samples were collected and 11 samples were analysed for TPH/BTEX, PAHs and PFOS/PFOA. Results indicated:
  - Total PAH was reported below the LOR for all samples analysed
  - No exceedances of *Airport (Environment Protection) Regulations 1997* criteria were reported for TPH/BTEX
  - Concentrations of PFOS in all surface samples were above the LOR and two of the reported concentrations exceeded the adopted criteria

- Concentrations of PFOA were above the LOR in 10 of 11 samples analysed, however no exceedance of the adopted guideline value for PFOA was reported

- Areas of environmental concern were identified as:
  - Training area
  - Areas surrounding the former training area
  - Open drainage line from the waste oil separator
  - Drainage channel located to the south of the site
  - Kerosene AST area
  - Oil/Water separator and shed
  - Waste oil UST
  - Soil farm area
  - Potential importation of filling materials of unknown origin

5.2.4 Low Ecological Services P/L, 2010

Report on Soil and Waste Water Sampling at Alice Springs Airport Fire Station and ARFF Drill Ground, Alice Springs, NT, Low Ecological Services, January 2010

- The Alice Springs Fire Station first opened in 1965
- The fire retardant 3M Light Water™ AFFF has been used from 1988[1] until 2003
- Nine soil samples were collected from the site, the analysis suite included metals, TPH/BTEX, PFOS, PFOA, pH and electrical conductivity. Samples were generally collected at the surface and at a depth of 0.5 m. Results of soil sampling analysis indicated:
  - All reported results for PFOS/PFOA were above the laboratory detection limit
  - PFOS concentrations ranged from 8 to 26,000 µg/kg. Two exceedances of the adopted guideline criteria were reported
  - PFOA concentrations ranged from 2.5 to 3,900 µg/kg. No exceedances of the adopted guideline criteria were reported
  - pH ranged between 7.2 to 9.9
- Three surface water samples were collected from the site, the analysis suite included metals, TPH/BTEX, PFOS, PFOA, pH and electrical conductivity. Results of water sampling indicated:
  - PFOA concentrations ranged from 1.1 to 2.9 µg/L
  - PFOS concentrations ranged from 0.69 to 2.4 µg/L
  - TPH in the sample collected from the training ground separator was reported as 17,630 µg/kg, which exceeded the adopted guideline criterion

[1] Supplementary information provided by [redacted] (Senior Environment Specialist with Airservices Australia) via email on 6 September 2016 states that 3M Light Water™ AFFF has been used at ASA since at least 1983.

5.2.5 Low Ecological Services P/L, 2014

Report on Soil and Waste Water Sampling at ARFF Fire Station and Drill Facility, Alice Springs Airport, Low Ecological Services, April 2014

- In 2003 Ansulite™ AFFF replaced 3M Light Water ™ AFFF.
- In 2010/11 Airservices cleaned the facilities and switched to using RF6 Solberg Foam, ceased using foam during fire training activities.
- Since November 2009 Low Ecological Services Pty Ltd have regularly sampled at the Alice Springs Airport. Samples were collected and analysed in November 2009, October 2010, November 2010, December 2010, December 2011, December 2012, April 2013 and February 2014.
- Twenty-one soil samples were tested for a suite of analytes including metals, MBAS, BTEX/TPH, TRH, PFOA, PFOS, 6:2 FtS, pH and electrical conductivity. The findings were reported as:
  - PFOS/PFOA concentrations were above the detection limit and four concentrations exceeded the adopted guideline criteria
  - No exceedances of the adopted PFOA criteria were reported
  - Reported pH ranged from 5.7 to 9 and five out of 21 reported concentrations were outside the adopted guideline limit for pH
  - Detectable levels of 6:2 FtS were reported in samples collected from BH1, BH2, BH3 and BH9
- Four water samples were tested for a suite of analytes including metals, PAH, TPH, BTEX, PFOS, PFOA, 6:2 FtS, pH and electrical conductivity. Results indicated:
  - All reported results for PFOS and PFOA were above the LOR
  - All samples exceeded the *adopted PFOS criteria*
  - Laboratory results for cadmium, copper, lead, zinc, total PAHs, TRH and TPH (C6-9 and C10-36 fraction) exceeded the adopted guideline criteria
- Reportedly, the results in attachment 3 indicate a peak in PFOS contamination was detected in the surface during 2010, and a peak at 0.5 m depth was detected in 2012.
- In the area immediately surrounding the mock aircraft (BH1, BH2 and BH3) and downstream from the training ground separator (BH9), exceedances of the adopted PFOS guideline criteria were reported in samples collected from the surface and at 0.5 m depth.
- In the soil remediation area (BH4 and BH5) no exceedances of the adopted PFOS criterion were reported in near surface soil samples, however exceedances were reported at 0.5 m depth.

5.2.6 Report review summary

The report review indicates that ASA commenced operation in 1965 (Low Ecological Services, 2009) and the establishment of the Alice Springs ARFF drill ground occurred sometime prior to 1978. Application of AFFF had begun at least by 1988, and possibly as early as 1983, until 2010. Prior to refurbishment works beginning in 2001, all training activities occurred on unsealed areas.

Whilst contamination assessment has occurred on site since approximately 1996 (Low Ecological Services 2014), sampling and analysis of PFAS did not begin until 2008 (GHD, 2008).

Prior to construction of the new training pad in 2001, 5 m^3 of petroleum hydrocarbon impacted soils from below the original training area was excavated and stockpiled in the "soil farm" area. Between 2002 and 2008, the soil stockpiles were turned at least twice and remain on site.

The refurbishment of the FTG area in 2001-2002 included the construction of a concrete pad, large mock up aircraft unit (LMU), a 5000 L AVTUR (kerosene) AST with underground kerosene distribution pipes, a wastewater UST with associated pipe work, an oil-water separator and a clean water discharge open drain line.

Results from soil sampling and analysis in 2008 indicated that PFOS concentrations in the near surface soils exceeded the adopted criteria in samples collected in the vicinity of the LMU (BH1 and BH2) (GHD 2008).

Sampling and analysis in 2009 indicated two soil samples exceeded the adopted PFOS criterion.

5.3 Operational responses system outputs

GHD was also provided with three ARFF operational response system (ORS) incident detail reports which involved the use of AFFF at ASA. The incidents are summarised in Table 6:

Table 6 ORS summary output

Incident date	Incident location and description	Materials used	Actions taken
17 August 1997	A helicopter was found leaking fuel at the apron adjacent to the Helicentre	60 L water 10 L foam	Foam blanket was sprayed over the fuel spill
29 June 1999	Aircraft on fire at apron bay 8	18 kg of dry chemical powder 4000 L water 60 L foam	ARFF put out the fire from the exhaust of the aircraft, and then washed off the area after the operation.
15 December 2000	Aircrash at 1.5 km north-east of airfield	1200 L water 50 L foam	No mention of fire rescue action, therefore the foam is likely used for precautionary purposes.

5.4 Interviews

GHD and Airservices conducted site interviews on 20 and 21 July 2016 with the following personnel:

- [redacted] – Acting Fire Station Manager – Airservices Australia
- [redacted] – Airport Environment Officer (AEO - Commonwealth regulator)
- [redacted] Environmental Manager, NT Airports[2]
- [redacted] – General Manager – NT Airports Pty Ltd

A summary of the key findings from the assessment are listed in Section 5.4.1 and 5.4.2. A transcript of the interviews is provided in Appendix F.

In addition, [redacted] who is the Senior Environmental Specialist for Airservices provided supplementary information via email on 6 September 2016.

[2] Alice Springs Airport is wholly owned by NT Airports.

5.4.1 Alice Springs – NT Airports and AEO

The main information obtained from the interview with the Airport management included:

- The current airport terminal building is approximately 25 years old. The original airport was located at 7 Mile at the western end of ASA and was moved to the current location in 1964.
- It was understood that training only occurred at the FTG and MFS and no other entity (e.g. town fire brigade) used these areas for training purposes. The Airport only does fire extinguisher training and the extinguishers did not contain AFFF.
- Foam is not used in the airport hangars. The latest hangar is for the NT Police which contains no foam or sprinklers. The use of AFFF at 7 Mile is considered unlikely given the site ceased operation in 1965, before the introduction of AFFF.
- The Airport commissioned soil and surface water PFAS assessment works. Soil samples and drain samples did contain PFAS.
- Dumping of potentially contaminated soil on site has not occurred.
- Groundwater is not extracted on site for any purpose. The town water supply is extracted from permanent lenses around 60 to 90 m depth at the local borefield. This matches with groundwater in bores underneath the site which encountered water between 75 and 85 m depth (Refer to Section 4.4).

5.4.2 Airservices Australia - Acting Fire Station Manager

The main information obtained from the interview with the Acting Fire Station Manager included:

- The MFS was built in 1964. The age of the FTG was less clear but may have been around the late 1990s. The new plane mock-ups were developed in the late 1990s.
- The FTG and the smoke hut (located adjacent to the MFS) were the only known areas of fire training. It is possible that training occurred at other areas of the site in the past but there is no record of such events. Foam was not used in the smoke hut as these fires were wood-based and water was applied.
- AFFF was discontinued for use in training by 2010. Ansulite foam was held for few years after that before the excess was freighted up to Darwin.
- A large bulk storage tank for AFFF is present in a bund at the MFS and has been there since around 2006, though it may not have always been in the bund. Some bulk storage tanks, 200L drums and 1000 L tanks were present in a bund at the FTG awaiting disposal.
- One major incident occurred at ASA on 5 January 1977, when a former employee of Connair flew a stolen aircraft into the Connair offices (now SkyPort Building) located at the airport. Foams were probably used but these were likely to be protein foams that did not contain PFAS. This incident was not documented in the ORS Incident Detail reports (Section 5.3) either because AFFF was not used, or the incident predates the reporting system.
- Former training schedules were not known but they were likely to be similar to current schedules which involve one aviation and one structural fire training exercise per month. However, if officer training was required, the frequency would be increased.
- During training, foam was deployed via the truck (roof) monitors, underbody protection system, bumper monitors and hoses (depending on the type of vehicle in use, e.g. not all trucks had bumper monitors).

- The main treatment for water at FTG was to leave it to evaporate from the pad. If not, it was sent via a separator to a holding tank and then to ground. The separator was designed to separate oil from water and not foam.
- The discharge area was a 'table drain' at the rear of the FTG.
- Foam was replenished in every vehicle after every use as required by CASA regulation, in order for the trucks to always be operationally ready.
- No bulk earth works were conducted in recent memory. It was likely that earth moving had occurred during construction of the FTG and smoke hut. However, a number of large stockpiles were noted near the road between the terminal and the FTG. These may have come from the runway construction. It was considered unlikely that these were impacted by PFAS as there was no knowledge of use of AFFF on the runway itself.
- Waste water from the MFS wash down bay and hose drying racks was diverted to a separator and then to a surface drain adjacent to the main runway. This drain is unlined.
- Storage vessels labelled with either 'Ansulite AFFF' or 'Waste water contaminated with AFFF' were present in bunds at both the FTG and MFS.

5.4.3 Airservices Australia – Senior Environmental Specialist

The main information obtained from a supplementary email from Airservices included:

- The waste water contaminated with AFFF stored in the bunded area in the FTG was generated by a pad cleaning exercise. Both this waste water and the AFFF waste stored in a large bunded bulk storage tank in the MFS were scheduled to be removed (to Geocycle in Victoria) but the EPA Victoria has halted the disposal of the solids, although liquid disposal is still allowed as contaminants are destroyed as opposed to landfilled.
- Although the Low Ecological Services 2010 report indicated that the fire retardant 3M Light Water™ AFFF had been used from 1988, it was actually used earlier (by 1983 at the latest).
- Airservices ceased use of AFFF in training in January 2010, and RF6 replaced Ansulite at Alice Springs in December 2010.
- The age of the FTG predates 1978, however it was redeveloped to its current configuration and infrastructure circa 1996-1998 as part of the standard setup of an LMU on a concrete pad that Airservices established at every FTG when they commenced operations at an airport.
- The transition to Solberg happened in December 2010 and the surplus Ansulite stock was kept onsite until it could be moved to Darwin in early 2011.

5.5 Summary of site history

The site historical review indicated that the airport commenced operation at the 7 Mile site in 1940 and stayed there until 1965 when the new terminal was built. It is considered unlikely that AFFF was used at 7 Mile.

The MFS was built around 1964. Airservices began operation in 1995 and set up the current configuration at the FTG. Training has only occurred at the FTG and the smoke hut near the MFS. AFFF was not used during training at the smoke hut. AFFF was used at the FTG for training purposes.

Ansulite was used and stored at the MFS but its use was discontinued in 2010. However, some remnant AFFF remains on-site in bunded areas awaiting disposal.

The FTG and MFS are considered to be the main potential sources of PFAS contamination due to the activities that have occurred here and the likely storage of AFFF. Drains leading from both of these facilities may have provided a migration pathway to other areas of the site. However, sampling by Low (2014) indicated PFAS had not travelled any significant distance via these drains.

Remediation of a small volume of soil has occurred on the site near the FTG. This involved biopiling of soils impacted by petroleum hydrocarbons.

There have been three documented operational uses of AFFF at the following locations:

- Apron adjacent to the Helicentre
- Apron bay 8 (includes drainage lines as area washed off after the operation)
- 1.5 km north-east of airfield

There was also a deliberate plane crash in 1977, however it was considered likely that only protein based foams were used.

Potential AFFF source areas are outlined in Figure 4 in Appendix A.

6. Preliminary and targeted sampling

6.1 Scope of work

Based on the outcomes of the PSI, a Sample Analysis and Quality Plan (SAQP) was developed for the investigation (GHD, 2016).

The SAQP was prepared so that the field investigations and analyses were undertaken in a way that enabled the collection and reporting of reliable data on which to base any further soil, groundwater and surface water monitoring programs for specific areas of the site.

The scope of work undertaken, methodology adopted and results of the sampling program are provided in a Preliminary Sampling report (GHD, 2017).

6.2 Results summary

The investigations completed as part of this scope of works reported the highest PFAS concentrations in the vicinity of the FTG (compared to significantly lower results at the MFS). These included results from the soil bores, drain sediments and the land farming soils. These concentrations are consistent with the area having been used for training purposes rather than just storage.

The soil results of the FTG area did not exceed health based screening criteria (HBSC) but did exceed the Airservices ecological interim screening levels (EISLs) (terrestrial) 95%, 80% and 60% protection – this includes the commercial / industrial land use scenario.

The single surface water sample obtained from the drainage channel to the south of the MFS (SW01) contained PFOS in excess of the Airservices HISLs (consumption of fish) and Airservices EISLs (toxicity effects on aquatic organisms). The consumption of fish HISL is not considered relevant to the assessment of risk to human health at the site given the nature of the water body (i.e. a stormwater drain) and the site setting. However, it is possible that native aquatic fauna may utilise the water and therefore could be exposed to PFASs.

Leached PFAS analysis was also conducted on five soil bore samples and five stockpile samples. Elevated PFOS concentrations were reported at SB02_1.0 (321 µg/L), SB04_0.2 (441 µg/L), SB09_0.2 (1120 µg/L), SP03 (388 µg/L), SP05 (1700 µg/L). However, leached PFOS concentrations were identified in all soil samples indicating PFAS contamination is likely to be mobile and be readily transported, both vertically and laterally, in water at the site. Full details of the scope of work undertaken, methodology and results are provided in the Preliminary Sampling report (GHD, 2017).

7. Conceptual site model

Based on our understanding of the contamination issues and site setting, a conceptual site model (CSM) has been developed to identify the potential contamination sources, pathways and receptors, and the potential linkages (or pollutant linkages) between these.

A CSM is a critical element of any PSI and forms the basis for the assessment of contamination risk and prioritisation of any further investigations. As it is based only on limited information at the PSI stage, it is regarded as being preliminary only at this point and as the foundation for the development of a more detailed CSM as site investigations progress.

Different land use scenarios have different contamination risk profiles depending on the sensitivity of receptors and the nature and likelihood of potential exposure mechanisms. This CSM assumes a commercial/industrial land use scenario consistent with the site's current use as an airport. A representation of the CSM using a cross-section is shown in Figure 5 in Appendix A. A representation is also included in Chart 1.

7.1 Sources

The main primary source of PFAS at the ASA is considered to be the use and storage of AFFF products, notably at the FTG and MFS.

- The FTG – routine discharge of AFFF in this area from 1983 to 2010
- The MFS and surrounding area – wash down of vehicles and hoses, drainage associated with the bunded areas that contained AFFF, the daily and six-monthly AFFF discharges adjacent to the current ARFF fire station from 1992 to 2010

PFAS has been distributed further from these sources via surface drains.

Stockpiled (biopiled) soil near the FTG has not been assessed for PFAS.

AFFF may have been used in one-off events associated with operational use, however the volume of AFFF used was minimal and these are not considered to be likely significant sources.

7.2 Pathways

The key mechanisms for contaminant transport at the site have been identified as:

- *Surface water drains* – discharge of PFAS-contaminated water to surface drains at the FTG and MFS. There is limited potential for migration of contaminated surface water off-site, but the drains are unlined and water is likely to percolate to depth. Sediments in the drains may undergo limited migration down the drain but only during high rainfall events.
- *Groundwater advection/dispersion* – horizontal and vertical migration of contaminants from the ASA soils into the underlying aquifer. The depth to the aquifer suggests this is not likely. There are also no obvious local discharge areas for groundwater to the surface.
- *Relocation of contaminated soils on site* – There is potential that soils impacted with PFAS may have been relocated on the ASA as part of bulk earth works. Large stockpiles are located parallel to the runway and may have originated from runway development works. It is considered unlikely that these are impacted by PFAS although this has not been assessed.

7.3 Receptors

The site is located in a highly modified commercial/industrial site setting. The following are the key potential human health and ecological contamination receptors considered to be relevant in the context of the site's setting:

- Site workers whose activities may result in exposure to site soils and surface water.
- Terrestrial flora and fauna consuming impacted plant material e.g. grasses. This in turn may impact their predators.

Based on the identified receptors and the release and fate and transport characteristics of PFAS, contaminant uptake pathways through which receptors may become exposed to contamination include ingestion and dermal absorption.

- *Ingestion exposure pathway* - Ingestion of contaminants by site workers could occur during site works which will involve excavation and handling of site soils or surface water. This is not considered to be of a concern for indoor site workers.
- Terrestrial soil organisms may ingest contaminants via soil consumption. Larger terrestrial fauna may consume animal and plant matter impacted by PFAS.
- *Dermal exposure pathway* - Exposure may occur via sorption through biological membranes such as skin, based on animal studies. This has not been confirmed for humans and PFOS has a low skin permeability constant.
- *Inhalation exposure pathway* – PFAS are not considered to be volatile so inhalation is not considered to be a viable exposure route.

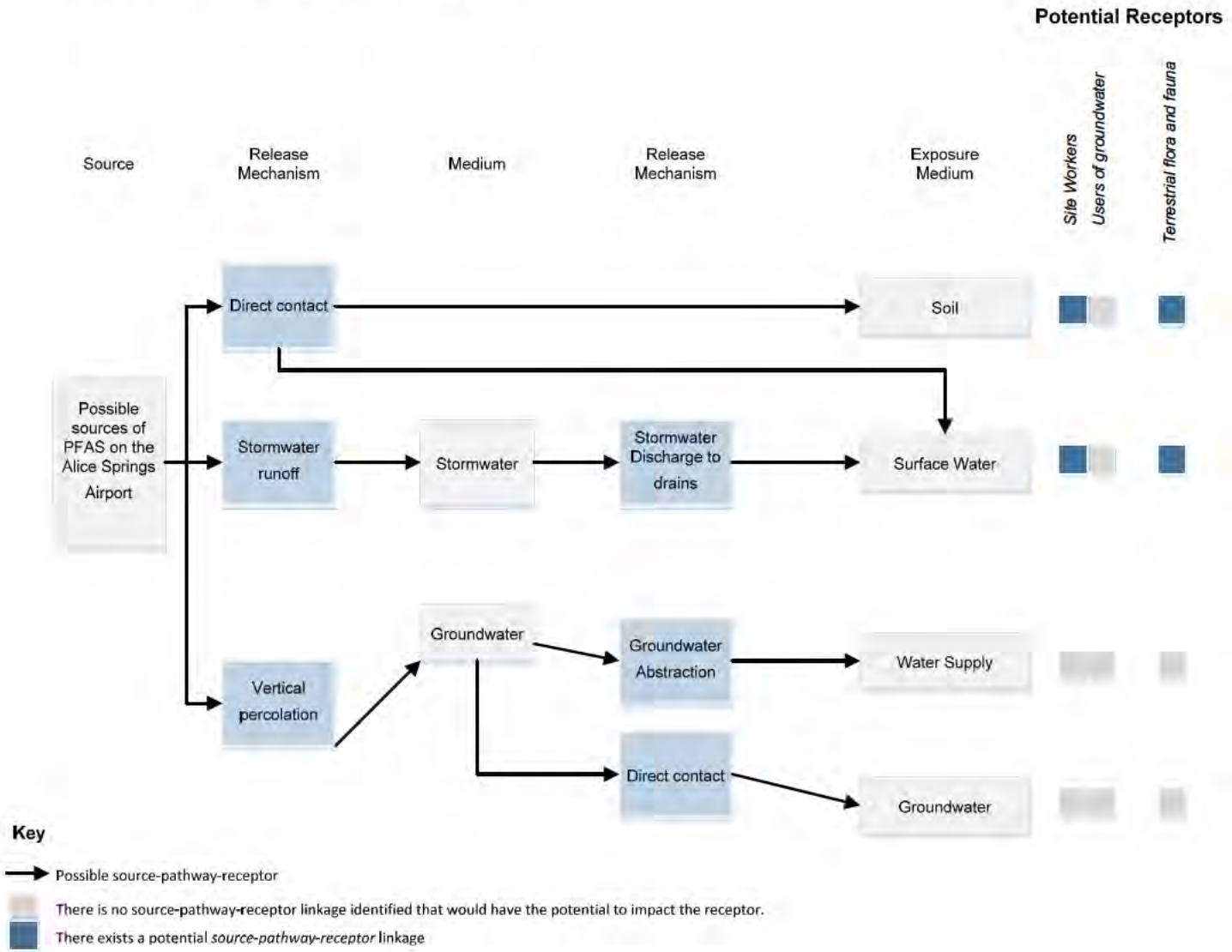
7.4 Potential source-pathway receptor linkages

The CSM has identified a number of potential source-pathway-receptor pollutant linkages which are highlighted in Table 7 and Chart 1. A cross sectional CSM is provided is provided in Appendix A as Figure 5 and a pathways CSM as Figure 6. These are discussed below in the context of the ASA setting.

Table 7 PFAS contamination – potential pollutant linkages

Potential pollutant linkages	Key exposure routes and risks
Potential human health risks	
Health risks to site workers who may come into contact with contaminated site media	Day to day activities are not likely to expose site personnel to these media. However, it remains a possibility where workers are involved with excavation and handling of contaminated soil or surface water. It is expected that this can be managed through good hygiene practices and task-specific management plans.
Potential ecological risks	
Terrestrial ecology – take up of PFAS from soil and surface water by soil biota and plants and subsequent consumption by larger fauna and predators	There is potential for prey species to ingest impacted flora or soil and then be predated by larger animals e.g. eagles, snakes, foxes.

Chart 1 - Conceptual Site Model



8. Conclusions

8.1 Conclusions

Based on the review of available site history information, site inspection and site interviews, the following potential sources of PFAS have been identified:

- The FTG – routine discharge of foam in this area from 1980 to 2010
- The MFS and surrounding area – wash down of vehicles and hoses, drainage associated with the bunded areas that contained foam, the daily and six-monthly foam discharges adjacent to the current AFFF fire station from 1992 to 2010
- Existing and former surface water drainage channels
- Areas where soil from FTG is currently (and historically) been relocated and stockpiled

The following potential sensitive receptors have been identified:

- Site workers whose activities may result in exposure to site soils and surface water
- Terrestrial fauna consuming impacted plant material e.g. grasses. This in turn may impact their predators

8.2 Summary of preliminary sampling program

Based on the data reviewed in this study and the CSM, the following summary is made:

- The primary source (use of AFFF containing PFASs) no longer exists. Secondary sources include residual soil, sediment, stockpile and minor surface water contamination.
- Soil results reported PFAS concentrations which exceeded the adopted ecological guidelines, indicating that in the areas sampled, soils may present an unacceptable risk to ecological receptors.
- Given the elevated PFAS concentrations reported in the stockpile to the south east of the FTG and in the soil in the vicinity of the FTG, it would be prudent to develop a management strategy for this soil (possible options involve excavation and containment).

9. References

Airports Act 1996

Airports (Environment Protection) Regulations 1997

Australian Standard AS 4482.1:2005: Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil

AS/NZS ISO 31000:2009: Risk management - Principles and guidelines

Australian Commonwealth Work Health and Safety Act 2011

Commonwealth Work Health and Safety Regulations 2011

Darwin Airport 2006, Soil Sample Results taken on the 2nd November 2006, Alice Springs Airport, 2006

Department of Infrastructure and Regional Development (DoIRD, 2015): GEM 002 - PFC Management Actions Advice

Environment Protection Act 1970

GHD 2008, Preliminary Site Contamination Assessment, Alice Springs ARFF Drill ground, Alice Springs Airport, September 2008

GHD, 2015, Airservices Interim Contamination Management Strategy and Decision Framework for PFC contamination, June 2015 (the 'Interim Framework')

GHD, 2016: Airservices Australia – Alice Springs Airport Sampling and Analysis Quality Plan

GHD. 2017: Airservices Australia – Alice Springs Airport Preliminary Sampling Report

Low Ecological Services 2009, Report on Soil and Waste Water Sampling at Alice Springs Airport Fire Station and ARFF Drill Ground, Alice Springs, NT January 2010

Low Ecological Services 2014, Report on Soil and Waste Water Sampling at ARFF Fire Station and Drill Facility, Alice Springs Airport, April 2014

MGT Environmental Consulting 2003, Soil and water sample analysis results from ARFF drill ground, Alice Springs Airport, June 2003

NEPC, 2013: National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013 (the ASC NEPM)

10. Limitations

This report has been prepared by GHD for Airservices Australia (Airservices) and may only be used and relied on by Airservices for the purpose agreed between GHD and Airservices.

GHD otherwise disclaims responsibility to any person other than Airservices arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Airservices and others who provided information to GHD which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

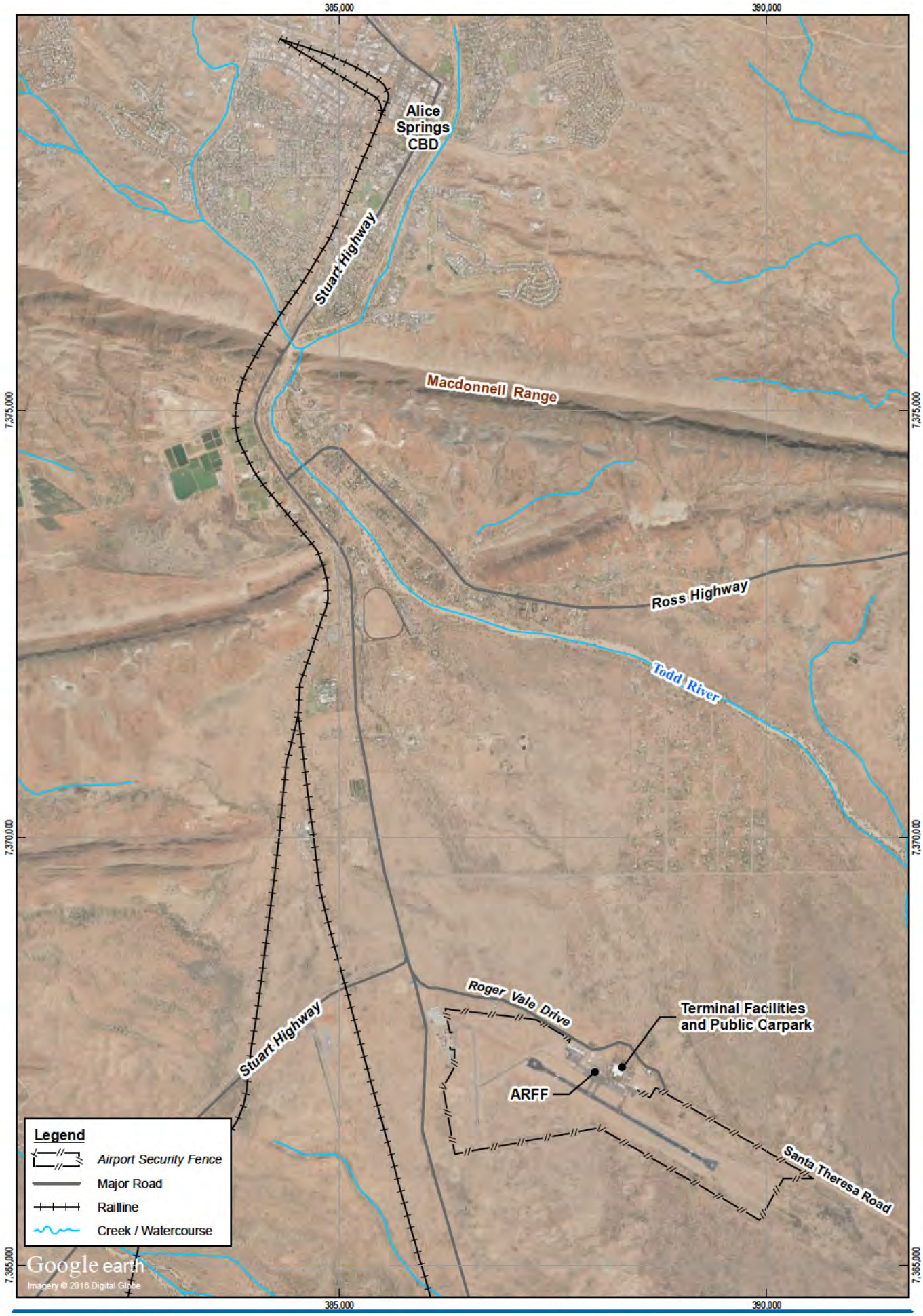
The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

Appendices

Appendix A – Figures



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0 500 1,000 1,500 2,000 2,500

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53

N

GHD airservices

Airservices Australia
Alice Springs Airport
Preliminary Site Investigation

Job Number 31-34249
Revision A
Date 12 Sep 2016

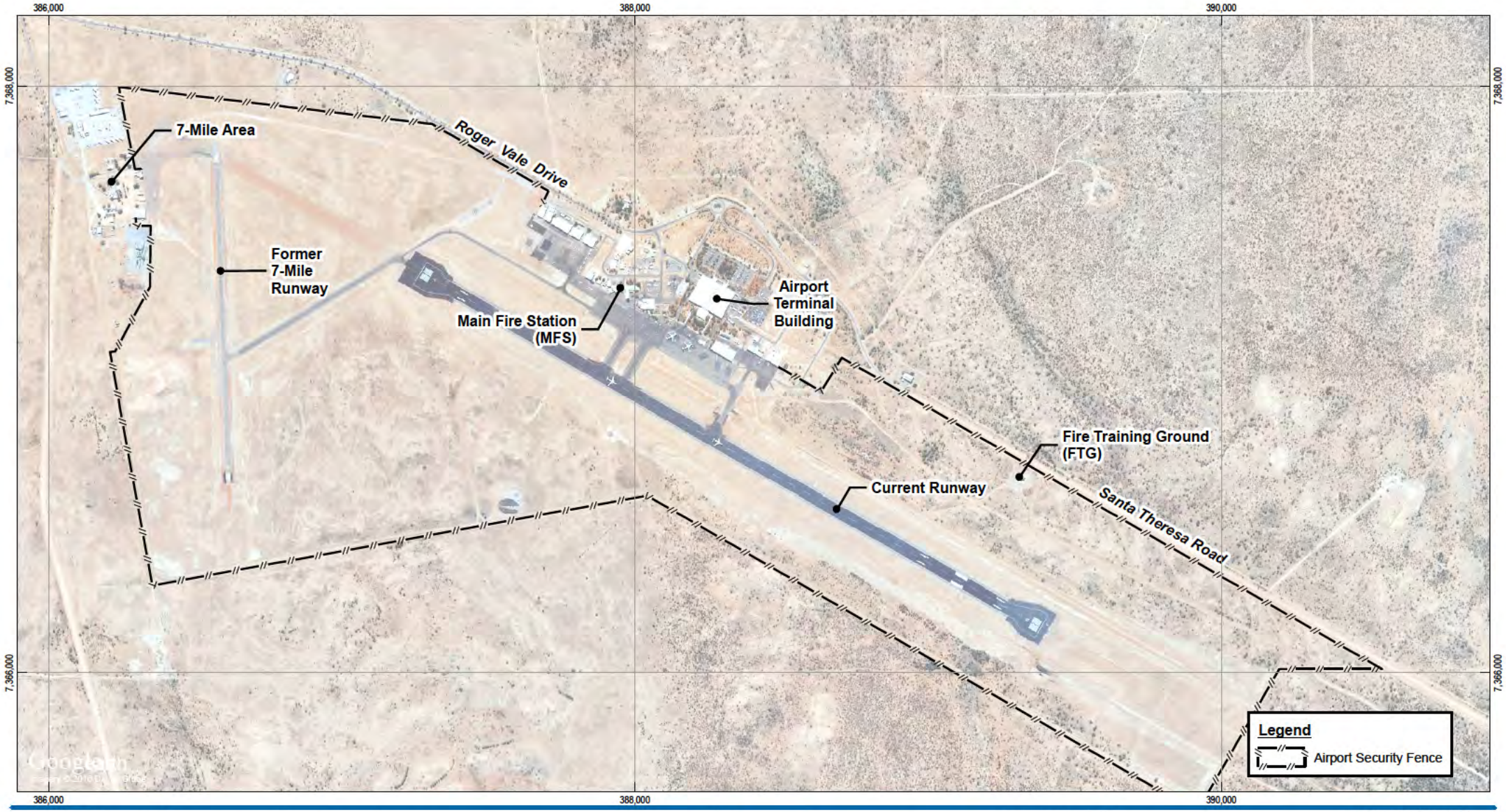
Site Locality

Figure 1

H:\Projects\31\34249\GIS_bne_jvc\maps\MXD\31-34249-511_aliceSpringsLocality_revA.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com.au W www.ghd.com

Data Source: Northern Territory Lands: bores and geology mapping (2015); Google Earth: imagery (May 2015, extracted Jul 2016). Created : jvc



1:18,000 (at A4)

0 200 400 600 800

metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53

N

Airservices Australia
Alice Springs Airport
Preliminary Site Investigation

Job Number 31-34249
Revision A
Date 30 Sep 2016

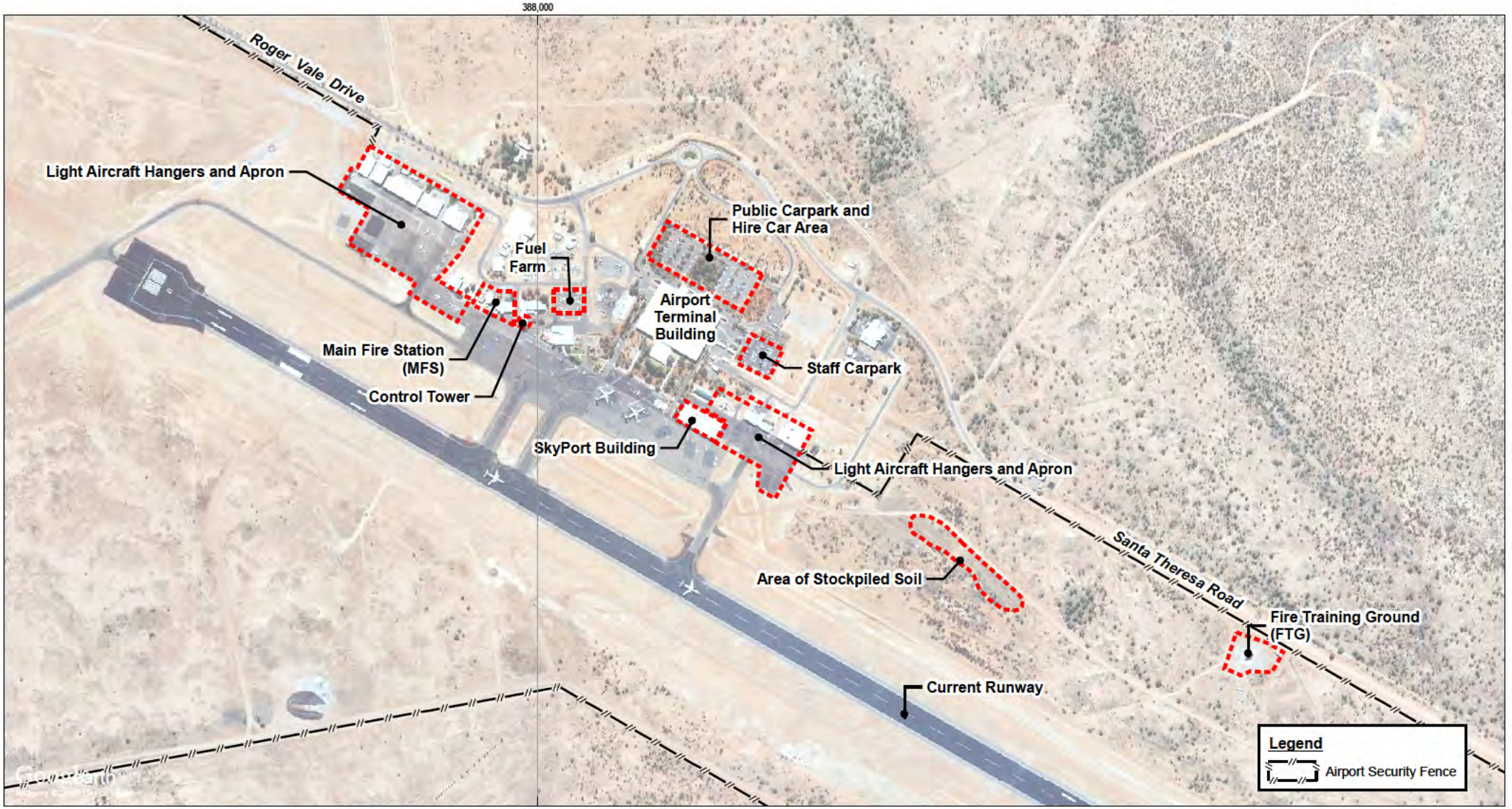
Site Features

Figure 2a

H:\Projects\31\34249\GIS_bne_jvc\maps\MXD\31-34249-513_AliceSpringsDetail_revA.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: Google Earth: imagery (May 2015, extracted Jul 2016). Created : jvc



1:10,000 (at A4)

0 100 200 300 400

metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53

N

Airservices Australia
Alice Springs Airport
Preliminary Site Investigation

Job Number 31-34249
Revision A
Date 06 Oct 2016

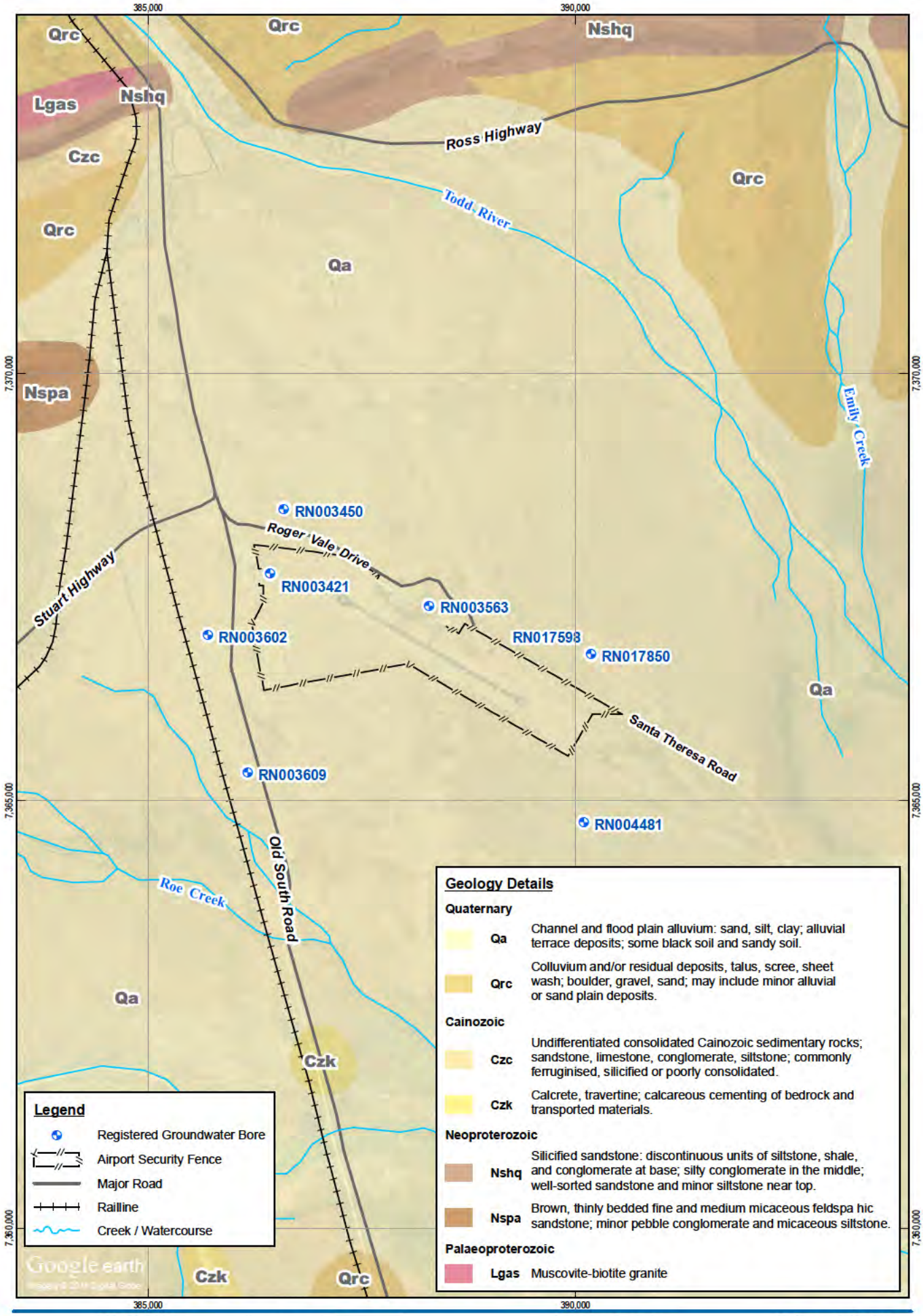
Site Features

Figure 2b

H:\Projects\31\34249\GIS_bne_jvc\maps\MXD\31-34249-514_AliceSspringsDetail02_revA.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: Google Earth: imagery (May 2015, extracted Jul 2016). Created : jvc



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Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53

N

GHD airservices

Airservices Australia
Alice Springs Airport
Preliminary Site Investigation

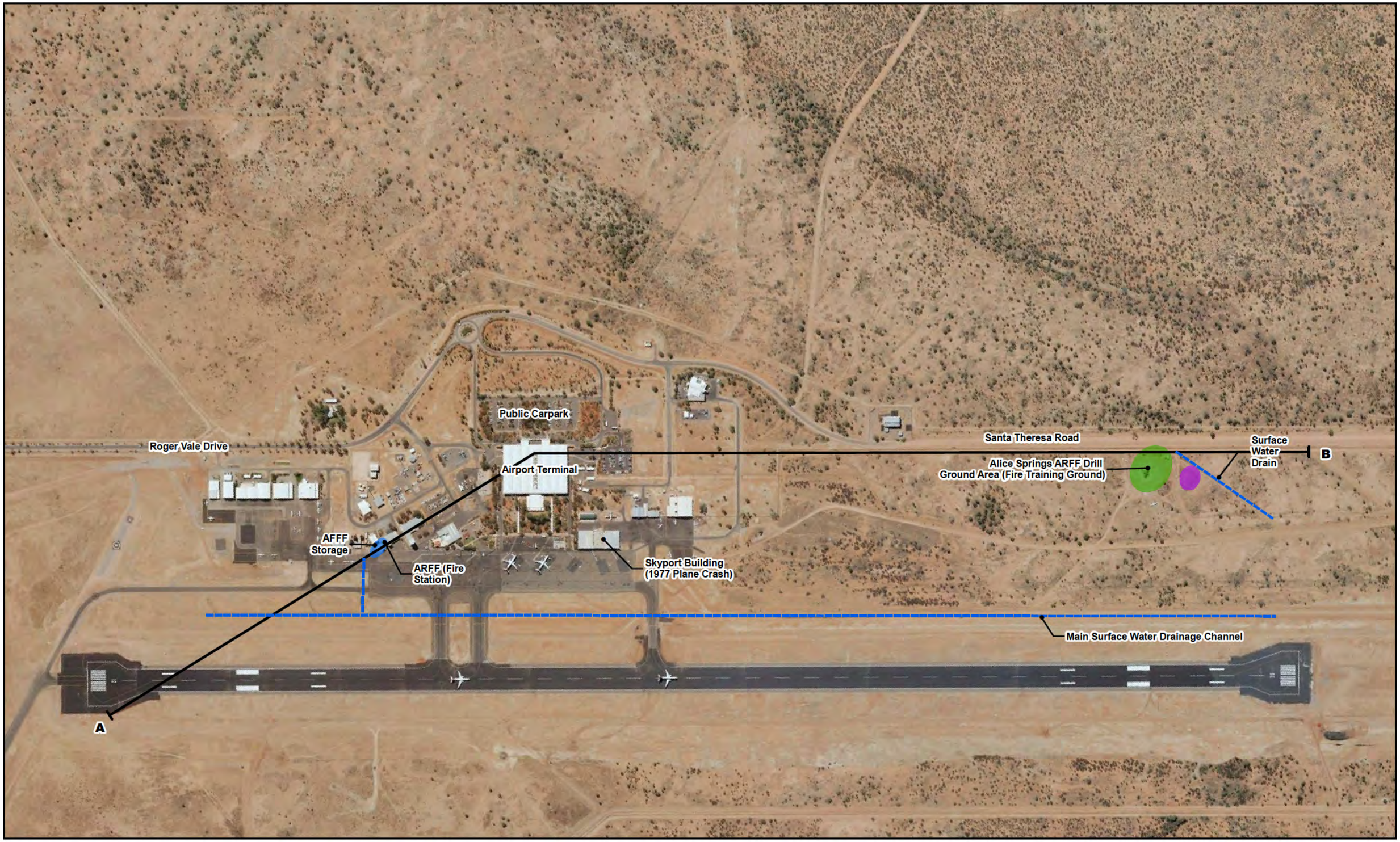
Job Number 31-34249
Revision A
Date 12 Sep 2016

Geology and Hydrogeology Figure 3

H:\Projects\31\34249\GIS_bne_jvc\maps\MXD\31-34249-512_aliceSpringsGeology_revA.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com.au W www.ghd.com

Data Source: Northern Territory Lands: bores and geology mapping (2015); Google Earth: imagery (May 2015, extracted Jul 2016). Created : jvc



1:7,000 (at A3)

0 30 60 120 180 240

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53

LEGEND

- Known usage of PFAS for training
- Landfarming remediation stockpile area
- Storage of PFAS

Airservices Australia
Preliminary Site Investigation

Job Number	31-34249
Revision	A
Date	14/07/2016

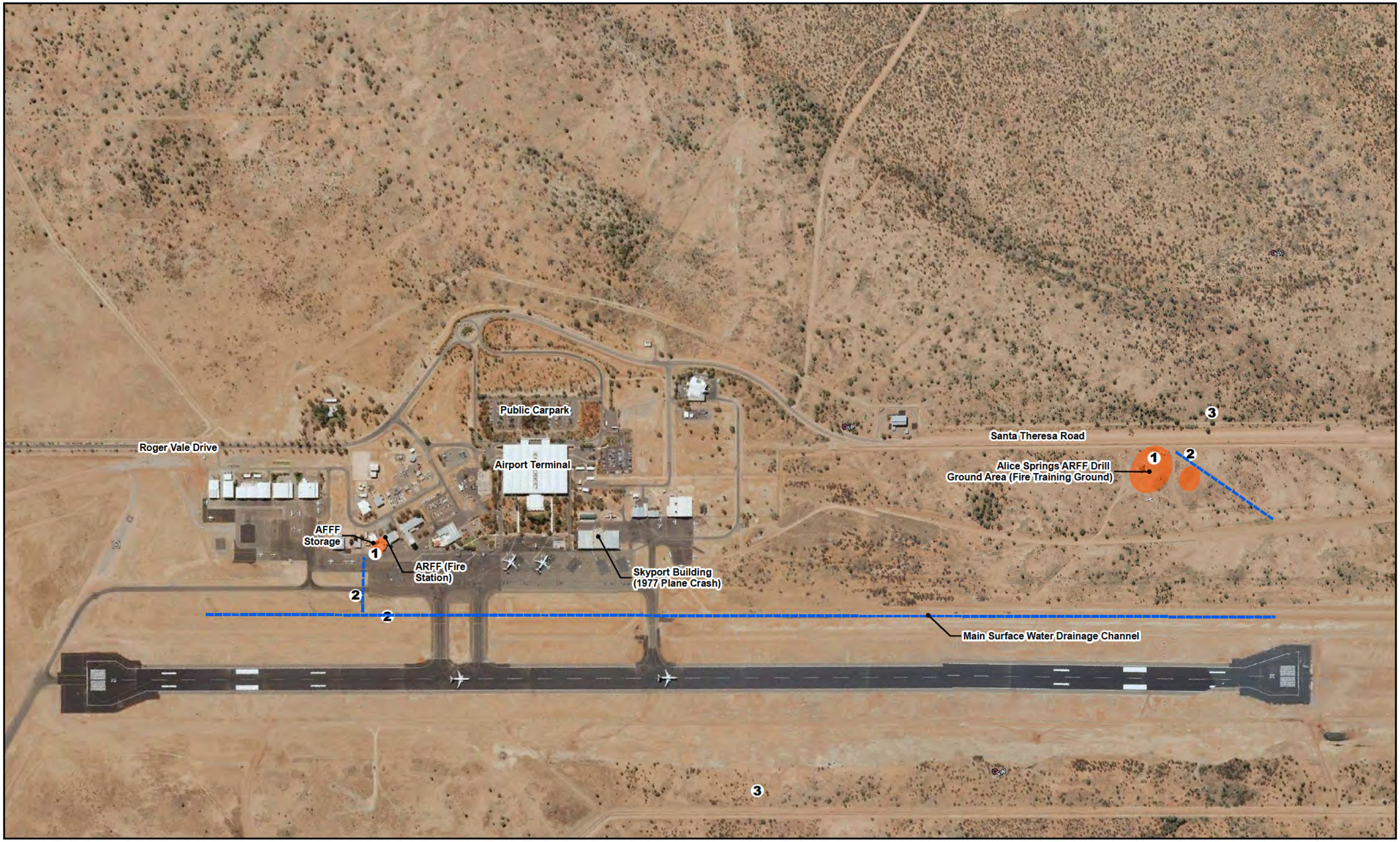
Potential AFFF source areas

Figure 4

N:\AU\Melbourne\Projects\31\34249\GIS\Maps\Deliverables\31_34249_Z002_AliceSprings_F3_SiteFeatures.mxd

Data source: Image retreieved from Google Earth Pro 08/07/2016. Data custodian: DigitalGlobe, Imagery Date: 10/02/2016 Created by: jvancooten

180 Lonsdale Street Melbourne VIC 3000 **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com.au



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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53

LEGEND

Areas of Environmental Concern

Pathways

1 Site workers exposure to impacted soils and surface water

2 Migration of contamination to surface water

3 Bioaccumulation in fauna

Airservices Australia
Preliminary Site Investigation

Job Number 31-34249
Revision A
Date 14/07/2016

Alice Springs Airport Conceptual Site Model Pathways

Figure 5

180 Lonsdale Street Melbourne VIC 3000 **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com.au

N:\AU\Melbourne\Projects\31\34249\GIS\Maps\Deliverables\31_34249_Z003_AliceSprings_F5_CSM.mxd

Data source: Image retreieved from Google Earth Pro 08/07/2016. Data custodian: DigitalGlobe, Imagery Date: 10/02/2016 Created by: jvancooten

Paper Size A4

Airservices Australia
Alice Springs Airport
Preliminary Site Investigation

Job Number	31-34249
Revision	B
Date	13 Sept 2016

Conceptual Site Model Pathways Figure: 6

S:\GIS\Projects\31-34249\maps\Conceptual_Diagrams\AliceSprings\ 31_34249_AliceSprings_CSM_Pathways_rev_b.indd

145 Ann Street Brisbane QLD 4000 | T 61 7 3316 3000 | F 61 7 3316 3333 | E bnemail@ghd.com | W www.ghd.com

Appendix B – Certificate of Title

NORTHERN TERRITORY OF AUSTRALIA

Record of Administrative Interests and Information

Record of Administrative Interests and Information
The information contained in this record of Administrative Interests only relates to the below parcel reference.

Parcel Reference: N.T. Portion 00429 plan(s) S 80/149

(See section 38 of the Land Title Act)

Note: The Record of Administrative Interests and Information is not part of the Land Register and is not guaranteed by the Northern Territory of Australia, and the NT Government accepts no Liability for any omission, misstatement or inaccuracy contained in this statement.

Registrar General

Government Land Register
(none found)

Custodian - Registrar General (+61 8 8999 6252)

Current Title
CUFT 663 311 (order 1)

Tenure Type
ESTATE IN FEE SIMPLE

Tenure Status
Current

Area Under Title
4 square kilometres 9 hectares 9000 square metres

Owners
Commonwealth of Australia
Dept. Transport & Regional Development, Level 3, 22 Cooyong Street, Canberra ACT 2601

Easements
(none found)

Unit Entitlements
(none found)

Transfers
(none found)

Tenure Comments
(none found)

Historic Titles
CUFT 594 089 (order 1)
CUFT 501 124 (order 1)
CUFT 166 047 (order 2)
CUFT 166 047 (order 1)
Visit the website http://www.nt.gov.au/justice/bdm/land_title_office/

Custodian - Surveyor General (+61 8 8995 5353)

Address
196 ROGER VALE DR, CONNELLAN

Survey Plan
S 80/149

Parcel Status
CURRENT

Parcel Area
4 square kilometres, 9 hectares, 9000 square metres

Map Reference
Code 010 Scale 5000 Sheet 15.13

Parent Parcels
(none found)

Parcel Comments
PT PROP R1536 S73/96/73 - A/S AERODROME. FEE SIMPLE ACQ OVER PART BY COA CG S116 29/6/78. BAL ACQ BY COA CG S119 29/6/79 NTG 14/7/78. PROP TO CLOSE ADJ ROAD - S91/35. CAA LEASES OVER PARTS VIDE NT PORS 4132(A) S92/40, 4133A S92/41, 4134(A), 4141(A) S92/42, 4135(A) S92/43. LEASES OVER PARTS - NT PORS 4138(A), 4144(A) S92/46, 4139(A), 4145(A) S92/47. ORDER TO CLOSE ROAD NTG G16 22/4/1992. LEASE SITES S94/39-42 NT PORS 4689-4693, S94/44 NT PORS 4695-4696. LONG TERM LEASE NT POR 4710(A) S94/67. LONG TERM LEASE NT POR 4851 S95/39. NT POR 429 APPOINTED AN AIRPORT UNDER SEC 15 OF THE CUSTOMS ACT NTG 37 11/9/1963. DECLARED PART OF FEDERAL AIRPORT KNOWN AS "ALICE SPRINGS AIRPORT" UNDER FAC ACT 1986 CG GN37 27/9/1989. DECLARED A FEDERAL AIRPORT UNDER FAC ACT 1986 VIDE CG S 102 29/3/1989. DECLARED HERITAGE PLACE (SEVEN MILE AERODROME BUILDINGS) NT POR 6363(A) OVER PART NTG G40 5/10/2005.

Survey Comments
(none found)

Proposed Easements
(none found)

Municipality
Alice Springs Town Council

Region
ALICE SPRINGS

Custodian - Valuer General (+61 8 8982 5700)

Owner's Last Known Address
Commonwealth of Australia, Dept. Transport & Regional Development Level 3 22 Cooyong Street Canberra ACT 2601

Parcels in Valuation
N.T. Portion 00429

Unimproved Capital Value
$2,150,000 on 01/07/2006
$1,700,000 on 01/07/2003
$58,000 on 01/07/2000
$50,000 on 01/07/1997

Valuation Improvements
12/04/1995 Special uses other

Custodian - Property Purchasing (+61 8 8999 7722)

Acquisitions
(none found)

Custodian - Building Advisory Service (+61 8 8999 8965)

Building Control Areas
(none found)

Building Permits

Application Number:	3 of 4
Permit to Occupy Issued Date:	03/12/1997
Description:	AIRCRAFT HANGER & ATTACHED OFFICE
Permit to Occupy Type:	Full Code
Number of Residental Units:	1
Australian Bureau of Statistics Type:	(none found)
Building Class:	Warehouse
Area:	1120 square metres

Application Number:	2 of 4
Permit to Occupy Issued Date:	03/12/1997
Description:	AIRCRAFT HANGER & ATTACHED OFFICE
Permit to Occupy Type:	Full Code
Number of Residental Units:	1
Australian Bureau of Statistics Type:	(none found)
Building Class:	Warehouse
Area:	0 square metres

Application Number:	4 of 4
Permit to Occupy Issued Date:	11/06/1997
Description:	SHOP FIT OUT TENANCY 2
Permit to Occupy Type:	Full Code
Number of Residental Units:	
Australian Bureau of Statistics Type:	(none found)
Building Class:	Shop Assembly building
Area:	160 square metres

Application Number:	1 of 4
Permit to Occupy Issued Date:	03/02/1994
Description:	SHED
Permit to Occupy Type:	
Number of Residental Units:	1
Australian Bureau of Statistics Type:	(none found)
Building Class:	Out building
Area:	36 square metres

Visit the website http://www.nt.gov.au/lands/building/

Custodian - Town Planning and Development Assessment Services (+61 8 8999 6057)

Planning Scheme Zone
CA No Planning Scheme Controls

Interim Development Control Orders
(none found)

Planning Notes
(none found)

Planning Applications

File Number
PA1994/0698

Type
Subdivision

Date Received
06/09/1994

Application Purpose
CREATE 8 LOTS LEASE IN EXCESS OF 12 YEARS TO PROVIDE AIR ROUTE AND AIRWAY FACILITIES

Application Status
Approved

Other Affected Parcels
(none found)

Instrument Signed
25/09/1994

Instrument Number
DPM94/0035

Instrument Issued
Signed

Instrument Status

File Number
PA1992/0197

Type
Subdivision

Date Received
12/05/1992

Application Purpose
CREATE 10 LOTS

Application Status
Approved

Other Affected Parcels
(none found)

Instrument Signed
09/07/1992

Instrument Number
S 2338

Instrument Issued
Signed

Instrument Status
Completed

Custodian - Power and Water Corporation (1800 245 092)

Meters on Parcel

Power Water - Electricity	1
Power Water - Water	2

For Account balances, contact the Power and Water Corporation.

Custodian - Pool Fencing Unit (+61 1300 301 059)

Swimming Pool/Spa Status
(none found)

For more information, contact the Pool Fencing Unit (+61 1300 301 059).

Custodian - Mines and Energy (+61 8 8999 5322)

For information on possible Exploration Licences, contact Mines & Energy or visit the website http://www.nt.gov.au/ntg/minen.shtml

For information on possible Petroleum Titles, contact Mines & Energy for further details.

Custodian - Environment and Heritage (+61 8 8924 4139)

Results of site contamination assessment
(none found)

For further information contact Environment and Heritage or visit the website http://www.nt.gov.au/nreta/environment/waste/register/index.html

Other Interests

For Account balances, contact Alice Springs Town Council

Proposed Heritage Place. Contact the Heritage Unit, Department of Infrastructure, Planning and Environment on 8924 4143.

Date Registered: 14/07/2003 **Volume** 663 **Folio** 311
Duplicate Certificate as to Title issued? Yes 14/07/2003

SEARCH CERTIFICATE

N.T. Portion 429 from plan(s) S 80/149
Area under title is 4 square kilometres 9 hectares 9000 square metres

Owner:
Commonwealth of Australia
of Dept. Transport & Regional Development, Level 3, 22 Cooyong Street, Canberra ACT 2601

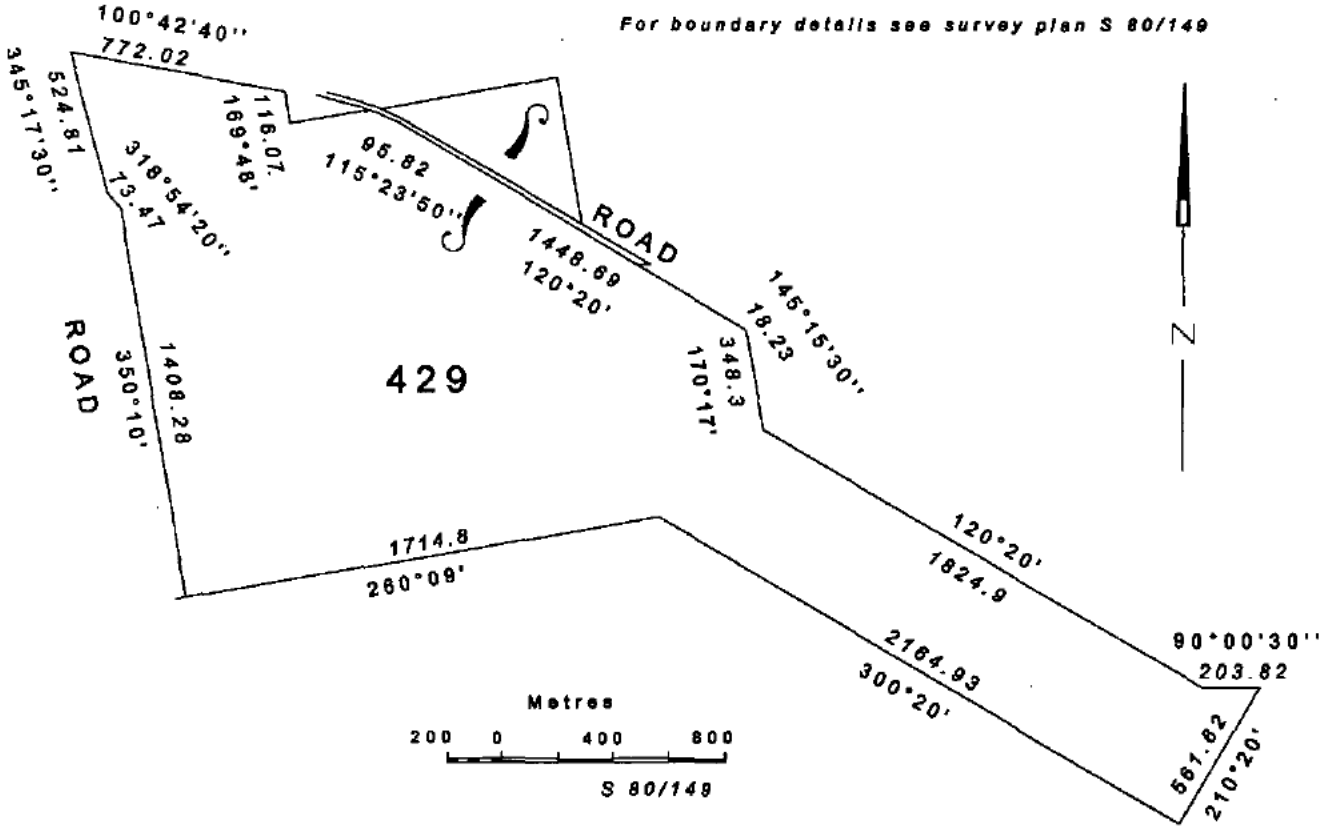
Registered Date	Dealing Number	Description
		Previous title is **Volume** 594 **Folio** 089
14/07/2003	524963	Request to issue Certificate as to Title
10/11/1998	411112	Mortgage of lease to CBA Corporate Services (NSW) Pty Ltd
10/11/1998	411111	Lease to Alice Springs Airport Pty. Ltd. - expiring 10/6/2048
07/08/1997	380969	Lease to Airservices Australia - Lot 4140(A) - expiring 30/6/2034
07/08/1997	380968	Lease to Airservices Australia - Lot 4139(A) - expiring 30/6/2034
07/08/1997	380967	Lease to Airservices Australia - Lot 4689(A) - expiring 30/6/2034
07/08/1997	380966	Lease to Airservices Australia - Lot 4145(A) - expiring 30/6/2034
07/08/1997	380965	Lease to Airservices Australia - Lot 4144(A) - expiring 30/6/2034
07/08/1997	380964	Lease to Airservices Australia - Lot 4695(A) - expiring 30/6/2034
07/08/1997	380963	Lease to Airservices Australia - Lot 4692(A) - expiring 30/6/2034
07/08/1997	380962	Lease to Airservices Australia - Lot 4690(A) & 4691(A) - expiring 30/6/2034
07/08/1997	380961	Lease to Airservices Australia - part - expiring 30/6/2034
04/12/1996	365195	Lease to Vodafone Pty. Ltd. - part - expiring 30/6/2001

End of Dealings

Reservations: Interests in minerals vested in the Northern Territory of Australia by the Northern Territory (Self Government) Act 1978.

Date Registered: 14/07/2003 **Volume** 663 **Folio** 311

Duplicate Certificate as to Title issued? Yes 14/07/2003



For boundary details see survey plan S 80/149

Appendix C – Site photographs

Photo 1	Photograph
Fire Station wash down bay	
Photo 2	**Photo**
AFFF storage bund at Fire Station	

Photo 3	Photo
Fuel bowser at Fire Station	
Photo 4	**Photo**
Fire Station surface drain	

Photo 5	Photo
AFFF Storage Bund at Fire Training Ground	
Photo 6	**Photo**
Kerosene AST and pipework at Fire Training Ground	

Photo 7	Photo
Fire Ground Training Pad with mock plane	
Photo 8	**Photo**
Waste water UST at Fire Training Ground	

Photo 9	Photo
Waste water separator at Fire Training Ground	
Photo 10	**Photo**
Surface drain parallel to runway	

Photo 11	Photo
Fire Training Ground table drain	

Photo 12	Photo
Water bore and pump at 7 Mile	

Appendix D – Groundwater data search results

Origin of Water MEREENI GRID

BORE 73Z46

Reference SN 65 / 55

Specimen Advice Note No. 8801

Date Sampled 24/7/64

Date Received 30/7/64

Results in parts per million RN 4481

HARDNESS (Calculated as CaCO3)		
" Total	266	
" Temporary	266	
" Permanent	NIL	
ALKALINITY IN EXCESS OF TOTAL HARDNESS	27	
CHLORIDE	150	4·33
SULPHATE	325	6·77
FLUORIDE	1.5	
CALCIUM	65	3·24
BICARBONATE	357	5·85
CARBONATE	NIL	
SODIUM	250	10·87
POTASSIUM	16	0·41
		11·28
MAGNESIUM	25	2·06
NITRATE	NIL	
NITRITE	NOT DETERMINED	
AMMONIA	"	"
$\frac{HCO_3}{Cl_2} = 1·38$		
TOTAL DISSOLVED SALTS	1190	

$\frac{2}{} = 0·8$ pH 7.8

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The above results are forwarded for your information.

Signature [signature]

6,250 ppm. equals approx. 1 oz. per gall.

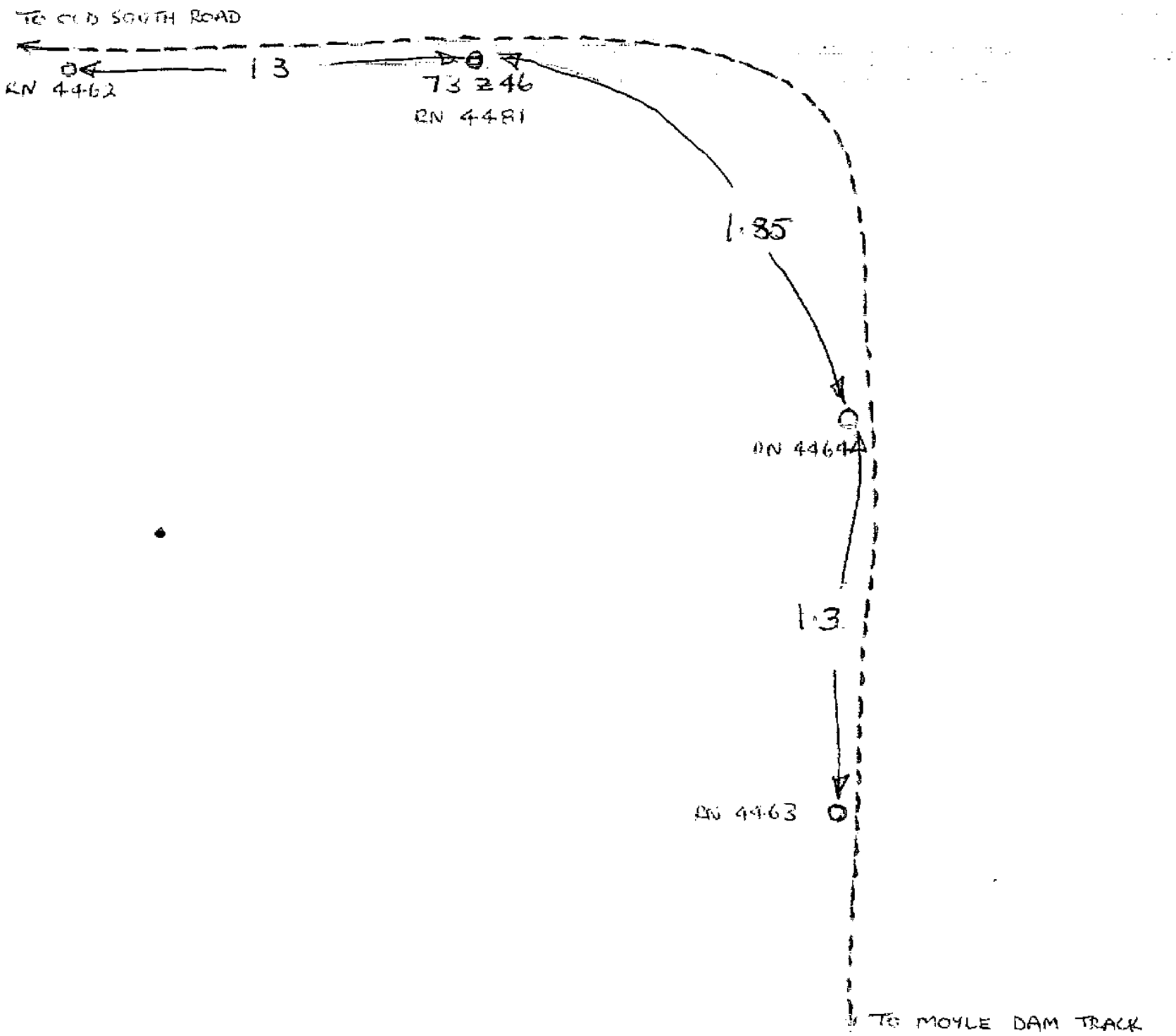
Date 25/8/64

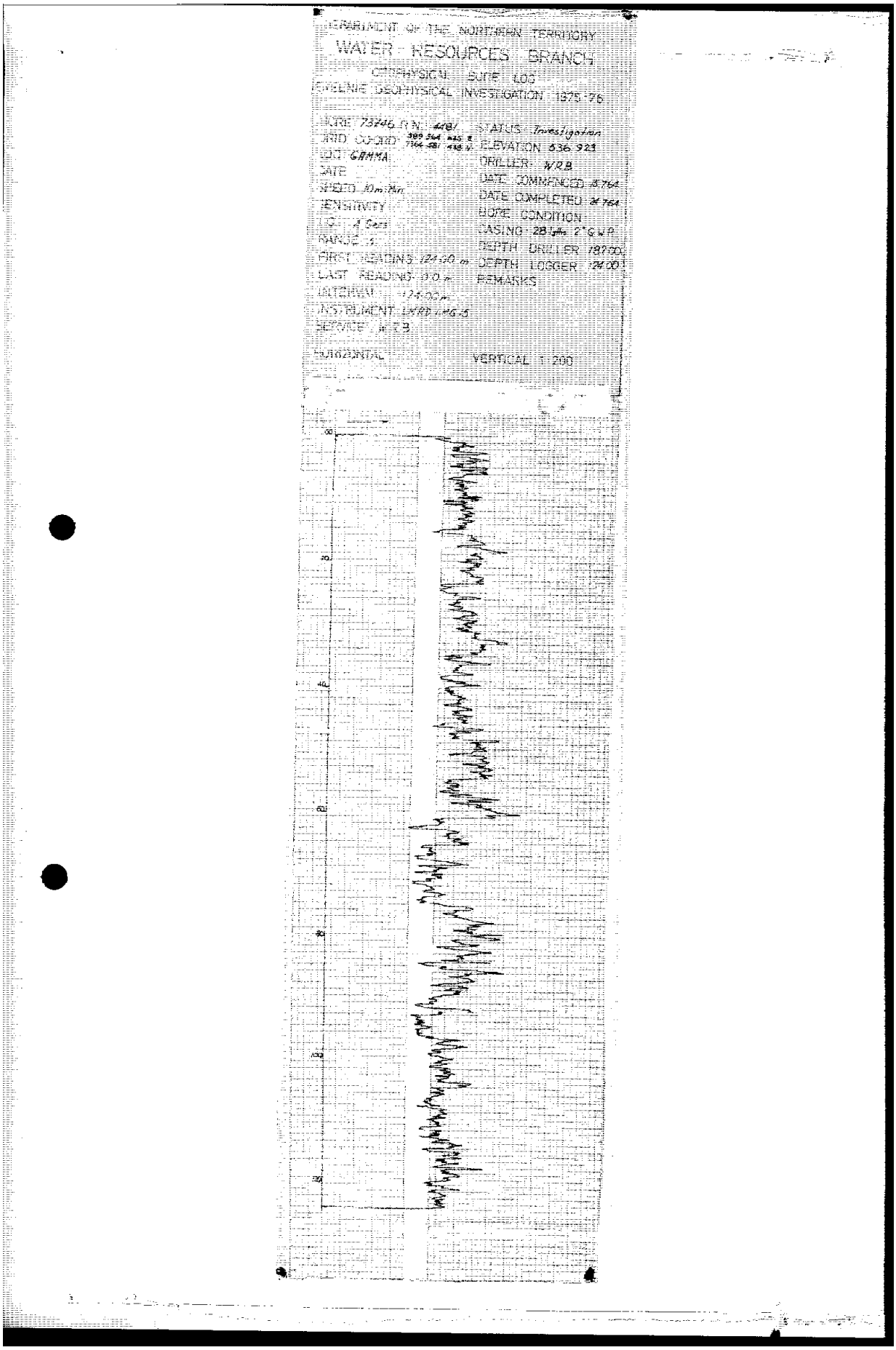
1200—1.63 7523

BORE 73 Z 46

RN 4481

2" G W P




DEPARTMENT OF THE NORTHERN TERRITORY
WATER RESOURCES BRANCH
GEOPHYSICAL SURVEY LOG
PIPELINE GEOPHYSICAL INVESTIGATION 1975-76
BORE 73246 R.N. 4481
GRID CO-ORD
LOG GAMMA
DATE
SPEED 10m/m
SENSITIVITY
TC 4 Secs
RANGE 1
FIRST READING 124.00 m
LAST READING 0.0 m
INTERVAL 1/4.00m
INSTRUMENT UWED 146-5
SERVICE W.R.B.
HORIZONTAL
STATUS Investigation
ELEVATION 536.923
DRILLER W.R.B.
DATE COMMENCED 8.764
DATE COMPLETED 8.764
BORE CONDITION
CASING 28"@ 21'6 W.P.
DEPTH DRILLER 187.00
DEPTH LOGGER 124.00
REMARKS
VERTICAL 1:200

W R B / 1 1 2 4 6

Description of Samples

0– 20'	Very coarse brown silty sand
20– 40'	Brown medium to coarse sandy clayey silt
40– 50'	Brown very coarse and gravelly silty sand
50– 60'	Brown medium grained very sandy silt
50– 70'	Brown medium to coarse sandy clayey silt
70– 80'	Very coarse gravel. Average size of grains is ¼" or more.
80–100'	Brown coarse to very coarse silty sand UNCONFORMITY – TOP OF TERTIARY
100–110'	Pale grey fine to coarse sandy clay
110–130'	Sample consists mainly of coarse Quaternary sand. Few chips of billy and hard drilling, suggest that this interval is all billy.
130–180'	Grey and brown coarse sandy clay
180–190'	Very coarse and gravelly greyish sand
190–200'	Pale reddish-brown, mottled pale grey, fine sandy and silty clay
210–220'	Coarse to very coarse sand
220–230'	Pale reddish-brown and grey fine sandy clay
230–250'	Coarse greyish sand
250–280'	Mottled grey and red brown fine sandy clay
280–290'	Medium to coarse sand
290–330'	Grey and red-brown clay, with some coarse sand layers
330–350'	Mottled grey and brown sandy clay
350–390'	Mid grey slightly sandy clay with black ?carbonaceous streaks
390–400'	Dark olive grey clay cuttings. Some cuttings of black ?carbonaceous clay

D. WOOLLEY
Resident Geologis
22.7.64.

Description of samples

400–440'	White to pale grey silty and very fine sandy clay
440–450'	Brown and white coarse sandy clay
450–462'	White silicified fine sandy clay
462–510'	White very fine sandy clay
510–530'	Cream and grey billy
530–600'	White very fine sandy clay

D. WOOLLEY

Resident Geologist
30.7.64.

SF53-14
1700.43

N.T.A. WATER RESOURCES BRANCH

BORE DATA SHEET

NAME 73 Z 46 HEREENIE GRID WRB Investigation

INDEX No. 16/715

REG. No. ... 4481

FILE No. ...

LOCALITY UNDOOLYA

DEPTH 600'

CASINGS 28 LENGTHS 2" G.W.P.

PERFORATIONS 4 BLANK. BOTTOM 3. PERF.

SCREENS 4 BLANK. 4 PERF 113 BLANK.

LOCATION AMG Surveyed 1:53.138196 E 7364584N

SURFACE LEVEL R.L.

B M LEVEL R.L. 1753.01 ABOVE COLLAR

DATUM P.T. M.S.L. AUGUSTA.

CONTRACTOR W.R.B

DRILLER M. CALLERY

DATE STARTED 15-7-64

DATE FINISHED 24-7-64.

WATER

AQUIFERS				
DEPTH STRUCK				
AQUIFER THICKNESS..				
STANDING WATER LEVEL	201'			
PUMP TEST G.P.H.				
DRAWDOWN LEVEL..				
PUMP LEVEL				
DURATION OF TEST HOURS ...	Pumped with air			
R.L. S.W.L				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.....				

ANALYSES

BINOMIAL CLASSIFICATION				
T.D.S.	1190			
CONDUCTIVITY				
TOTAL HARDNESS	266			
CHLORIDE	150			
BICARBONATE	357			
CARBONATE	NIL			
SULPHATE.....	325			
NITRATE	NIL			
FLUORIDE.....	1·5			
SODIUM.....	250			
POTASSIUM	16			
CALCIUM	65			
MAGNESIUM	25			
p.H.	7.8			
REG. ANAL. No.....				

EQUIPMENT

REMARKS

UNFIT FOR HUMAN CONSUMPTION:

SULPHATE IN EXCESS OF 250 p/m.

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA
25				TOPSOIL AND SAND
55				BROWN SANDY CLAY
102				BROWN GREY SANDY CLAY AND QUARTZITE BOULDERS
119				WHITE SANDY CLAY
132				BILLY BROWN SANDSTONE QUARTZITE
150				RED GREY SANDY CLAY
154				BILLY
370				BROWN GREY SANDY CLAY
430				GREY SANDY CLAY
451				WHITE SANDY CLAY
468				BILLY AND LATERITE
512				WHITE SANDY CLAY
540				BILLY AND LATERITE
600				WHITE SANDY CLAY.

DEPARTMENT OF INTERIOR

NORTHERN TERRITORY ADMINISTRATION

MINES AND WATER RESOURCES BRANCH

Groundwater Section - Alice Springs District

JOB: Alice Springs Mereenie Investigation Stage II

LOCATION: Alice Springs Mereenie Well Field

ELEVATION: 1753.01 Ground Level
1754.59' Top of 2" Ø C.P.

DATE SPUDDED: 15/7/64

DATE COMPLETED: 24/7/64

ABBREVIATIONS

FORMATION

Q	Quaternary
T	Tertiary
Pzp	Pertnjarra sandstone
Dm	Mereenie Sandstone
Olp	Pacoota Sandstone

BITS

B	Blade Bits
R	Tricone Rock Roller
HX	Hammerbit - Tungsten Carbide Inserts

CIRCULATION

B	Bentonite (100 lb. sack Volclay)
S	Starch
L	Lime
M	Crushed Mica (100 lb. sack)
Sd	Sawdust (1 cub. ft. sack)
L.C	Lost Circulation
cfm	Cubic Feet per Minute

INDMA NO: 16/715

REGISTERED NO: 4481

GRID LOCATION: 73 Z 46

DRILLING RIG: W.R.B. 12 'Failing' 4.W.1

DRILLER: W. Callery

CASING

ø	diameter
gwp	galvanised water pipe
6" ø bb	6" ID Black Bore Casing
8" ø bb	8" ID Black Bore Casing
10" ø bb	10" ID Black Bore Casing
.	perforations
'	slotted

SUPPLY

W.L.	Water Level - perched
S.W.L.	Standing Water Level
I.g.p.h.	Imperial Gallons per Hour

GENERAL

T.D.	Total Depth
S.N.T.	Supply Not Tested
F	Fahrenheit

GAMMA RAY — DRILLERS LOG

DEPT. OF TRANSPORT & WORKS

R. N. 4481

AREA MEREENIE

STATUS INVEST

LOCATION

SHEET NAME ALICE SPRINGS SE 53-14

GRID REF 170 043

LAT _____ LONG _____

PERMANENT DATUM _____ ELEV. _____

LOG MEASURED FROM _____ m ABOVE PERM DATUM

DRILLING MEASURED FROM _____

OTHER SERVICES

ELEVATION METHOD A.H.D.

BM _____

CT _____

G.L. 536.923m

DATE	3·3·76
RUN NO.	2
DEPTH DRILLER	182.92m
DEPTH LOGGER	124.0 m
BTM LOG INTER.	
TOP LOG INTER.	0.0 m
TYPE LOG	GAMMA RAY
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	61.25 m
MAX REC. TEMP. °C	
OPERATING RIG TIME	15·7·64
RECORDED BY	C. J. B.
WITNESSED BY	

BOREHOLE RECORD

NO	BIT	FROM	TO	SIZE	TYPE
				2"	G.W.P.

CASING RECORD

TYPE	FROM	TO
G.W.P.	0.0m	183.0m

EQUIPMENT DATA

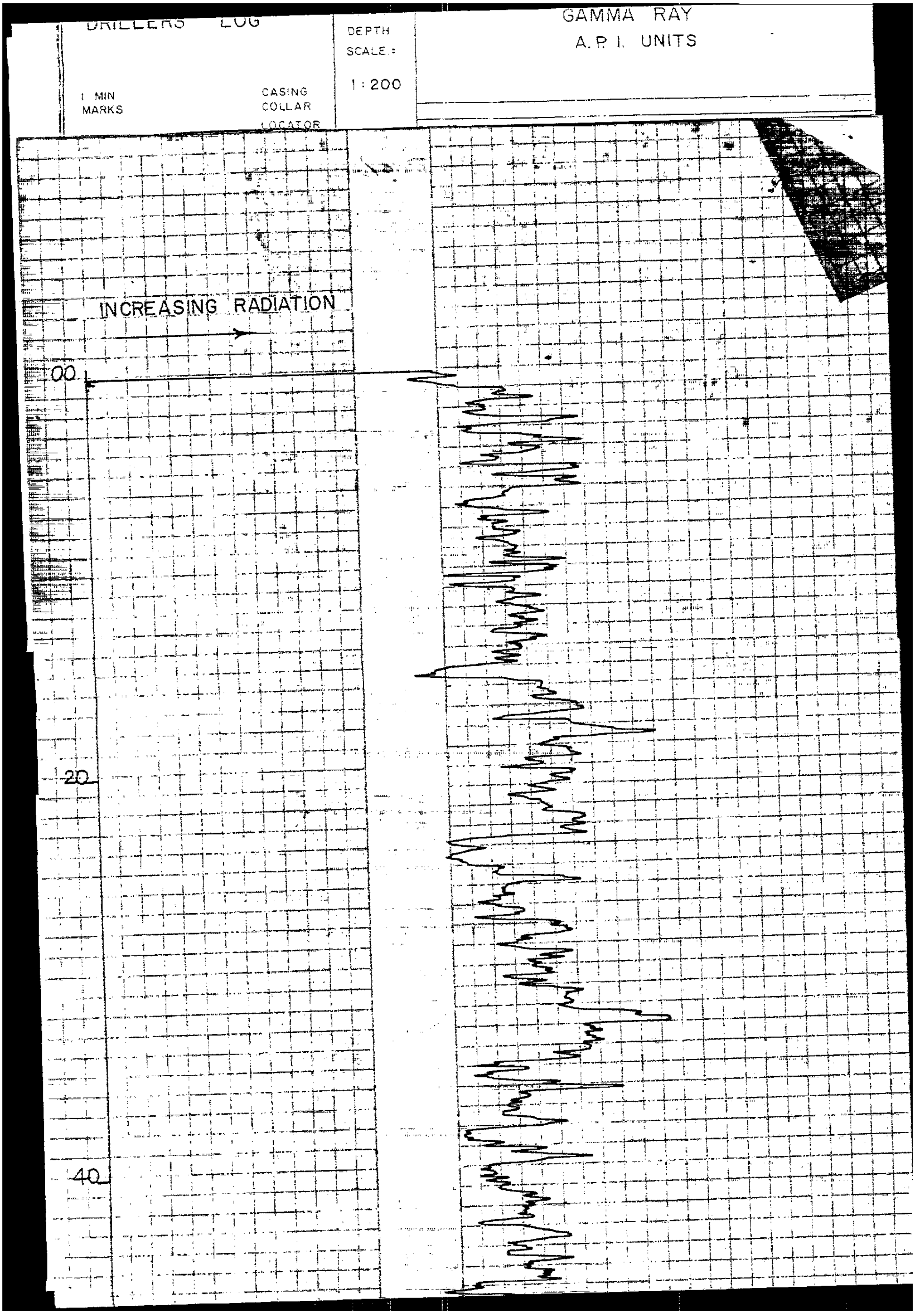
GAMMA RAY			NEUTRON		
RUN NO.	2		RUN NO.		
TOOL MODEL NO	LMG 15		LOG TYPE		
DIAMETER	38 mm		TOOL MODEL NO.		
DETECTOR MODEL NO.			DIAMETER	38 mm	
TYPE			DETECTOR MODEL NO.		
LENGTH			TYPE		
DISTANCE TO N SOURCE			LENGTH		
			SOURCE MODEL NO.		
GENERAL			SERIAL NO.		
HOIST TRUCK NO.			SPACING		
INSTRUMENT ~~TRUCK~~ NO.	LMRD		TYPE		
TOOL SERIAL NO			STRENGTH		

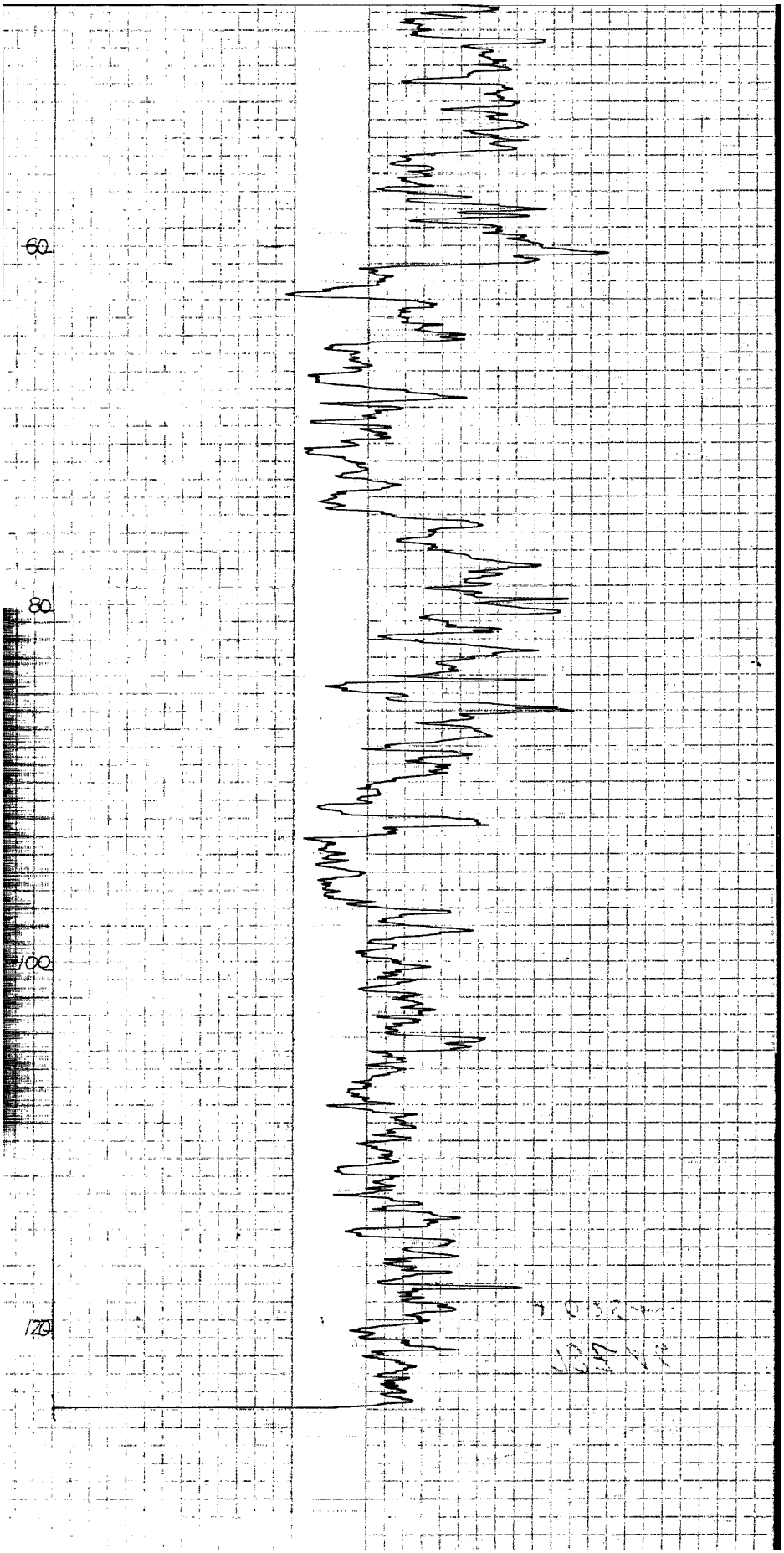
LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO	DEPTHS FROM	DEPTHS TO	SPEED m/MIN	T. C. SEC	SENS. SETTINGS	ZERO DIV. L or R	API. GR. UNITS PER LOG DIV	T. C. SEC	SENS. SETTINGS	ZERO DIV L or R	API. U PER
2	124·0m	0·0m	10	4	Range 5	5 R					

REFERENCE LITERATURE

REMARKS


DRILLERS LOG
DEPTH
SCALE:-
1:200
GAMMA RAY
A.P.I. UNITS
1 MIN
MARKS
CASING
COLLAR
LOCATOR
INCREASING RADIATION
00
20
40


60
80
100
120

TEMPERATURE LOG

DEPT. OF TRANSPORT & WORKS

R.N. 4481

AREA MEREENIE

STATUS INVEST.

LOCATION

SHEET NAME ALICE SPRINGS SE 53-14

GRID REF 170 043

LAT. ____ LONG ____

OTHER SERVICES

ELEVATION METHOD A.H.D.

B.M. ____

C.T. ____

G.L. 536.923m

PERMANENT DATUM ____ ELEV ____

LOG MEASURED FROM ____ m ABOVE PERM. DATUM

DRILLING MEASURED FROM ____

DATE	26-11-68
RUN NO.	1
DEPTH DRILLER	182.92m
DEPTH LOGGER	126.52m
BTM. LOG INTER.	
TOP LOG INTER.	0.0m
TYPE LOG	ABS. TEMP.
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	60.06m
MAX. REC. TEMP. °C	
OPERATING RIG TIME	15.7.64 — 24.7.64
RECORDED BY	C.J.B.
WITNESSED BY	

BORE - HOLE RECORD

NO	BIT	FROM	TO

CASING RECORD

SIZE	TYPE	FROM	TO
2"	G.W.P.	0.0m	190.0m

TEST DATA

RUN NO.	1	2	3
DEPTH FROM	0.0m		
TO	126.52m		
LOGGING SPEED m/min	2.8 m		
TIME START			
FINISH			
TEMP. LOG °C/cm	1 Div = 0.79° F		
MAX. TEMP.			
	Air 84° F		
DIFF. LOG: SENS.			
SPACING			

EQUIPMENT DATA

TOOL DIAM. 38 mm

NO. ____

PANEL NO. ____

TRUCK NO. ____

OTHER DATA ____

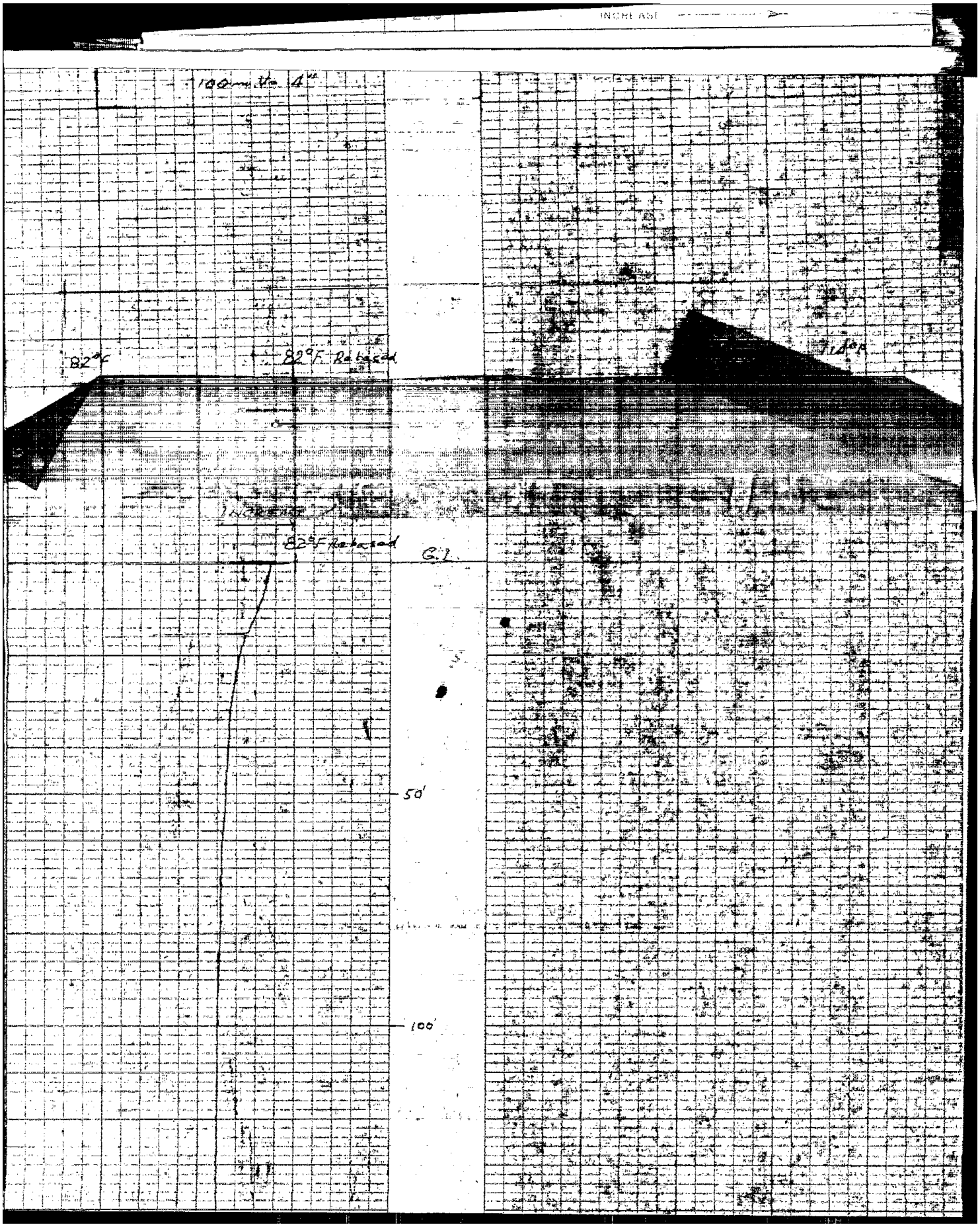
BORE DATA

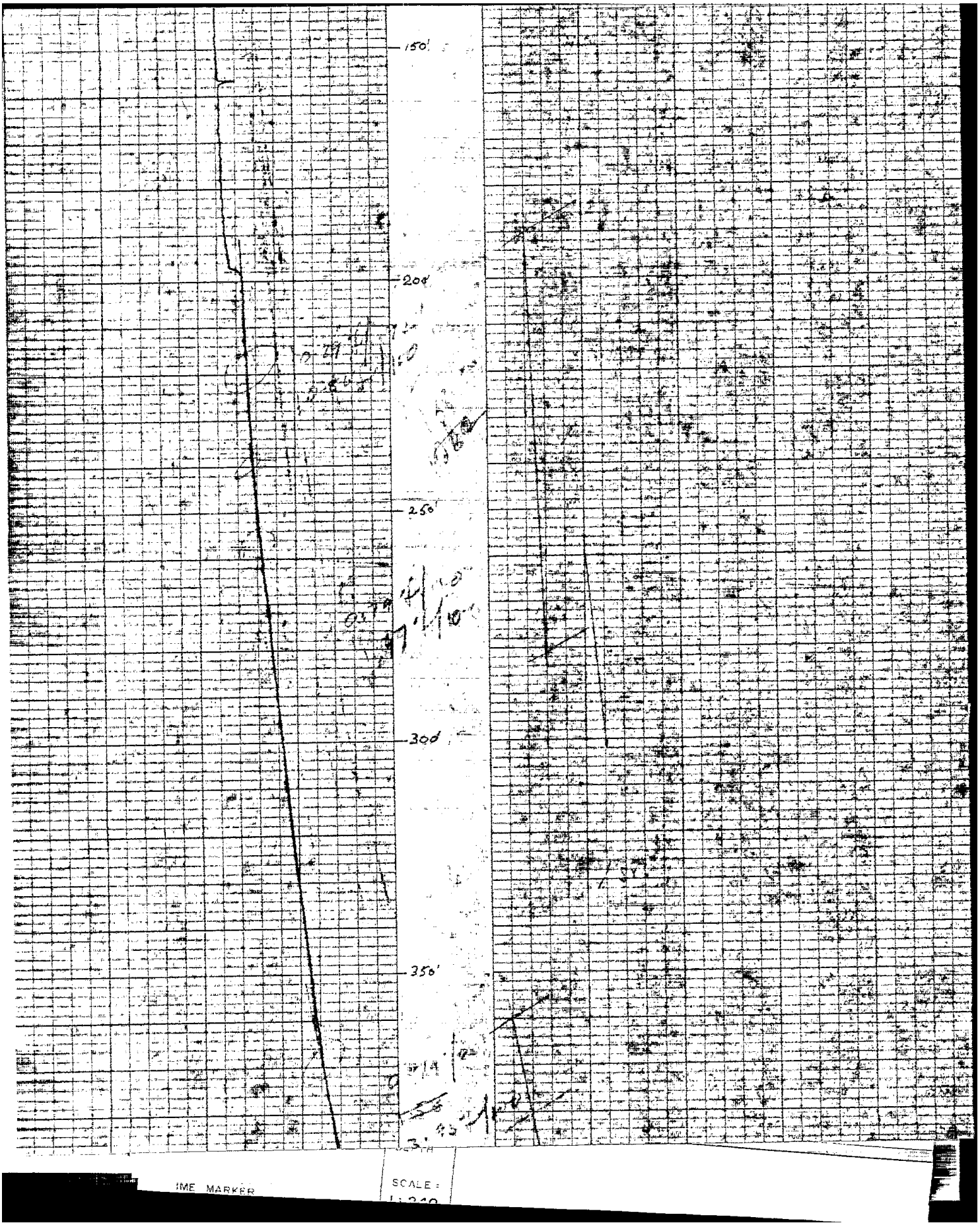
REMARKS

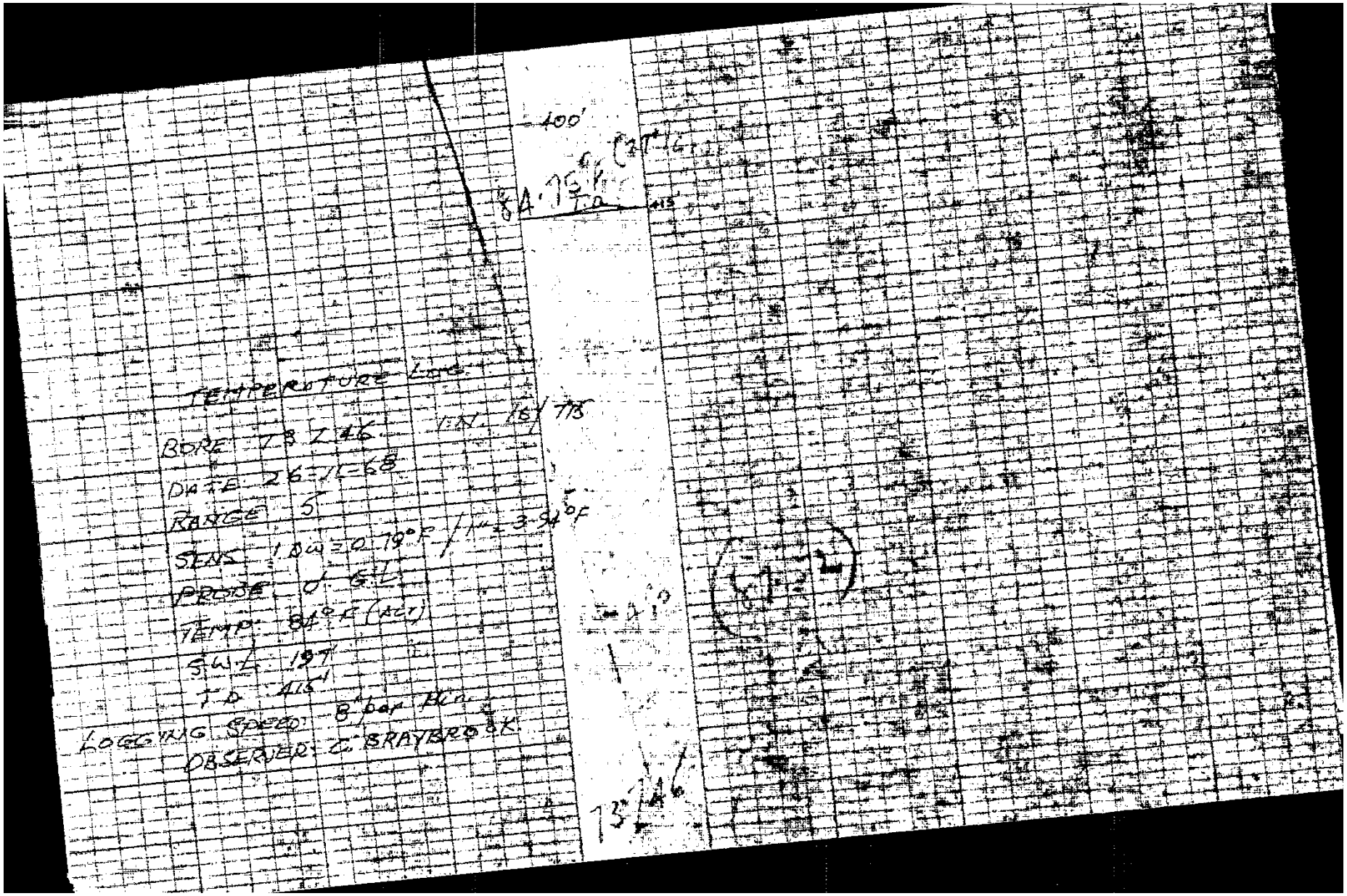
DEPTH

SCALE: 1:240

TIME MARKER


INCREASE
100 mins to 4hrs
82°F
82°F Reheated
82°F Reheated
G.L.
50'
100'


150'
200'
250'
300'
350'
SCALE :


-100'
84.15'
T.D.
415
TEMPERATURE LOG
BORE 78 Z 46
DATE 26-7-68
RANGE 5
SENS 1 DIV = 0.79°F / 1" = 3.94°F
PROBE 0' G.L.
TEMP. 84°F (ACT)
S.W.L. 197
T.D. 415'
LOGGING SPEED 8 per Min.
OBSERVER: C. BRAYBROOK
13" 14"

171

N.T.A. WATER RESOURCES BRANCH

BORE DATA SHEET

Mereenie Grid Point 73Z46

NAME 73Z46

INDEX No. 16/715

LOCALITY Undoolya Station

REG. No.... 4481

DEPTH 600 ft. 182·9m

FILE No. ...

CASINGS 28 lengths 2" pipe

PERFORATIONS 4 blank on bottom then 3 perforated

SCREENS 4 blank 4 perforated and 13 blank

LOCATION / / E N | SURFACE LEVEL R.L. | B M LEVEL R.L. | DATUM

CONTRACTOR Water Resources Branch | DRILLER M.F. Callery | DATE STARTED 15/7/64 | DATE FINISHED 14/7/64

WATER

AQUIFERS				
DEPTH STRUCK				
AQUIFER THICKNESS..				
STANDING WATER LEVEL	200'10"			
PUMP TEST G.P.H.				
DRAWDOWN LEVEL..				
PUMP LEVEL				
DURATION OF TEST HOURS ...	Pumping with air			
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.....				
ANALYSES	24/7/64			
BINOMIAL CLASSIFICATION				
T.D.S.	266			
CONDUCTIVITY				
TOTAL HARDNESS				
CHLORIDE				
BICARBONATE				
CARBONATE				
SULPHATE.....				
NITRATE				
FLUORIDE.....	1·5			
SODIUM.....				
POTASSIUM				
CALCIUM				
MAGNESIUM				
REG. ANAL. No.....				

EQUIPMENT

REMARKS

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA
0				Top soil and sand
25				Brown sandy clay
65				Brown & grey sandy clay and quartzite boulders
102				White sandy clay
118				Billy brown sandstone & quartzite
132				Red and grey sandy clay
150				Billy
154				
180				
200				
250				Brown and grey sandy clay
300				
370				
400				Grey sandy clay
430				White sandy clay
451				Billy and laterite
469				White sandy clay
500				
512				Billy and laterite
540				White sandy clay
600				

SM—10.64 1556

DEPARTMENT OF THE NORTHERN TERRITORY

WATER RESOURCES BRANCH

GEOPHYSICAL BORE LOG

MR MESNIL GEOPHYSICAL INVESTIGATION 1975-76

BORE 73746 R.N. 4481 STATUS Investigation

GRID COORD. 389 354 mE S
7314 58 mN

ELEVATION 536.923

LOG GAMMA

DRILLER N.R.B.

DATE

DATE COMMENCED 6-7-76

SPEED 10 m/sec

DATE COMPLETED 8-7-76

SENSITIVITY

BORE CONDITION

T.C. 2.5 sec

CASING 28 3/4" @ 6 m

RANGE 1

DEPTH DRILLER 182.00

FIRST READING 124.00 m

DEPTH LOGGER 124.00

LAST READING 0.0 m

REMARKS

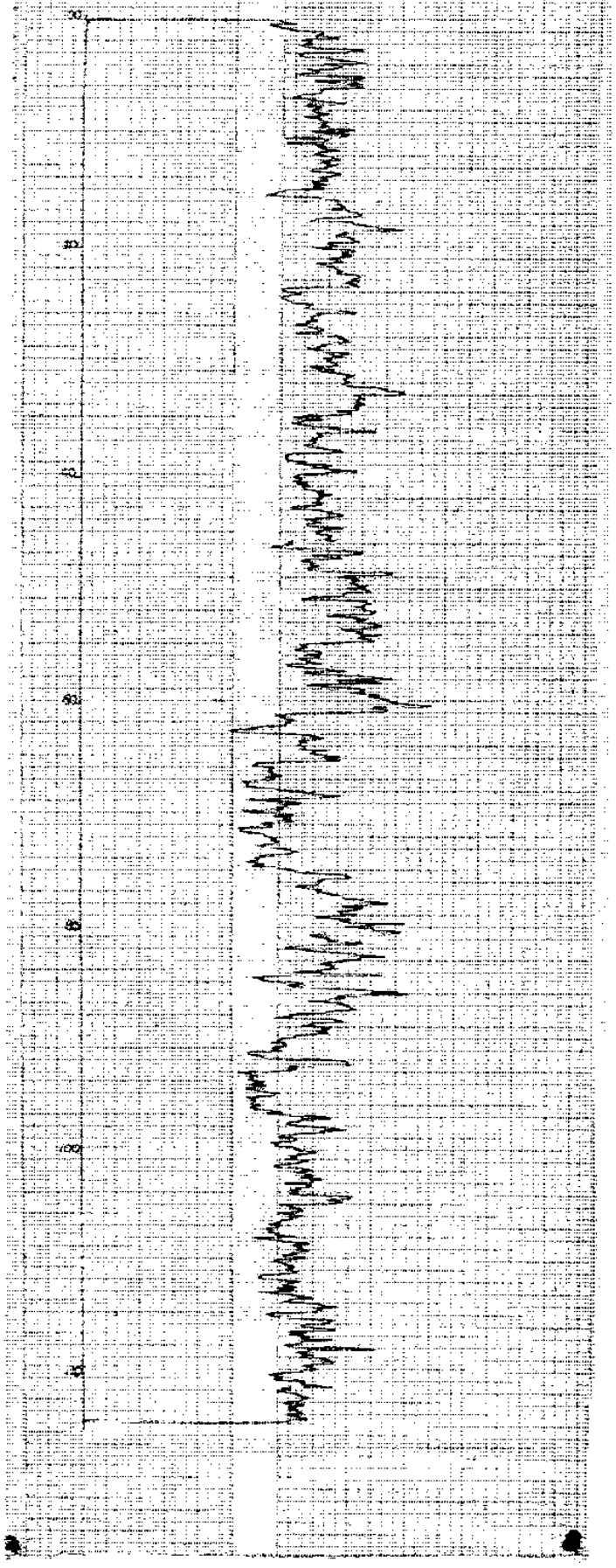
INTERVAL 124.00 m

INSTRUMENT UNIQUE MK 15

SERVICE N.R.B.

HORIZONTAL

VERTICAL 1:200



DEPARTMENT OF THE NORTHERN TERRITORY

WATER RESOURCES BRANCH

GEOPHYSICAL BORE LOG

SENIC GEOPHYSICAL INVESTIGATION 1975-76

16/7?

BORE 73746 R.N. 4481 STATUS: Investigation

GRID COORD: 389 364 655 E 7164 581 458 N ELEVATION: 336.923

LOG: GAMMA DRILLER: WRB

DATE: DATE COMMENCED: 8 764

SPEED: 10m/min DATE COMPLETED: 21 764

SENSITIVITY: BORE CONDITION:

TC: 2.5 secs CASING: 28.6m 2" G.W.P.

RANGE: DEPTH DRILLER: 122.00

FIRST READING: 124.00 m DEPTH LOGGER: 124.00

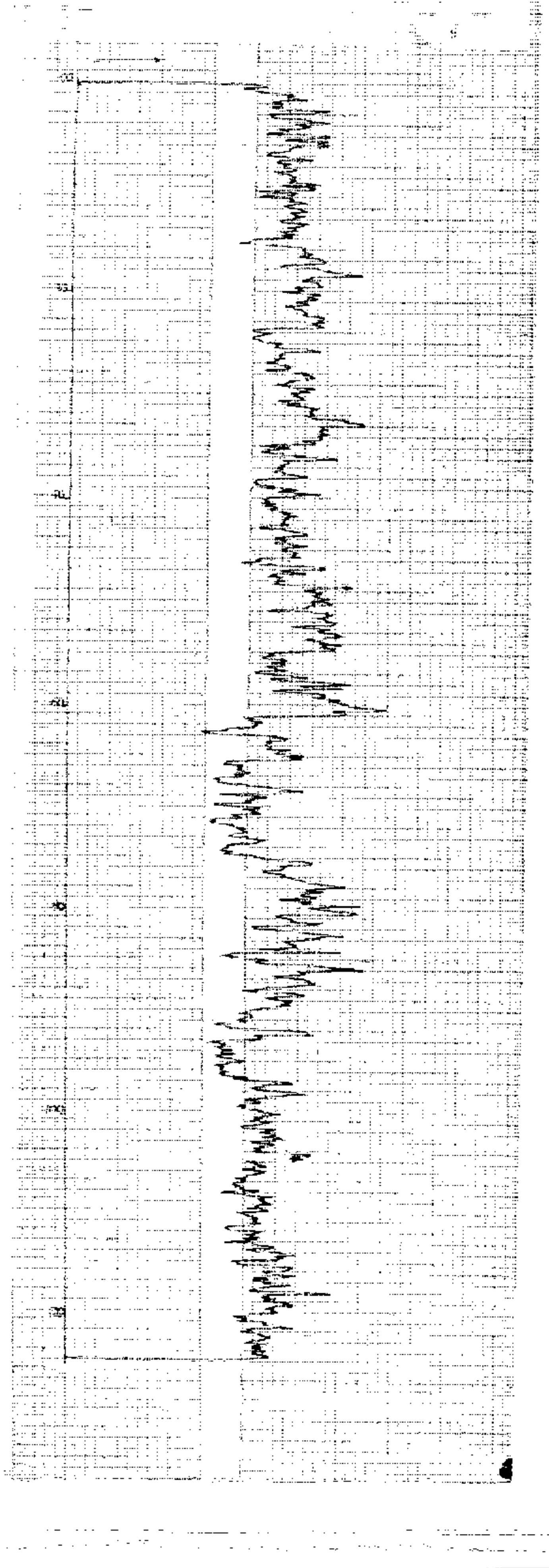
LAST READING: 0.0 m REMARKS:

INTERVAL: 124.00m

INSTRUMENT: LM83 LM0 16

SERVICE: WRB

HORIZONTAL: VERTICAL: 1:200



THE NORTHERN TERRITORY OF AUSTRALIA

Water Act

FINAL STATEMENT OF BORE

Name of Owner: N T GOVERNMENT
Name of Bore: SHANNON 1/03
Intended use: INVESTIGATION
Location: FAC Land. (Alice Springs).

Registration No.: 17850
Index Map No.: 16/2776
Permit No.:

From	To	Particulars of Strata
0	3	RED TOPSOIL SAND AND LATERITE
3	10	RED BROWN SANDY CLAYS
10	14	BROWN CLAY WITH COARSE SAND/GRAVELS
14	52.8	YELLOW AND BROWN SANDY CLAY
52.8	55.3	YELLOW BROWN CLAY AND SANDSTONE
55.3	99	BROWN SANDY CLAY
99	134	BROWN CLAY WITH BANDS OF COARSE SAND
134	175	BROWN AND GREY CLAY
175	297	RED AND WHITE CLAY WITH BANDS OF SAND
297	310	SAND AND CLAY
310	313	FIRM BROWN CLAY
313	320.7	SAND SANDSTONE AND BROWN CLAY
320.7	324	FIRM BROWN CLAY

Name of Contractor: NAT RES
Name of Driller: P PARDON
Date Commenced: 01/04/03
Date Completed: 02/05/03
Depth Drilled: 324 m
Completion Depth: 324 m

METHOD OF DRILLING

Rotary	Rev. Cir	Cable	Other
☑	☐	☐	☐

HOLE DIAMETER			Drilling Fluid
From	To	Diam	Type
0	6	310mm	AIR
6	322	200mm	PAC R/PAC L
322	324	90mm	PAC R/PAC L

PARTICULARS OF CASING

From	To	Diam (ID)	Type
0	6	203mm	STEEL

PARTICULARS OF PERFORATIONS OR SCREEN STRINGS

From	To	Diam (ID)	Aperture	Type
6	324		OPEN HOLE	

Casing Suspended: Yes ☐ No ☑
Method: SEATED AND CEMENTED
Height of Casing above GL: 300mm

Top of Packer set at: N/A m
Length of Packer: N/A m
Method of Packer Connection: N/A

CEMENTING/GRAVEL PACKING

From	To	Type
0	6	CEMENT

WATER BEARING BEDS

Depth (m) From	Depth (m) To	Yield L/s	SWL m	Duration hr	Quality	EC	ph	Bottle No.
HOLE	DRILLED	WITH	MUD	NO	AIRLIFT	DONE		

STRATA and WATER SAMPLES
Have been ☑ Will be ☐
Left at: ALICE SPRINGS

Completion Yield: NIL L/s Method: Duration: hr
Compltion SWL from GL: m Depth of lift: m

LOCATION SKETCH OF BORE	LOCATION DESCRIPTION OF BORE
AGD 66 390051 7366549	m/km E ☐ SE ☐ W ☐ NE ☐ N ☐ SW ☐ S ☐ NW ☐ OF:

FINAL CONSTRUCTION STATUS

Capped	Casing Pulled	Left for Obs.	Abandoned	Equipped	Backfilled	Other
☑	☐	☐	☐	☐	☐	☐

GPS DATUM:	AGD66	WGS84	GDA94	Other	Easting	Northing
	☐	☑	☑	☐		

ADDITIONAL INFORMATION AND INTEREST ABOUT THE BORE:
Hole was not completed due to lack of funds and to be completed at a later date

Signature of Licensed Driller: P PARDON Date: 21/01/04

FOR OFFICIAL USE ONLY

How Located:	GPS	TST	Survey	Hand Plotted	other
	☑	☐	☐	☐	☐

ELEVATION OF BORE AHD: (m) from: GL ☐ TOC ☐

DESCRIPTION OF PROPERTY:

Rural	Mineral	Pastoral	Reserve	VCL	SPL	EL	Other
☐	☐	☐	☐	☐	☐	☐	☑

Lease No: Lot No: Hundred of:
Portion No: Section No: Town of:

Class of Bore:	Town	Domestic	Investigation	Agriculture	Mineral	Pastoral	Other
	☐	☐	☑	☐	☐	☐	☐

Use of Bore:	Production	Investigation	Irrigation	Observation	Monitoring	Roads	None
	☐	☑	☐	☐	☐	☐	☐

Grid Reference: GDA 94 AMG ☐ Clark ☐ Zone: 53 Scale: 1:100000
Easting: 390180 Lattitude: Map Name: Alice Springs - Rural
Northing: 7366720 Longitude: Map Number: 5650 map 16
AWRC stream Basin Number: Major Geological Units Name: Sheet

Geophysical Log Run: Yes ☐ No ☐ Date: Depth: m

Gamma	SP	Caliper	Point Res.	Density	Camera	Other ( )
☐	☐	☐	☐	☐	☐	☐

Test Pump carried out: Yes ☐ No ☐
Date Registered: 18/02/2004 Bore Plotted on the map? Yes ☑ No ☐
Officer: B. Turner Signature:
Remarks: 17850

WR 9/1

DRILLERS LOG

Power and Water Authority

DATE 1-4-03 TUE

BORE No. RN 17850

SHANNON 1/03

Supervisor: [illegible]

Driller: P PARSONS

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA
0830				SET UP RIG DRILL TO 6m 0-3			SUB +		RR	12¼	1.43	1.43	6 BAGS
				RED TOPSOIL WITH COARSE SAND AND									CEMENT
				LATERITE 3-6 RED BROWN CLAYS			CLAW BIT			8"	.20	.20	
				RUN 6.3m 10" SURFACE CASING.			8½ x 3½		SUB	4½	.42	.62	
				AND CEMENT IN.			4½ x 3½		SUB	5"	.28	.90	
							ROT		SCAB	7 7/8	1.25	2.15	
WED + THURS				SET UP MUD PITS AND TANK					DRS	5"	.20	2.35	
				SET BLUEY LINE ETC				1	DP	4½	6.1	8.45	
								2	DP	4½	6.1	14.55	
FRI				FINNISH OF BLUEY LINE				3	DP	4½	6.1	20.65	
				TRIP IN WITH 8" CLAW BIT AND									
				START DRILLING 6 - 10 m BROWN									
				SANDY CLAYS 10 - 13 BROWN CLAY									
				WITH BANDS QUARTZ SAND COARSE									
				13 - 14 COARSE SAND LOOSE CIRCULATION									
				USE FOAM AND PULL OUT STRING									
				DO SLUG OR INJECTION TEST									
				4 L/s APPROX CLEAN UP STAB									
				AND BACK OF RIG. FIX GEN									
				SET AND WATCH CLAY SPOTS ON									
				ROAD.									

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE: MON 7-4-03 BORE No. RN 17850 Supervisor: S KEOGH

SHANNON 1/03 Driller: P PAYDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				BRING WATER IN TANK AND PIT									PIT (1)		
				TO PH 9. USE PAC R MUD AND				CLAW BIT	8"	.20	.20		PH 9.15		
				MIX MUD TO 40 SEC. PUMP MUD	FROM				SUB	4½	.42	.62	1.25 BAGS		
				TANK INTO PIT AND FILL HOLE	WITH				SUB	5"	.28	.90	TANK (1)		
				MUD DRILL TO 18m 14-18 BROWN					STAB	7 7/8	1.25	2.15	PH 9.1		
				SANDY CLAY STOP, PULL BACK					COLLAR	6"	5.88	8.03	1 BAG (40)		
				ONE ROD AND CHECK OUT MUD PUMP					SUB	5"	.20	8.23	TANK (2)		
				AND MIX MORE MUD. CONT DRILLING					COLLAR	5"	5.74	13.97	9.27 PH		
				18 - 19.4 AS ABOVE CLEAN HOLE PULL					COLLAR	4½	5.98	19.95	1 BAG	(39)	
				OUT AND PUT COLLARS ON & MIX MORE				(1)	DP	4½	6.1	26.05	TANK	(3)	
				MUD. SEND TANK FOR WATER				(2)	DP	4½	6.1	32.15	PH 9.07		
1110				CONT DRILLING PT.4 - 24.8 BROWN/GREY				(3)	DP	4½	6.1	38.25	1 BAG	(39)	
				CLAY ADD ROD (2) 24.8 - 30.9 AS ABOVE				(4)	DP	4½	6.1	44.35	TANK	(4)	
				ADD ROD (3) 30.9 - 37 AS ABOVE				(5)	DP	4½	6.1	50.45	PH 9.1		
1225				PULL BACK AND PULL VALVES OUT OF				(6)	DP	4½	6.1	56.55	1 BAG	(40)	
				MUD PUMP. REPLACE SOME RUBBOLI											
				PUT BACK TO GOTHA AND CLEAN OUT											
1400				HOLE. ADD ROD (4) 37. - 43.1 YELLOW											
				BROWN SANDY CLAY ADD (5) 43.1									MUD TANK		
				49.2 AS ABOVE CLEAN HOLE ADD (6)									APPROX		
				49.2 - 55.3 AS ABOVE, HARD BAND OF									5500 L.		
				SANDSTONE 52.8 m STOP AT 55.3 AND											
				CLEAR HOLE. PULL OUT TO 4½ COLLAR											
1544				PULL MUD PUMP DOWN AND HEAD											
				FOR SHIVER RACKING											
1635				KNOCK OFF											

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 8-4-03 TUES BORE No. RN17850 Supervisor: S HEART

SHANNON 1/03 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA		WATER SAMPLES No.	Depth
0730				FINNISH FIXING SWIVEL PACKING							56.55	56.55				
				TRIP IN TO 55m AND CLEAN OUT.				(7)	DP	4½	6.1	62.65.				
				ADD ROD (7) MUD FLOW - PIT 50 SEC				(8)	DP	4½	6.1	68.75				
				CONTINUE REAMING 55.3 – 61.4				(9)	DP	4½	6.1	74.85	2	CONDET.		
				AS ABOVE MUD INCREASE IN VISCOSITY	(50)			(10)	DP	4½	6.1	80.95.				
0940				ADD ROD (8) 61.4 – 67.5 BROWN CLAY				(11)	DP	4½	6.1	87.05.				
				ADD ROD (9) 67.5 – 73.6 AS ABOVE				(12)	DP	4½	6.1	93.15				
				NOT CLEARING PROPERLY PULL BACK				(13)	DP	4½	6.1	99.25				
				AND CONDITION UP MUD ADD 2x2				(14)	DP	4½	6.1	105.35				
				OF CONDET U TO MUD PIT + TANK									TANK 5			
				ADD ROD (10) 73.6 – 79.7 AS ABOVE									pH 9.10			
				ADD ROD (11) 79.7 – 85.8 AS ABOVE									~~½~~ BAG (30)			
				ADD ROD (12) PUMP IN TANK OF									TANK 6			
				MUD TO LOWER VISCOSITY 85.8 – 91.9												
				AS ABOVE STOP + FIX PUMP ROD OILLOW												
				ADD (13) + CONT 91.9 – 98m AS ABOVE												
				SOME FIRM + SOME SOFT BANDS ADD												
				CLEAR HOLE ADD ROD (14) 98 – 99m AS												
				ABOVE 99 – 104.1 SAND (COARSE) +												
				BROWN CLAY DRILLING EASTON												
				STOP + CLEAN HOLE												
				PULL OUT, BACK TO 4½ COLLAR												
1640				KNOCK OFF												

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 9-4-03 WED BORE No. RN 17850 Supervisor: S HERIOT

Driller:

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				PULL OUT REST OF STRING TO								93.15			
				CHECK BIT + STAB. CONDITION MUD				(13)	DP	4½	6.1	99.25	TANK (6)		
				BAG TO 40 SEC IN PITS TRIP INTO				(14)	DP	4½	6.1	105.35	PH 9.5		
				92 M AND CLEAN OUT TO 104.1				(15)	DP	4½	6.1	111.45	½ BAG		
0940				ADD (15) AND START DRILLING 104.1				(16)	DP	4½	6.1	117.55	30 SECS		
				110 M BROWN SOFT SANDY CLAY				(17)	DP	4½	6.1	123.65			
				ADD ROD (16) 110.2 – 116.3 AS ABOVE									TANK (7)		
				MUD PUMP WONT STOP AND OILER									PH 9.1		
				NOT WORKING, CLEAN HOLE AND									32 SECS ¾ BAG		
1102				(17) START DRILLING. 116.3 – 122.4											
				AS ABOVE PUMP NOT FULL CAPACITY											
1145				STOP AT 122.4 AND CLEAN HOLE											
1200				PULL OUT TAKE OFF 8" CLAW BIT											
				AND RUN 8" BLADE DOWN BLADE BIT											
				PULL OILER PUMP APART AND CLEAN											
				UP TRIP IN + REAM HOLE, OILER PUMP											
				STILL U/S PULL OUT CLEAN AND FILL											
				UP RESERVOIR + CONT REAMING											
				REAM TO 80M + CLEAN HOLE											
				PACK UP + PULL OUT.											
1630				SHUT DOWN											

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE THURS 10-4-03 BORE No. RN 17850

SHANNON 1/03

Supervisor: S HERLOT

Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				SERVICE GEAR LOWER MAST TO INSPECT TOP BREAK OUT TONG. ALL BENT TAKS OFF TO FIX & STRAIGHTEN MIX + CONDITION UP MUD IN PITS	1									~~TANK~~ (2)	
~~1100~~				0730 – 1100 FIXING HEAD BREAK OUT SHANNON					BIT + COLLARS			19.95			
								8x	DP	4½	48.86	68.79			
1200				BIT BLOCKED PULL OUT STRING.				(9)	DP	4½	6.1	74.85			
				NON RETURN VALVE U/S FIND ANOTHER				(10)	DP	4½	6.1	80.95			
				ON AT DEPOT AND PUT IN SUB TRIP IN				(11)	DP	4½	6.1	87.05			
				CLEAN FROM 68m TO 80 ADD (11)				(12)	DP	4½	6.1	93.15			
				~~START~~ REAMING ADD (12) (13) (14) (15)				(13)	DP	4½	6.1	99.25			
1515				(16) + (17) CLEANED TO 122.4m ADD (18)				(14)	DP	4½	6.1	105.35			
				122.4 – 128.5 BROWN CLAY				(15)	DP	4½	6.1	111.45			
1600				STOP AND CLEAN HOLE				(16)	DP	4½	6.1	117.55			
1611				TRIP OUT. TO COLLARS				(17)	DP	4½	6.1	123.65			
1645				PACK UP + SHUT DOWN				(18)	DP	4½	6.1	129.75			

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 11-04-03 FRID BORE No. RN17850

Supervisor: S HERIOT

Driller: P PARDON

SHANNON 1/03

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				SERVICE RIG + MIX MUD (COND)								117.55			
				TRIP IN TO 116m AND CLEAN TO				(17)	DP	4½	6.1	123.65	TANK	(8)	
				128.5 (17) & (19) ADD ROD (19) AND				(18)	DP	4½	6.1	129.75	PH 9.15		
0822				START DRILLING. FLOW NOT GOOD				(19)	DP	4½	6.1	135.85	34.5 SECS		
				STOP + PULL DOWN MUD PUMP.				(20)	DP	4½	6.1	141.95	3/4 BKG		
				128.5 – 134.6 AS ABOVE PULL OUT				(21)	DP	4½	6.1	148.05	1 DRUM CONTG		
0932				6 RODS AND WORK ON PUMP.				(22)	DP	4½	6.1	154.15			
				FIX MUD PUMP AND TRIP BACK				(23)	DP	4½	6.1	160.25			
				INTO 128m CLEAN OUT TO 134				(24)	DP	4½	6.1	166.35			
1300				ADD ROD (20) 134.6 – 140.8				(25)	DP	4½	6.1	172.45			
1316				GREY BROWN CLAY ADD (21)											
1337				140.8 – 146.9 AS ABOVE ADD (22)											
1357				146.9 – 153 AS ABOVE ADD (23)											
				153 – 159 AS ABOVE SOFT BANDS											
1422				AROUND 159m ADD (24) 159 – 165.1 AS ABOVE											
1523				ADD DRILL ROD (25) 165.1 – 171.2 AS ABOVE											
				STOP CLEAN HOLE											
1555				PULL OUT. BACK TO COLLAR											
1700				SHUT DOWN + KNOCK OFF.											

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE SAT 2-04-03 BORE No. RN17850

SHANNON 1/03.

Supervisor: S HERLOT

Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				SERVICE GEAR + PULL OUT COLLARS					BIT	8"	.90	.90			
				TAKE OFF STAB AND PUT ON 2x3m COLLARS					SUB	5"	.28	1.18	TANK (9)		
				6" TRIP INTO 163 AND START CLEANING					COLLAR	6"	2.94	4.12	PIT 9.0		
				TO BOTTOM ADD (25) & CONT DRILLING					COLLAR	6"	3.00	7.12	32 SECS		
				171.2 - 175.2 m BROWN GREY CLAY					COLLAR	6"	5.88	13.00	1/2 BAC		
				CLEAR HOLE AND ADD ROD (26) 175.2					SUB	5"	.20	13.20			
1023				187.3 WHITE + ADD CLAY ADD (27)					COLLAR	5½	5.74	17.94			
1039				181.3 - 187.4 WHITE CLAY ADD (28)					COLLAR	4½	5.98	23.92			
				187.4 - 193.5 WHITE CLAY ADD (29)				25%	DP	4½	152.5	176.42	176.42		
1132				193.5 - 199.6 AS ABOVE ADD (30)				(29)	DP	4½	6.1	182.52			
				199.6 - 205.7 AS ABOVE HARD BAND				(27)	DP	4½	6.1	188.62			
1216				AT 204.7 ADD ROD (31) 205.7 - 211.8				(28)	DP	4½	6.1	194.72			
				AS ABOVE ADD ROD (32) 211.8 - 217.9				(29)	DP	4½	6.1	200.82			
				AS ABOVE ADD (33) 217.9 - 224m AS				(30)	DP	4½	6.1	206.92			
				ABOVE ADD (34) 224 - 230.1 AS ABOVE				(31)	DP	4½	6.1	213.02			
				ADD (35) 230.1 - 236.2 WHITE CLAY				(30)	DP	4½	6.1	219.12			
1401				ADD (36) 236.2 - 242.3 WHITE CLAY				(33)	DP	4½	6.1	225.22			
1415				CLEAN LOCO & TRIP OUT				(34)	DP	4½	6.1	231.32			
1745				PACK UP AND SHUT DOWN				(35)	DP	4½	6.1	237.42			
				LOTS OF TROUBLE WITH CLAY PULLING				(36)	DP	4½	6.1	243.52			
				OUT CABLE ON HOIST BREAKS PULL											
				RODS OUT OF CARBIDE TWICE.											

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 14-04-03 MON BORE No. RN17850 Supervisor: S HERIOT

SHANNON 1/03 Driller: P PLAZDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				TRIP IN MUD PUMP ON RIG				36	DRILL PIPE			243.52			
				W/S GO TO DEPOT + PICK UP				(37)	DP	4½	6.1	249.62	TANK 10		
				BLUE MUD PUMP ON TRAILER.				(38)	DP	4½	6.1	255.72	PH 9.2		
				SET UP PUMP AND CLEAN OUT									40 SECS		
				FROM 200M									¾ BAR.		
1235				START DRILLING ROD (37) 242.3-											
				248.4 WHITE + RED CLAY ADD (38)											
				HOLD BACK 252-252.5m 248.4-											
				254.5 AS ABOVE WHITE CLAY											
				BLOW MUD PUMP NOT WORKING											
1400				TO CAPACITY, CLEAN HOLE AND PULL											
				BACK PULL DOWN PUMP, STICK											
				UNDER END OF LOWER VALVES.											
				PUT BACK TOGETHER											
1630				SHUT DOWN											

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 15-04-03 TUES BORE No. RN 17850 Supervisor: S HERIOT

S HANNON 1/05 Driller: P RANDAN

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				SERVICE RIG + CLEAN OUT				38	DRILL PIPE			255.72			
				MUD PITS, TRIP IN CLEAN OUT				39	DP	4½	6.1	261.82			
				FROM 243 TO 254.5 AND ADD (39)				40	DP	4½	6.1	267.92			
0908				START DRILLING 254.5 – 260.6 AS				41	DP	4½	6.1	274.02			
				ABOVE RELIEF VALVE ON RIG BLOWS				42	DP	4½	6.1	280.12			
0945				PUT IN NEW PIN AND ADD ROD (40)				43	DP	4½	6.1	286.22			
				260.6 – 266.7 WHITE CLAY CLEAR HOLES.				44	DP	4½	6.1	292.32			
1011				ADD ROD (41) 266.7 – 272.8 WHITE				45	DP	4½	6.1	298.42			
				CLAY AND SAND ADD (42) 272.8 – 278.9				46	DP	4½	6.1	304.52			
				AS ABOVE CLEAR HOLE COMING ADD				47	DP	4½	6.1	310.62		311-62	
1116				(43) FIRM DRILLING 278.9 –											
				285 m WHITE + RED CLAY, CLEAR HOLE											
1200				AND ADD (44) 285 – 291.1 AS ABOVE											
1243				CLEAR HOLE ADD (45) 291.1 – 297.2											
1317				CLEAR HOLE ADD (46) 297.2 – 303.3 SAND +											
				SOFT CLAY CLEAR HOLE ADD											
1347				(47) 303.3 – 310.4 CLAY WITH LOTS OF											
1420				SAND STOP CLEAR HOLE TRIP OUT											
				TROUBLE WITH HOLE NEARLY STUCK											
1700				PACK UP + SHUT DOWN (BACK TO COOLALO)											

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 16-04-03 THEO BORE No. RN 17850 Supervisor: S HERIOT

S/HANNON 1/03 Driller: P PARDAN

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA		WATER SAMPLES No.	Depth
0730				SERVICE RIG + PULL OUT COLLARS					CLAW	8"	.20					
				TO CHECK BIT - WORN, TAKE OFF					SUB	4½	.42	.62				
				AND RUN 8" CLAW BIT TRIP					SUB	5"	.28	.90				
				IN. CLEAN OUT TO 310.4 ROD					COLLAR	6"	2.94	3.84				
34 MINS/M				(48) DRILLING. 310.4 - 313 FIRM					COLLAR	6"	3.00	6.84				
				DRILLING STOP AT 313 + CIRCULATE.					COLLAR	6"	5.88	12.72				
1330				STOP + PULL OUT					SUB	5"	.20	12.92				
1640				PACK UP + SHUT DOWN					COLLAR	5½	5.74	18.66				
									COLLAR	4½	5.98	24.64				
								20 x	DP	4½	120	144.64				
	7-04-03							8 x	DP	4½	48.8	193.44				
0730				SERVICE RIG PULL OUT LAST				10 x	DP	4½	61.0	254.44				
				COLLAR AND TAKE OFF BIT				5 x	DP	4½	30.5	284.94				
				REPLACE HOIST CABLE AND			(48)	5 x	DP	4½	30.5	315.44				
				PULL DOWN MUD PUMP												
				HEAD BOB REED SET UP FOR												
				LOGGING												
1045				SHUT DOWN + WORK ON GOOD FRIDAY UP												
	FRI 18 -			MON 21 EASTER HOLIDAYS												
TUES	22/4			MAINTENANCE ON RIG												
WED	23/4			" " "												

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE TUES 29-04-03 BORE No. RN 17850

SHANNON 1/03

Supervisor: S HANCOCK

Driller: P RALDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				MAKE UP DIT WELD UP FLIGHT			DRAG		DIT	8"	-90	-90	TANK ①		
0915				MIX MUD AND START RUNNING IN					BUB	5"	.28	1.18	9.1 PH		
				HOLE TIGHT FROM 53M ROAM OUT					COLLAR	6"	2.98	4.12	35 SECS		
				SANDSTONE + CONT TRIPPING IN					COLLAR	6"	3.00	7.12	1 BAG		
1310				HOSE ON ENGINE COMPRESSOR BLOWS					COLLAR	6"	5.88	13.00			
				OFF GET NEW HOSE AND CONDITION					SUB	5 1/2"	.20	13.20	PIT ①		
				MUD UP. (NEW PAC & NOT THICKENING	QUICK)				COLLAR	5 1/2	5.74	17.94	9.4		
1425				CONT RUNNING IN CLEAN OUT					COLLAR	4 1/2	5.98	23.92	37 SECS		
				TO 216 M POOR BAIL 8 RODS				5x	DC	4 1/2	30.5	54.42	1 BAG.		
1630				RACK UP + SHUT DOWN				20x	DP	4 1/2	120	174.42			
								7x	DP	4 1/2	42.7	217.12	TANK ② PH 9.1 38 SECS 1 BAG		
													TANK ③ PH 9.3 38.5 SECS 3 BAGS		
													1 BAG IN PIT		
													TANK ④ PH 9.1 38 SECS 2 BAGS.		

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE WED 30-04-07 BORE No. RN17850

SHANNON 1/03

Supervisor: S HORLOT

Driller: P PARDEN

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				SERVICE RIG TRIP IN 6 RODS									3 BAGS		
				+ MIX MUD IN RIG ADD ROD								174.42	IN PIT.		PL
				(33) + CONT. RUN 5 WITH HOIST				7x	DP	4½	42.7	217.12			
				HND AND USE UP CARDOX TO 284m				(33)	DP	4½	6.1	223.22	1 BAG PAC R		
				ADD (44) (45) + CONT CLEANING HOLE			*10 =	43	DP	4½	6.1	284.22			
				BACKFILLED ON CUTTINGS FROM 285m				(44)	DP	4½	6.1	290.32			
				TO 313 HAND DRILLING ADD				(45)	DP	4½	6.1	296.42			
				ROD (46) 313 - 317 RAN SLOW DRILLING				(46)	DP	4½	6.1	302.52			
				317 - 319.6 SOFTER AND QUICKER DRILLING				(47)	DP	4½	6.1	308.62			
				INCREASE IN CLAY IN CUTTINGS				(48)	DP	4½	6.1	314.72			
				313 - 319.6 QUARTZ SAND SANDSTONE RWD				(49)	DP	4½	6.1	320.82			
				BROWN CLAY ADD (50) 320 TOO				(50)	DP	4½	6.1	326.92			
1130				HAND STOP + PULL OUT STRING											
				25 RODS TO GO STOP PICK UP											
1600				CLOSE DOWN RIG SHUT DOWN											

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 1-5-03 THURS BORE No. RN 17850

SHANNON 1/03.

Supervisor: S HERLOT

Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA		WATER SAMPLES No.	Depth
				PULL OUT REST OF STRING. BIT				CORE B		3½	3.52	3.52				
				WORN AWAY. PICK UP CORING BARREL				2x	SUB	4⅝	.32	3.84				
				AND BREAK DOWN + CLEAN UP				CK CAL		4⅝	5.98	9.82				
1230				MAKE UP STRING AND TRIP IN				2x	DP	4½	120.0	129.82				
				START PUMP UP AT 307m CLEAN TO				23x	DP	4½	140.32	270.12				
				322m CORE TO 324m PULL OUT				2X	DP	4½	12.2	282.32				
				STRING AND BREAK DOWN CORE				6x	DP	4½	36.6	318.92				
				BARREL 1.75m OF CORE IN BARREL				52	DP	4½	6.1	325.02				
1715				PACK UP + SHUT DOWN												

WR 9/1 **DRILLERS LOG** **Power and Water Authority**

DATE 2-5-03 FRIDAY BORE No. RN17850

Supervisor: S. HERIOT

Driller: P PARDON

SHANNON 1/03

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA		WATER SAMPLES No.	Depth
0730				SERVICE R16 BOB REED CHECKS					Rock Roll	6	.15					
				OUT CORE AND ADVISES TO GO DEPOT,					SUB	4½	.42	.57				
				PACK UP CORE BARREL AND RUN 6¾					COLLAR	5½	5.74	6.31				
0900				RR DART RINGS UP STANDBY					COLLAR	4½	5.98	12.29				
				WAITING ON DECISION FROM TOWN				20x	DP	4½	120.0	132.29				
				TO ABANDON HOLE OR NOT				23x	DP	4½	140.3	272.59				
				DAVE SAYS TO PACK UP				6x	DP	4½	36.6	309.19				
				PACK UP GEAR AND START TAKING GEAR												
				BACK TO DEPOT.												
1610				KNOCK OFF.												

24-32 Government Printer of the Northern Territory 250746

N.T.A. WATER RESOURCES BRANCH

BORE DATA SHEET

OCT. '68.
SF53-14
160038

NAME Z.E. GRID REF 5F.74 I 50.49
LOCALITY ROAD RESERVE
DEPTH 701' 213.67m
CASINGS 387' / 4"
PERFORATIONS
SCREENS NIL
INDEX No. 16/329
REG. No.... 3602.
FILE No. ...
LOCATION AMG Surveyed / 53 / 385571 E7366766 N
SURFACE LEVEL R.L. 1789.92'
B M LEVEL R.L.
DATUM M.S.L. PT AUGUSTA.
CONTRACTOR W.R.B
DRILLER L. HARGRAVE
DATE STARTED 12-1-62
DATE FINISHED 18-1-62

WATER

AQUIFERS				
DEPTH STRUCK	84'			
AQUIFER THICKNESS..				
STANDING WATER LEVEL	256'	78.03m		
PUMP 5 G.P.H.	SEEPAGE			
DRAWDOWN LEVEL..				
PUMP LEVEL				
DURATION OF TEST HOURS ...				
S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.....				

ANALYSES

NOMIAL CLASSIFICATION		/		
T.D.S.	1023'			
CONDUCTIVITY				
TOTAL HARDNESS	34'			
CHLORIDE	335'			
BICARBONATE	164			
CARBONATE	9'			
SULPHATE.....	151			
NITRATE	NIL			
FLUORIDE.....	0.5'			
SODIUM.....	335'			
POTASSIUM	20'			
CALCIUM	NIL			
MAGNESIUM	8			
p.H.	9.3			
LAB. ANAL. No.....				

EQUIPMENT

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA
				TOP SOIL SANDY CLAY SAND AND GRAVEL
				YELLOW WHITE CLAY AND GRAVEL
200				BROWN AND WHITE CLAY AND GRAVEL.
				WHITE SANDY CLAY
400				WHITE CLAY & ~~SILICEOUS~~ SANDSTONE
				WHITE CLAY & SILICEOUS SANDSTONE
600				WHITE AND YELLOW SANDSTONE WITH ODD RED BROWN CLAY.
900				

540
350
190
1.

PLACE THIS EDGE TO FILE SCORE OR FILE EDGE

FROM	TO	DESCRIPTION OF STRATA
0	80	Top soil sandy clay ~~xxxx~~ sand & gravel
80	160	Yellow white clay & gravel
160	300	Brown & white clay & "
300	482	White sandy clay
482	500	White clay & sandstone
500	590	White clay & siliceous sandstone
590	701	White & yellow sandstone with odd red brown clay

LOCATION OF BORE: (or supply sketch on back hereof.)

.....Miles

N	NE	of (b)
S	SE	.....
E	NW	
W	SW	.....

Shot point 15
On seismic
line ~~from~~
Circle appropriate direction
~~from~~ known point such as existing bore, homestead, outstation, etc.

ADDITIONAL INFORMATION OF INTEREST

Losing water rapidly after 600

Samples of strata and Water supplies have been / will be left at the following Trading Place or,

.....

.....

(SIGNATURE)

FOR OFFICE USE ONLY.

Name of Bore

Name of Property
EC

Description of Property
ROAD RESERVE

Name of Owner
AS ABOVE

Name of Contractor
[illegible]

Name of Driller
ARID RECOVERIES BRANCH

Date of Commencement
[illegible]

Date of Completion
12/1/62

Total Depth
15/1/62

Particulars of Casing
701'

Particulars of Perforations on Screens.
3½" OD

WATER SUPPLY	1st SUPPLY	2nd SUPPLY	3rd SUPPLY
Struck at			
Standing Water Level	84	600 onward	
Pumping Supply, ~~xxxx~~ seepage G.P.H.			
Duration of Pump Test			
Water Level during Test			
Quality- good, fair or bad			

Origin of Water MERSEYLE GRID — Reference SN 65 / 451

BORE ZE — Specimen Advice Note No. 9628

Date Sampled 23-2-65. — Date Received 26/2/65

Results in parts per million

HARDNESS (Calculated as CaCO3)		
"	Total	424
"	Temporary	241
"	Permanent	183
ALKALINITY IN EXCESS OF TOTAL HARDNESS		Nil
CHLORIDE	110	3·10
SULPHATE	242	5·04
FLUORIDE	0.9	
CALCIUM	90	4·49
BICARBONATE	294	4·82
CARBONATE	Nil	
SODIUM	94	4·09
POTASSIUM	11	0·28
MAGNESIUM	49	4·03
NITRATE	5	0·08
NITRITE	Not Determined	
AMMONIA	"	"
TOTAL DISSOLVED SALTS	896	

pH 8.0

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The above results are forwarded for your information.

Signature Donald R Newman

6,250 ppm. equals approx. 1 oz. per gall.

Date 23-3-65.

1200—1.63 7521

Origin of Water MEREENIE GRID

BORE ZE

Reference SN 65 / 315

Specimen Advice Note No. 9261

Date Sampled 9/12/64

Date Received 11/12/64

Results in parts per million

HARDNESS (Calculated as CaCO3)		
" Total	34	
" Temporary	34	
" Permanent	Nil	
ALKALINITY IN EXCESS OF TOTAL HARDNESS	115	
CHLORIDE	335	9.45
SULPHATE	151	3.14
FLUORIDE	0.5	
CALCIUM	Nil	
BICARBONATE	164	2.69
CARBONATE	9	0.30
SODIUM	335	14.58 } 1970
POTASSIUM	20	5.12 }
MAGNESIUM	8	0.66
NITRATE	Nil	
NITRITE	NOT DETERMINED	
AMMONIA	" "	
$\frac{HCO_3}{Cl}$ = 0.28		
$\frac{HCO_3}{SO_4}$ = 0.86		
TOTAL DISSOLVED SALTS	1023	

pH 9.3

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

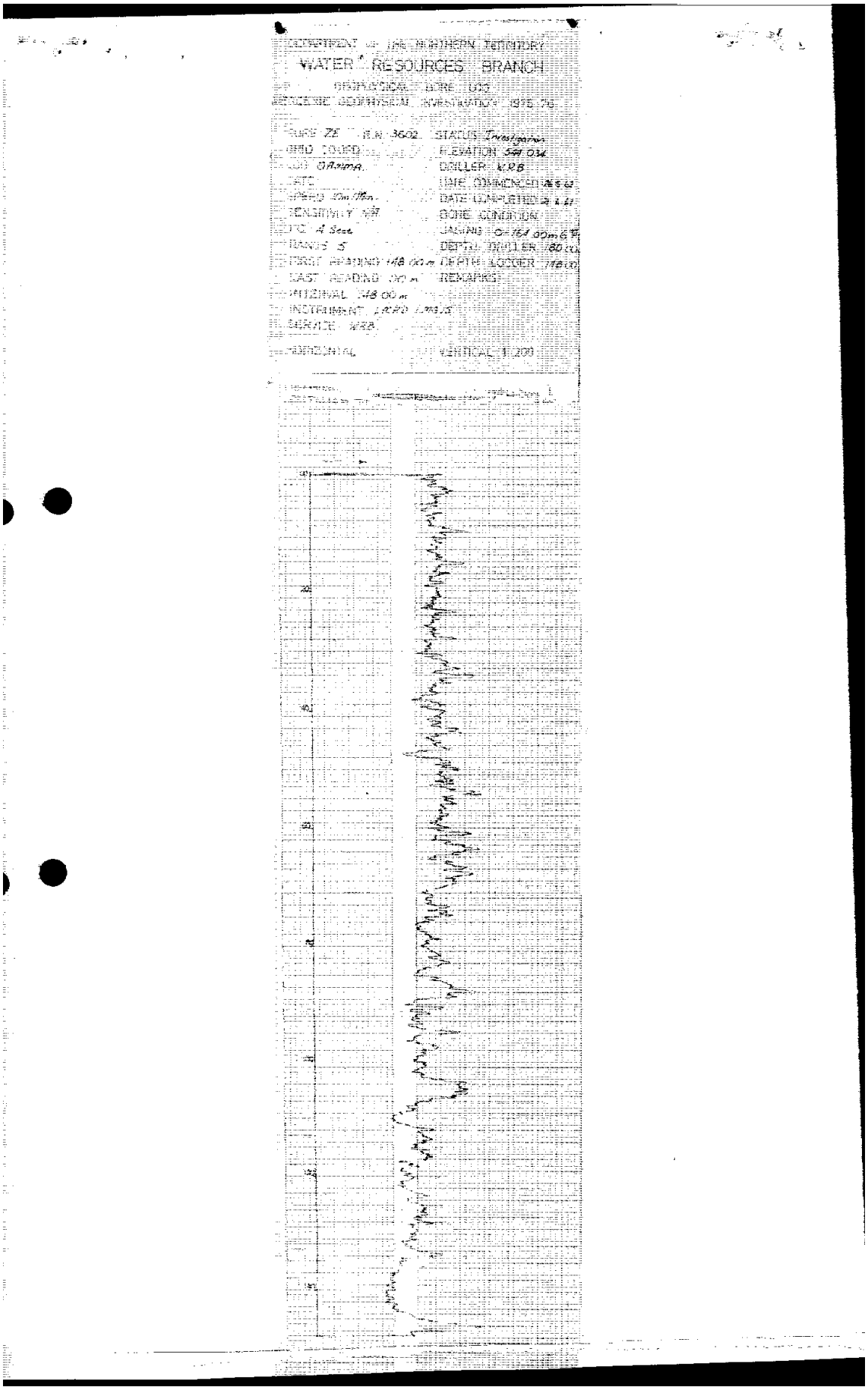
The above results are forwarded for your information.

Signature [signature]

Date 5/1/65

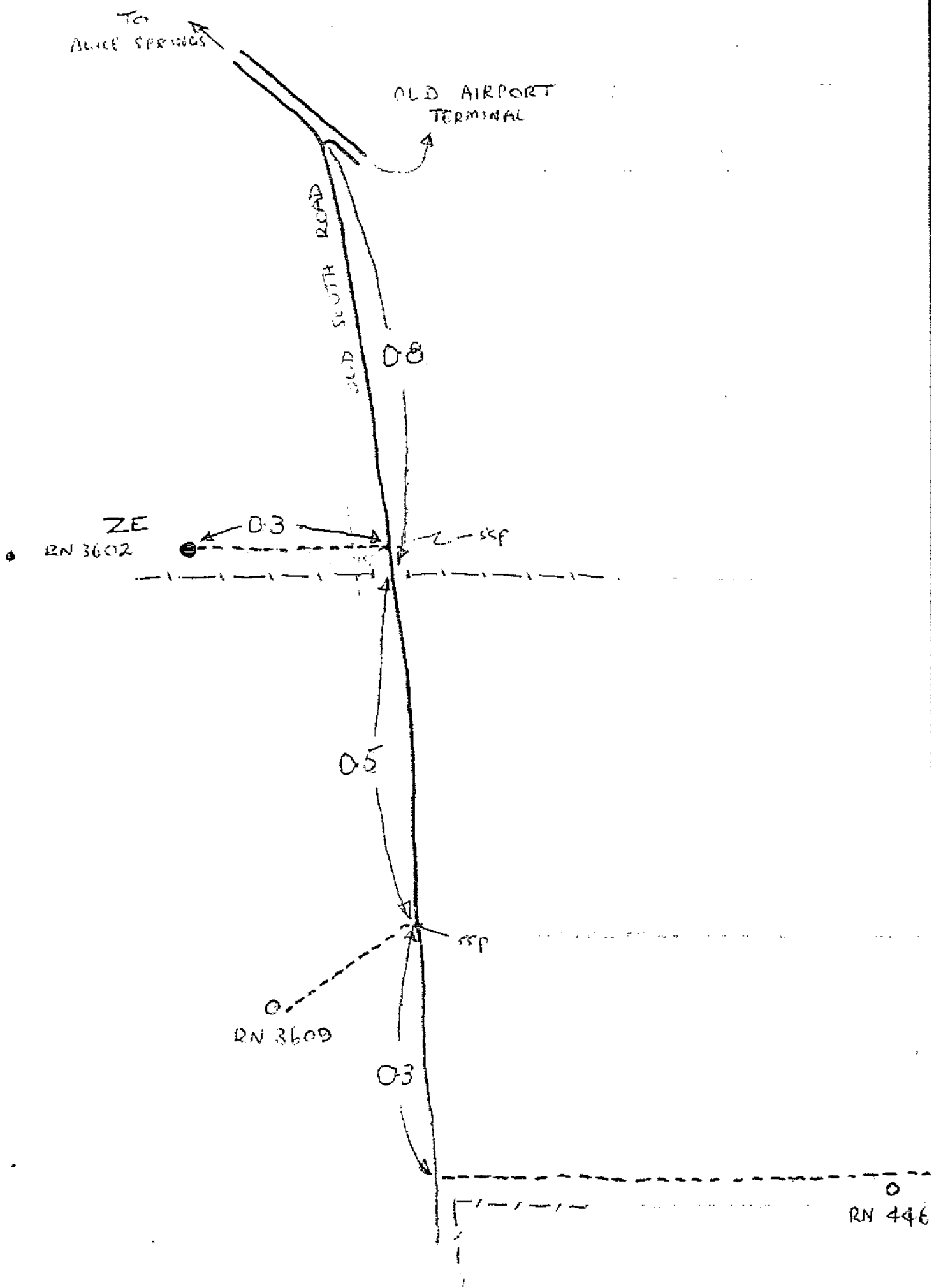
6,250 ppm. equals approx. 1 oz. per gall.

1200—1.63 7523


DEPARTMENT OF THE NORTHERN TERRITORY
WATER RESOURCES BRANCH
GEOPHYSICAL BORE LOG
ELEVATION
DRILLER
DATE COMMENCED
DATE COMPLETED
BORE CONDITION
CASING
DEPTH DRILLER
DEPTH LOGGER
REMARKS
VERTICAL 1:200

BORE ZE RN 3602

4" CASING WITH 2" GWP SOCKET



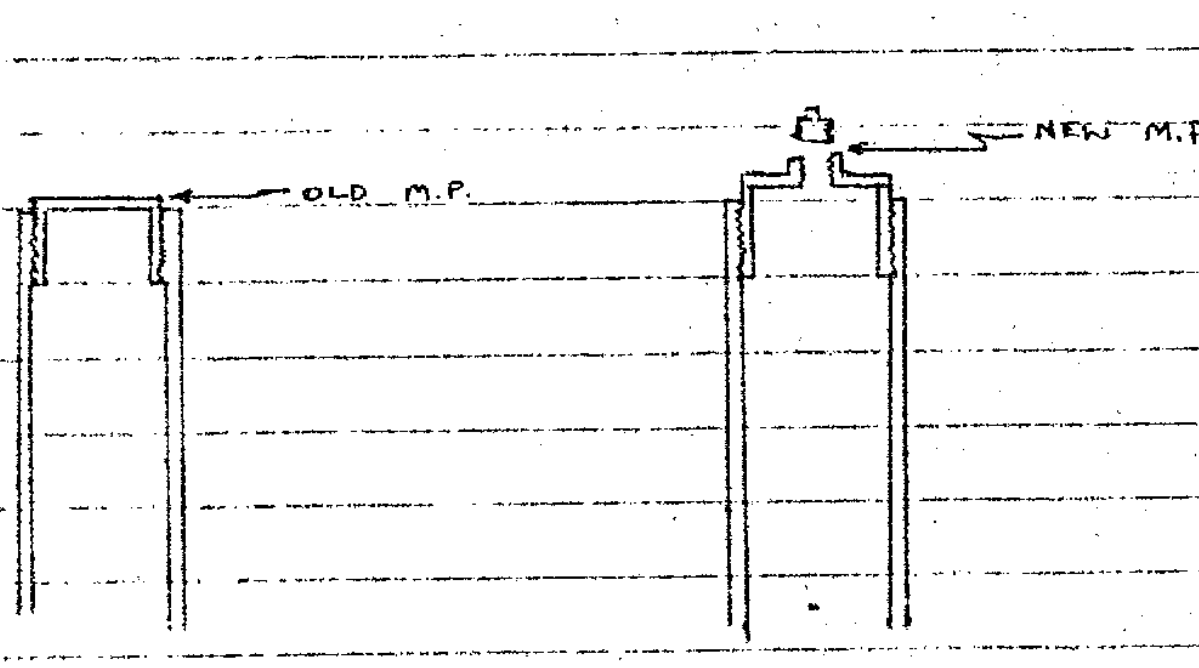
ALTERATION TO WATER LEVEL MEASURING POINT

BORE ZE RN 3602

PRIOR TO 19-12-77 THE MEASURING POINT FOR WATER LEVELS WAS THE TOP OF CASING R.L. 544.034

ON 19-12-77 THE MEASURING POINT WAS ALTERED BY REMOVING THE BLANK SCREW CAP OF THE CASING AND INSERTING A SCREW CAP WITH A 2 INCH G.W.P. SOCKET AND PLUG.

MEASURING POINT WAS RAISED BY 0.108 m AND IS NOW R.L. 544.142 m AHD.



POWER AND WATER AUTHORITY

GEOPHYSICS
LOGGING DATA

RN..3602.....

LOCATION....MEREENIE / AIRPORT...WESTERN BOUNDRY.....

.....

LOG	DATE	INTERVAL LOGGED	CASING DETAILS AT TIME OF LOGGING
SLIM GAMMA	13/2/85	148.0 - 1.0m	CASING 387' OF 4"

REMARKS e.g. Hole drilled with foam or mud ?

2745-A-90

W.R.B/Z.E (drilled at SP 19).

6	Dark chocolate brown clayey silt.
17	Brown clayey silt with pebbles and boulders.
22	Fine to medium brown sand with coarse to very coarse sand grains and pebbles (damp).
30	Medium grained brown slightly silty sand (damp).
34	Brown medium to coarse sandy and slightly clayey silt (damp). (soakage at 36'). (~~damp~~)x
40	Medium to coarse brown slightly silty sand. (damp).
52	Brown sandy clightly clayey silt with pebbles up to 1" (damp).
64	Very coarse sand and gravel.
74	Medium to coarse gravel, with some lumps of medium grained brown sandy clay.
80	Medium to very coarse brown clayey sand, with some pebbles.
85	UNCONFORMITY (Mesozoic Top).
90- 100	Coarse to very coarse clayey sand with pebbles, and lumps of pale grey fine sandy clay.
110	Fine to very coarse sandy and gravely pale grey clay. Cuttings indicate presence of cobbles and/or boulders.
120	Coarse to very coarse sand with pebbles and ? cobbles.
132	Red - brown and grey medium grained sandy clay.
140	Red - brown and grey medium to coarse grained sandy clay, with cuttings of pebbles and cobbles.
150	Fine to medium grained Red - brown and grey ~~medium~~ sandy clay, with cuttings of pebbles and cobbles.

160	Brown and grey clay and fine sandy clay with some medium to coarse sand.
170	Brown and grey fine sandy clay, with some chips of pebbles.
180	Brown and grey fine sandy clay, with some chips of pebbles, with some medium grained sand (possibly clayey sand interbeds)
190 - 210	Brown and grey clay with coarse to very coarse subangular to sub rounded sand grains.
220 - 230	Mottled brown and grey clay, with a few medium to very coarse sand grains, including some sub angular ironstone fragments.
240	Grey and brown very fine sandy clay, with some chips of deep red - brown clayey siltstone (or very fine sandstone).
250	Grey and red - brown very fine sandy clay, with a few coarse sand grains (quartz and ironstone)
260	Grey and red - brown very fine sandy clay, with a few coarse sand grains (quartz and ironstone) and chips of red - brown clayey siltstone.
270	Grey and yellow clay, with some chips of red - brown silty claystone.
280	Mottled grey and red - brown very fine very sandy clay.
290	Grey and brown clay, with some medium to coarse sand and chips of red - brown clayey siltstone.
300	Grey and brown very fine very sandy claym with some medium sand grains, and chips of pale grey claystone and deep red - brown clayey ~~xxxx~~ siltstone.
310	Pale grey fine grained (with some medium to coarse) very sandy clay, with few chips of purple clayey siltstone.
320	Medium to coarse grey clayey sand, with some grey fine sandy clay and few chips of red - brown clayey siltstone.

330 - 360	Pale grey fine to medium grained sandy clay.
368	White fine to medium sandy clay.
380	White fine grained sandy clay.
390	White fine grained sandy clay with chips of brown clayey siltstone.
400	Grey and brown fine slightly sandy clay and brown c clayey siltstone.
400 - 410	Grey and brown fine sandy clay.
450	White yellow and brown very sandy very fine to fine grained sandy clay.
460	Fine to medium grey and brown sandy clay.
470	Fine, with some medium, sandy grey and brown clay.
480	Grey and yellow very fine extremely sandy clay and clayey sand.
~~480~~x 482	Grey and yellow very fine to fine clayey sand in ~~xx~~ sample and some quartz pebbles up ½". Few chips of brown ferruginous fine sandstone, probably off bottom.
487	Hard white fine grained sandstone. Consists of colorless sub-angular to rounded moderately even grained quartz fragments, in a white kaolinitic. (? silicified) matrix.
490	Chips of yellow and grey porcellanised clayey sand (very fine to medium grained) and poorly sorted fine to medium grained grey and yellow hard sandstone, with a silicified clayey matrix.
500	Sample contains: a. Lumps of purple, grey, red and yellow very fine very sandy clay. b. Few medium and coarse rounded quartz grains, with patches of grey clay adhering. c. Fine to medium grained grey and yellow sandstone

with a silicified clayey matrix.

d. Chips of ironstone. These consist of fine grained sandy clay, in which the clay has been almost completely feruginised, with a few small patches of clay remaining.

508 Sample consists of:
a. Small lumps (probably cuttings) of grey and brown fine sandy clay, and yellow very fine clayey sand.

b. Grey and cream poorly sorted fine to medium grained silicified clayey sandstone.

c. Dark red - brown slightly silty claystone.

520 Sample consists mainly of dark red - brown slightly silty clay, as small lumps (probably cuttings). Also some lumps of yellow very fine clayey sand and grey sand and grey sandy clay. Few chips of a. ironstone (feruginised micaceous sandstone)

b. Fine grained quartz sandstone with very little (siliceous) matrix.

530 - 540 Cuttings of fine even grained white quartz sandstone with small amount of siliceous cement. Quartz grains are colorless and sub - rounded. Red clay and grey sandy clay in sample may be lag.

546 Chips of two types of sandstone:
a. fine even grained creamy brown quartz sandstone, with yellow limonite coated grains and a siliceous and limonitic matrix.

b. White and cream fine grained quartz sandstone, with colorless sub-rounded grains, in a siliceous (and in patches feruginous) matrix.
Also in the sample is a lot of grey fine sandy clay, which may be lag, or stripped from the wall of the hole.

548 Chips of:
a. Dark red - brown silty claystone.

b. White fine grained well sorted siliceous quartz

sandstone (similar to sandstone from 540)

c. White poorly sorted very fine to medium grained silicified clayey sandstone. (Similar to the sandstone from 500'). One chip only. The chips of sandstone are mixed with grey and brown clay, possibly stripped from the side of the hole.

554 White fine grained siliceous quartz sandstone chips Also a large proportion of small lumps of soft grey and brown fine sandy clay (Mesozoic) which appears to be cuttings from the bottom.

560 Chips of a. Pale grey fine grained slightly sandy claystone.

b. Dark red - brown slightly silty claystone.

c. Yellow - brown poorly sorted fine grained sandstone formed by silicification and feruginisation of a sandy clay.
Also lumps of grey and brown sandy clay.

570 Chips of white fine grained quartz sandstone with a little quartz cement, and brown and grey fine sandy clay.

580 Chips of red and grey fine sandy claystone, and brown and grey sandy clay.

590 Small pieces (almost certainly cuttings) of extremely fine grained white and brown clayey sand. Some chips of red silty claystone.

600 No sample. Circulation lost.

610 White and pale grey poorly sorted very fine to medium grained clayey sand, almost entirely disaggregated. The quartz grains aresub - angular, mostly colorless, but some have a feruginous coating. There appears to have been some silicification, and the smaple contains a few chips of hard silicified sandy clay.

620 Chips of white very fine grained very fine
ble quartz sandstone, with very little clayey m

matrix. Also a few chips of porcellanised medium grained white sandy clay.

630 Chips of a. brown porcellanised fine sandy clay

b. White fine grained friable siliceous quartz sandstone.

640 Chips of fine grained friable white siliceous sandstone. Also some lumps of white soft fine to medium grained sandy clay. (These could have come from the wall of the hole)

650 - 660 Grey, Kakhi and brick red poorly sorted very fine to medium grained sandy clay. Largely disaggregated (sample is very sandy) but a few original lumps in sample. The red clay is definitely from the bottom, since it was not penetrated anywhere highest in the hole. (Also chips of fine grained white sandstone at 660')

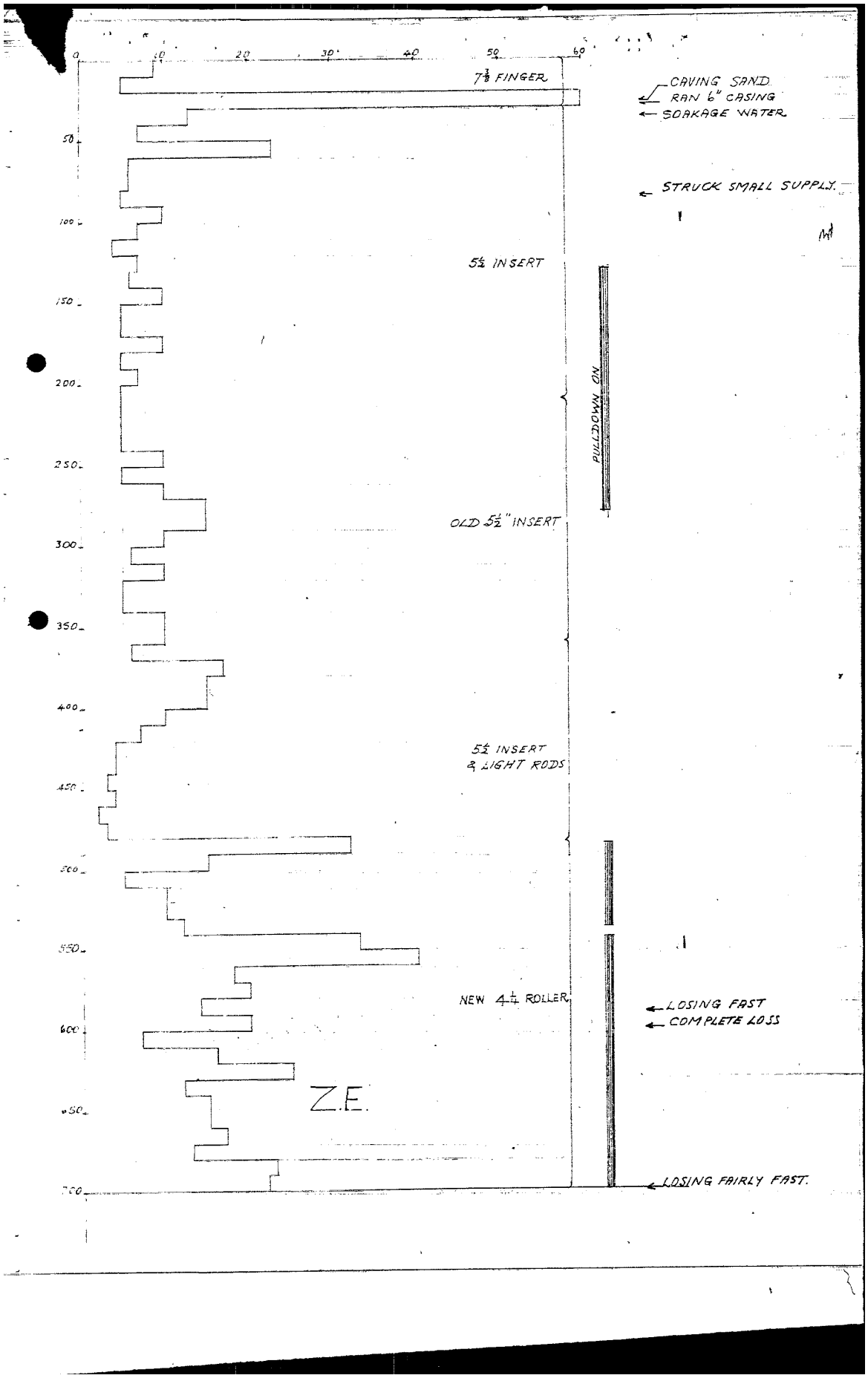
666 Bright red - brown clay, and chips of fine grained white sandstone.

678 Bright yellow and red clay, and chips of fine grained white cream and yellow quartz sandstone, with siliceous , and sometines feruginous matrix Colour of the sandstone is due both to coloured matrix and iron coated grains.

690 - 701 Chips of white, cream and yellow fine grained quartz sandstone, with a small amount of siliceous cement, and some clayey and limonitic matrix, varying from nil to considerable. The quartz grains are sub - rounded and mostly colourless but few have a yellow feruginous coat. Also lumps of red and yellow clay (claystone)

Note. The Mesozoic/Palaeozoic boundary is probably at approximately 600 feet. No undoubted Mesozoic type clay was encounted below this depth.

D. WOOLLEY.
Resident Geologist.


0
10
20
30
40
50
60
50
100
150
200
250
300
350
400
450
500
550
600
650
700
7⅞ FINGER
CAVING SAND
RAN 6" CASING
SOAKAGE WATER
STRUCK SMALL SUPPLY.
5½ INSERT
PULLDOWN ON
OLD 5½" INSERT
5½ INSERT
& LIGHT RODS
NEW 4¼ ROLLER
LOSING FAST
COMPLETE LOSS
Z.E.
LOSING FAIRLY FAST.

BORE DATA SHEET

NAME ZE

LOCALITY Alice Springs

DEPTH 701

CASINGS 387'/4"

INDEX No. 16/339

REG. No. ... 3602

FILE No. ...

PERFORATIONS

SCREENS NIL

LOCATION / / E N

SURFACE LEVEL R.L.

B M LEVEL R.L.

DATUM

CONTRACTOR W.R.B.

DRILLER HANCRAVE

DATE STARTED 12/1/62

DATE FINISHED 18/1/62

WATER

AQUIFERS				
DEPTH STRUCK	84+	600-7		
AQUIFER THICKNESS				
STANDING WATER LEVEL	Seepage			
PUMP TEST G.P.H.	Seepage			
DRAWDOWN LEVEL				
PUMP LEVEL				
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				

ANALYSES

BINOMIAL CLASSIFICATION				
T.D.S.	1,023			
CONDUCTIVITY				
TOTAL HARDNESS	34			
CHLORIDE	335			
BICARBONATE	164			
CARBONATE	9			
SULPHATE	151			
NITRATE	NIL			
FLUORIDE	0.5			
SODIUM	335			
POTASSIUM	20			
CALCIUM	NIL			
MAGNESIUM	8			
pH	9.3			

REG. ANAL. No.....

EQUIPMENT

REMARKS

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA
0				Top siol s andy clay sand and gravel.
80				Yellow and white clay & gravel
160				Brown and white clay & gravel
300				White sandy clay
482				White clay and sandstone
500				Whi te cla y & siliceous s andstone
590				White & yellow sandstone with odd red brown clay
701				

NAME	ZE	INDEX No.	16/329
LOCALITY	A/S	REG. No.	3602
DEPTH	701'	FILE No.	
CASINGS	387 1/4"	PERFORATIONS / SCREENS	
LOCATION	/ / E N	SURFACE LEVEL R.L.	B.M. LEVEL R.L. / DATUM
CONTRACTOR	WRB	DRILLER Hargrave	DATE STARTED 12/1/62 / DATE FINISHED 18/1/62

WATER

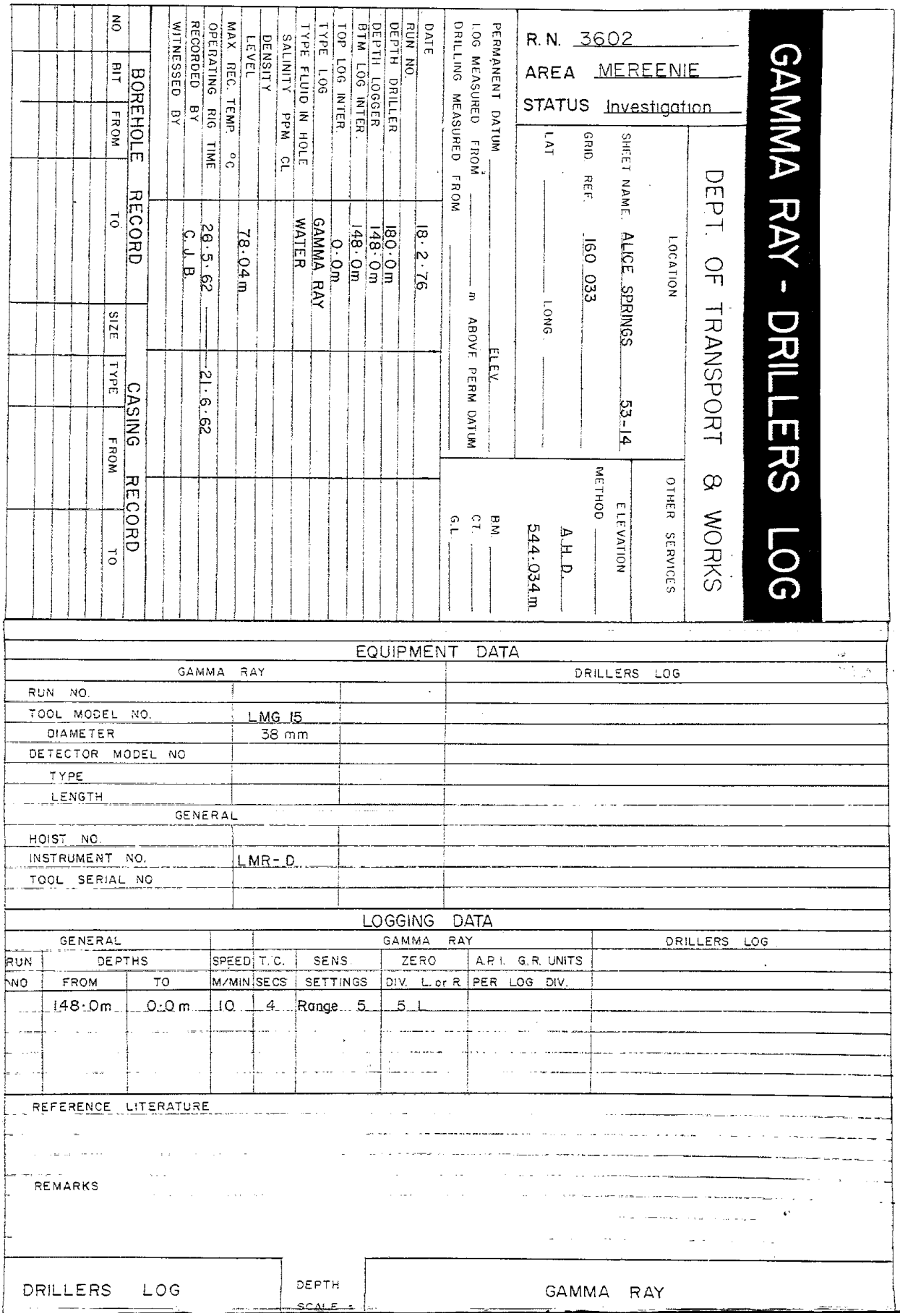
AQUIFERS				
DEPTH STRUCK	84+			
AQUIFER THICKNESS				
STANDING WATER LEVEL				
PUMP TEST G.P.H.	Seepage			
DRAWDOWN LEVEL				
PUMP LEVEL				
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES				
BINOMIAL CLASSIFICATION				
T.D.S.				
CONDUCTIVITY				
TOTAL HARDNESS				
CHLORIDE				
BICARBONATE				
CARBONATE				
SULPHATE				
NITRATE				
FLUORIDE				
SODIUM				
POTASSIUM				
CALCIUM				
MAGNESIUM				
REG. ANAL. No.				

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA
				Top soil sandy clay sand and gravel
60				
				Yellow and white clay & gravel
160				
200				Brown and white clay & gravel
300				
400				White sandy clay
442				White clay and sandstone
500				
590				
600				
701				
800				



GAMMA RAY - DRILLERS LOG

DEPT. OF TRANSPORT & WORKS

R.N. 3602

AREA MEREENIE

STATUS Investigation

LOCATION

SHEET NAME ALICE SPRINGS 53-14

GRID REF. 160 033

LAT ____ LONG ____

OTHER SERVICES

ELEVATION METHOD A.H.D.

B.M. ____

C.T. ____

G.L. 544.034 m.

PERMANENT DATUM ____ ELEV. ____

LOG MEASURED FROM ____ m ABOVE PERM DATUM

DRILLING MEASURED FROM ____

DATE	18·2·76
RUN NO.	
DEPTH DRILLER	180·0m
DEPTH LOGGER	148·0m
BTM LOG INTER.	148·0m
TOP LOG INTER.	0·0m
TYPE LOG	GAMMA RAY
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	78·04m
MAX REC. TEMP. °C	
OPERATING RIG TIME	26·5·62
RECORDED BY	C.J.B.
WITNESSED BY	

BOREHOLE RECORD

NO	BIT FROM	TO

CASING RECORD

SIZE	TYPE	FROM	TO
	21·6·62		

EQUIPMENT DATA

	GAMMA RAY	DRILLERS LOG
RUN NO.		
TOOL MODEL NO.	LMG 15	
DIAMETER	38 mm	
DETECTOR MODEL NO		
TYPE		
LENGTH		
GENERAL		
HOIST NO.		
INSTRUMENT NO.	LMR-D	
TOOL SERIAL NO		

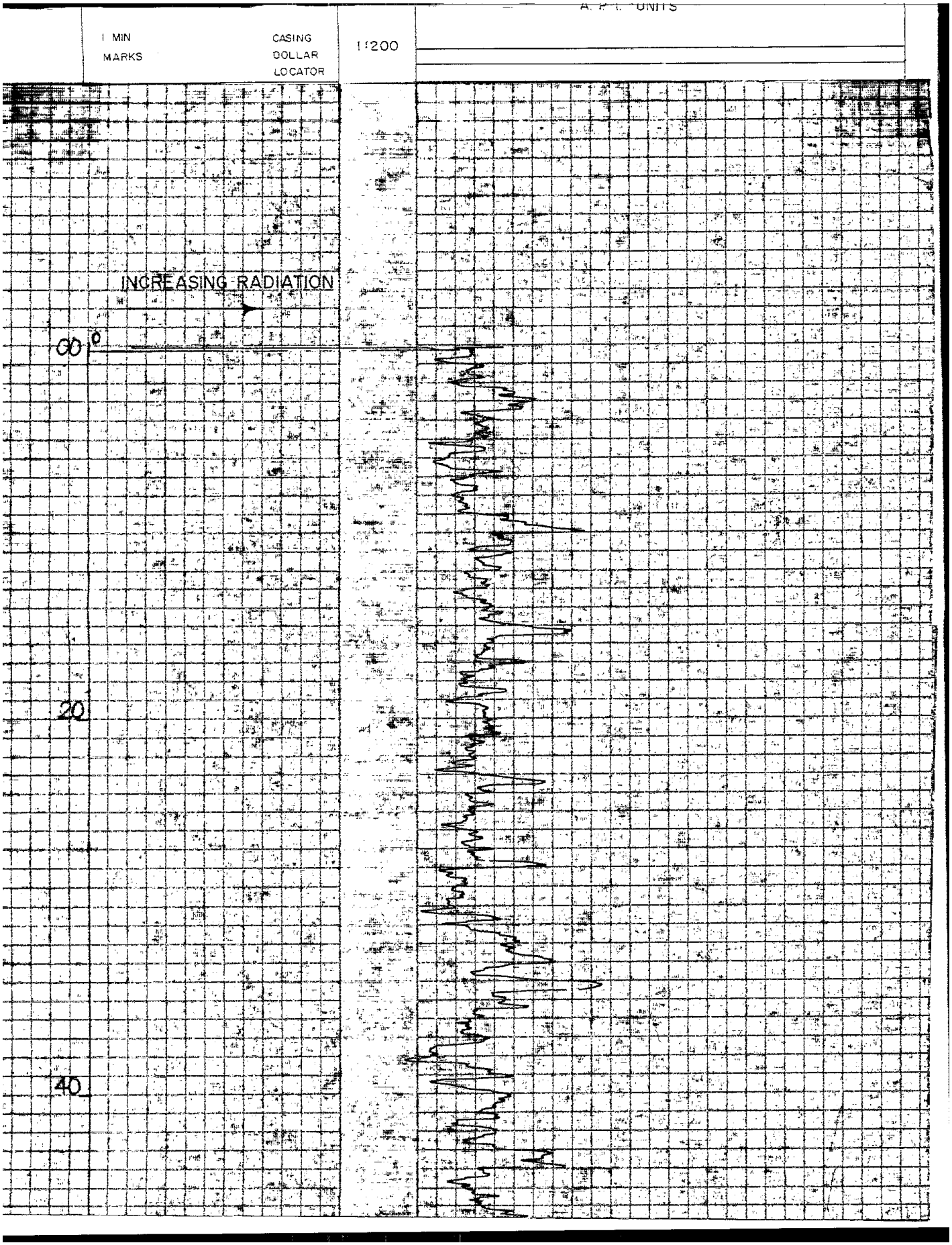
LOGGING DATA

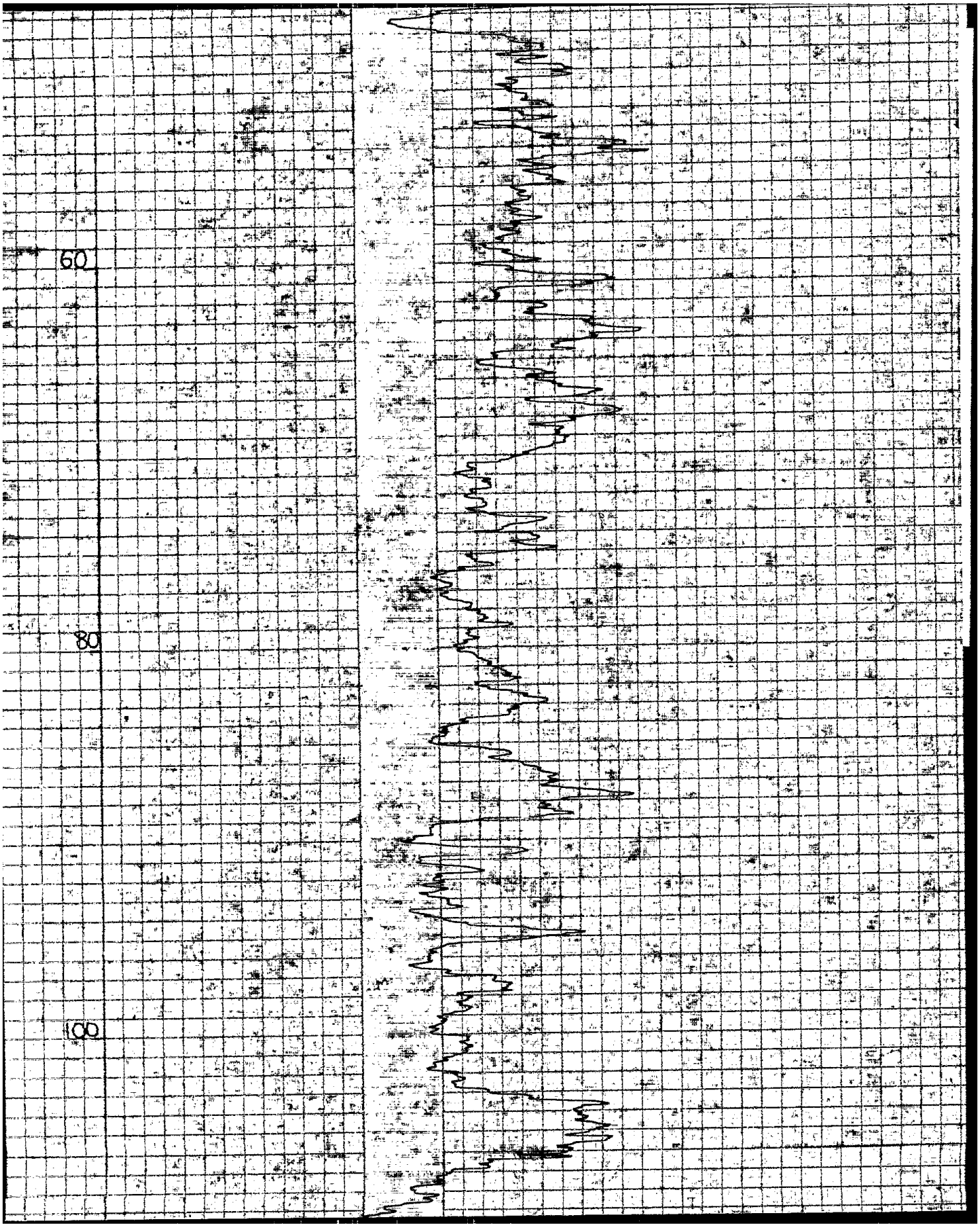
GENERAL				GAMMA RAY				DRILLERS LOG
RUN NO	DEPTHS FROM	TO	SPEED M/MIN	T.C. SECS	SENS SETTINGS	ZERO DIV. L or R	A.P.I. G.R. UNITS PER LOG DIV.	
	148·0m	0·0m	10	4	Range 5	5 L		

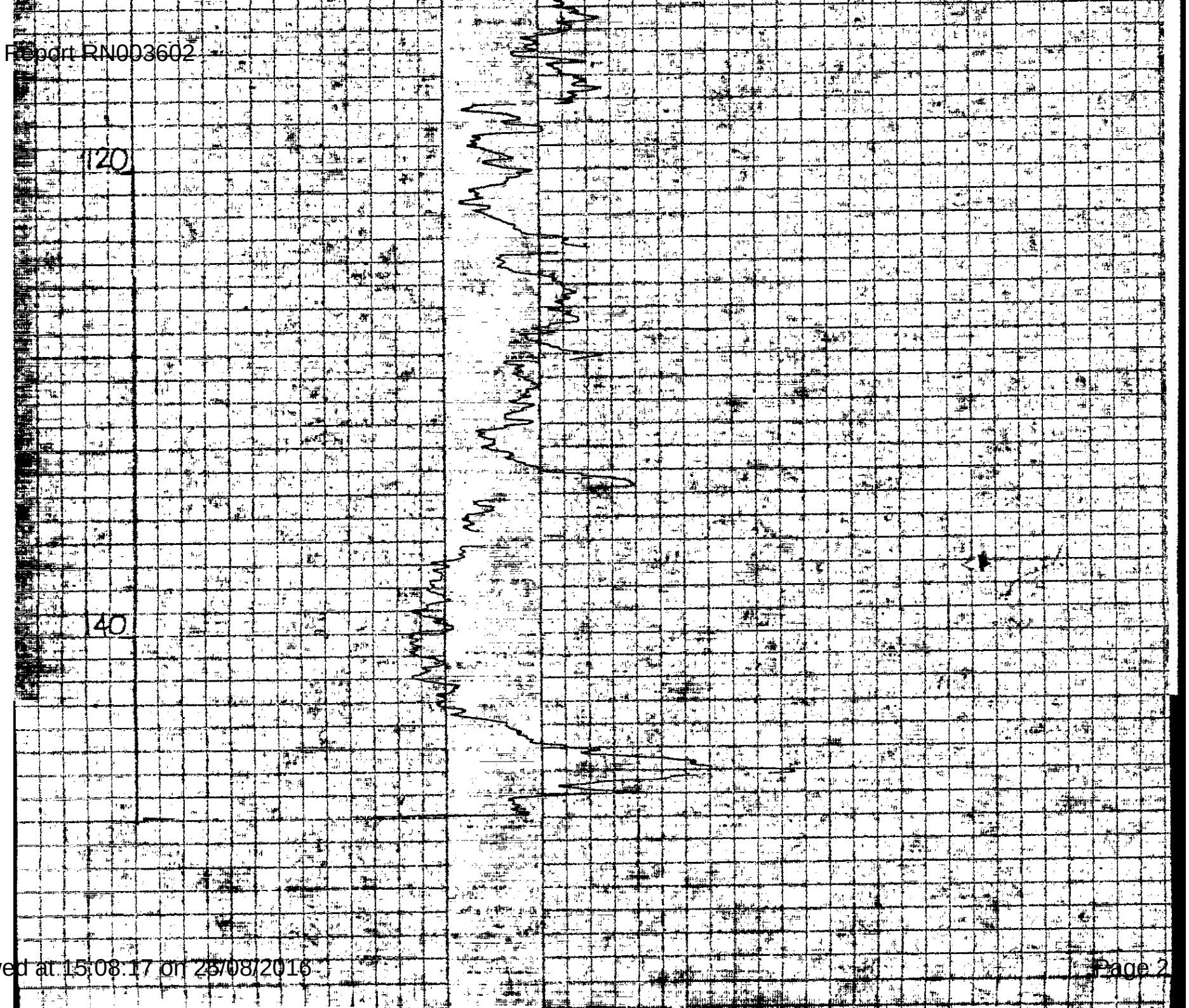
REFERENCE LITERATURE

REMARKS

DRILLERS LOG — DEPTH SCALE = — GAMMA RAY


A. P. I. UNITS
1 MIN
MARKS
CASING
COLLAR
LOCATOR
1:200
INCREASING RADIATION
00
20
40


60
80
100


120
140

TEMPERATURE LOG

DEPT. OF TRANSPORT & WORKS

R.N. 3602

AREA MEREENIE

STATUS Investigation

LOCATION

SHEET NAME ALICE SPRINGS SF 53-14

GRID REF 160 033

LAT ____ LONG ____

OTHER SERVICES

ELEVATION METHOD A.H.D.

B M 554.034m

C T

G L

PERMANENT DATUM ____ ELEV ____

LOG MEASURED FROM ____ m ABOVE PERM. DATUM

DRILLING MEASURED FROM ____

DATE	23-11-68
RUN NO.	1
DEPTH DRILLER	180.0m
DEPTH LOGGER	150.6m
BTM. LOG INTER.	150.6m
TOP LOG INTER.	0.0m
TYPE LOG	ABS. TEMP.
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	78.04m
MAX. REC. TEMP. °C	26.5.62
OPERATING RIG TIME	21.6.62
RECORDED BY	C.J.B.
WITNESSED BY	

BORE - HOLE RECORD

NO	BIT	FROM	TO

CASING RECORD

SIZE	TYPE	FROM	TO

TEST DATA

RUN NO	1	2	3
DEPTH FROM	0.0m		
TO	150.6m		
LOGGING SPEED m/min.	2.4m/m		
TIME START			
FINISH			
TEMP LOG ~~°C/cm~~	1" = 4.3°F		
MAX. TEMP			
DIFF. LOG: SENS.			
SPACING			

EQUIPMENT DATA

TOOL: DIAM. 38mm

NO 1MT-1

PANEL NO. LMR-D

TRUCK NO.

OTHER DATA

BORE DATA

REMARKS

ABSOLUTE

TIME MARKER →

DEPTH

SCALE: 1:240

DIFFERENTIAL

INCREASE →

N.T.A. WATER RESOURCES BRANCH

RN003602

BORE DATA SHEET

NAME ZE Road Reserve

INDEX No. 16/329

LOCALITY A/S

REG. No. 3602

DEPTH 704' 213.7m

FILE No.

CASINGS 387'/4"

PERFORATIONS

SCREENS

LOCATION / / E N

SURFACE LEVEL R.L.

B M LEVEL R.L.

DATUM

CONTRACTOR. WRB

DRILLER. Hargrave

DATE STARTED. 12/1/62

DATE FINISHED. 10/1/62

WATER

AQUIFERS				
DEPTH STRUCK	84'			
AQUIFER THICKNESS				
STANDING WATER LEVEL				
PUMP TEST G.P.H.	seepage			
DRAWDOWN LEVEL				
PU LEVEL				
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES	23/2/65			
BINOMIAL CLASSIFICATION				
T.D.S.	896			
CONDUCTIVITY				
TOTAL HARDNESS				
CHLORIDE				
BICARBONATE				
CARBONATE				
SULPHATE				
NITRATE	5			
FLUORIDE	0.9			
SODIUM				
POTASSIUM				
CALCIUM				
MAGNESIUM				
REG. ANAL. No.				

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET | CASING | AQU. | SEC.

	STRATA
80	Top soil sandy clay sand and gravel
160	Yellow & white clay & gravel
	Brown & white clay & gravel
300	
	White sandy clay
482	
500	White clay and sandstone
590	
701	

NORTHERN TERRITORY ADMINISTRATION.
CONTROL OF WATERS ORDINANCE 1938-1959.
WATER RESOURCES BRANCH.

REGULATION 8:

FINAL STATEMENT OF BORE.

3602

FROM	TO	DESCRIPTION OF STRATA
0	80	Top soil sandy clay sand and gravel
80	160	Yellow & white clay + gravel
160	300	Brown & white clay + " "
300	482	White sandy clay
482	500	White clay & sandstone
500	590	White clay & siliceous sandstone
590	701	White & yellow sandstone with odd red brown clay.

Name of Bore.
ZE

Name of Property.
ROAD RESERVE

Description of Property.
AS ABOVE

Name of Owner.
N. T. A

NAME OF CONTRACTOR.
Water Resources Branch

Name of Driller.
L. G. HARGRAVES

LOCATION OF BORE: (or supply sketch on back hereof.)

..... Miles
SHOT POINT 19
Orthogonal Line near Aerodrome

N	NE	of (b)
S	SE	.....
E	NW	
W	SW	.....

(a) Circle appropriate direction
(b) Use known point such as existing bore, homestead, outstation, etc,

Date of Commencement:
12-1-62

Date of Completion:
18-1-62

Total Depth:
701

Particulars of Casing:
387' of 4"

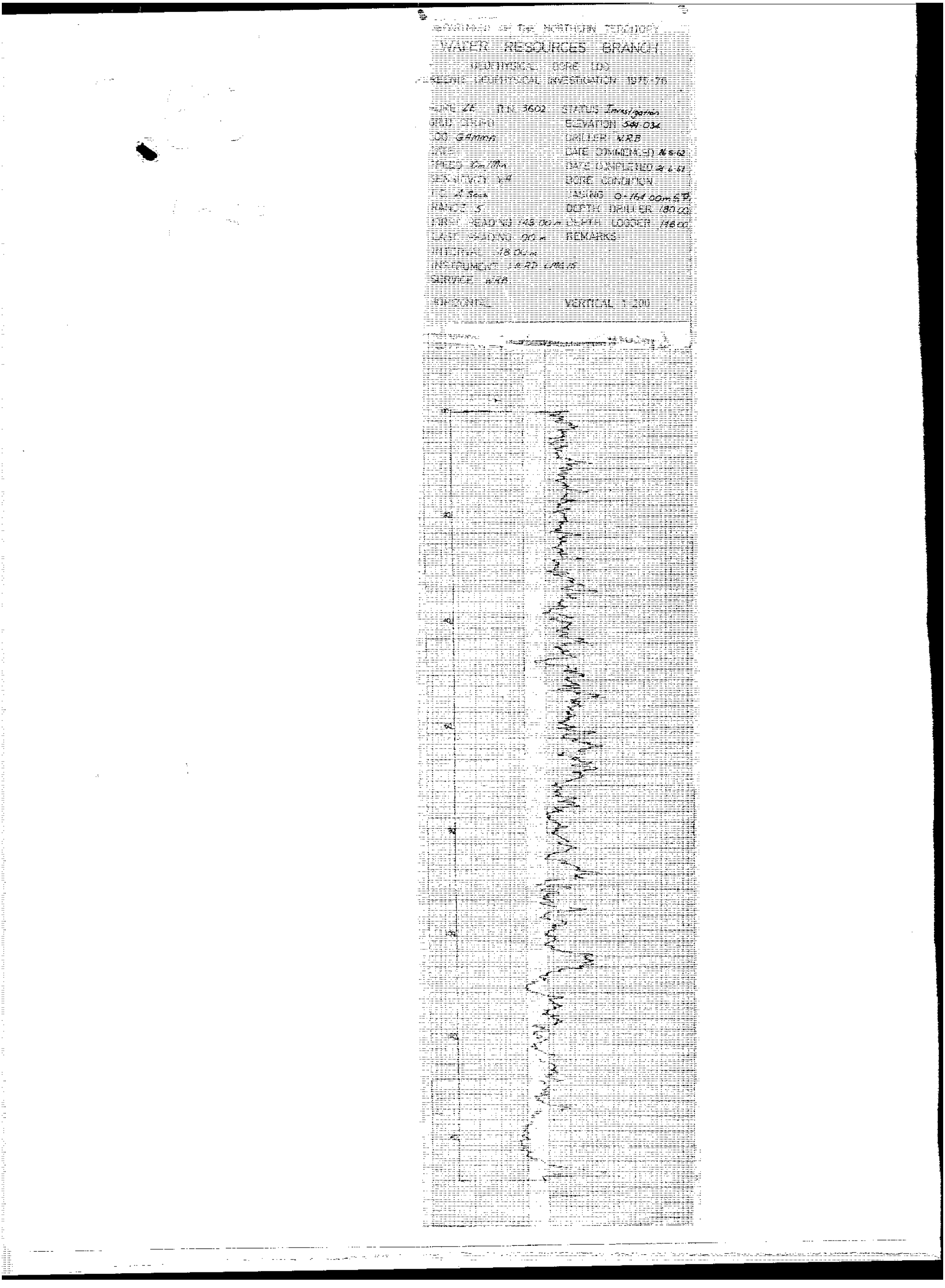
ADDITIONAL INFORMATION OF INTEREST
Losing water rapidly after 600

Particulars of Perforations or Screens:
NIL

Samples of strata and Water supplies have been / will be left at the following Trading Place
.....B.M.R.....
.....
(SIGNATURE)

FOR OFFICE USE ONLY.
R.D 37

WATER	1st Supply	2nd Supply	3rd Supply
Struck at	84	600 onward	
Standing Water Level	surface	-	
Pumping Supply, G.P.M.		-	
Duration of Pump Test	-	-	
Water Level during Test	-	-	
Quality- good, fair or bad	-	-	


WATER RESOURCES BRANCH
RN 3602
STATUS
ELEVATION
DRILLER
DATE COMMENCED
DATE COMPLETED
BORE CONDITION
CASING
DEPTH DRILLER (80 m)
DEPTH LOGGER (78 m)
REMARKS
VERTICAL 1:200

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 16-08-02 BORE No. SHANNON SITE 1 RN17598

Supervisor: S HERIOT

Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				MOVE GEAR ON SITE SET UP AND											
0415				POT 12" DRAG BIT ON COMMENCE 0-1.5 CLAY			DRAG		BIT	12"	.9	.90			
				DRILLING 1.5-5 RED BROWN SANDSTONE				(1)	DP	4½	6.1	7.00			
				& LOOSE CEMENTED 5-5.5 SOFT SAND				(2)	DP	4½	6.1	13.1			
				ADD ROD (2) 5.5-9.5 AS ABOVE											
				9.5-10.4 LOOSE SAND AND GRAVELS											
				HOLE NOT CLEARING PULL OUT.											
				BREAK DOWN BIT, DEPTH HOLE											
				BACKFILLED TO 6.8m DIG MUD											
				PITS AND MAKE UP STRING 12¼ RR											
1200				AND 9⅞ REAMER. DRIVE BACK TO DEPTH.											
~~1300~~	~~to~~			~~TRUCK BACK WITH WATER CONT MIXING~~											
				~~AND CLEAN OUT HOLE~~											
										0-1.5	RED BROWN CLAY				
										1.5-10.4	SAND COARSE &				
											BANDS CLAY.				

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 27-08-02 TUES. BORE No. SHANNON. 1/02 Supervisor: S HERIOT

53K 0390182 — UTM 7366720 RN. 17598 Driller: P BARDON

Time	Depth	Metres drilled	Mins lapsed	0935 AM ON WGS 84 Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SET UP HOSES FOR MUD LINES					RR	12-1/4	.28				
				FINISH PUTTING STRING TOGETHER			5½x4½		SUB	6"	.90	1.18			
				SEND TRUCK FOR MORE WATER.					STAB	STAB	9 7/8	1.44	2.62		
1030	1Hr 20 MINS			TRUCK BACK WITH WATER CONT					COLLAR	6"	5.98	8.60			
				MIXING MUD AND CLEAN HOLE OUT			4½x5½		SUB	5½	.20	8.80			
				TO 8.4m FIX LEAK IN SWIVEL SOCK					COLLAR	5½	5.73	14.53			
1152				ADD 6" COLLAR AND CONT. CLEAN OUT					1 DP	4½	6.10	20.63			
				TO 10.4 SWIVEL PACKING LEAKING BAD											
				STOP PULL BACK AND REPLACE RUBBER											
1420				COMMENCE DRILLING AGAIN. 10.4 – 13.6											
				BROWN SANDY CLAY WITH SOME											
				COARSE SAND. CLEAR HOLE AND											
1500				ADD 5½" COLLAR. CONT DRILL											
				RIG BENT SWAP FOR ANOTHER.											
				CONT DRILLING 13.6 – 18.7 AS ABOVE											
				FIRM BAND AT 16.2											
1600				TALK TO DAVE AND ADVISED TO STOP											
				AND CABE PULL BACK CLEAR HOLE AND											
				PULL BACK TO 5½ COLLAR.											

10.4 – 16.2
BANDS OF COARSE SAND AND BROWN CLAY.

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 28-08-02 WED. BORE No. 17598

SHANNON STG 1

Supervisor: S HERIOT

Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				PICK UP MONS CASING 10" FROM					CSG	5½		14.53			
				DEPOT FIX MUD PUMP SHAFT OILER				(1)	DC	4½	6.1	20.63			
				AND NEW ROD GLANDS, MIX MUD				(2)	DC	4½	6.1	26.73			
0915				AND CONT DRILLING SEND TRUCK FOR				(3)	DP	4½	6.1	32.83			
				WATER AND FUEL											
0945				AT 19.4 ~~RIG~~ TIGHTEN SWIVEL PACKING AND							261mm ID.				
0952				ADD ROD (2) + CONT. 19.4 – 25.5 BROWN					273mm	CASING	DETAILS			10¾"	
1051	25.5	6.1	65min	SANDY CLAYS WITH BANDS SANDSTONE CLEAR HOLE					(1)	6.03					
				420 ROD (3) + CONT. 25.5 – 29.8 AS ABOVE					(2)	6.03	12.06				
1142	29.8			SOME FIRM BANDS. STOP + CLEAR HOLE AT					(3)	6.03	18.09				
				29.8, PREPARE FOR CASING. PULL OUT					(4)	6.02	24.11				
				STRING AND BREAK DOWN. RUN CASING					(5)	6.02	30.13.				
				WELD ON CLEATS FOR LIFTING.											
1620				CASING ON BOTTOM RACK UP MUD											
1630				SHUT DOWN.											
											162–298	BROWN			
												SANDY CLAY WITH			
												BANDS OF SANDSTONE			
											29.8–51.5	AS ABOVE			
										+	QUARTZ CHIPS				

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 24-08-02 TIMES BORE No. 17598 Supervisor: S HERIOT

SWANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				SERVICE GEAR PUT ON BLUEY LINE											
				HEAD WORKS AND BOLT UP WINE					CLAW	8"	.21				
				MAKE UP STRING, SAND LINE GETS			4½ x 4½		SUB	5⅛	.72	.93			
				TANGLED STOP AND FREE UP CUT					STAB	7 7/8	1.25	2.18			
				SAND LINE AND FIX START MAKING					COLLAR	5"	5.98	8.16			
1040				UP STRING AGAIN & CLAW BIT.					SUB	5½	.22	8.38			
				29.8 – 31.2 BROWN SANDY CLAYS					COLLAR	5½	5.73	14.11			
				AND SOME COARSE SAND. ADD (5)					(6) COLLAR	4½	5.98	20.09			
				31.2 – 37.3 AS ABOVE ADD (6)					(1) DP	4½	6.1	26.19			
				37.3 – 43.4 SANDY CLAY WITH					(2) DP	4½	6.1	32.29			
				LOTS OF COARSE SAND + GRAVELS					(3) DP	4½	6.1	38.39			
				SOME LARGE PIECES OF QUARTZ					(4) DP	4½	6.1	44.49			
				ADD (5) 43.4 – 49.5 AS ABOVE					(5) DP	4½	6.1	50.49			
				ADD (6) 49.5 – 51.5 AS ABOVE					(6) DP	4½	6.1	56.59			
				51.5 – 55.5 AS ABOVE WITH SOME					(7) DP	4½	6.1	62.69			
				HARD BANDS OF QUARTZ STOP					(8) DP	4½	6.1	68.79			
				PULL BACK TO MIX BLUE LINE					(9) DP	4½	6.1	74.89			
1155				TRIP BACK IN CLAW HOLE + CONT					(10) DP	4½	6.1	80.99			
				ADD ROD (7) HOLE OPEN TO BOTTOM					(11) DP	4½	6.1	87.09			
				SAND AND GRAVEL MUST BE CAVING 55-61.6					(12) DP	4½	6.1	93.19			
1415				ADD ROD (8) 61.6 – 65 AS ABOVE 65-67.6											
1441				ROD BROWN CLAY ADD ROD (9) + CONT											
				67.6 – 73.8 AS ABOVE ADD ROD (10)											
				73.8 – 79.9 AS ABOVE ADD (11)											
				79.9 – 86m AS ABOVE ADD (12) 86 –											
				92.1 AS ABOVE BUT SANDY CLAY HOLE AND PULL OUT.											
				KNOCK OFF											

RECEIVED 22 OCT 2002 GROUNDWATER DATA

51.5 – 65 BROWN SANDY CLAY WITH BANDS OF QUARTZ

65 – 86 RED BROWN CLAY

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE FRI 30/08/02 BORE No. RN 17598 1/02 Supervisor:

SHANNON STG 1 Driller:

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND TRIP IN				PREVIOUS RIG				93.19			
				CLEANING HOLE AS WE GO				(13)	DP	4½	6.1	99.29			
				AIRLIFTING WATER 55-61 (SEEPAGE				(14)	DP	4½	6.1	105.39			
		OR FOAM,		OVERNIGHT) HOLE BACKFILLED TO				(15)	DP	4½	6.1	111.49			
				APPROX 74m WITH CLAY AND SAND				(16)	DP	4½	6.1	117.59			
				~~ADD~~ RIG CONT CLEANING OUT TO 98m				(17)	DP	4½	6.1	123.69			
0907				ADD ROD 13 + START DRILLING 92-98.1				(18)	DP	4½	6.1	129.79			
~~0907~~				AS ABOVE ADD (14) 98.1 — 104.2				(19)	DP	4½	6.1	135.89			
				AS ABOVE ADD (15) 104-110.3 BROWN				(20)	DP	4½	6.1	141.99			
				SANDSTONE AND WATER AIRLIFTING				(21)	DP	4½	6.1	148.09			
1030				APPROX 1 HR AIRLIFT + TAKE SAMPLE				(22)	DP	4½	6.1	154.19	SAMPLE	# 1	
				ADD ROD (16) + CONT 110.3 — 116.4				(23)	DP	4½	6.1	160.29	DEPTH	110.3m	
				AS ABOVE. ADD ROD (17) 116.4 — 122.5				(24)	DP	4½	6.1	166.39	PH	7.75	
				AS ABOVE ADD ROD (18) 122.5 - 128.6				(25)	DP	4½	6.1	172.49	TEMP	26.4 °C	
				AS ABOVE INCREASE IN EROSION ADD				(26)	DP	4½	6.1	178.59	COND	1210	
				ROD (19) 128.6 - 134.7 AS ABOVE ADD									TIME	1100	
				ROD (20) 134.7 - 140.8 AS ABOVE											
				ADD (21) 140.8 - 147m AS ABOVE									BOTTLE NO		
				ADD (22) 147 - 153.1 AS ABOVE				86-104					RL01		
				ADD (23) 153.1 - 159.1 AS ABOVE					BROWN SAND, CLAY						
				ADD (24) 159.1 - 165.2 AS ABOVE					104 - 177 CEMENTED SAND						
				ADD (25) 165.2 - 171.3 AS ABOVE					OR LOOSELY CEMENTED SANDSTONE.						
				ADD (26) 171.3 - 177.4 AS ABOVE											
				CLEAR HOLE AND PULL OUT STRING,											
				INCREASE IN SAND COMING UP					CONTINUED COARSE UP						
				TRIP OUT AND BREAK DOWN STRING											

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE Sat 31-08-02 BORE No. 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				SERVICE GEAR, DO REPAIRS TO								TIME.	0810	AM.	
				ROTATION CONTROL AND LOWER										SWL	
				BREAK OUT RAM. TAKE SWL 56m										56m	
				RIG NOT MAKING AIR STOP AND								HOLE	DEPTH	177.4	
				CHECK OUT HOSE FROM COMPRESSOR								AQUIFER		104-110	
				TO TANK U/S PULL OFF INLET	BALK							SUPPLY		1 L/S.	
1100				UP KNOCK OFF											
												3½ hrs	REPAIRS + MAINT		

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE: Mon 21/09/02 BORE No: 11598 1/01 Supervisor: S HASLOT

SHANNAN SUB 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND RIG ON HOLE				6	DP			56.5			
				DRILL HOLE 56m CHANGE OVER TO MUD				(7)	DP	4½	6.1	62.6			
				DRILLING, TAKE OFF 10" HEAD WORKS				(8)	DP	4½	6.1	68.7	MUD + FOAM		
				TRIP IN WITH SAME STRING + MIX MUD				(9)	DP	4½	6.1	74.8	USED		
				PUMP PIT INTO HOLE + SEND TRUCK FOR MORE				(10)	DP	4½	6.1	80.9	FOAM	DA:	
0954				WATER AND CLEAN TO 55m WAIT ON TRUCK				(11)	DP	4½	6.1	87.0	M	20	
1000				MIX MORE MUD + ADD ROD (7) CLEAN				(12)	DP	4½	6.1	93.1	F	2	
				TO 61.5 ADD (8) 67.6 ADD (9) 73.7 ADD (10) 79.9				(13)	DP	4½	6.1	99.2			
				ADD (11) 86 ADD (12) 92m ADD (13) 98.1				(14)	DP	4½	6.1	105.3			
				ADD (14) 104.2 ADD (15) 110.3 ADD (16) 116.4				(15)	DP	4½	6.1	111.4			
				ADD (17) PULL BACK MUD COND MUD ADD (18)				(16)	DP	4½	6.1	117.5			
1310				128.6 ADD (19) 134.7 ADD (20) 140.9				(17)	DP	4½	6.1	123.6			
				ADD (21) 147 ADD (22) 153.1 ADD (23)				(18)	DP	4½	6.1	129.7			
				159.1 ADD (24) 165.2 ADD (25) 171.3				(19)	DP	4½	6.1	135.8			
				ADD (26) 177.5 ADD ROD (27) + START DRILLING				(20)	DP	4½	6.1	141.9			
1447				FROM 177.5 — 182.7 AS ABOVE 182.7m ADD				(21)	DP	4½	6.1	148.0			
1512				STOP AT 183.5m AND CIRCULATE.				(22)	DP	4½	6.1	154.1			
1524				START TRIPPING OUT PACK UP RIG				(23)	DP	4½	6.1	160.2			
				SHUT DOWN				(24)	DP	4½	6.1	166.3			
								(25)	DP	4½	6.1	172.4			
								(26)	DP	4½	6.1	178.5			
								(27)	DP	4½	6.1	184.6			
								177 — 182.7 AS ABOVE							
								182.7 — 192.8 LOOSELY CEMENTED							
								SANDSTONE WITH FIRM BANDS.							

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 03-09-02 TUES. BORE No. RN17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P RUZDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0800				SERVICE GEAR, TRIP IN AND MIX				10	DRILL PIPE			80.99			
				MUD. HOLE ABIT TIGHT ON FALLON				(11)	DP	4½	6.1	87.09			
843				IN AROUND 98 m, START MUD CIRC.				(12)	DP	4½	6.1	93.19			
				AND CLEANING OUT HOLE. HOLE APPEARS				(13)	DP	4½	6.1	99.29			
				TO BE CLEAN FROM 128, CONT CLEANING				(14)	DP	4½	6.1	105.39			
				HOLE STILL OPEN AT 105 m HOLE				(15)	DP	4½	6.1	111.49			
				HAS BACKFILL FROM 180 m APPROX				(16)	DP	4½	6.1	117.59			
				CLEAN TO 188.5 ADD ROD (28)				(17)	DP	4½	6.1	123.69			
				AND DRILL TO 189.6 CLEAN				(18)	DP	4½	6.1	129.79			
930				HOLE NOT MAKING CUTTINGS ADD ROD (29)				(19)	DP	4½	6.1	135.89			
				189.6 – 192.8 AS ABOVE SOFT BANDS				(20)	DP	4½	6.1	141.99			
				192.8 – 195.7 HARD DRILLING				(21)	DP	4½	6.1	148.09			
12				CLEAN HOLE AT 195.7 ADD (30)				(22)	DP	4½	6.1	154.19			
18				195.7 – 197 HARD 197 – 199 SOFT BAND				(23)	DP	4½	6.1	160.29			
00				199 – 201.8 HARD STOP AND CIRCULATE				(24)	DP	4½	6.1	166.39			
07				ADD ROD (31) + CONT				(25)	DP	4½	6.1	172.49			
50				STOP AND COND MUD AND CLEAN OUT				(26)	DP	4½	6.1	178.59			
				SETTLE PIT AND DRAIN				(27)	DP	4½	6.1	184.69			
55				CONT DRILLING. 201.8 – 208 HARD DRILLING				(28)	DP	4½	6.1	190.79			
50				STOP AND CIRCULATE				(29)	DP	4½	6.1	196.89			
13				START PULLING STRING OUT.				(30)	DP	4½	6.1	202.99			
20				OUT OF HOLE, BREAK DOWN BIT.				(31)	DP	4½	6.1	209.09			
0				PACK UP AND SHUT DOWN											
				HAVE HOLE LOGGED	192.8 – 208 HARD SANDSTONE.										

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 04-09-02 WED BORE No. RN 17598 1/02 Supervisor: S HERIOT

SITANNION STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND MAKE UP 7 7/8					RR	7 7/8	.20				
3820				RR STRING AND TRIP IN TO					SUB	5 1/2	.52	.72	4 HRS		
				153m MIX MUD ROTATION NOT WORKING				REAM	STAB	7 7/8	1.25	1.97	R+M.		
3900				STOP AND REPAIR. GO TO TOWN FOR NEW					DC	6"	5.98	7.95			
				REGISTER RETURN TO RIG & REPLACE.					SUB	5 1/2	.22	8.17			
1300				CONT MIXING MUD. ADD (22) CLEAN TO					COL	5 1/2	5.73	13.90			
				159 ADD (24) ADD (25) ADD (26) ADD (27)					COL	4 1/2	5.98	19.88			
				ADD (28) ADD (29) ADD (30) ADD (31) AND				20	DP	4 1/2	122	141.88			
				CLEAN TO 207.7 ADD ROD (32)				(21)	DP	4 1/2	6.1	147.98			
1346				START DRILLING. 208 – 213.8 AS ABOVE				(22)	DP	4 1/2	6.1	154.08			
1420				STOP + CLEAN HOLE				(23)	DP	4 1/2	6.1	160.18			
1425				ADD ROD (33) + CONT 213.8 – 219.9 AS ABOVE				(24)	DP	4 1/2	6.1	166.28			
				SOFT BANDS ADD ROD (34)				(25)	DP	4 1/2	6.1	172.38			
23				CONT DRILLING 219.9 – 223 SOME FIRM				(26)	DP	4 1/2	6.1	178.48			
525				BANDS STOP AND CIRCULATE				(27)	DP	4 1/2	6.1	184.58			
530				PULL OUT STRING + PACK UP				(28)	DP	4 1/2	6.1	190.68			
630				SHUT DOWN.				(29)	DP	4 1/2	6.1	196.78			
								(30)	DP	4 1/2	6.1	202.88			
								(31)	DP	4 1/2	6.1	208.88			
								(32)	DP	4 1/2	6.1	214.88			
								(33)	DP	4 1/2	6.1	220.98			
								(34)	DP	4 1/2	6.1	227.18			
								208 – 213	FIRM SANDSTONE & SANDY CLAYS						

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 5/09/02 BORE No. RN 17598 1/02

SHANNON STG 1

Supervisor: S HERIOT

Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				SERVICE GEAR + TRIP IN.			25	DRILL PIPE				172.38			
0830				MIX MUD + CONDITION MUD.				8x	DP	4½	48.8	221.18			
				CLEAN OUT FROM 175m TO 223m				(34)	DP	4½	6.1	227.28			
1010				ADD (34) + CONT 223 - 232.2 AS ABOVE				(35)	DP	4½	6.1	233.38			
1021		6.1	33min	ADD (36) + CONT. 232.2 — 238.3 AS ABOVE				(36)	DP	4½	6.1	239.48			
1102				ADD (37) + CONT 238.3 - 240m AS ABOVE				(37)	DP	4½	6.1	245.58			
				240-240.5 HARD DRILLING TO 244.4				(38)	DP	4½	6.1	251.68			
1246				STOP AND CIRCULATE. ADD ROD (38)				(39)	DP	4½	6.1	257.78			
1258				CONT DRILLING 244.4 — 246 SOFTER											
1410		6.1	72min	HARD AGAIN 246 — 250.5 CLEAN HOLE											
1415				ADD ROD (39) + CONT 250.5 - 252 AS ABOVE											
1445				STOP + CLEAN HOLE + PULL OUT + RACK											
1636				KNOCK OFF BOYS DRIVE BACK TO DEPOT.											
									213 - 246			SANDY CLAY Brown & White			
									246 - 303			Brown + White + YELLOW Clay			
									303 - 325			BANDS OF Clay + SAND + Clay Stone			

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 6-09-02 FRID BORE No. RN 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR CLEAN UP STABILIZER					CLAW	8"	.21				
				AND TAKE OFF. RUN 8" CLAW BIT.			3½x4½		SUB	5½	.23	.44			
0810				TRIP IN. CLEAN OUT MUD PITS			4½x4½		SUB	5½	.52	.96			
				AND MIX MUD				COLLAR		6"	5.98	6.94			
1010				CLEAN OUT HOLE FROM 214m TO 253					SUB	5½	.22	7.16			
1042				START DRILLING 253 – 256.6 Clay				COLLAR		5½	5.73	12 89			
1100				STOP + CLEAN HOLE ADD ROD (40)				COLLAR		4½	5.98	18.87			
1111				+ CONT. DRILLING 256.6 – 262.7 AS ABOVE			3 2x	DP		4½	195.2	214.87			
				ADD (41) 262.7 – 268.8 AS ABOVE MIX MUD.				(33)	DP	4½	6.1	220.97			
1202		6.1	20	ADD (42) + CONT. 268.8 – 274.9 AS ABOVE				(34)	DP	4½	6.1	227.07			
1222				ADD (43) + CONT 279 PULL BACK AND				(35)	DP	4½	6.1	238.27			
1245		4	23	CONDITION MUD (THICKEN UP)				(36)	DP	4½	6.1	250.37			
1305		2	40	281m CIRCULATE				(37)	DP	4½	6.1	256.47			
				ADD ROD (44) + CONT 281 – 287 AS ABOVE				(38)	DP	4½	6.1	262.57			
13[illegible]		6.1		SOME FIRM BANDS. CIRCULATE				(39)	DP	4½	6.1	268.67			
1349				ADD ROD (45) + CONT. 287 – 293 AS ABOVE				(46)	DP	4½	6.1	263.77			
				SOME FIRM BANDS. CIRCULATE TO CLEAN				(41)	DP	4½	6.1	269.87			
				HOLE, THICKEN UP MUD				(42)	DP	4½	6.1	275.97			
1450				START TRIPPING OUT. FILL DOWN CABLE				(43)	DP	4½	6.1	282.07			
				COMES OFF STOP + FIX + TENSION UP BOTH				(44)	DP	4½	6.1	288.17			
				WINCH				(45)	DP	4½	6.1	294.27			
1548				START PULLING OUT AGAIN. OUT											
				TRAVELLING BLOCK ON HOIST WIRE AND											
				PULL OUT TO CASING											
1705				BACK UP + START DOWN.											

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 7-09 02 SAT BORE No. RN 17598 1/02 Supervisor: S HEALEY

SHANNON STC 1 Driller: P PANDA

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
0810				SERVICE GEAR AND TRIP IN				4½	COLLAR			18.87			
				STRINGS STOPS 157m START CLEANING				22x	DP	4½	134.2	153.07			
0840				HOLE FROM 157m TO 293 ADD ROD				23x	DP	4½	140.3	293.37			
				(46) 293-298.2 AS ABOVE PUMP NOT				(46)	DP	4½	6.0	299.37			
				WORKING PROPERLY. AND HOLE NOT CLEANING											
				GETTING TIGHT WHEN PULLING BACK PULL BACK											
1030				AND CIRCULATE. MECHANIC DOES CHECKS											
				ON HYDRAULICS AND SAYS PRESSURE DOWN											
				MAYBE PUMP U/S DAVE TAKES MECHANIC											
				BACK TO TOWN TO GET MORE GADGETS.											
1110				STAND DOWN TIME.											
1200				DAVE + MECHANIC ARRIVE BACK											
				DO MORE TEST BUT PUMP AT 95%											
1315				~~BACK~~ CAPACITY CLEAN HOLE + PULL OUT.											
1453				BACK TO CASING STOP, RACK UP + CLEAN											
				DOWN GEAR											
				SHUT DOWN TAKE LOADER TO DEPOT.											
9/9/02				MON WORK IN DEPOT PUTTING											
				MUD PUMP TOGETHER AND TRANSPORT												
				OUT TO SITE + TEST RUN.											

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE TUES 10/9/02 BORE No. RN 17598 1/02.

SHANNON STG 1

Supervisor: S HERON

Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE CREW AND CLEAN OUT			JP	20	COLLAR	6¼	18.87	18.87			
				MUD PIT. SETTLING PIT				33x	DP	4½	201.3	220.17			
				CONDITION MUD + TRIP IN AND				19x	DP	4½	73.2	293.37			
				CLEAN OUT TO 298m AND START				(46)	DP	4½	6.0	298.37			
1045				DRILLING 298.2 – 303 AS ABOVE				(47)	DP	4½	6.0	304.37			
				ADD (49) 303 – 307 AS ABOVE START				(48)	DP	4½	6.0	310.37			
				FROM BANDS CLEAN HOLE, PULL											
				BACK 7 RODS AND ADD MORE 6.0					STRING	WITH	6.0	RODS				
				RODS.					NOW			304.67			
1200				CONT DRILLING 309 – 315.7 SAND FROM BANDS.				(48)	DP	4½	6.1	310.77			
1305				CLEAN HOLE ADD ROD (50)				(49)	DP	4½	6.1	316.87			
1315				+ CONT 315.7 – 321.8 FROM HAND DRILLING				(50)	DP	4½	6.1	322.97			
				SAND STONE ? 321 – 321.8 SOFT.				(51)	DP	4½	6.1	329.07			
1406				~~ADD~~ CIRCULATE											
1413				ADD ROD (51) + CONT 321.8 – 324											
				SOFTER AS ABOVE 324–325 HARD BRAIN.											
				STOP + CLEAN HOLE.											
1420				TRIP OUT											
1637				OUT OF HOLE START RACKING UP.											
				SHUT DOWN.											

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22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE: WED 11-09-02 BORE No.: RN 17598 1-02 Supervisor: S HENROT

SWANSON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0630				TRAVEL TO SITE MOVE CASING				1	5.96						
				SERVICE GEAR AND PREPARE TO				2	5.92	11.88					
				RUN CASING.				3	5.99	17.87					
0700				START RUNNING				4	598	23.85					
								5	597	29.82	- BEVEL GROOVER				
								6	599	35.81	TAKE OFF				
								7	5.99	41.8	SWAP OVER STRING				
				✓ 27 5.44 - 162.05	47 5.99 - 281.47			8	5.36	47.80					
				28 6.06 - 168.11	48 5.96 - 287.43			9	6.79	53.95					
				29 6.05 - 174.16	49 6.00 - 293.43			10	6.01	59.96					
				30 6.03 - 180.19	50 5.97 - 299.4			11	6.00	65.96					
				31 6.07 - 186.26				12	5.99	71.95					
				32 5.95 - 192.21				13	5.95	77.9					
				33 5.95 - 198.16				14	6.01	83.91					
				34 6.00 - 206.16 HOLE TIGHT FROM				15	6.01	89.92					
				35 5.93 - 210.09 APPROX 270m. CASING				16	5.98	95.9					
				36 5.98 - 216.07 STOPS AT 278m PACK				17	5.95	101.85					
				37 6.06 - 222.13 UP + START RIG DOWN AT				18	5.47	107.32					
				38 5.97 - 228.1 1900 BOYS LOAD SITE				19	6.42	113.74					
				39 5.97 - 234.07 R/O DRIVE TO DEPOT.				20	5.96	119.70					
				40 6.00 - 240.07				21	6.14	126.16					
				41 5.36 - 245.43				22	5.95	132.11					
				42 6.05 - 251.48				23	5.97	138.08					
				43 6.04 - 257.52				24	6.03	144.11					
				44 6.04 - 263.56				25	5.97	150.08					
				45 5.96 - 269.52				26	6.03	156.11					
				46 5.96 - 275.48											

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE THURS 12-09-02 BORE No. RN 17598 1/02

Supervisor: S HERON

Driller: P PARDON

SHANNON ST61

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				SERVICE GEAR AND CUT OFF CASING					BIT	5 5/8	.10	.10			
				TRIP IN WITH 5 5/8 BRADE BIT STOP					SUB	4½	.42	.52			
				CLEAN OUT FROM 245m TO 325m				COLUM.	5½	5.73	6.25				
				DRILL 325-325.5 SOFT MS IF CLAY.				COLUM	4½	5.78	12.03				
1348				STOP + CIRCULATE CLEAN HOLE.				3X	DP	4½	225.7	237.73			
1355				TRIP BACK TO CASING AND WORK ON				9X	DP	4½	54	291.73			
				STUCK PIECE OF CASING THAT WAS CUT OFF											
				NO (47) TRY PUSHING AND PULLING CASING											
1530				DOT STUCK FAST CUT EXCESS CASING											
				OFF AGAIN AND FIT UP BLOW LINE.										TEST OF WATER		
				RAISING STOP AND PACK UP										FLOW 6		
				FAN BELT ON RIG MOTOR SMOKING										COND 957		
				UP RUBBING ON GUARD												
1600				RETURN TO DEPOT												

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE FRI 13-09-02 BORE No. RN 17598 1/02 Supervisor: S HERLOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				PICK UP BOYS FROM DEPOT AND		STRING	PREVIOUS		PAGE						
				HEFFO MAKES UP NEW PLATE FOR					D.T	5 5/8	10	10			
				BUCKY HEAD WORKS. GO TO SITE					SUB	4½	92	52			
				SET UP HEAD WORKS AND SERVICE				COLLAR	5⅝	5-73	6 25				
				GEAR. PICK UP HEFFO AND RIG				COLLAR	4 1/2	5 78	12-03				
				FOR BUCKY LINE				37x	DP	4½	225.7	237-73			
1006				PULL BUCKY LINE TOGETHER				9x	DP	4½	54	291	73		
1107				TRIP IN TO 320				(47)	DP	4½	6.1	297-83			
1130				START AIRLIFTING MUD OFF,				(48)	DP	4½	6.0	303-83			
				MUD STARTS TO RUN THEN STOPS				(49)	DP	4½	6.0	309.83			
				NOT ENOUGH AIR PRESSURE PULL 5 RODS				(50)	DP	4½	6.0	315.87			
				OFF. NOT ENOUGH PULL BACK TO				(51)	DP	4½	6.0	321-87			
1230				295m AND AIRLIFT. ABOUT 4Lp MUD											
				GREY SAND CONT AIRLIFTING FOR SAMPLE,									# 2		
				TAKE SAMPLE, ADD 5 RODS AND AIRLIFT FROM									SAMPLE BOTTLE		
				295.									RL02		
1339				ADD 4 MORE RODS STRING NOW 279									225m		
				ADD 4 MORE RODS STRING NOW 303-8									TEST WATER		
1428				START TRIPPING OUT. TOO MUCH SAND.									PH 7.5		
1545				BACK TO COLLARS, TAKE OFF HEAD WORKS.									COND 957		
1612				PACK UP AND SHUT DOWN											
													# 3 SAMPLE BOT		
													304 m		
													PH 7.6		
													COND 1010		
													RL03		

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE SAT 14-09-02 BORE No. RN 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON.

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				SERVICE GEAR AND GET SECTION				BLADE	BIT	5 5/8	.10	.10	SWL	35.8m	
				NO OFF RIG ENGINE 11002902					SUB	4 1/2	.42	.52			
				DEPTH SWL 35.8m PULL OFF					COLLAR	4 1/2	5.98	6.50			
				HEAD WORKS + 5 1/2 COLLAR + TRIP				38 x	DP	4 1/2	234.8	238.3	6.1 s		
				IN WATER FLOWING OVER CASING BIT SLOWS				8x	DP	4 1/2	48.0	286.3			
				265 m PIPE SLOWING DOWN 280-286 CHANGE				5x	DP	4 1/2	30.0	316.3	2 AQUA POL		
				LINES TO MUD AND MIX MUD. 6 BAGS MUD				52	DP	4 1/2	6.1	322.4	2 EXTRA GEL		
1125				PUMP ROD GLANDS AND START CLEANING				53	DP	4 1/2	6.1	328.5			
				OUT FROM 280 m LOTS OF GREY PURPLE				54	DP	4 1/2	6.1	334.6.			
				CLAY CLEAN OUT TO 285.2m				55	DP	4 1/2	6.1	340.7			
				HOLE MUST HAVE BACKFILLED TO BOTTOM											
				OF CASING OVERNIGHT. CLEAN OUT											
				TO 325 m AND DRILL TO 327.4 CLEAN											
1345.				HOLE ADD ROD (54) 327.4 – 333.5											
1410				GREY CLAY ADD ROD (55) 333.5 – 339.6					325 – 346				BROWN + GREY + W/ROCK		
				AT 339.6 MUD PRESSURE BUILDING UP								SANDY CLAYS			
1444				CLEAN HOLE AT 339.6											
1447				TRIP OUT, PULL BACK TO CASING.											
1520				SHUT DOWN											

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE: MON 16-09-02 BORE No.: RN17598 Supervisor: S HERLOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND TRIP IN				UP to Collar				6.5			
				MIX MUD AND CLEAN OUT FROM				38x	DC	4½	231.8	238.3			
				325m MUD PUMP HAS HOLE IN				15x	DP	4½	90.0	328.3			
				UNDER PART OF LINER CASING				(54)	DP	4½	6.1	334.4			
				ABOUT THE SIZE OF A PENCIL				(55)	DP	4½	6.1	340.5			
				CONT CLEAN TO 339.5 ADD				(56)	DP	4½	6.1	346.6			
				ROD (56) + START DRILLING.				(57)	DP	4½	6.1	352.7			
				339.5 - 345.5 DARK GREY CLAY.	(DARK)			(58)	DP	4½	6.1	358.8			
1015				+ WHITE ADD (57) 345.5 - 351.6 AS	ABOVE			(59)	DP	4½	6.1	364.9			
1049				ADD (58) 351.6 - 357.7 DARK GREY				(60)	DP	4½	6.1	371.0			
1116				CLAY ADD (59) 357.7 - 363.8 AS ABOVE				(61)	DP	4½	6.0	377.0			
				ADD (60) 363.8 - 370 AS ABOVE WHITE.				(62)	DP	4½	6.0	383.0			
1225				ADD (61) 370 - 376 AS ABOVE WHITE				(63)	DP	4½	6.0	389.0			
1304				ROD (62) + CONT DRILLING 376 - 382 WHITE				(64)	DP	4½	6.0	395.0			
				+ GREY CLAY. CLEAN HOLE AND											
1340				ADD ROD (63) 382 - 388 AS ABOVE											
				DO REPAIRS TO MUD PUMP AND											
				ADD (64) 388 - 394 AS ABOVE SOME											
				FINAL BANDS CLEAN HOLE											
1544				START TRIPPING OUT.											
				PACK UP AND TAKE PIPE TRUCK											
				BACK TO DEPOT FOR MORE DRILL											
				PIPE.											

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE TUES 17/09/02 BORE No. RN 17598

Supervisor: S HERIOT

Driller: P PARDON.

SHANNON STG 1

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR + CLEAN OUT SETTLING				58	DP	TALLY		~~385~~ 358.3			
				PIT BRING OUT MORE DRILL PIPE				6x	DP	4½	27.48	385.78			
				RIG EXTRA GEL TRIP IN HOLE				65	DP	4½	4.58	390.36			
				BACKFILLED TO APPROX 362m START				66	DP	4½	4.58	394.93			
				CLEANING OUT HARD TO BUILD UP				67	DP	4½	6.1	401.03			
				SLIPS FOR 4.58 DRILL PIPE CONT CLEANING				68	DP	4½	6.1	407.13			
				WITH CARROUSEL PULL BACK 7 PIPE				69	DP	4½	6.1	413.23			
				RIG RUN 8 PIPE OFF TRAILER				70	DP	4½	6.1	419.33			
1025				COMMENCED DRILLING FROM 394m				71	DP	4½	6.1	425.43			
1052				394–400 AS ABOVE ADD (68) 400–403				72	DP	4½	6.1	431.53			
				WHITE + GREY CLAY 403–406 WHITE				73	DP	4½	6.1	437.63			
1124				RIG ROD CLAY ADD ROD (69) 406–412.1											
				AS ABOVE NOISE IN MUD PUMP											
				STOP AND FIX REPAIRING PUMP											
1330				ADD ROD (70) + CONT. 412–418.2											
1354				~~CHANGE~~ CLAY ADD ROD (71) + CONT.											
				418.2 – 424.3 AS ABOVE											
1430				ADD ROD (72) ~~BOSS~~ 424.3 – 430.4											
				ADD (73) 430.4 – 436.5 AS ABOVE											
				SOME FIRM BANDS CLEAN HOLE											
				RIG PULL BACK TO CASING											
1732				SHUT DOWN											

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GROUNDWATER DATA

6 EXTRAS

DRILLERS LOG

Department of Lands, Planning & Environment

DATE WED 18-09-02 BORE No. RN 17598 1/02

SHANNON STG 1

Supervisor: S HERLOT

Driller: P PARDEN

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				SERVICE GOAK + TRIP IN		WITH	ROD	66		TALLY	394.93				
0858				START CLEANING OUT FROM 426m				1/2	DP	4½	32.06	426.99			
				ROD (74) ADD ROD (75) CLEAN TO				(74)	DP	4½	6.1	433.09			
				436.5 AND DRILL TO 438.1				(75)	DP	4½	6.1	439.19			
				ADD (76) 438.1 – 444.2				(76)	DP	4½	6.1	445.29			
				WITH BROWN CLAY + GREY				(77)	DP	4½	6.1	451.39			
1048				CLAYSTONE ADD ROD (77)				(78)	DP	4½	6.1	457.49			
				444.2 – 450.2 BROWN + WHITE CLAY				(79)	DP	4½	6.1	463.59			
1135				ADD (78) 450.2 – 456.3 AS ABOVE BROWN				(80)	DP	4½	6.1	469.69			
				ADD ROD (79) 456.3 – 462.4 BROWN											
1310				CLAY ADD ROD (80) 462 – 467.3 AS ABOVE											
				467.3 – 468 FINISHED DRILLING 468											
				VERY HARD. PULL OUT TO CASING											
1710				STOP KNOCK OFF											

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GROUNDWATER DATA

Government Printer of the Northern Territory

THE NORTHERN TERRITORY OF AUSTRALIA

Water Act

FINAL STATEMENT OF BORE

Name of Owner:	DIPE NATURAL RESOURCES	**Registration No.:**	**RN17598**
Name of Bore:	SHANNON 1/02		
Intended use:	INVESTIGATION	Index Map No.:	16/2672
Location:	ALICE SPRINGS AIRPORT PROPERTY	Permit No.:	551

From	To	Particulars of Strata
0	1.5	CLAY AND TOPSOIL
1.5	16.2	RED BROWN SANDSTONE SAND AND CLAY
16.2	51.5	BROWN SANDY CLAYS AND SANDSTONE
51.5	55.5	AS ABOVE WITH QUARTZ BANDS
55.5	104	SAND AND GRAVELS CEMENTED WITH
		RED BROWN CLAYS
04	192.8	SANDSTONE SAND AND CLAY
192.8	208	FIRM SANDSTONE
208	213	SANDSTONE AND SANDY CLAYS
213	303	BROWN WHITE AND YELLOW CLAYS
303	325	BANDS OF CLAY CLAYSTONE AND SAND
325	339.5	GREY AND WHITE CLAY
339.5	370	DARK GREY CLAY
370	403	WHITE AND GREY CLAY
403	468	BROWN RED AND WHITE CLAY

Name of Contractor:	DIPE
Name of Driller:	P PARDON
Date Commenced:	27/08/02
Date Completed:	18/09/02
Depth Drilled:	468 m
Completion Depth:	468 m

METHOD OF DRILLING

Rotary	Rev. Cir	Cable	Other
☑	☐	☐	☐

HOLE DIAMETER			Drilling Fluid
From	To	Diam	Type
0	29.8	310mm	MUD
29.8	177.4	200mm	AIR/FOAM
177.4	325	200mm	MUD
325	468	145mm	MUD

PARTICULARS OF CASING

From	To	Diam (ID)	Type
0	29.8	254mm	STEEL
0	278	152mm	STEEL

PARTICULARS OF PERFORATIONS OR SCREEN STRINGS

From	To	Diam (ID)	Aperture	Type
278	468			OPEN HOLE

Casing Suspended: Yes ☐ No ☑

Method:

Height of Casing above GL: .6 M

Top of Packer set at: N/A m

Length of Packer: N/A m

Method of Packer Connection: N/A

CEMENTING/GRAVEL PACKING

From	To	Type

STRATA and WATER SAMPLES

Have been ☐ Will be ☑

Left at: ALICE SPRINGS

WATER BEARING BEDS

Depth (m) From	Depth (m) To	Yield L/s	SWL m	Duration hr	Quality	EC	ph	Bottle No.
104	110	1	56	DRILL	GOOD	1210	7.75	RL01
278	304	4		1	GOOD	1010	7.6	RL03

Completion Yield: L/s Method: Duration: hr

Compltion SWL from GL: m Depth of lift: m

LOCATION SKETCH OF BORE	LOCATION DESCRIPTION OF BORE		
			m/km
	E ☐	SE ☐	
	W ☐	NE ☐	
	N ☐	SW ☐	
	S ☐	NW ☐	
	OF:		

FINAL CONSTRUCTION STATUS

Capped	Casing Pulled	Left for Obs.	Abandoned	Equipped	Backfilled	Other
☑	☐	☐	☐	☐	☐	☐

GPS DATUM:	AGD66	WGS84	GDA94	Other	Easting	Northing
	☐	☑	☐	☐	390182	7366720

ADDITIONAL INFORMATION AND INTEREST ABOUT THE BORE:
THIS HOLE HAS NOT BEEN COMPLETED

Signature of Licensed Driller: P PARDON Date: 21/10/02

FOR OFFICIAL USE ONLY

How Located: GPS ☑ TST ☐ Survey ☐ Hand Plotted ☐ other ☐

ELEVATION OF BORE AHD: (m) from: GL ☐ TOC ☐

DESCRIPTION OF PROPERTY:

Rural	Mineral	Pastoral	Reserve	VCL	SPL	EL	Other
☐	☐	☐	☐	☐	☐	☐	☑

Lease No: Lot No: Hundred of:
Portion No: Section No: Town of: Alice Springs

Class of Bore:	Town	Domestic	Investigation	Agriculture	Mineral	Pastoral	Other
	☐	☐	☑	☐	☐	☐	☐

Use of Bore:	Production	Investigation	Irrigation	Observation	Monitoring	Roads	None
	☐	☑	☐	☐	☐	☐	☐

Grid Reference: AMG ☐ Clark ☐ Zone: 53 Scale: 1:100,000
Easting: 390182 Lattitude: Map Name: Alice Springs -
Northing: 7366720 Longitude: Map Number: Sheet 5650 / map 16
AWRC stream Basin Number: Major Geological Units Name:

Geophysical Log Run: Yes ☐ No ☐ Date: Depth: m

Gamma	SP	Caliper	Point Res.	Density	Camera	Other ( )
☐	☐	☐	☐	☐	☐	☐

Test Pump carried out: Yes ☐ No ☐
Date Registered: 22/10/2002 Bore Plotted on the map? Yes ☑ No ☐
Officer: P. Turner Signature:
Remarks: 17598

THE NORTHERN TERRITORY OF AUSTRALIA

Water Act

FINAL STATEMENT OF BORE

Name of Owner:	DIPE NATURAL RESOURCES	**Registration No.:**	**RN17598**
Name of Bore:	SHANNON 1/02		
Intended use:	INVESTIGATION	Index Map No.:	16/2672
Location:	ALICE SPRINGS AIRPORT PROPERTY	Permit No.:	551

From	To	Particulars of Strata
0	1.5	CLAY AND TOPSOIL
1.5	16.2	RED BROWN SANDSTONE SAND AND CLAY
16.2	51.5	BROWN SANDY CLAYS AND SANDSTONE
51.5	55.5	AS ABOVE WITH QUARTZ BANDS
55.5	104	SAND AND GRAVELS CEMENTED WITH
		RED BROWN CLAYS
04	192.8	SANDSTONE SAND AND CLAY
192.8	208	FIRM SANDSTONE
208	213	SANDSTONE AND SANDY CLAYS
213	303	BROWN WHITE AND YELLOW CLAYS
303	325	BANDS OF CLAY CLAYSTONE AND SAND
325	339.5	GREY AND WHITE CLAY
339.5	370	DARK GREY CLAY
370	403	WHITE AND GREY CLAY
403	468	BROWN RED AND WHITE CLAY

Name of Contractor:	DIPE
Name of Driller:	P PARDON
Date Commenced:	27/08/02
Date Completed:	18/09/02
Depth Drilled:	468 m
Completion Depth:	468 m

METHOD OF DRILLING

Rotary	Rev. Cir	Cable	Other
☑	☐	☐	☐

HOLE DIAMETER			Drilling Fluid
From	To	Diam	Type
0	29.8	310mm	MUD
29.8	177.4	200mm	AIR/FOAM
177.4	325	200mm	MUD
325	468	145mm	MUD

PARTICULARS OF CASING

From	To	Diam (ID)	Type
0	29.8	254mm	STEEL
0	278	152mm	STEEL

PARTICULARS OF PERFORATIONS OR SCREEN STRINGS

From	To	Diam (ID)	Aperture	Type
278	468			OPEN HOLE

Casing Suspended: Yes ☐ No ☑

Method:

Height of Casing above GL: .6 M

Top of Packer set at: N/A m

Length of Packer: N/A m

Method of Packer Connection: N/A

CEMENTING/GRAVEL PACKING

From	To	Type

STRATA and WATER SAMPLES

Have been ☐ Will be ☑

Left at: ALICE SPRINGS

WATER BEARING BEDS

Depth (m) From	Depth (m) To	Yield L/s	SWL m	Duration hr	Quality	EC	ph	Bottle No.
104	110	1	56	DRILL	GOOD	1210	7.75	RL01
278	304	4		1	GOOD	1010	7.6	RL03

Completion Yield: L/s Method: Duration: hr

Compltion SWL from GL: m Depth of lift: m

LOCATION SKETCH OF BORE	LOCATION DESCRIPTION OF BORE		
			m/km
	E ☐	SE ☐	
	W ☐	NE ☐	
	N ☐	SW ☐	
	S ☐	NW ☐	
	OF:		

FINAL CONSTRUCTION STATUS

Capped	Casing Pulled	Left for Obs.	Abandoned	Equipped	Backfilled	Other
☑	☐	☐	☐	☐	☐	☐

GPS DATUM:	AGD66	WGS84	GDA94	Other	Easting	Northing
	☐	☑	☐	☐	390182	7366720

ADDITIONAL INFORMATION AND INTEREST ABOUT THE BORE:
THIS HOLE HAS NOT BEEN COMPLETED

Signature of Licensed Driller: P PARDON Date: 21/10/02

FOR OFFICIAL USE ONLY

How Located: GPS ☑ TST ☐ Survey ☐ Hand Plotted ☐ other ☐

ELEVATION OF BORE AHD: (m) from: GL ☐ TOC ☐

DESCRIPTION OF PROPERTY:

Rural	Mineral	Pastoral	Reserve	VCL	SPL	EL	Other
☐	☐	☐	☐	☐	☐	☐	☑

Lease No: Lot No: Hundred of:
Portion No: Section No: Town of: Alice Springs

Class of Bore:	Town	Domestic	Investigation	Agriculture	Mineral	Pastoral	Other
	☐	☐	☑	☐	☐	☐	☐

Use of Bore:	Production	Investigation	Irrigation	Observation	Monitoring	Roads	None
	☐	☑	☐	☐	☐	☐	☐

Grid Reference: AMG ☐ Clark ☐ Zone: 53 Scale: 1:100,000
Easting: 390182 Lattitude: Map Name: Alice Springs -
Northing: 7366720 Longitude: Map Number: Sheet 5650 / map 16
AWRC stream Basin Number: Major Geological Units Name:

Geophysical Log Run: Yes ☐ No ☐ Date: Depth: m

Gamma	SP	Caliper	Point Res.	Density	Camera	Other ( )
☐	☐	☐	☐	☐	☐	☐

Test Pump carried out: Yes ☐ No ☐
Date Registered: 22/10/2002 Bore Plotted on the map? Yes ☑ No ☐
Officer: P. Turner Signature:
Remarks: 17598

DRILLERS LOG

Department of Lands, Planning & Environment

DATE 26-08-02 BORE No. SHANNON STG 1
RN17598

Supervisor: S HERIOT
Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				MOVE GEAR ON SITE SET UP AND											
0415				PUT 12" DRAG BIT ON COMMENCE 0-1.5 CLAY				DRAG	BIT	12"	.9	.90			
				DRILLING 1.5-5 RED BROWN SANDSTONE				(1)	DP	4½	6.1	7.00			
				LOOSELY CEMENTED 5-5.5 SOFT SAND				(2)	DP	4½	6.1	13.1			
				ADD ROD (2) 5.5-9.5 AS ABOVE											
				9.5-10.4 LOOSE SAND AND GRAVELS											
				HOLE NOT CLEARING PULL OUT.											
				BREAK DOWN BIT, DEPTH HOLE											
				BACKFILLED TO 6.8m DIG MUD											
				PITS AND MAKE UP STRING 12¼ RR											
1200				AND 9 7/8 REAMER. DRIVE BACK TO DEPOT.											
[illegible]	12			~~TRUCK BACK WITH WATER CONT MIXING~~											
				~~AND CLEAN OUT HOLE~~											

0 - 1.5 RED BROWN CLAY
1.5 - 10.4 SAND COARSE & BANDS CLAY.

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE 27-08-02 TUES. BORE No. SHANNON. 1/02 Supervisor: S HERIOT

53K 0390182 — UTM 7366720 RN.17598 Driller: P BARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				0935 AM ON WGS 84											
				SET UP HOSES FOR MUD LINES					RR	12-1/4	.28				
				FINISH PUTTING STRING TOGETHER			5½x4½		SUB	6"	.90	1.18			
				SEND TRUCK FOR MORE WATER.					STAB	STAB	9 7/8	1.44	2.62		
1030	1 Hr 20 MINS			TRUCK BACK WITH WATER CONT					COLLAR	6"	5.98	8.60			
				MIXING MUD AND CLEAN HOLE OUT			4½x5½		SUB	5½	.20	8.80			
				TO 8.4m FIX LEAK IN SWIVEL SOCK					COLLAR	5½	5.73	14.53			
1152				ADD 6" COLLAR AND CONT. CLEAN OUT					1 DP	4½	6.10	20.63			
				TO 10.4 SWIVEL PACKING LEAKING BAD											
				STOP PULL BACK AND REPLACE RUBBER											
1420				COMMENCE DRILLING 96MM. 10.4 – 13.6											
				BROWN SANDY CLAY WITH SOME											
				COARSE SAND. CLEAR HOLE AND											
1500				ADD 5½" COLLAR. CONT DRILL											
				PIPE BENT SWAP FOR ANOTHER.											
				JNT DRILLING 13.6 – 18.7 AS ABOVE											
				FIRM BAND AT 16.2											
1600				TALK TO DAVE AND ADVISED TO STOP											
				AND CABE PULL BACK CLEAR HOLE AND											
				PULL BACK TO 5½ COLLAR.											

10.4 – 16.2
BANDS OF COARSE SAND AND BROWN CLAY.

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE 28-08-02 WED. BORE No. 17598 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				PICK UP MONS CASING 10" FROM					CASING	5½		14.53			
				DEPOT FIX MUD PUMP SHAFT OILER				(1)	DC	4½	6.1	20.63			
				AND NEW ROD GLANDS, MIX MUD				(2)	DC	4½	6.1	26.73			
0915				AND CONT DRILLING SEND TRUCK FOR				(3)	DP	4½	6.1	32.83			
				WATER AND FUEL											
0945				AT 19.4 RIG TIGHTEN SWIVEL PACKING AND							261mm ID.				
0952				ADD ROD (2) + CONT. 19.4 – 25.5 BROWN					273mm	CASING	DETAILS			10¾"	
1051	25.5	6.1	65min	SANDY CLAYS WITH BANDS SANDSTONE CLEAR HOLE					(1)	6.03					
				420 ROD (3) + CONT. 25.5 – 29.8 AS ABOVE					(2)	6.03	12.06				
1142	29.8			SOME FIRM BANDS. STOP + CLEAR HOLE AT					(3)	6.03	18.09				
				29.8, PREPARE FOR CASING. PULL OUT					(4)	6.02	24.11				
				STRING AND BREAK DOWN. RUN CASING					(5)	6.02	30.13.				
				WELD ON CLEATS FOR LIFTING.											
1620				CASING ON BOTTOM PACK UP MUD											
1630				SHUT DOWN.											
											162-298	BROWN			
											SANDY CLAY WITH				
											BANDS OF SANDSTONE				
											298-515	AS ABOVE			
										+	QUARTZ CHIPS				

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22 OCT 2002
GROUNDWATER DATA

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE 24-08-02 TIMES BORE No. 17598 Supervisor: S HERIOT

SWANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR PUT ON BLUEY LINE											
				HEAD WORKS AND BOLT UP WINE					CLAW	8"	.21				
				MAKE UP STRING, SAND LINE GETS		4½	4½		SUB	5⅛	.72	.93			
				TANGLED STOP AND FREE UP CUT					STAB	7⅞	1.25	2.18			
				SAND LINE AND FIX START MAKING					COLLAR	5"	5.98	8.16			
1040				UP STRING AGAIN & CLAW BIT.					SUB	5½	.22	8.38			
				28-31.2 BROWN SANDY CLAYS					COLLAR	5½	5.73	14.11			
				AND SOME COARSE SAND ADD (5)					(6) COLLAR	4½	5.98	20.09			
				31.2 – 37.3 AS ABOVE ADD (6)					(1) DP	4½	6.1	26.19			
				37.3 – 43.4 SANDY CLAY WITH					(2) DP	4½	6.1	32.29			
				LOTS OF COARSE SAND + GRAVELS					(3) DP	4½	6.1	38.39			
				SOME LARGE PIECES OF QUARTZ					(4) DP	4½	6.1	44.49			
				ADD (5) 43.4 – 49.5 AS ABOVE					(5) DP	4½	6.1	50.49			
				ADD (6) 49.5 – 51.5 AS ABOVE					(6) DP	4½	6.1	56.59			
				51.5 – 55.5 AS ABOVE WITH SOME					(7) DP	4½	6.1	62.69			
				HARD BANDS OF QUARTZ STOP					(8) DP	4½	6.1	68.79			
				PULL BACK TO MIX BLUE LINE					(9) DP	4½	6.1	74.89			
1155				TRIP BACK IN CLAW HOLE + CONT					(1) DP	4½	6.1	80.99			
				ADD ROD (7) HOLE OPEN TO BOTTOM					(11) DP	4½	6.1	87.09			
				SAND AND GRAVEL MUST BE CAUGHT 55-61.6					(12) DP	4½	6.1	93.19			
1415				ADD ROD (8) 61.6 – 65 AS ABOVE 65-67.6											
1441				RED BROWN CLAY ADD ROD (9) + CONT											
				67.6 – 73.8 AS ABOVE ADD ROD (10)											
				73.8 – 79.9 AS ABOVE ADD (11)											
				79.9 – 86m AS ABOVE ADD (12) 86 –											
				92.1 AS ABOVE BUT SANDY CLAY HOLE AND PULL OUT.											
				KNOCK OFF											

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51.5 – 65 BROWN SANDY CLAY WITH BANDS OF QUARTZ

65 – 86 RED BROWN CLAY

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE FRI 30/08/02 BORE No. RN 17598 1/02 Supervisor:

SHANNON STG 1 Driller:

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND TRIP IN				PREVIOUS RAGE				93.19			
				CLEANING HOLE AS WE GO				(13)	DP	4½	6.1	99.29			
				AIRLIFTING WATER 55-61 (SEEPAGE				(14)	DP	4½	6.1	105.39			
		OR FOAM,		OVERNIGHT) HOLE BACKFILLED TO				(15)	DP	4½	6.1	111.49			
				APPROX 74m WITH CLAY AND SAND				(16)	DP	4½	6.1	117.59			
				ADDED AND CONT CLEANING OUT TO 98m				(17)	DP	4½	6.1	123.69			
0907				ADD ROD 13 + START DRILLING 92-98.1				(18)	DP	4½	6.1	129.79			
0907				AS ABOVE ADD (14) 98.1 - 104.2				(19)	DP	4½	6.1	135.89			
				AS ABOVE ADD (15) 104 - 110.3 BROWN				(20)	DP	4½	6.1	141.99			
				SANDSTONE AND WATER AIRLIFTING				(21)	DP	4½	6.1	148.09			
1030				APPROX 1 HR AIRLIFT + TAKE SAMPLE				(22)	DP	4½	6.1	154.19	SAMPLE	# 1	
				ADD ROD (16) + CONT 110.3 - 116.4				(23)	DP	4½	6.1	160.29	DEPTH	110.3m	
				AS ABOVE. ADD ROD (17) 116.4 - 122.5				(24)	DP	4½	6.1	166.39	PH	7.75	
				AS ABOVE ADD ROD (18) 122.5 - 128.6				(25)	DP	4½	6.1	172.49	TEMP	26.4 °C	
				AS ABOVE INCREASE IN EROSION ADD				(26)	DP	4½	6.1	178.59	COND	1210	
				ROD (19) 128.6 - 134.7 AS ABOVE ADD									TIME	1100	
				ROD (20) 134.7 - 140.8 AS ABOVE											
				ADD (21) 140.8 - 147m AS ABOVE									BOTTLE NO		
				ADD (22) 147 - 153.1 AS ABOVE				86 - 104					RL01		
				ADD (23) 153.1 - 159.1 AS ABOVE					BROWN SAND, CLAY						
				ADD (24) 159.1 - 165.2 AS ABOVE				104 - 177	CEMENTED SAND						
				ADD (25) 165.2 - 171.3 AS ABOVE				OR LOOSELY	CEMENTED SANDSTONE.						
				ADD (26) 171.3 - 177.4 AS ABOVE											
				CLEAR HOLE AND PULL OUT STRING,											
				INCREASE IN SAND COMING UP				(CONTINUED)							
				TRIP OUT AND BREAK DOWN STRING											

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE Sat 31-08-02 BORE No. 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				SERVICE GEAR, DO REPAIRS TO							TIME.		0810	AM.	
				ROTATION CONTROL AND LOWER										SWL	
				BREAK OUT RAM. TAKE SWL 56m										56m	
				RIG NOT MAKING AIR STOP AND							HOLE	DEPTH	177-4		
				CHECK OUT HOSE FROM COMPRESSOR							AQUIFER		104-110		
				TO TANK U/S PULL OFF INLET	BALK						SUPPLY		1 L/D.		
1100				UP KNOCK OFF											
											3½	Hrs	REPAIRS + MAINT		

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE Mon 21/09/02 BORE No. 11598 1/01 Supervisor: S HASLOT

SHANNAN SIG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND RIG ON HOLE				6	DP			56.5			
				DRILL HOLE 56m CHANGE OVER TO MUD				7	DP	4½	6.1	62.6			
				DRILLING, TAKE OFF 10" HEAD WORKS				8	DP	4½	6.1	68.7	MUD + FOAM		
				TRIP IN WITH SAME STRING + MIX MUD				9	DP	4½	6.1	74.8	USED		
				PUMP PIT INTO HOLE + SEND TRUCK FOR MORE				10	DP	4½	6.1	80.9	TD	DA:	
0154				LUNCH AND CLEAN TO 55m WAIT ON TRUCK				1	DP	4½	6.1	87.0	M	20	
1100				MIX MORE MUD + ADD ROD (7) CLEAN				2	DP	4½	6.1	93.1	F	2	
				TO 61.5 ADD (8) 67.6 ADD (9) 73.7 ADD (10) 79.9				3	DP	4½	6.1	99.2			
				ADD (11) 86 ADD (12) 92m ADD (13) 98.1				4	DP	4½	6.1	105.3			
				ADD (14) 104.2 ADD (15) 110.3 ADD (16) 116.4				5	DP	4½	6.1	111.4			
				ADD (17) PULL BACK MUD COND MUD ADD (18)				6	DP	4½	6.1	117.5			
1510				128.6 ADD (19) 134.7 ADD (20) 140.9				7	DP	4½	6.1	123.6			
				ADD (21) 147 ADD (22) 153.1 ADD (23)				8	DP	4½	6.1	129.7			
				159.1 ADD (24) 165.2 ADD (25) 171.3				9	DP	4½	6.1	135.8			
				ADD (26) 177.5 ADD ROD (27) + START DRILLING				10	DP	4½	6.1	141.9			
1447				FROM 177.5 — 182.7 AS ABOVE 182.7m ADD				11	DP	4½	6.1	148.0			
1512				STOP AT 183.5m AND CIRCULATE.				12	DP	4½	6.1	154.1			
1524				START TRIPPING OUT PACK UP RIG				13	DP	4½	6.1	160.2			
				SHUT DOWN				14	DP	4½	6.1	166.3			
								15	DP	4½	6.1	172.4			
								16	DP	4½	6.1	178.5			
								17	DP	4½	6.1	184.6			
								177 — 182.7 AS ABOVE							
								182.7 — 192.8 LOOSELY CEMENTED							
								SANDSTONE WITH FIRM BANDS.							

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG — Department of Lands, Planning & Environment

DATE 03-09-02 TUES. BORE No. RN 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P RUZDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0800				SERVICE GEAR, TRIP IN AND MIX				10	DRILL PIPE			80.99			
				MUD. HOLE ABIT TIGHT OR FILLIN				(11)	DP	4½	6.1	87.09			
843				IN AROUND 98 M, START MUD CIRC.				(12)	DP	4½	6.1	93.19			
				AND CLEANING OUT HOLE. HOLE APPEARS				(13)	DP	4½	6.1	99.29			
				TO BE CLEAN FROM 128, CONT CLEANING				(14)	DP	4½	6.1	105.39			
				HOLE STILL CAVE AT 105 in HOLE				(15)	DP	4½	6.1	111.49			
				HAS BACKFILL FROM 117m APPROX				(16)	DP	4½	6.1	117.59			
				CLEAN TO 188.5 ADD ROD (28)				(17)	DP	4½	6.1	123.69			
				AND DRILL TO 189.6 CLEAN				(18)	DP	4½	6.1	129.79			
930				HOLE NOT MAKING CUTTINGS ADD ROD (29)				(19)	DP	4½	6.1	135.89			
				189.6 – 192.8 AS ABOVE SOFT BANDS				(20)	DP	4½	6.1	141.99			
				192.8 – 195.7 HARD DRILLING				(21)	DP	4½	6.1	148.09			
112				CLEAN HOLE AT 195.7 ADD (30)				(22)	DP	4½	6.1	154.19			
118				195.7 – 197 HARD 197 – 199 SOFT BAND				(23)	DP	4½	6.1	160.29			
100				199 – 201.8 HARD STOP AND CIRCULATE				(24)	DP	4½	6.1	166.39			
07				ADD ROD (31) + CONT				(25)	DP	4½	6.1	172.49			
250				STOP AND COND MUD AND CLEAN OUT				(26)	DP	4½	6.1	178.59			
				SETTLE PIT AND DRAIN				(27)	DP	4½	6.1	184.69			
35				CONT DRILLING. 201-8 – 208 HARD DRILLING				(28)	DP	4½	6.1	190.79			
350				STOP AND CIRCULATE				(29)	DP	4½	6.1	196.89			
13				START PULLING STRING OUT.				(30)	DP	4½	6.1	202.99			
20				OUT OF HOLE, BREAK DOWN BIT.				(31)	DP	4½	6.1	209.09			
0				PACK UP AND SHUT DOWN											
				HAVE HOLE LOGGED	192.8 – 208 HARD SANDSTONE.										

RECEIVED 22 OCT 2002 GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE 04-09-02 WED BORE No. RN17598 1/02 Supervisor: S HERIOT

SITANNOW STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE CCOM AND MAKE UP 7 7/8					RR	7 7/8	.20				
3820				RR STRING AND TRIP IN TO					SUB	5 1/4	.52	.72	4 HRS		
				153m MIX MUD ROTATION NOT WORKING				REAM	STAB	7 7/8	1.25	1.97		R+M.	
3900				STOP AND REPAIR. GO TO TOWN FOR NEW					DC	6"	5.98	7.95			
				REGISTER RETURN TO RIG & REPLACE.					SUB	5 1/2	.22	8.17			
1300				CONT MIXING MUD. ADD (22) CLEAN TO					COL	5 1/2	5.73	13.90			
				159 ADD (24) ADD (25) ADD (26) ADD (27)					COL	4 1/2	5.98	19.88			
				ADD (28) ADD (29) ADD (30) ADD (31) AND				20	DP	4 1/2	122	141.88			
				CLEAN TO 207.7 ADD ROD (32)				(21)	DP	4 1/2	6.1	147.98			
1346				START DRILLING. 208 – 213.8 AS ABOVE				(22)	DP	4 1/2	6.1	154.08			
1420				STOP + CLEAN HOLE				(23)	DP	4 1/2	6.1	160.18			
1425				ADD ROD (33) + CONT 213.8 – 219.9 AS ABOVE				(24)	DP	4 1/2	6.1	166.28			
				SOFT BANDS ADD ROD (34)				(25)	DP	4 1/2	6.1	172.38			
23				CONT DRILLING 219.9 – 223 SOME FIRM				(26)	DP	4 1/2	6.1	178.48			
525				BANDS STOP AND CIRCULATE				(27)	DP	4 1/2	6.1	184.58			
530				PULL OUT STRING + PACK UP				(28)	DP	4 1/2	6.1	190.68			
630				SHUT DOWN.				(29)	DP	4 1/2	6.1	196.78			
								(30)	DP	4 1/2	6.1	202.88			
								(31)	DP	4 1/2	6.1	208.88			
								(32)	DP	4 1/2	6.1	214.88			
								(33)	DP	4 1/2	6.1	220.98			
								(34)	DP	4 1/2	6.1	227.18			
								208 – 213	FIRM SANDSTONE !						
									+ SANDY CLAYS						

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GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE 5/09/02 BORE No. RN 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR + TRIP IN.				25	DRILL PIPE			172-38			
0830				MIX MUD + CONDITION MUD.				8x	DP	4½	48.8	221-18			
				CLEAN OUT FROM 175m TO 223m				(34)	DP	4½	6.1	227.28			
1010				ADD (34) + CONT 223-232.2. AS ABOVE				(35)	DP	4½	6.1	233.38			
1021		6.1	33min	ADD (36) + CONT. 232.2 — 238.3 AS ABOVE				(36)	DP	4½	6.1	239.48			
1102				ADD (37) + CONT 238.3 - 240m AS ABOVE				(37)	DP	4½	6.1	245.58			
				240-240.5 HARD DRILLING TO 244.4				(38)	DP	4½	6.1	251.68			
1246				STOP AND CIRCULATE. ADD ROD (38)				(39)	DP	4½	6.1	257.78			
1258				CONT DRILLING 244.4 — 246 SOFTER											
1410		6.1	72min	HARD AGAIN 246 — 250.5 CLEAN HOLE											
1415				ADD ROD (39) + CONT 250.5 - 252 AS ABOVE											
1445				STOP + CLEAN HOLE + PULL OUT + RACK											
1630				KNOCK OFF BOYS DRIVE BACK TO DEPOT.											
									213 - 246			SANDY CLAY Brown & White			
									246 - 303			Brown + White + YELLOW Clay			
									303 - 325			BANDS OF Clay + SAND + Clay Stone			

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE 6-09-02 FRID BORE No. RN 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR CLEAN UP STABILIZER					CLAW	8"	.21				
				AND TAKE OFF. RUN 8" CLAW BIT.			3½x4½		SUB	5½	.23	.44			
0810				TRIP IN. CLEAN OUT MUD PITS			4½x4½		SUB	5½	.52	.96			
				N/D MIX MUD				COLLAR		6"	5.98	6.94			
1010				CLEAN OUT HOLE FROM 214m TO 253					SUB	5½	.22	7.16			
1042				START DRILLING 253-256.6 Clay				COLLAR		5½	5.73	12 89			
1100				STOP + CLEAN HOLE ADD ROD (40)				COLLAR		4½	5.98	18.87			
1111				+ CONT. DRILLING 256.6 - 262.7 AS ABOVE			3 2	DP		4½	195.2	214.87			
				ADD (41) 262.7 - 268.8 AS ABOVE MIX MUD.				(33)	DP	4½	6.1	220.97			
1202		6.1	20	ADD (42) + CONT. 268.8 - 274.9 AS ABOVE				(34)	DP	4½	6.1	227.07			
1222				ADD (43) + CONT 279 PULL BACK AND				(35)	DP	4½	6.1	238.27			
1245		4	23	CONDITION MUD (THICKEN UP)				(36)	DP	4½	6.1	250.37			
1305		2	40	281m CIRCULATE				(37)	DP	4½	6.1	256.47			
				ADD ROD (44) + CONT 281 - 287 AS ABOVE				(38)	DP	4½	6.1	262.57			
13[illegible]		6.1		SOME FIRM BANDS. CIRCULATE				(39)	DP	4½	6.1	268.67			
1349				ADD ROD (45) + CONT. 287 - 293 AS ABOVE				(46)	DP	4½	6.1	263.77			
				SOME FIRM BANDS. CIRCULATE TO CLEAN				(41)	DP	4½	6.1	269.87			
				N/D, THICKEN UP MUD				(42)	DP	4½	6.1	275.97			
1450				START TRIPPING OUT. FILL DOWN CABLE				(43)	DP	4½	6.1	282.07			
				COMES OFF STOP + FIX + TENSION UP BOTH				(44)	DP	4½	6.1	288.17			
				WINCH				(45)	DP	4½	6.1	294.27			
1548				START PULLING OUT AGAIN. OUT											
				TRAVELLING BLOCK ON HOIST W/NO AND											
				PULL OUT TO CASING											
1705				RACK UP + SHUT DOWN.											

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE 7-09-02 SAT BORE No. RN 17598 1/02 Supervisor: S HEALEY

SHANNON STC 1 Driller: P PANDA

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0810				SERVICE GEAR AND TRIP IN				4½	COLLAR			18.87			
				STRINGS STOPS 157m START CLEANING				22x	DP	4½	134.2	153.07			
0840				HOLE FROM 157m TO 293 ADD ROD				23x	DP	4½	140.3	293.37			
				(46) 293-298.2 AS ABOVE PUMP NOT				(46)	DP	4½	6.0	299.37			
				WORKING PROPERLY. AND HOLE NOT CLEANING											
				GETTING TIGHT WHEN PULLING BACK PULL BACK											
1030				AND CIRCULATE. MECHANIC DOES CHECKS											
				ON HYDRAULICS AND SAYS PRESSURE DOWN											
				MAYBE PUMP U/S DAVE TAKES MECHANIC											
				BACK TO TOWN TO GET MORE GADGETS.											
1110				STAND DOWN TIME.											
1200				DAVE + MECHANIC ARRIVE BACK											
				DO MORE TEST BUT PUMP AT 95%											
1315				~~BACK~~ CAPACITY CLEAN HOLE + PULL OUT.											
1453				BACK TO CASING STOP, RACK UP + CLEAN											
				DOWN GEAR											
				SHUT DOWN TAKE LOADER TO DEPOT.											
9/9/02				MON WORK IN DEPOT PUTTING											
				MUD PUMP TOGETHER AND TRANSPORT												
				OUT TO SITE + TEST RUN.											

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE TUES 10/9/02 BORE No. RN 17598 1/02. Supervisor: S HERON

SHANNON STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE CREW AND CLEAN OUT			JP	20	COLLAR	6¼	18.87	18.87			
				MUD PIT. SETTLING PIT				33x	DP	4½	201.3	220.17			
				CONDITION MUD + TRIP IN AND				19x	DP	4½	73.2	293.37			
				CLEAN OUT TO 298m AND START				(46)	DP	4½	6.0	298.37			
1045				DRILLING 297.2 – 303 AS ABOVE				(47)	DP	4½	6.0	304.37			
				ADD (49) 303 – 307 AS ABOVE START				(48)	DP	4½	6.0	310.37			
				FROM BANDS CLEAN HOLE, PULL											
				BACK 7 RODS AND ADD MORE 6.0				STRING	WITH	6.0	RODS				
				RODS.					NOW			304.67			
1200				CONT DRILLING 309 – 315.1 SAND FROM BANDS.				(48)	DP	4½	6.1	310.77			
1305				CLEAN HOLE ADD ROD (50)				(49)	DP	4½	6.1	316.87			
1315				+ CONT 315.1 – 321.8 FROM HARD DRILLING				(50)	DP	4½	6.1	322.97			
				SAND STONE ? 321 – 321.8 SOFTER.				(51)	DP	4½	6.1	329.07			
1406				ADD CIRCULATE											
1413				ADD ROD (51) + CONT 321.8 – 324											
				SOFTER AS ABOVE 324–325 HARD AGAIN.											
				STOP + CLEAN HOLE.											
1420				TRIP OUT											
1637				OUT OF HOLE START RACKING UP.											
				SHUT DOWN.											

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE WED 11-09-02 BORE No. RN 17598 1-02 Supervisor: S HENRIOT

SWANVIEW STG 1 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0630				TRAVEL TO SITE MOVE CASING				1	5.96						
				SERVICE GEAR AND PREPARE TO				2	5.92	11.88					
				RUN CASING.				3	5.99	17.87					
0700				START RUNNING				4	5.98	23.85					
								5	5.97	29.82		- BEVEL GROOVES.			
								6	5.99	35.81		TACK OFF			
				✓ 27 5.44 - 162.05	47 5.99 - 281.47			7	5.99	41.8		SWAP OVER STRING			
				28 6.06 - 168.11	48 5.96 - 287.43			8	5.36	47.80					
				29 6.05 - 174.16	49 6.00 - 293.43			9	6.79	53.95					
				30 6.03 - 180.19	50 5.97 - 299.4			10	6.01	59.96					
				31 6.07 - 186.26				11	6.00	65.96					
				32 5.95 - 192.21				12	5.99	71.95					
				33 5.95 - 198.16				13	5.95	77.9					
				34 6.00 - 206.16	HOLE TIGHT FROM			14	6.01	83.91					
				35 5.93 - 210.09	APPROX 270m. CASING			15	6.01	89.92					
				36 5.98 - 216.07	STOPS AT 278m PACK			16	5.98	95.9					
				37 6.06 - 222.13	UP + SHUT RIG DOWN AT			17	5.95	101.85					
				38 5.97 - 228.1	1900 BOYS LOAD SITE			18	5.47	107.32					
				39 5.97 - 234.07	R10 DRIVE TO DEPOT.			19	6.42	113.74					
				40 6.00 - 240.07				20	5.96	119.70					
				41 5.36 - 245.43				21	6.44	126.16					
				42 6.05 - 251.48				22	5.95	132.11					
				43 6.04 - 257.52				23	5.97	138.08					
				44 6.04 - 263.56				24	6.03	144.11					
				45 5.96 - 269.52				25	5.97	150.08					
				46 5.96 - 275.48				26	6.03	156.11					

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DRILLERS LOG **Department of Lands, Planning & Environment**

DATE THURS 12-09-02 BORE No. RN 17598 1/02 Supervisor: S HERON

SHANNON ST61 Driller: P PARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND CUT OFF CASING					BIT	5 5/8	.10	.10			
				TRIP IN WITH 5 5/8 BRADE BIT STOP					SUB	4½	.42	.52			
				CLEAN OUT FROM 245m TO 325m					COLLAR.	5½	5.73	6.25			
				DRILL 325-325.5 SOFT MS IF CLAY.					COLLAR	4½	5.78	12.03			
1348				STOP + CIRCULATE CLEAN HOLE.				3/8	DP	4½	225.7	237.73			
1355				TRIP BACK TO CASING AND WORK ON				9x	DP	4½	54	291.73			
				STUCK PIECE OF CASING THAT WAS CUT OFF											
				NO (47) TRY PUSHING AND PULLING CASING											
1530				DOT STUCK FAST CUT EXCESS CASING											
				OFF AGAIN AND FIT UP BLOW LINE.									TEST OF WATER			
				RAISING STOP AND PACK UP									FLOW 6		
				FAN BELT ON RIG MOTOR SMOKING									COND 957		
				UP RUBBING ON GUARD											
1600				RETURN TO DEPOT											

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE FRI 13-09-02 BORE No. RN 17598 1/02 Supervisor: S HERLOT

SHANNON ST6 1 Driller: P PARDON.

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
0730				PICK UP BOYS FROM DEPOT AND		STRING	PREVIOUS		PAGE						
				HEFFO MAKES UP NEW PLATE FOR					D.T	5 5/8	4.10	.40			
				BUCKY HEAD WORKS. GO TO SITE					SUB	4½	0.92	-52			
				SET UP HEAD WORKS AND SERVICE				COLLAR	5⅝	5.73	6 25				
				GEAR. PICK UP HEFFO AND RIG				COLLAR	4 7/8	5 78	12.03				
				FOR BUCKY LINE				37x	DP	4½	225.7	237.73			
1006				PULL BUCKY LINE TOGETHER				9x	DP	4½	54	291	73		
1107				TRIP IN TO 320				(47)	DC	4½	6.1	297.83			
1130				START AIRLIFTING MUD OFF,				(48)	DC	4½	6.0	303.83			
				MUD STARTS TO RUN THEN STOPS				(49)	DC	4½	6.0	309.83			
				NOT ENOUGH AIR PRESSURE PULL 5 RODS				(50)	DC	4½	6.0	315.87			
				OFF. NOT ENOUGH PULL BACK TO				(51)	DC	4½	6.0	321.87			
1230				295m AND AIRLIFT. ABOUT 4Lp MUD											
				GREY SAND CONT AIRLIFTING FOR SAMPLE,									# 2		
				TAKE SAMPLE. ADD 5' RODS AND AIRLIFT FROM									SAMPLE BOTTLE		
				295.									RL02		
1339				ADD 4 MORE RODS STRING NOW 279									225m		
				ADD 4 MORE RODS STRING NOW 303.8									TEST WATER		
1428				START TRIPPING OUT. TOO MUCH SAND.									PH 7.5		
1545				BACK TO COLLARS, TAKE OFF HEAD WORKS.									COND 957		
1612				PACK UP AND SHUT DOWN											
													# 3 SAMPLE BOT		
													304 m		
													PH 7.6		
													COND 1010		
													RL03		

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GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE SAT 14-09-02 BORE No. RN 17598 1/02 Supervisor: S HERIOT

SHANNON STG 1 Driller: P PARDON.

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND GET SERIAL				BUCK	BIT	5 5/8	.10	.10	SWL	35.8M	
				NO OFF RIG ENGINE 11002902					SUB	4 1/2	.42	.52			
				DEPTH SWL 35.8m PULL OFF					COLLAR	4 1/2	5.98	6.50			
				HEAD WORKS + 5 1/2 COLLAR + TRIP			38 x		DP	4 1/2	224.8	238.3	6.1 s		
				IN WATER FLOWING OVER CASING BUT SLOW			8x		DP	4 1/2	48.0	286.3			
				265 m PIPE SLOWING DOWN 280-286 CHANGE			5x		DP	4 1/2	30.0	316.3	2 AQUA POL		
				LINES TO MUD AND MIX MUD. 6 BAGS MUD			6		DP	4 1/2	6.1	322.4	2 EXTRA GEL		
1125				PUMP ROD GLANDS AND START CLEANING			53		DP	4 1/2	6.1	328.5			
				OUT FROM 280 m LOTS OF GREY PURPLE			54		DP	4 1/2	6.1	334.6.			
				CLAY CLEAN OUT TO 285.2m			55		DP	4 1/2	6.1	340.7			
				HOLE MUST HAVE BACKFILLED TO BOTTOM											
				OF CASING OVERNIGHT. CLEAN OUT											
				TO 325 m AND DRILL TO 327.4 CLEAN											
1345.				HOLE ADD ROD (54) 327.4 – 333.5									+ GREY		
1400				GREY CLAY ADD ROD (55) 333.5 – 339.6						325 – 346			BROWN + W/HITE		
				AT 339.6 MUD PRESSURE BUILDING UP									SANDY CLAYS		
1444				CLEAN HOLE AT 339.6											
1447				TRIP OUT, PULL BACK TO CASING.											
1520				SHUT DOWN											

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GROUNDWATER DATA

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE MON 16-09-02 BORE No. RN17598 Supervisor: S HERLOT

SHANNON STG 1 Driller: P RARDON

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR AND TRIP IN				UP to Collar				6.5			
				MIX MUD AND CLEAN OUT FROM				38x	DP	4½	231.8	238.3			
				325m MUD PUMP HAS HOLE IN				15	DP	4½	90.0	328.3			
				UNDER PART OF LINER CASING				(54)	DP	4½	6.1	334.4			
				ABOUT THE SIZE OF A PENCIL				(55)	DP	4½	6.1	340.5			
				CONT CLEAN TO 339.5 ADD				(56)	DP	4½	6.1	346.6			
				ROD (56) + START DRILLING.				(57)	DP	4½	6.1	352.7			
				339.5 - 345.5 DARK GREY CLAY.	(DARK)			(58)	DP	4½	6.1	358.8			
1015				+ WHITE ADD (57) 345.5 - 351.6 AS	ABOVE			(59)	DP	4½	6.1	364.9			
1049				ADD (58) 351.6 - 357.7 DARK GREY				(60)	DP	4½	6.1	371.0			
1116				CLAY ADD (59) 357.7 - 363.8 AS ABOVE				(61)	DP	4½	6.0	377.0			
				ADD (60) 363.8 - 370 AS ABOVE WHITE.				(62)	DP	4½	6.0	383.0			
1225				ADD (61) 370 - 376 AS ABOVE WHITE				(63)	DP	4½	6.0	389.0			
1304				ROD (62) + CONT DRILLING 376 - 382 WHITE				(64)	DP	4½	6.0	395.0			
				+ GREY CLAY. CLEAN HOLE AND											
1340				ADD ROD (63) 382 - 388 AS ABOVE											
				DO REPAIRS TO MUD PUMP AND											
				ADD (64) 388 - 394 AS ABOVE SOME											
				FINAL BANDS CLEAN HOLE											
1544				START TRIPPING OUT.											
				PACK UP AND TAKE PIPE TRUCK											
				BACK TO DEPOT FOR MORE DRILL											
				PIPE.											

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE TUES 17/09/02 BORE No. RN 17598

SHANNON STG 1

Supervisor: S HERIOT

Driller: P PARDON.

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	Size	Type	Worn cond'n	STRING DATA Item	O.D.	Length	Prog. tally	MUD DATA	WATER SAMPLES No.	Depth
				SERVICE GEAR + CLEAN OUT SETTLING				58	DP	TALLY		~~375~~ 358.3			
				P.T. BRING OUT MORE DRILL PIPE				6x	DP	4½	27.48	385.78			
				RWD EXTRA GEL TRIP IN / HOLD				(65)	DP	4½	4.58	390.36			
				BACKFILLED TO APPROX 362 m START				(66)	DP	4½	4.58	394.93			
				CLEANING OUT HOLE TO BUILD UP				(67)	DP	4½	6.1	401.03			
				SLIPS FOR 4.58 DRILL PIPE CONT CLEANING				(68)	DP	4½	6.1	407.13			
				WITH CARROUSEL PULL BACK 7 PIPE				(69)	DP	4½	6.1	413.23			
				RWD RUN 8 PIPE OFF TRAILER				(70)	DP	4½	6.1	419.33			
1025				COMMENCED DRILLING FROM 394 m				(71)	DP	4½	6.1	425.43			
1052				394–400 AS ABOVE ADD (68) 400–403				(72)	DP	4½	6.1	431.53			
				WHITE + GREY CLAY 403–406 WHITE				(73)	DP	4½	6.1	437.63			
1124				RWD ROD CLAY ADD ROD (69) 406–412.1											
				AS ABOVE NOISE IN MUD PUMP											
				STOP AND FIX REPAIRING PUMP											
1330				ADD ROD (70) + CONT. 412–418.2											
1354				~~CHANGE~~ CLAY ADD ROD (71) + CONT.											
				418.2 – 424.3 AS ABOVE											
1430				ADD ROD (72) ~~BOSS~~ 424.3–430.4											
				ADD (73) 430.4 – 436.5 AS ABOVE											
				SOME FIRM BANDS CLEAN HOLE											
				RWD PULL BACK TO CASING											
1732				SHUT DOWN											

RECEIVED
22 OCT 2002
GROUNDWATER DATA

6 EXTRAS

Government Printer of the Northern Territory

DRILLERS LOG **Department of Lands, Planning & Environment**

DATE WED 18-09-02 BORE No. RN 17598 1/02 Supervisor: S HERLOT

SHANNON STG 1 Driller: P PARDEN

Time	Depth	Metres drilled	Mins lapsed	Drillers remark, casing details	BIT DATA No.	BIT DATA Size	BIT DATA Type	BIT DATA Worn cond'n	STRING DATA Item	STRING DATA O.D.	STRING DATA Length	STRING DATA Prog. tally	MUD DATA	WATER SAMPLES No.	WATER SAMPLES Depth
				SERVICE GOAK + TRIP IN		WITH		ROD	66		TALLY	394.93			
0858				START CLEANING OUT FROM 426m				7/8	DP	4½	32.06	426.99			
				ROD (74) ADD ROD (75) CLEAN TO				(74)	DP	4½	6.1	433.09			
				436.5 MD DRILL TO 438.1				(75)	DP	4½	6.1	439.19			
				ADD (76) 438.1 – 444.2				(76)	DP	4½	6.1	445.29			
				WITH BROWN CLAY + GREY				(77)	DP	4½	6.1	451.39			
1048				CLAYSTONE ADD ROD (77)				(78)	DP	4½	6.1	457.49			
				444.2 – 450.2 BROWN + WHITE CLAY				(79)	DP	4½	6.1	463.59			
1135				ADD (78) 450.2 – 456.3 AS ABOVE BROWN				(80)	DP	4½	6.1	469.69			
				ADD ROD (79) 456.3 – 462.4 BROWN											
1310				CLAY ADD ROD (80) 462–467.3 AS ABOVE											
				467.3 – 468 FIRM HARD DRILLING 468											
				VERY HARD. PULL OUT TO CASING											
1710				STOP KNOCK OFF											

RECEIVED
22 OCT 2002
GROUNDWATER DATA

Government Printer of the Northern Territory

Robert Paul
24/02/2005 10:58 AM

To: ntel@bigpond.com
cc: Scotty Balfour/IPE/NTG@NTGeMAG
Subject: Water Samples RN17598

Alastair,

We are sending two water samples up to you today. The samples can be added to the water sample from RFDS bore, RN2799, sent up on 22/02/2005. There are two 1 litre samples. The samples are marked:
RL01 : RN17598 30/08/2002 @ 11:00 Depth 110.3 metres EC 1210 µS/cm 1 l/sec.
RL03 : RN17598 13/09/2002 @ 14:25 Airlift Depth 304 metres EC 1010 µS/cm 4 l/sec.

We would like a Potable water analysis on this sample, ie complete chemical analysis and selected metals. The results should be sent to:
Scotty Balfour
PO Box 2130
Alice Springs NT 0870
scotty.balfour@nt.gov.au

If there are any problems give me a ring.

Bob.

****
Bob Paul
Resource Assessment Branch
Natural Resources Division
Department of Infrastructure, Planning & Environment
PO Box 2130, Alice Springs NT 0871
Phone: (08) 8951 9202 Fax: (08) 8951 9222
e-mail: robert.paul@nt.gov.au
****

2749

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES PTY LTD

CHEMICAL ANALYSIS REPORT

Dept InfrastructurePlanning&Environment
NATURAL RESOURCES ALICE SPRINGS
PO Box 2130 ALICE SPRINGS NT 0871
AUSTRALIA

NTEL
ABN 95 095 369 289
PO Box 1382 Berrimah 0828
3407 Export Drive
Berrimah NT 0828
Ph: (08) 8947 0510
Fax: (08) 8947 0520

REPORT CODE: **EL04300**
Report Date: 07/03/05
Samples Received: 25/02/05
Number of Samples: 3

Report Distribution:
Scotty Balfour

Purchase Order:
Project: ADWQG TM & GP
Cost Code:

Resource Assessment Branch
Tel: 08 8951 9202
Fax: 08 8951 9222
E-mail: scotty.balfour@nt.gov.au

Sample Details:

Report Details: **NATA ACCREDITATION No: 14610**
Test results only apply to samples received
Samples were analysed between 25/02/05 and 07/03/05

Comments: Waters samples will be disgarded one month from date of report.

Due to high levels of dissolved solids some samples have been diluted to reduce matrix effects. The dilution factors are listed in the report & the detection levels are increased accordingly.

Samples with concentrations greater than the linear working range (>LWR) of the ICPMS were reanalysed by ICPOES.

National Association of Testing Authorities, Australia

NATA ENDORSED DOCUMENT
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Authorisation:

Fiona Dunbar-Smith

This coversheet is an integral part of the report. This report can only be reproduced in full.

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES

REPORT CODE: EL04300

Methodology:

Analysis	Analytical Method	Technique	Accuracy/ Precision +-%	Detection Limit	Data Units
pH	ALK1	EA	10	0.1	units
EC	ALK1	EA	10	1	µS/cm
Alkalinity	ALK1	EA	10	1	mg/L
CO3	ALK1	EA	10	1	mg/L
HCO3	ALK1	EA	10	1	mg/L
OH	ALK1	EA	10	1	mg/L
NO2_N	FIAS_4	FIA	10	0.005	mg/L
NO3_N	FIAS_4	FIA	10	0.005	mg/L
Cl	FIAS_4	FIA	10	0.1	mg/L
PO4_P	FIAS_4	FIA	10	0.005	mg/L
NO2	FIAS_4	FIA	10	0.02	mg/L
NO3	FIAS_4	FIA	10	0.02	mg/L
F	FISE1	EA	10	0.1	mg/L
NH3_N	NH3_N	FIA	10	0.005	mg/L
Hardness	TH1	CALC.	10	0.1	mg/L
TSS	TSSTDS	GRAV	10	10	mg/L
TDS	TSSTDS	GRAV	10	10	mg/L
Turbidity	TURB1	CA	10	1	NTU
Ca_F	W108I	ICPOES	10	0.1	mg/L
K_F	W108I	ICPOES	10	0.1	mg/L
Mg_F	W108I	ICPOES	10	0.1	mg/L
Na_F	W108I	ICPOES	10	0.1	mg/L
SO4_F	W108I	ICPOES	10	0.1	mg/L
SiO2	W108I	ICPOES	10	0.2	mg/L
Al_T	W205I	ICPOES	10	0.02	mg/L
Fe_T	W205I	ICPOES	10	0.05	mg/L
Ag_T	W205M	ICPMS	10	10	µg/L
Al_T	W205M	ICPMS	10	20	µg/L
As_T	W205M	ICPMS	10	0.5	µg/L
B_T	W205M	ICPMS	10	20	µg/L
Ba_T	W205M	ICPMS	10	50	µg/L
Be_T	W205M	ICPMS	10	1	µg/L
Br_T	W205M	ICPMS	10	2	µg/L
Cd_T	W205M	ICPMS	10	0.2	µg/L
Cr_T	W205M	ICPMS	10	5	µg/L
Cu_T	W205M	ICPMS	10	10	µg/L
Fe_T	W205M	ICPMS	10	20	µg/L
Hg_T	W205M	ICPMS	10	0.1	µg/L
I_T	W205M	ICPMS	10	10	µg/L
Mn_T	W205M	ICPMS	10	5	µg/L
Mo_T	W205M	ICPMS	10	5	µg/L
Ni_T	W205M	ICPMS	10	2	µg/L
Pb_T	W205M	ICPMS	10	1	µg/L
Sb_T	W205M	ICPMS	10	0.2	µg/L
Se_T	W205M	ICPMS	10	1	µg/L
Sn_T	W205M	ICPMS	10	10	µg/L
U_T	W205M	ICPMS	10	0.01	µg/L
Zn_T	W205M	ICPMS	10	10	µg/L

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES

REPORT CODE: **EL04300** **Project:**

Element:	pH	EC	Alkalinity	CO3	HCO3	OH	Turbidity	TSS	TDS
Method:	ALK1	ALK1	ALK1	ALK1	ALK1	ALK1	TURB	TSSTDS	TSSTDS
Units:	units	µS/cm	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L
Sample ID									
RN2799 18/02/05	7.2	1790	353	<1	353	<1	1	<10	1140
RN17598 300802 RL01	7.8	1500	209	<1	209	<1	33	5480	1000
RN17598 130902 RL03	7.8	1100	114	<1	114	<1	150	30	760

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES

REPORT CODE: **EL04300** **Project:**

Element:	NO2_N	NO2	NO3_N	NO3	Cl	PO4_P	NH3_N	F	Hardness
Method:	FIA_4	FIA_4	FIA_4	FIA_4	FIA_4	FIA_4	FIA	FISE1	TH1
Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample ID									
RN2799 18/02/05	<0.005	<0.02	1.26	5.58	285	0.095	0.010	0.4	275
RN17598 300802 RL01	<0.005	<0.02	0.260	1.14	174	0.015	0.040	1.2	450
RN17598 130902 RL03	<0.005	<0.02	<0.005	<0.02	87.9	0.010	0.020	1.2	352

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES

REPORT CODE: **EL04300** **Project:**

	Element:	Ca_F	K_F	Mg_F	Na_F	SO4_F	SiO2	Ag_T	Al_T	Al_T
	Method:	W108I	W108I	W108I	W108I	W108I	W108I	W205M	W205M	W205I
Sample ID	Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L
RN2799 18/02/05		62.1	9.5	29.0	271	168	26.2	<10	<20	--
RN17598 300802 RL01		107	9.4	44.2	134	381	29.0	<10	>LWR	265
RN17598 130902 RL03		99.3	10.6	25.3	99.2	339	26.8	<10	1480	--

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES

REPORT CODE: **EL04300** **Project:**

Element:	As_T	B_T	Ba_T	Be_T	Br_T	Cd_T	Cr_T	Cu_T	Fe_T
Method:	W205M	W205M	W205M	W205M	W205M	W205M	W205M	W205M	W205M
Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample ID									
RN2799 18/02/05	2.0	140	50	<1	1670	<0.2	<5	<10	40
RN17598 300802 RL01	11.0	160	950	10	1340	<0.2	290	140	>LWR
RN17598 130902 RL03	1.0	280	<50	<1	848	<0.2	<5	<10	<20

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES

REPORT CODE: **EL04300** **Project:**

Element:	Fe_T	Hg_T	I_T	Mn_T	Mo_T	Ni_T	Pb_T	Sb_T	Se_T
Method:	W205I	W205M	W205M	W205M	W205M	W205M	W205M	W205M	W205M
Units:	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample ID									
RN2799 18/02/05	--	<0.1	90	5	<5	4	<1	0.8	10
RN17598 300802 RL01	213	<0.1	40	2160	10	128	104	<0.2	14
RN17598 130902 RL03	--	<0.1	50	60	15	6	<1	<0.2	4

NORTHERN TERRITORY ENVIRONMENTAL LABORATORIES

REPORT CODE: **EL04300** **Project:**

Element:	Sn_T	U_T	Zn_T
Method:	W205M	W205M	W205M
Units:	µg/L	µg/L	µg/L
Sample ID			
RN2799 18/02/05	<10	19.8	10
RN17598 300802 RL01	<10	38.9	270
RN17598 130902 RL03	<10	6.29	<10

N.T.A. WATER RESOURCES BRANCH

BORE DATA SHEET

SF53-14.
164034

NAME Aerodrome Bore Old Terminal
INDEX No. 16/181
LOCALITY A/S
REG. No. 3421
DEPTH 404' 123.1m
FILE No.
CASINGS 368'7"/6" 46'/5"
PERFORATIONS
SCREENS
LOCATION / / E N
SURFACE LEVEL R.L.
B M LEVEL R.L.
DATUM
CONTRACTOR.
DRILLER. J. Gorey
DATE STARTED. 1942
DATE FINISHED.

WATER

AQUIFERS				
DEPTH STRUCK	1761	377	53.65m	
AQUIFER THICKNESS				
STANDING WATER LEVEL	256		78.01 m.	
PUMP TEST G.P.H.	1400			
DRAWDOWN LEVEL				
PUMP LEVEL	340.			
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES				
BINOMIAL CLASSIFICATION				
T. D. S.	1009			
CONDUCTIVITY				
TOTAL HARDNESS	508			
CHLORIDE	133			
BICARBONATE	303			
CARBONATE	19			
SULPHATE	262			
NITRATE	6			
FLUORIDE	0.8			
SODIUM	110			
POTASSIUM	8			
CALCIUM	113			
MAGNESIUM	55			
REG. ANAL. No.	5996			
EQUIPMENT.				

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA

1942 Gorey
TD 404
RL 340

0-404' Alluvium.

Test 24 hr.
1 Shr. @ 1000 gpl
24 hr @ 1400 gpl

WATER ANALYSIS

181

Origin of water D.C.A. AIRPORT

Reference Sn 66 / 384

Specimen Advice Note No. 9487

Date sampled 18/3/66

Date received 18/3/66

* Results in milligrams per litre of filtered sample.

	Sample	Recommended Maximums (see over page). Domestic	Stock	Agriculture
HARDNESS (calculated as $CaCO_3$)—				
" Total	514	500	—	—
" Carbonate	289	—	—	—
" Non-Carbonate	225	—	—	—
ALKALINITY IN EXCESS OF TOTAL HARDNESS	Nil	—	—	—
CHLORIDE	125	500	—	—
SULPHATE	294	250	2,000	—
BICARBONATE	352	—	—	—
		Child 20	—	—
NITRATE	2	Adult 120	—	—
FLUORIDE	0.9	1.5	5.0	—
CARBONATE	Nil	—	—	—
SODIUM	120	—	—	—
POTASSIUM	11	—	—	—
CALCIUM	116	100	—	—
MAGNESIUM	54	100	300	—
TOTAL DISSOLVED SALTS	1075	3,000	8,000	1,000
RESIDUE ON EVAPORATION	-	3,000	8,000	1,000

pH 8.3

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The sample, as analysed, is chemically unsuitable for human consumption due to the excess of calcium and sulphate present in the water.

Signature W. K. Newman

Date 27-4-66

* 14.3 milligrams per litre equals 1 grain per gallon. 437.5 grains equals 1oz.

16/1/81 1

Alice Springs Aerodrome Bore 13/2/59

Cations Anions

	120	3-38
	284	5-95
	0.4	
5.5	111	5.66
	346	
	0	
5-2	120	
.24	9	
4.3	52	
	1	
15-24		4.99
TDS	1043	

Ca+Mg 9-8

15 - 38

M-28

Northern Territory Administration — Animal Husbandry Branch

WATER ANALYSIS

Origin of Water: TOWNSITE DROME (E. DURRELLAN)

Bore No. RN 3421

Reference: SN 53/251

Specimen Advice Note No. 1568

Date Received 12/5/53

16/181

ANALYSIS

(Results in parts per million .6250 p.p.m. = approx. 1 oz. per gal.)

HARDNESS (Calculated as CaCO3)	
" Total	620
" Temporary	350
" Permanent	270
FREE ALKALI (Calculated as CaCO3	-
CHLORIDE	550
SULPHATE	295
FLUORIDE	1.2
NITRATES	-
CALCIUM	158
PHOSPHOROUS	-
Bicarbonates	427
Carbonates	-
Sodium	275
Potassium	-
Magnesium	107
Silica Iron and Aluminium	38
TOTAL DISSOLVED SOLIDS	1844
	ozs/gal.
REACTION: (pH)	

HYPOTHETICAL COMPOUNDS

(Results in parts per million)

CALCIUM BICARBONATE	568
MAGNESIUM BICARBONATE	-
CALCIUM SULPHATE	57
MAGNESIUM SULPHATE	312
CALCIUM CHLORIDE	-
MAGNESIUM CHLORIDE	171
SODIUM BICARBONATE	-
SODIUM SULPHATE	-
SODIUM CHLORIDE	698
Silica Iron & Aluminium	38

N.T.A. WATER RESOURCES BRANCH

RN003421

BORE DATA SHEET

NAME	Aerodrome bore	INDEX No.	16/181
LOCALITY	A/S	REG. No.	3421
DEPTH	404'	FILE No.	
CASINGS	368'7"/6" 468/5"	PERFORATIONS SCREENS	
LOCATION / / E N	SURFACE LEVEL R.L.	B M LEVEL R.L.	DATUM
CONTRACTOR.	DRILLER.	DATE STARTED.	DATE FINISHED.

WATER				
AQUIFERS				
DEPTH STRUCK	176	377		
AQUIFER THICKNESS				
STANDING WATER LEVEL	256			
PUMP TEST G.P.H.	1400			
DRAWDOWN LEVEL				
P.S. LEVEL				
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES				
BINOMIAL CLASSIFICATION				
T.D.S.	1009			
CONDUCTIVITY				
TOTAL HARDNESS	508			
CHLORIDE	133			
BICARBONATE	303			
CARBONATE	19			
SULPHATE	262			
NITRATE	6			
FLUORIDE	0.8			
SODIUM	110			
POTASSIUM	8			
CALCIUM	113			
MAGNESIUM	55			
REG. ANAL. No.	5996			

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA

Northern Territory Administration - Animal Industry Division

997

WATER ANALYSIS

Origin of Water. TOWNSITE 'DROME,
ALICE SPRINGS. RN 3421
E. CONNELLAN. 16/18.1

Reference: SN../..53/200
Specimen Advice Note No. 2130
Date Received 24/2/53.

ANALYSIS

(Results in parts per million .6250 p.p.m. = approx. 1 oz. per gal.)

HARDNESS (Calculated as CaCO3)	
" Total	620
" Temporary	385
" Permanent	235
FREE ALKALI (Calculated as CaCO3	-
CHLORIDE	497
SULPHATE	426
FLUORIDE	-
NITRATES	-
CALCIUM	151
PHOSPHOROUS	-
Bicarbonate	470
Carbonate	-
Sodium	218
Potassium	-
Magnesium	165
Silica Iron and Aluminium	7
TOTAL DISSOLVED SOLIDS	1934
	ozs/gal.
REACTION: (pH)	

HYPOTHETICAL COMPOUNDS

(Results in parts per million)

CALCIUM BICARBONATE	616
MAGNESIUM BICARBONATE	8
CALCIUM SULPHATE	-
MAGNESIUM SULPHATE	554
CALCIUM CHLORIDE	-
MAGNESIUM CHLORIDE	217
SODIUM BICARBONATE	-
SODIUM SULPHATE	-
SODIUM CHLORIDE	554
Silica Iron and Aluminium	7

Northern Territory Administration — Animal Industry Division

WATER ANALYSIS

Origin of Water......TOWNSITE DROME

......(E. [illegible]).........

RN 3421

Reference: SN../....53/251........

Specimen Advice Note No...1568......

Date Received ......12/5/53........

16/181

ANALYSIS

(Results in parts per million .6250 p.p.m. = approx. 1 oz. per gal.)

HARDNESS (Calculated as CaCO3)	
" Total	620
" Temporary	350
" Permanent	270
FREE ALKALI (Calculated as CaCO3	-
CHLORIDE	550
SULPHATE	295
FLUORIDE	1.2
NITRATES	-
CALCIUM	158
PHOSPHOROUS	-
Bicarbonates	427
Carbonates	-
Sodium	275
Potassium	-
Magnesium	107
Silica Iron and Aluminium	38
TOTAL DISSOLVED SOLIDS	1844
	ozs/gal.
REACTION: (pH)	

HYPOTHETICAL COMPOUNDS

(Results in parts per million)

CALCIUM BICARBONATE	568
MAGNESIUM BICARBONATE	-
CALCIUM SULPHATE	57
MAGNESIUM SULPHATE	312
CALCIUM CHLORIDE	-
MAGNESIUM CHLORIDE	171
SODIUM BICARBONATE	-
SODIUM SULPHATE	-
SODIUM CHLORIDE	698
Silica Iron & Aluminium	38

File: 5/100

Northern Territory Administration

Water Resources Branch

BORE COMPLETION REPORT

BORE NAME: J. Jones No. 1 — Registered No. 3450

LOCATION: N.T. Portion 428 — Index No. 16/209

MAP: SF 53-14 — References 166034

GENERAL DATA

DATE BORE COMPLETED: 1955 — TOTAL DEPTH: 92.9 metres (305 ft)

WATER STRUCK AT	First supply	Second supply	Third supply
	78 m (256 ft)	----	----
in (aquifer)	Sand with clay bars	----	----

STANDING WATER LEVEL 66.9 metres (219.5 ft)

CASING DETAILS Interval — Diam. of casing, screens; size of perforations or slots in casing or screen slot openings.

143 mm internal diameter black bore casing

This branch has no record of casing length or of the type of screens used in this bore but there is good reason to believe the screens are 143 mm I.D., perforated or slotted black bore casing.

Casing straightness tested yes / no — 40 ft dolly mirror — passed test yes / no

Casing plumbness tested yes / no — maximum permissible deviation per — passed test yes / no

PUMPING TEST Completed on 2.2.72 DURATION 2 hours

Recommended maximum continuous pumping rate 0.38 ℓ/sec (300 gph)

Recommended pump setting 91.4 m (300 ft)

WATER ANALYSIS - results will be forwarded when they become available.

COMMENTS:

While pumping this bore an amount of sand was produced also the bore is now 5.6 metres shallower than when first constructed. This indicates either the bore has not been properly developed or that the screen apertures are too large and allow sand into the bore from the unconsolidated sediments of the aquifer. The true cause is probably a combination of both points.

Because of the low yield and age of this bore it would not be economical to rehabilitate.

Prepared by: J. Elliott — Approved by:

Designation: T/O 1 — Designation: District Engineer

Date: 2.2.72 — Date: 10.2.72

NTA 152

NORTHERN TERRITORY ADMINISTRATION

WATER RESOURCES BRANCH

WATER ANALYSIS

WR 4/1

Laboratory Register No.	72/0188	
Date received in laboratory	24.2.72	
Time of sampling (hrs.)	1600	Date of sampling 2.2.72

LOCATION AND DETAILS: N.T. PORTION 428, 9 MILES SOUTH ALICE SPRINGS

RN 3450 IN 16/709 300 ft. 550 G.P.H. PUMP DISCHARGE

ANALYSIS in milligrams per litre — mg/l (unless otherwise stated) —

Appearance			
Colour (Hazen units)		Turbidity (A.P.H.A. units)	
Odour		Suspended solids	
pH	7.1	Total solids	
Specific conductivity (micromhos/cm)	1240		
Total dissolved solids	870		
Sodium chloride (calc. from chloride)			
Total alkalinity (as $CaCo_3$)	134		
Total hardness (as $CaCo_3$)	401		
Chloride, Cl	121	Sodium, Na	110
Sulphate, So_4	320	Potassium, K	9
Nitrate, No_3	1	Calcium, Ca	101
Carbonate, Co_3		Magnesium, Mg	36
Bicarbonate, HCo_3	163	Iron (total), Fe	2820
Fluoride, F	1.0	Silica, Sio_2	22
Phosphate, PO_4	<1		

Analysed by JUDITH A. GRIMES Date 5 / 5 / 72

REMARKS:

Excessive iron, otherwise the sample as tested is chemically suitable for human consumption according to World Health Organization Drinking Water Standards.

"RN003450"

N.T.A. WATER RESOURCES BRANCH

BORE DATA SHEET

NAME	Jones bore	INDEX No.	16/209
LOCALITY	A/S Block	REG. No.	3450
DEPTH	323'	FILE No.	
CASINGS		PERFORATIONS / SCREENS	
LOCATION / / E N	SURFACE LEVEL R.L.	B M LEVEL R.L.	DATUM
CONTRACTOR.	DRILLER.	DATE STARTED.	DATE FINISHED.

WATER

AQUIFERS				
DEPTH STRUCK	256			
AQUIFER THICKNESS				
STANDING WATER LEVEL	230			
PUMP TEST G.P.H.	800			
DRAWDOWN LEVEL				
P[illegible] LEVEL	300			
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES				
BINOMIAL CLASSIFICATION				
T. D. S.	818.			
CONDUCTIVITY				
TOTAL HARDNESS	292			
CHLORIDE	135			
BI[illegible]BONATE	203			
CARBONATE				
SULPHATE	250			
NITRATE	4			
FLUORIDE	1·47			
SODIUM	130			
POTASSIUM	9			
CALCIUM	37			
MAGNESIUM	49			
REG. ANAL. No.	5627.			

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA

NTA 152

NORTHERN TERRITORY ADMINISTRATION

WATER RESOURCES BRANCH

WATER ANALYSIS

WR 4/1

Laboratory Register No.	72/0188
Date received in laboratory	24.2.72
Time of sampling (hrs.)	Date of sampling
1600	2.2.72

LOCATION AND DETAILS: N.T. PORTION 428, 9 MILES SOUTH ALICE SPRINGS

RN 3450 IN 16/709 300 ft. 550 G.P.H. PUMP DISCHARGE

ANALYSIS in milligrams per litre — mg/l (unless otherwise stated) —

Appearance			
Colour (Hazen units)		Turbidity (A.P.H.A. units)	
Odour		Suspended solids	
pH	7.1	Total solids	
Specific conductivity (micromhos/cm)	1240		
Total dissolved solids	870		
Sodium chloride (calc. from chloride)			
Total alkalinity (as $CaCo_3$)	134		
Total hardness (as $CaCo_3$)	401		
Chloride, Cl	121	Sodium, Na	110
Sulphate, So_4	320	Potassium, K	9
Nitrate, No_3	1	Calcium, Ca	101
Carbonate, Co_3		Magnesium, Mg	36
Bicarbonate, HCo_3	163	Iron (total), Fe	2820
Fluoride, F	1.0	Silica, Sio_2	22
Phosphate, PO_4	<1		

Analysed by JUDITH A. GRIMES Date 5 / 5 / 72

REMARKS:

Excessive iron, otherwise the sample as tested is chemically suitable for human consumption according to World Health Organization Drinking Water Standards.

WORLD HEALTH ORGANISATION DRINKING WATER STANDARDS

SUBSTANCE	PERMISSIV E	EXCESSIVE
Colour (Hazen units)	5	50
Turbidity (A.P.H.A. Units)	5	25
Odour	Unobjectionable	
pH range	7.0-8.5	Less than 6.5 or Greater than 9.2
Total dissolved solids	500 mg/l	1500 mg/l
Chloride, Cl	200 mg/l	600 mg/l
Sulphate, So_4	200 mg/l	400 mg/l
Nitrate, No_3	50 mg/l	100 mg/l
Fluoride, F	1.0 mg/l	1.5 mg/l
Calcium, Ca	75 mg/l	200 mg/l
Magnesium, Mg	50 mg/l	150 mg/l
Iron (total), Fe	0.3 mg/l	1.0 mg/l

NOTE: **Iron** gives rise to potability and aesthetic problems.

Nitrate in excess of 45 mg/l is dangerous to health in some infants under one year.

Fluoride in excess of 1.5 mg/l may give rise to dental fluorosis.

WATER QUALITY STANDARDS FOR STOCK USE

SUBSTANCE	LIMIT
pH range	5.5-9.0
Total dissolved solids	8000 mg/l
Sodium chloride (calc. from chloride)	Not more than 75% when total dissolved solids near limit
Sulphate, So_4	2000 mg/l
Nitrate, No_3	400 mg/l
Fluoride, F	5.0 mg/l
Magnesium, Mg	400 mg/l

NOTE: Stock standards are intended as a guide only.

NTA 152

NORTHERN TERRITORY ADMINISTRATION

WATER RESOURCES BRANCH

WATER ANALYSIS

WR 4/1

Laboratory Register No.	72/0186	
Date received in laboratory	24.2.72	
Time of sampling (hrs.)	1422	Date of sampling 2.2.72

LOCATION AND DETAILS: N.T. PORTION 428 9 MILE SOUTH ALICE SPRINGS

RN 3450 IN 16/109 300 ft. 550 G.P.H. PUMP DISCHARGE

ANALYSIS in milligrams per litre — mg/l (unless otherwise stated) —

Appearance			
Colour (Hazen units)		Turbidity (A.P.H.A. units)	
Odour		Suspended solids	
pH	7.9	Total solids	
Specific conductivity (micromhos/cm)	1180		
Total dissolved solids	800		
Sodium chloride (calc. from chloride)			
Total alkalinity (as $CaCo_3$)	220		
Total hardness (as $CaCo_3$)	357		
Chloride, Cl	116	Sodium, Na	111
Sulphate, So_4	218	Potassium, K	9
Nitrate, No_3	2	Calcium, Ca	92
Carbonate, Co_3		Magnesium, Mg	31
Bicarbonate, HCo_3	268	Iron (total), Fe	11
Fluoride, F	1.1	Silica, Sio_2	39
Phosphate, PO_4	<1		

Analysed by JUDITH A. GRIMES Date 5 / 5 / 72

REMARKS:

Excessive iron, otherwise the sample as tested is chemically suitable for human consumption according to World Health Organization Drinking Water Standards.

WORLD HEALTH ORGANISATION DRINKING WATER STANDARDS

SUBSTANCE	PERMISSIV E	EXCESSIVE
Colour (Hazen units)	5	50
Turbidity (A.P.H.A. Units)	5	25
Odour	Unobjectionable	
pH range	7.0-8.5	Less than 6.5 or Greater than 9.2
Total dissolved solids	500 mg/l	1500 mg/l
Chloride, Cl	200 mg/l	600 mg/l
Sulphate, So_4	200 mg/l	400 mg/l
Nitrate, No_3	50 mg/l	100 mg/l
Fluoride, F	1.0 mg/l	1.5 mg/l
Calcium, Ca	75 mg/l	200 mg/l
Magnesium, Mg	50 mg/l	150 mg/l
Iron (total), Fe	0.3 mg/l	1.0 mg/l

NOTE: **Iron** gives rise to potability and aesthetic problems.

Nitrate in excess of 45 mg/l is dangerous to health in some infants under one year.

Fluoride in excess of 1.5 mg/l may give rise to dental fluorosis.

WATER QUALITY STANDARDS FOR STOCK USE

SUBSTANCE	LIMIT
pH range	5.5-9.0
Total dissolved solids	8000 mg/l
Sodium chloride (calc. from chloride)	Not more than 75% when total dissolved solids near limit
Sulphate, So_4	2000 mg/l
Nitrate, No_3	400 mg/l
Fluoride, F	5.0 mg/l
Magnesium, Mg	300 mg/l

NOTE: Stock standards are intended as a guide only.

NTA 152

NORTHERN TERRITORY ADMINISTRATION

WATER RESOURCES BRANCH

WATER ANALYSIS

WR 4/1

Laboratory Register No.	72/0187	
Date received in laboratory	24.2.72	
Time of sampling (hrs.)	1540	Date of sampling 2.2.72

LOCATION AND DETAILS: N.T. PORTION 428, 9 MILES SOUTH ALICE SPRINGS

RN 3450 IN 16/209 300 ft. 550 G.P.H. PUMP DISCHARGE

ANALYSIS in milligrams per litre — mg/l (unless otherwise stated) —

Appearance			
Colour (Hazen units)		Turbidity (A.P.H.A. units)	
Odour		Suspended solids	
pH	7.9	Total solids	
Specific conductivity (micromhos/cm)	1240		
Total dissolved solids	880		
Sodium chloride (calc. from chloride)			
Total alkalinity (as $CaCo_3$)	246		
Total hardness (as $CaCo_3$)	408		
Chloride, Cl	116	Sodium, Na	110
Sulphate, So_4	243	Potassium, K	8
Nitrate, No_3	3	Calcium, Ca	109
Carbonate, Co_3		Magnesium, Mg	33
Bicarbonate, HCo_3	300	Iron (total), Fe	28
Fluoride, F	1.1	Silica, Sio_2	61
Phosphate, PO_4	<1		

Analysed by JUDITH A. GRIMES Date 5 / 5 / 72

REMARKS:

Excessive iron, otherwise the sample as tested is chemically suitable for human consumption according to World Health Organization Drinking Water Standards.

WORLD HEALTH ORGANISATION DRINKING WATER STANDARDS

SUBSTANCE	PERMISSIV E	EXCESSIVE
Colour (Hazen units)	5	50
Turbidity (A.P.H.A. Units)	5	25
Odour	Unobjectionable	
pH range	7.0-8.5	Less than 6.5 or Greater than 9.2
Total dissolved solids	500 mg/l	1500 mg/l
Chloride, Cl	200 mg/l	600 mg/l
Sulphate, So_4	200 mg/l	400 mg/l
Nitrate, No_3	50 mg/l	100 mg/l
Fluoride, F	1.0 mg/l	1.5 mg/l
Calcium, Ca	75 mg/l	200 mg/l
Magnesium, Mg	50 mg/l	150 mg/l
Iron (total), Fe	0.3 mg/l	1.0 mg/l

NOTE: **Iron** gives rise to potability and aesthetic problems.

Nitrate in excess of 45 mg/l is dangerous to health in some infants under one year.

Fluoride in excess of 1.5 mg/l may give rise to dental fluorosis.

WATER QUALITY STANDARDS FOR STOCK USE

SUBSTANCE	LIMIT
pH range	5.5-9.0
Total dissolved solids	8000 mg/l
Sodium chloride (calc. from chloride)	Not more than 75% when total dissolved solids near limit
Sulphate. So_4	2000 mg/l
Nitrate, No_3	400 mg/l
Fluoride, F	5.0 mg/l
Magnesium, Mg	300 mg/l

NOTE: Stock standards are intended as a guide only.

Rosewall No 2. New Test...? SF53-4 164034

NAME	Airport Bore No.2	INDEX No.	16/276
LOCALITY	A/S	REG. No.	3563
DEPTH	392' 119.48 m	FILE No.	

CASINGS		PERFORATIONS SCREENS	perfs. from 311'-366'

LOCATION	16 / 01 / 24.0 E 15.5 N	SURFACE LEVEL R.L.		B M LEVEL R.L.	DATUM
CONTRACTOR.		DRILLER.	G. Gorey	DATE STARTED. 1959 ap	DATE FINISHED.

WATER

AQUIFERS				
DEPTH STRUCK	280	85.34		
AQUIFER THICKNESS				
STANDING WATER LEVEL	231	70.41		
PUMP TEST G.P.H.	~~750~~	626	685	
DRAWDOWN LEVEL		37'	36'	
PUMP LEVEL				
DURATION OF TEST HOURS		24 hr	24 hr	
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES				
BINOMIAL CLASSIFICATION				
T.D.S.	909			
CONDUCTIVITY				
TOTAL HARDNESS	408			
CHLORIDE	95			
BICARBONATE	395			
CARBONATE				
SULPHATE	154			
NITRATE	13			
FLUORIDE	0.2			
SODIUM	105			
POTASSIUM	8			
CALCIUM	395			
MAGNESIUM	36			
pH	7.6			
REG. ANAL. No.	6558	12092		

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA

... stock ... 1200 gph

Rosewall Bore No 1 also at airport 1959 77340

Rosewall No 2. 2000' N of No 1

AERODROME - ALICE SPRINGS 63 705

Origin of Water ROSEWALL'S BORE NO. 2

Reference. SN/10777

Specimen Advice Note No.

Date Sampled 26/2/63

Date Received 11/3/63

Results in parts per million

HARDNESS (Calculated as CaCO3)	392
,, Total	392
,, Temporary	70
,, Permanent	
FREE ALKALI (Calculated as CaCO3)	Nil
CHLORIDE	100
SULPHATE	139
FLUORIDE	0.8
CALCIUM	101
BICARBONATE	392
CARBONATE	Nil
SODIUM	96
POTASSIUM	9
MAGNESIUM	34
NITRATE	9
NITRITE	
AMMONIA	
TOTAL DISSOLVED SALTS	881
pH 7.3	

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The sample, as analysed, is chemically suitable for human consumption.

Signature [signature]

Date 21/3/63

6,250 ppm. equals approx. 1 oz. per gall.

R3417

HFE/SJB: R/90. 16th April, 1963.

The Director.,
Water Resources Branch,
N. T. Administration,
DARWIN.

Attention: Senior Engineer, Groundwater.

Airport No.2 Bore Test - Job No.134.
Your File W865.

Further to my memorandum of 8th April, the following is the analysis of water from the abore bore:-

Hardness (Calculated as CaCO3)	392
" Total	392
" Temporary	70
" Permanent	---
Free Alkali (Calculated as CaCO3)	Nil
Chloride	100
Sulphate	139
Fluorids	0.8
Calcium	101
Bicarbonate	392
Carbonate	Nil
Sodium	96
Potassium	9
Magnesium	34
Nitrate	9
Nitrite	---
Ammonia	---
Total Dissolved Salts	881

pH....7.3.....

(H.F. Eggington)
DISTRICT ENGINEER.

File pl.

Ref: R31/12

EC/CM - 20/2/67

19

R29/10

IN/276

PUMP TEST - AIRPORT BORE NO. 2
NEW TERMINAL

1. Bore data:

Depth: 392'
S.W.L.: 227'
Perforations: 311' - 366'
Pump Setting: C.D.W. 302'
Pump Rate: Approx. 750 g.p.h.

2. D.C.A. require a pump test on this bore to determine the supply (and quality) available for future planning. This work will be costed against C.D.W. who will pull the existing pump and re-run it at the completion of our testing.

3. Tests required are:-

a) Step drawdown test for approx. 2 hours each at rates of 700 g.p.h. 1,000 g.p.h. and 1,400 g.p.h. approximately.

b) Long-term medium rate test at a rate to be determined from the above test (approximately 1,000-1,200 g.p.h.). Megger readings for drawdown are to be taken in the bore at intervals as previously laid down.

4. It is recommended that the Southern Cross pump jack be used with a 3¼" draw plunger pump. Pump setting should be approx. 360-370'

5. Water samples are required at the start and near completion of each test.

6. Work should commence on 22/2/67.

(E. Cutler)
T/O

R 31/12.

R29/10

DISTRICT ENGINEER.

IN 16/276...

Report on Pump Test on Airport Bore No. 2.

Bore Data:

R.N. 3563
I.N. 16/276
Name: Airport No. 2 or Rosewall No. 2
Depth: 392 feet
S.W.L. : 239 feet
Aquifer : 280' - 284' - Coarse Gravel?
Perforations: 311 - 366 feet
Pump setting for test: 363 feet
Water Quality: Good - Conductivity 1100 m/mhos / cm^3

Pump tested 1/3/67 to 2/3/67.

Pump Test:

The test was carried out using a 3½" draw plunger pump and the Southern Cross Pump Jack.

A 24 hour test at 626 g.p.h. was first carried out. The drawdown at 1,440 mins was 37'6". The bore was then allowed to recover to 10'2" (at 26 mins). At this stage, a 6 hour test at 900 g.p.h. was commenced, but the pumping unit failed at 55 mins. and the pump was shut down. No recovery measurements were taken.

PA Book 101

Analysis:

The results of the above tests were plotted, drawdown against time. The plot of the 24-hour test revealed three (3) "boundaries". These were also seen in the plot of the 900 g.p.h. test.

Since no bore log or Reg. 8 has been submitted for this bore, very little is known of aquifers intersected. First supply was obtained in coarse gravel from 280' - 284'.

From analysis of the graph, it seems likely that at least two similar aquifers were intersected beneath 284 feet. The transmissibility of these aquifers has been calculated at approximately 0.70 TG/D/F. From known geology of the area, it is likely that these aquifers are separated by layers of clay and sandy clays.

Recommendations:

This bore should be equipped to pump at 750 g.p.h. At this rate, the expected drawdown, after 24 hours pumping, would be 50 feet. From this drawdown the bore should fully recover in 12 hours. The pumping times should be restricted to this pattern until such a time as further tests can be carried out. This will be done using the existing pump.

The pump setting should be approximately 340 feet and the drawdown at any stage should not exceed 60 feet if possible.

(E. CUTLER)
T/O

Results No 2

$T = \frac{4.39 \times .685}{5.5} = 0.55$ Kg. per day per ft.

$\frac{T}{k\ (day)} = \frac{33}{.658} = 56$ ft per Kg.

(on a spec. cap of 10 gals per ft.)

S.W.L. 231 ft.

Perforations 311 — 366

Water ? (212 - 218)(236 - 242)
276 - 280
Sand. 300 - 308 (main formation likely)
364 - 366

Drawdown 300 - 231 = 69 ft.

at 1160 Send immediately upon commencing pumping.

Packer at 375 mm

COSTING DATA - BORE DRILLED BY BRANCH CREW.

JOB No. 134 JOB NAME AIRPORT NO 2. EX ROSE VALE BORE

PLANT HIRE.

RIG No. WRB 4 HYDROMASTER. TOTAL HOURS USED 16

PUMP TEST UNIT 5X DJB 2LHR TOTAL HOURS USED 24

-----ooOoo-----

LABOUR - (DRILLING AND PUMP TESTING).

NAME	DATES:-			
1. R-LINDON BORE INSPECTOR.	25th - 8 HRS	26th - 8 HRS	27th 14 HRS.	
2. R ADAMSON DRILLER.	25th 8 HRS	26th 8 HRS	28th 8 HRS	28th 8 HRS.
3. D G MCCONNELL - FITTER				
4.				
5.				

NOTE: Record hours worked each day on Job. (Include time travelling to and from Job)

-----ooOoo-----

MATERIALS (CASING, SHOES, CLAMPS, CEMENT, ETC.).

DESCRIPTION:	QUANTITY:	ORDER TO TRANSFER No.:
PUMP TEST ONLY		

NOTE: Net quantities, i.e., less materials returned to Store.

-----ooOoo-----

CARTAGE (INCLUDES TRANSPORT OF PLANT AND MATERIALS.

	Trip No. 1	No. 2	No. 3	No. 4
DATE	25/2/63 28/2/63			
VEHICLE No	12116			
VEHICLE TYPE	INTER 4WD			
DRIVER (Name)	LINDON & ADAMSON			
TOTAL MILEAGE	125			
TOTAL HOURS	32 HRS			

NOTE: Total hours and mileage to include Depot to Depot unless other Jobs concerned in which case an apportionment is to be made.

-----ooOoo-----

NOTE: In recording details of Plant Hire and Labour when a bore results from investigational drilling, also include an estimate of time for the job if work had not been of an investigational nature. Required for estimated cost if bore is to be sold to a landholder.

All inspection costs covered by 6% oncost.

Signature..... Designation..... Date.....

HFE/SJB: R/90. 11th March, 1963.

The Senior Engineer, Groundwater.,
Water Resources Branch,
Northern Territory Administration,
DARWIN.

Airport No.2 Bore Test - Job No.134.

Prior to the pump testing the bore was logged with the electric logger as the only information available was that included in my letter of 13th December,1962.

The followingwere determined:-

Depth 392 feet.
Perforations in interval 311 to 366 feet.
Standing Water Level 231 feet.

The Gamma Ray Log would suggest that the most likely aquifer is at 300 - 308 feet with minor sands at 276 - 280 and possibly 364 - 366 feet. Thus it would appear that the bore was completed with the perforations not opposite the main supply. The pump test results tend to confirm this.

A 3¼" Draw-Plunger pump was set with pump suction at 312 feet. Pumping at 685 gallons per hour the rate of increase of drawdown stabilized after 40 minutes at a figure appropriate to a transmissability of 550 gallons per day per foot. The drawdown at the end of the 24 hour test was 36 feet.

As this drawdown figure is only approximately half that apparently available to the major aquifer, short tests were run at higher rates of 757 g.p.h and 1100 g.p.h.

These tests established that at the two lower rates the well-loss is extraordinarily high. At the highest rate the well-loss is lower but the bore pumped sand immediately pumping commenced. The critical rate for the onset of sand production is between 800 and 850 g.p.h.

Thus it is evident that a far better bore than this could be constructed in this area. My recommendation for equipping the existing bore follows:-

Recommendation.

The Bore should be equipped to produce not more than 750 gallons per hour.

Pump suction should be set at a depth of 310 feet.

The bore is suitable for pumping continuously for periods of up to one week at the above rate.
The water analyses will be available on the 18th March. The water is expected to be suitable for human consumption with an analysis of the order of 900 p.p.m T.D.S although the hardness will very likely be high (400 p.p.m).

(H.F. Eggington)
DISTRICT ENGINEER.

HFE/SJB: R/90 8th April,1963.

The Director.,
Water Resources Branch,
N. T. Administration,
DARWIN.

Attention: Senior Engineer, Groundwater.

Airport No.2 Bore Test - Job No.134.
Your W865 Dated 14th March, 1963.

I have discussed this hole with J.P. Cole who, as you suggest, drilled the hole in partnership with A.J. Gorey. Cole states that the hole was cased with 1 plain joint of casing and then possibly up to 5 joints of finely perforated casing followed by plain casing.

The Single-Point Resistance and Self Potential Logs attached (Figure 1) clearly indicate that the perforations are in the interval 311 - 366 ft so presumably only 3 joints of perforated casing were run. You will note that the scales are set so that the Single Point Resistance (Right Side of Plot) is writing ½ inch above the Self Potential pen, thus the left side must be raised ½ inch to obtain side by side correlation. The scales are 1" = 100 m.v Self Potential and 1" = 5 ohms Resistance. The logging speed is 40 ft per minute.

Figure II shows a temperature log (Scale 1" = 6°F) on the right side with a Gamma Activity Log (Scale 1" = 5 mv. output from Gamma Probe Amplifier) on the left. A second Gamma Activity at a lower sensitivity (1" = 10 mv Amplifier Output) was taken to achieve a clearer record. My experience to date suggests the 20 m.v line as being a useful demarkation point when logging Central Australian Tertiary Age Sediments, the beds having a gamma activity recording above 20 mv being predominately clays and those below predominately sand.

With the exception of the temperature log all logs were recorded with the probe travelling up-hole. All vertical scales are 1" = 20 feet.

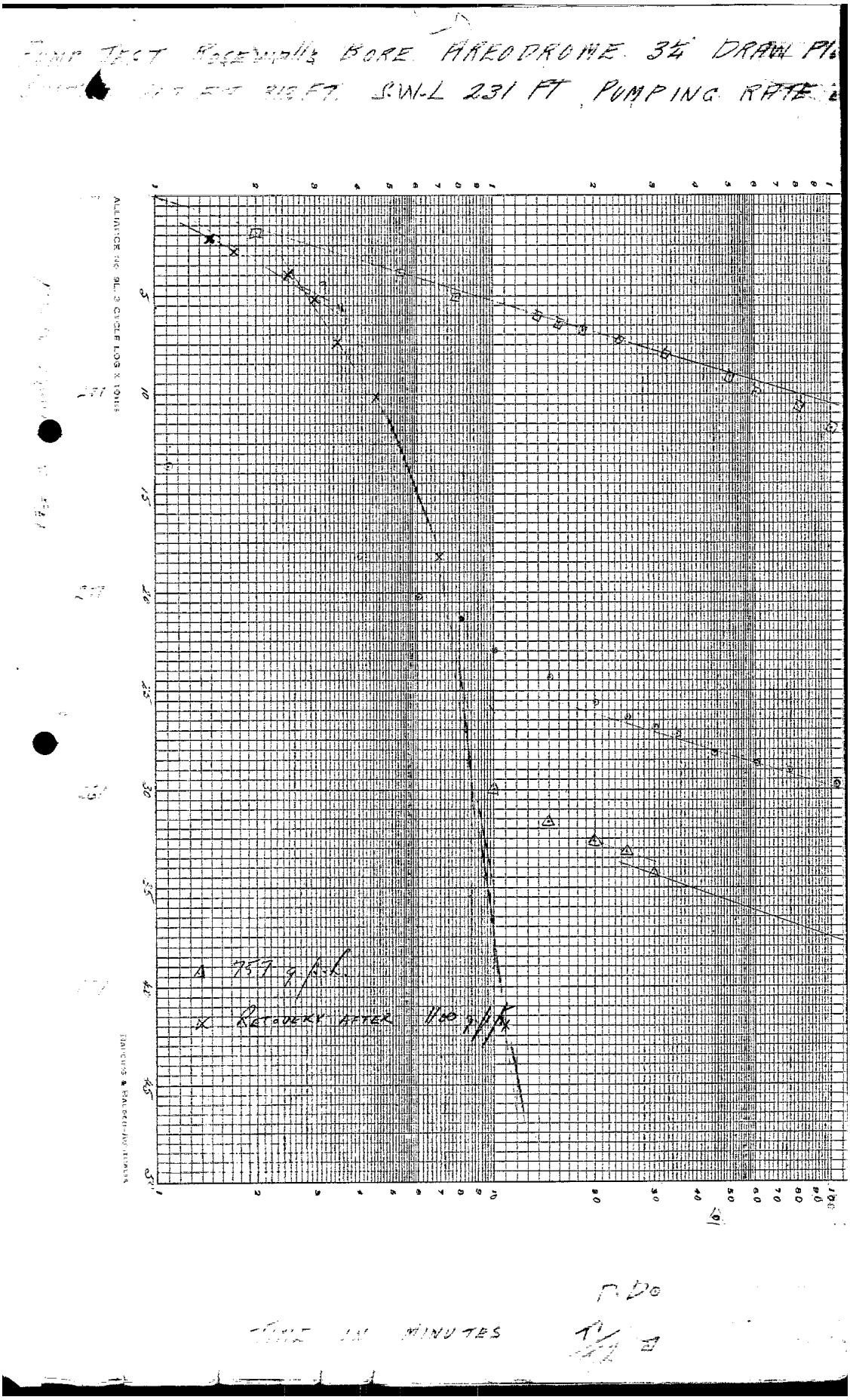
Yours faithfully,

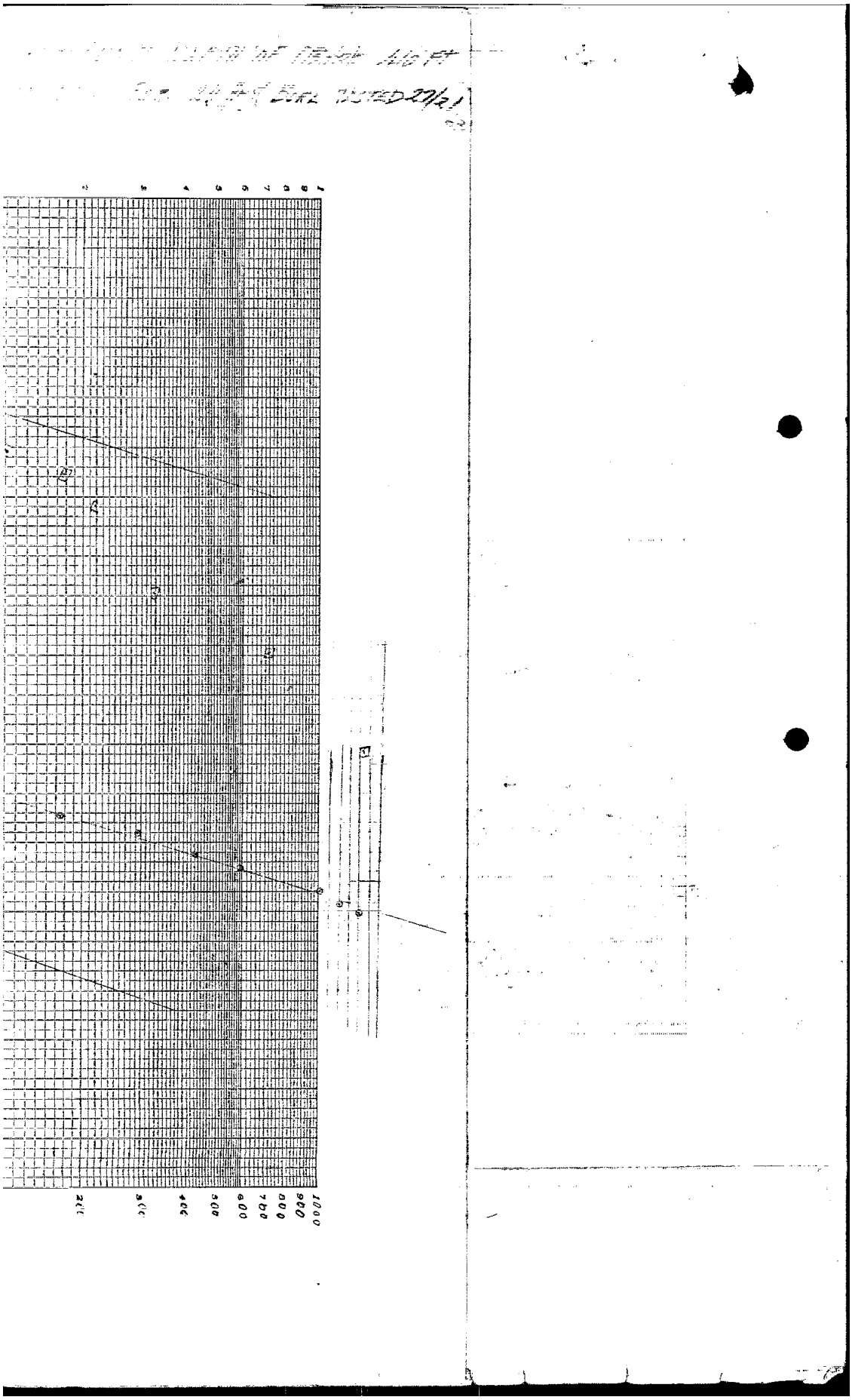
(H.F. Eggington)
DISTRICT ENGINEER.

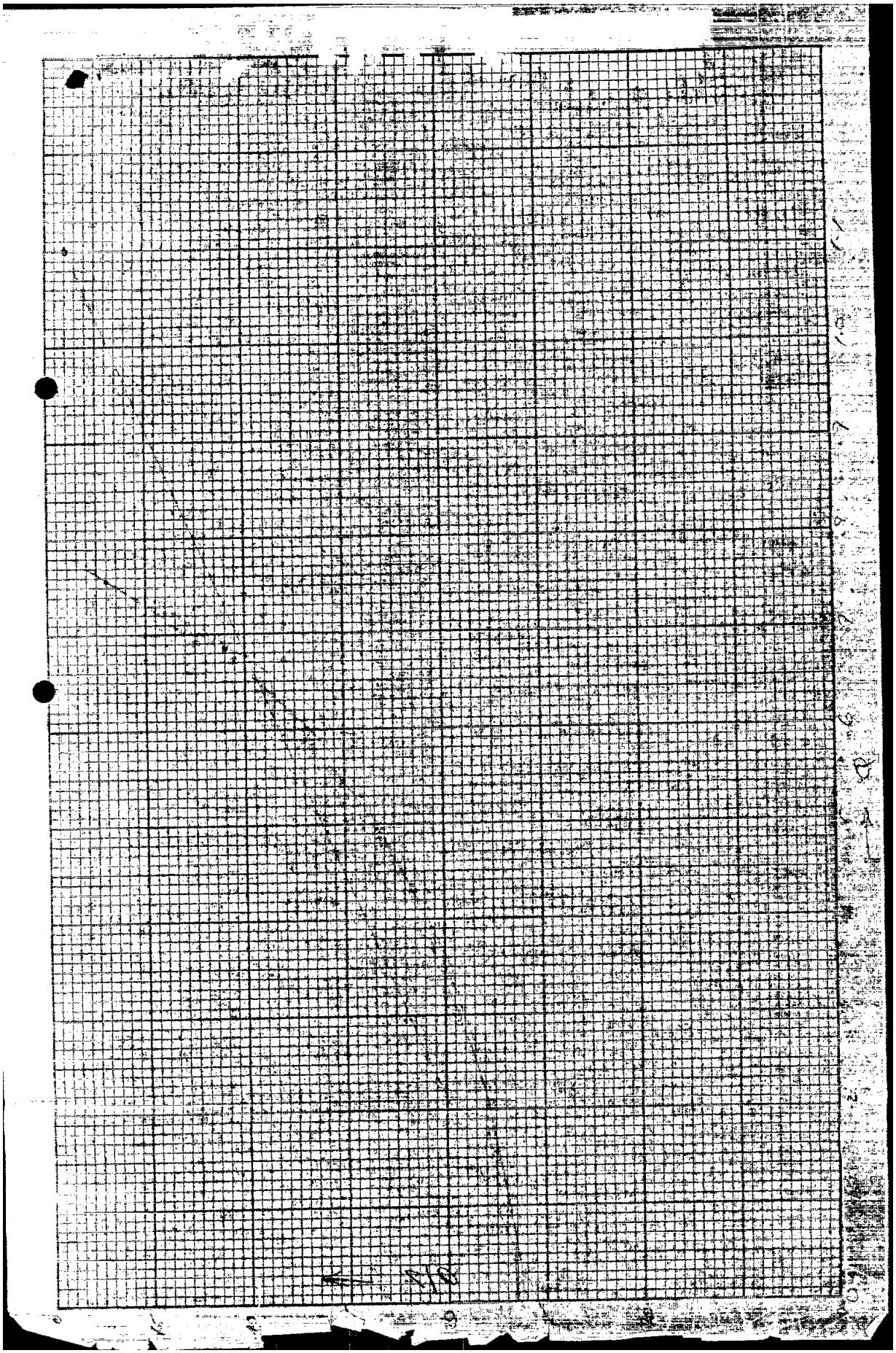
- Aerodrome No. -

Total	392
Temporary	322
Permanent.	70
Free alkalinity.	—
Cl	100
SO_4	139
F-	0·8
Ca	101
HCO_3	392
CO_3	—
Na	96
K	9
Mg	34
NO_3	9
	881

pH 7.3.


PUMP TEST ASCENDING BORE AERODROME 34 DRAW PI
SWL 231 FT PUMPING RATE
Δ 757 g.p.h.
X RECOVERY AFTER 1140 g.p.h.
TIME IN MINUTES





RN003563

N.T.A. WATER RESOURCES BRANCH

BORE DATA SHEET

NAME	Airport Bore No 2	INDEX No.	16/276
LOCALITY	A/S	REG. No.	3563
DEPTH	392'	FILE No.	
CASINGS		PERFORATIONS SCREENS	perfs. from 311'-366'
LOCATION	16 / 01 / 24.0 E 13.5N	SURFACE LEVEL R.L.	B M LEVEL R.L. / DATUM
CONTRACTOR.		DRILLER. G.Gorey	DATE STARTED. 1959 app. / DATE FINISHED.

WATER

AQUIFERS				
DEPTH STRUCK				
AQUIFER THICKNESS				
STANDING WATER LEVEL	231			
PUMP TEST G.P.H.	750			
DRAWDOWN LEVEL				
F. LEVEL				
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF				
ANALYSES				
BINOMIAL CLASSIFICATION PH.	7.6			
T. D. S.	909			
CONDUCTIVITY				
TOTAL HARDNESS	408			
CHLORIDE	95			
BICARBONATE	395			
CARBONATE				
SULPHATE	194			
NITRATE	13			
FLUORIDE	0.2			
SODIUM	105			
POTASSIUM	8			
CALCIUM	395			
MAGNESIUM	36			
REG. ANAL. No.	6588.	10092		

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET	CASING	AQUI.	SEC.	STRATA

COPY RN3563 AR76/392

Alice Springs.

7th July, 1959.

Director of Works.
DARWIN.

ATTENTION : PRINCIPAL ENGINEER.

ALICE SPRINGS AERODROME

Delay in replying to your memorandum 58/702/14 of 20/5/59 is regretted.

Two bores, known locally as No. 1 and No. 2, have been sunk by the Contractor in the vicinity of the new 11$6^{0}$ runway. Referred to runway centreline, the approximate positions of these bores are :-

No. 1 Chainage 5490	775L
No. 2 Chainage 3580	1400L

Centreline of apron and taxiways is at chainage 3765' and the northern edge of the apron is 815' left of runway centreline.

No. 1. bore is at present equipped with pump, pumphead and engine, all of which are the property of the contractor, and is in constant use for runway construction. It has been tested to 1800 galls/hour, but drawdown is not known. Casing is 6" dia. This bore has a marked tendency to draw in sand, and although a screen is fitted and the bore has been sand pumped several times, it is proving to be necessary to change pump leathers every fortnight when pumped continuously at about 1600 g.p.h. A sample of water has been chemically analysed by A.I.B. with the following results.

Total hardness	386
Temporary hardness	296
Permanent Hardness	90
Free alkali	Nil
Chloride	105
Sulphate	170
Flouride	1.1
Calcium	90
Bicarbonate	361
Carbonate	Nil
Sodium	100
Potassium	8
Magnesium	39
Nitrate	8
	882

The analysis report stated "The sample an analysed is chemically suitable for domestic use, human consumption and for agriculture."

No. 2 bore was located, by agreement with the Contractor, in the position which was considered most suitable for supplying the new terminal area. It is equipped with pump rods and column, which are the property of the contractor, but has no engine or pumphead fitted, and has not been pumped except at the testing stage. It has been tested successfullyto 1000 galls/hour (drawdown 51') but was "forked" at 1050 galls/hour. The boring contractor has stated that there is no risk of drawing sand into this bore. As far as can be ascertained no sample of this water has been taken for testing but the writer has tasted the water and found it quite satisfactory. Casing is 6" diam.

Assuming this supply to be sufficient, it is recommended that No. 2 Bore be utilised as the supply for the new terminal area, and that at the conclusion of the contract the equipment at present installed in the bore be purchased from the contractor. This comprises one 4¼" draw plunger pump 290' of pump rods, and 282' of 5" pump column.

(L.A.M. PITTELKOW)
Divisional Works Officer.

OCT. '68.
SF53-14
160038

N.T.A. WATER RESOURCES BRANCH

BORE DATA SHEET

INDEX No. 16/329
REG. No.... 3602.
FILE No. ...

NAME Z.E. GRID REF 5F.74 I 50.49
LOCALITY ROAD RESERVE
DEPTH 701' 213.67m
CASINGS 387' /4"
PERFORATIONS
SCREENS NIL
LOCATION AMG Surveyed / 53 / 385571 E7366766 N
SURFACE LEVEL R.L. 1789.92'
B M LEVEL R.L.
DATUM M.S.L. PT AUGUSTA.
CONTRACTOR W.R.B
DRILLER L. HARGRAVE
DATE STARTED 12-1-62
DATE FINISHED 18-1-62

WATER

AQUIFERS				
DEPTH STRUCK	84'			
AQUIFER THICKNESS				
STANDING WATER LEVEL	256'	78.03m		
AIMP 5 G.P.H.	SEEPAGE			
DRAWDOWN LEVEL				
AIMP LEVEL				
DURATION OF TEST HOURS				
S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				

ANALYSES

NOMIAL CLASSIFICATION	/			
T.D.S.	1023			
CONDUCTIVITY				
TOTAL HARDNESS	34			
SILICATE	335			
BICARBONATE	164			
CARBONATE	9			
SULPHATE	151			
NITRATE	NIL			
FLUORIDE	0.5			
SODIUM	335			
POTASSIUM	20			
CALCIUM	NIL			
MAGNESIUM	8			
P.H.	9.3			
LAB. ANAL. No.				

EQUIPMENT

DEPTH FEET	CASING	AQU.	SEC.	STRATA
				TOP SOIL SANDY CLAY SAND AND GRAVEL
				YELLOW WHITE CLAY AND GRAVEL
200				BROWN AND WHITE CLAY AND GRAVEL.
				WHITE SANDY CLAY
400				WHITE CLAY & ~~SILICEOUS~~ SANDSTONE
				WHITE CLAY & SILICEOUS SANDSTONE
600				WHITE AND YELLOW SANDSTONE WITH ODD RED BROWN CLAY.
800				

540
350
190
1.

PLACE THIS EDGE TO FILE SCORE OR FILE EDGE

FROM	TO	DESCRIPTION OF STRATA
0	80	Top soil sandy clay ~~xxxx~~ sand & gravel
80	160	Yellow white clay & gravel
160	300	Brown & white clay & "
300	482	White sandy clay
482	500	White clay & sandstone
500	590	White clay & siliceous sandstone
590	701	White & yellow sandstone with odd red brown clay

LOCATION OF BORE: (or supply sketch on back hereof.)

.....Miles

N	NE	of (b)
S	SE	.....
E	NW	
W	SW	.....

Shot point 15
On seismic
line
Circle appropriate direction
from known point such as existing bore, homestead, outstation, etc.

ADDITIONAL INFORMATION OF INTEREST

Losing water rapidly after 600

Samples of strata and Water supplies have been / will be left at the following Trading Place

.....

.....

(SIGNATURE)

FOR OFFICE USE ONLY.

Name of Bore

Name of Property
EC

Description of Property
ROAD RESERVE

Name of Owner
AS ABOVE

Name of Contractor
[illegible]

Name of Driller
ARID RECOVERIES BRANCH

Date of Commencement
[illegible]

Date of Completion
12/1/62

Total Depth
15/1/62

Particulars of Casing
701'

Particulars of Perforations on Screens.
3" of 4

WATER	1st SUPPLY	2nd SUPPLY	3rd SUPPLY
Struck at			
Standing Water Level	84	600 onward	
Pumping Supply, ~~xxxxx~~ G.P.H.			
Duration of Pump Test			
Water Level during Test			
Quality- good, fair or bad			

Origin of Water MERRENIE GRID — Reference SN 65 / 451

BORE ZE — Specimen Advice Note No. 9628

Date Sampled 23-2-65. — Date Received 26/2/65

Results in parts per million

HARDNESS (Calculated as CaCO3)		
" Total	424	
" Temporary	241	
" Permanent	183	
ALKALINITY IN EXCESS OF TOTAL HARDNESS	Nil	
CHLORIDE	110	3·10
SULPHATE	242	5·04
FLUORIDE	0.9	
CALCIUM	90	4·49
BICARBONATE	294	4·82
CARBONATE	Nil	
SODIUM	94	4·09
POTASSIUM	11	0·28
MAGNESIUM	49	4·03
NITRATE	5	0·08
NITRITE	Not Determined	
AMMONIA	"	"
TOTAL DISSOLVED SALTS	896	

pH 8.0

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

The above results are forwarded for your information.

Signature Donald R Newman

6,250 ppm. equals approx. 1 oz. per gall.

Date 23-3-65.

1200—1.63 7521

Origin of Water MEREENIE GRID

BORE ZE

Reference SN 65 / 315

Specimen Advice Note No. 9261

Date Sampled 9/12/64

Date Received 11/12/64

Results in parts per million

HARDNESS (Calculated as CaCO3)		
" Total	34	
" Temporary	34	
" Permanent	Nil	
ALKALINITY IN EXCESS OF TOTAL HARDNESS	115	
CHLORIDE	335	9.45
SULPHATE	151	3.14
FLUORIDE	0.5	
CALCIUM	Nil	
BICARBONATE	164	2.69
CARBONATE	9	0.30
SODIUM	335	14.58 } 1970
POTASSIUM	20	5.12 }
MAGNESIUM	8	0.66
NITRATE	Nil	
NITRITE	NOT DETERMINED	
AMMONIA	" "	
$\frac{HCO_3}{Cl}$ = 0.28		
$\frac{HCO_3}{SO_4}$ = 0.86		
TOTAL DISSOLVED SALTS	1023	

pH 9.3

General remarks of Analysing Officer with particular reference to suitability of the water for the purpose for which it is stated to be required.

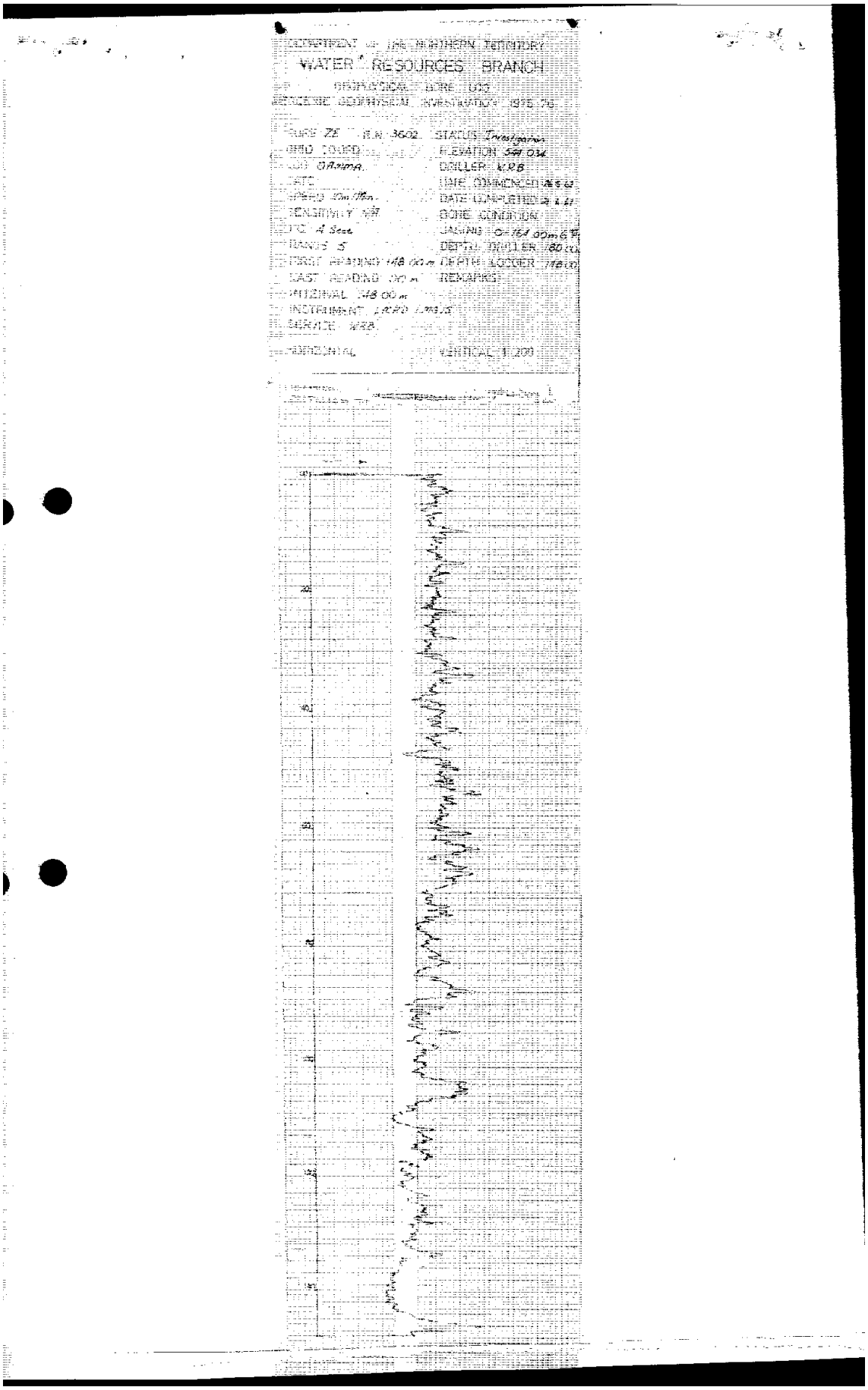
The above results are forwarded for your information.

Signature [signature]

Date 5/1/65

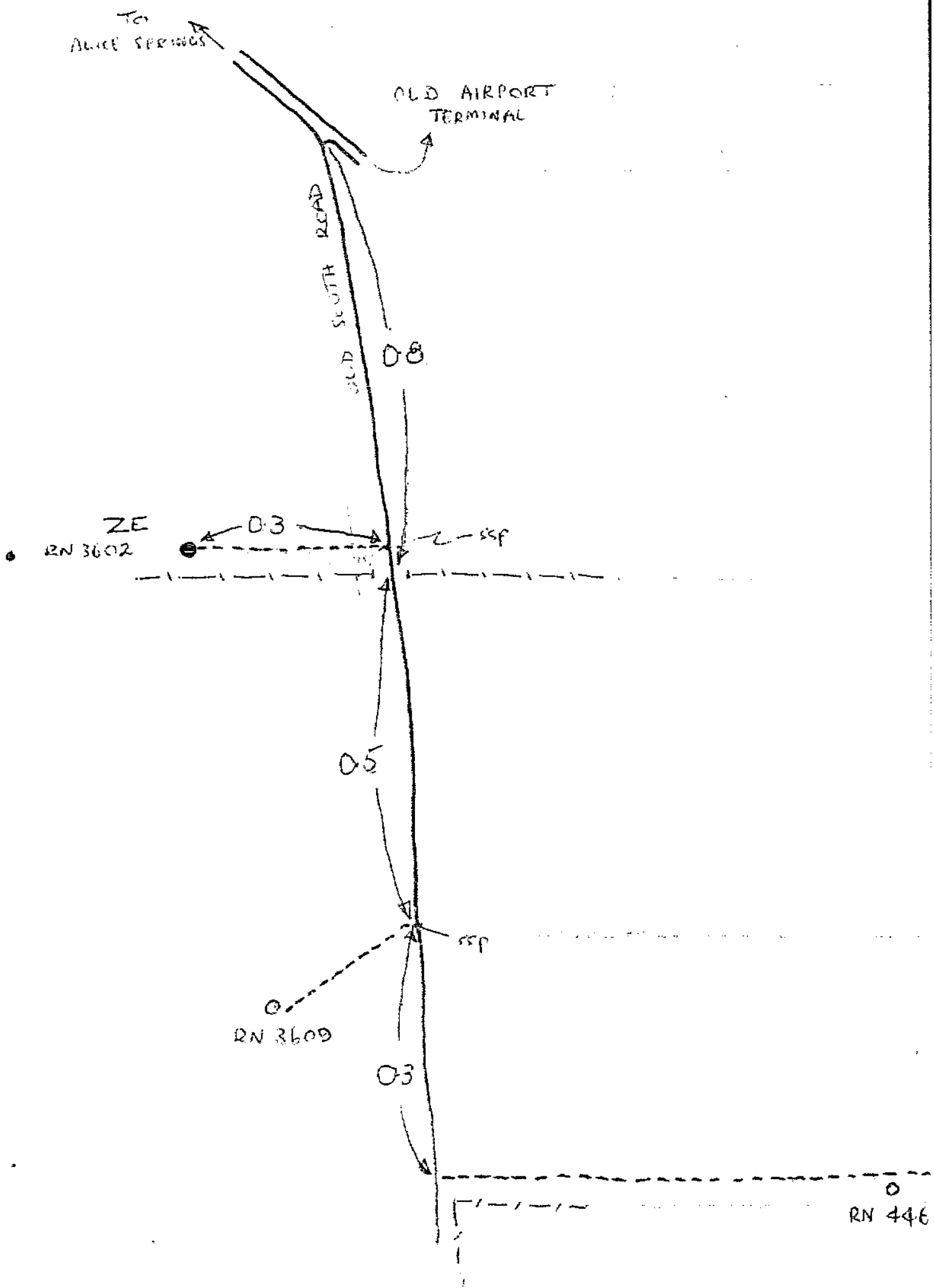
6,250 ppm. equals approx. 1 oz. per gall.

1200—1.63 7523


DEPARTMENT OF THE NORTHERN TERRITORY
WATER RESOURCES BRANCH
GEOLOGICAL BORE LOG
REGIONAL GEOPHYSICAL INVESTIGATIONS 1975-76
BORE ZE 3602 STATUS Investigation
HEAD TOWED ELEVATION 548.03K
LOG GAMMA DRILLER K.P.B.
DATE DATE COMMENCED 16.9.76
SPEED 5m/min DATE COMPLETED 21.9.76
SENSITIVITY 4W BORE CONDITION
T/C 4 Secs CASING 0-164.00m 6"
BANDS 5 DEPTH DRILLER 180.00m
FIRST READING 148.00m DEPTH LOGGER 178.00m
LAST READING 30.0m REMARKS
ORIGINAL 148.00m
INSTRUMENT LAND LOGS
SERVICE WRB
HORIZONTAL VERTICAL 1:200

BORE ZE RN 3602

4" CASING WITH 2" GWP SOCKET



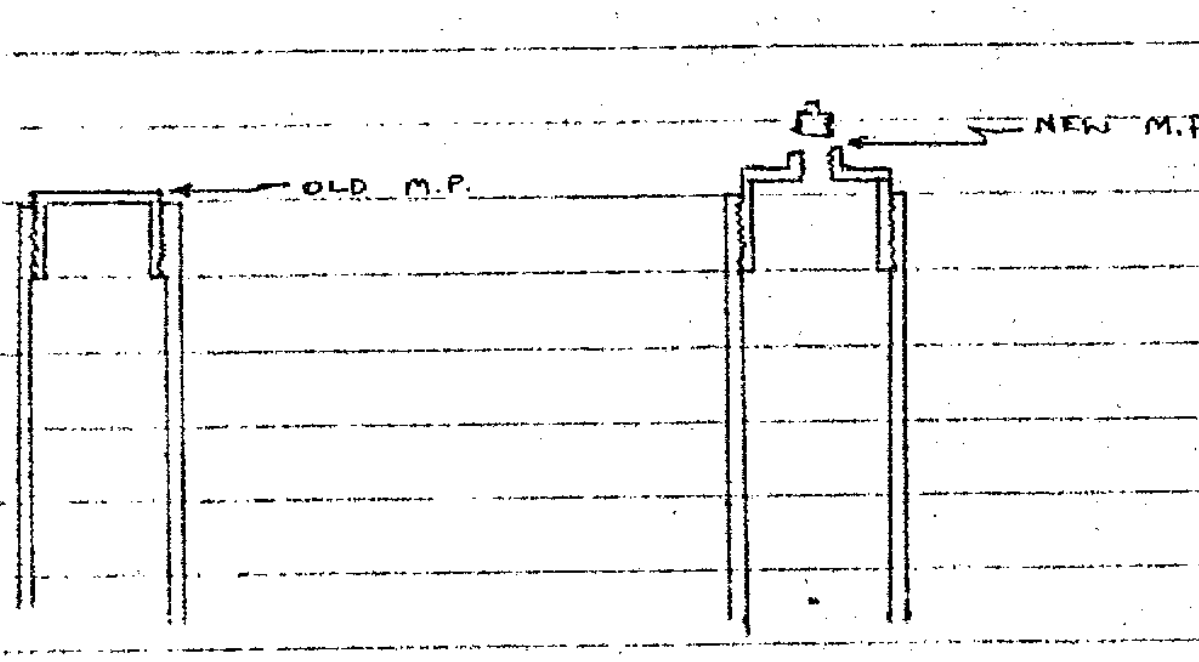
ALTERATION TO WATER LEVEL MEASURING POINT

BORE ZE RN 3602

PRIOR TO 19-12-77 THE MEASURING POINT FOR WATER LEVELS WAS THE TOP OF CASING R.L. 544.034

ON 19-12-77 THE MEASURING POINT WAS ALTERED BY REMOVING THE BLANK SCREW CAP OF THE CASING AND INSERTING A SCREW CAP WITH A 2 INCH G.W.P. SOCKET AND PLUG.

MEASURING POINT WAS RAISED BY 0.108 m AND IS NOW R.L. 544.142 m AHD.



POWER AND WATER AUTHORITY

GEOPHYSICS
LOGGING DATA

RN..3602.....

LOCATION....MEREENIE / AIRPORT...WESTERN BOUNDRY.....

.....

LOG	DATE	INTERVAL LOGGED	CASING DETAILS AT TIME OF LOGGING
SLIM GAMMA	13/2/85	148.0 - 1.0m	CASING 387' OF 4"

REMARKS e.g. Hole drilled with foam or mud ?

2745-A-90

W.R.B/Z.E (drilled at SP 19).

6	Dark chocolate brown clayey silt.
17	Brown clayey silt with pebbles and boulders.
22	Fine to medium brown sand with coarse to very coarse sand grains and pebbles (damp).
30	Medium grained brown slightly silty sand (damp).
34	Brown medium to coarse sandy and slightly clayey silt (damp). (soakage at 36'). (~~damp~~)x
40	Medium to coarse brown slightly silty sand. (damp).
52	Brown sandy clightly clayey silt with pebbles up to 1" (damp).
64	Very coarse sand and gravel.
74	Medium to coarse gravel, with some lumps of medium grained brown sandy clay.
80	Medium to very coarse brown clayey sand, with some pebbles.
85	UNCONFORMITY (Mesozoic Top).
90- 100	Coarse to very coarse clayey sand with pebbles, and lumps of pale grey fine sandy clay.
110	Fine to very coarse sandy and gravely pale grey clay. Cuttings indicate presence of cobbles and/or boulders.
120	Coarse to very coarse sand with pebbles and ? cobbles.
132	Red - brown and grey medium grained sandy clay.
140	Red - brown and grey medium to coarse grained sandy clay, with cuttings of pebbles and cobbles.
150	Fine to medium grained Red - brown and grey ~~medium~~ sandy clay, with cuttings of pebbles and cobbles.

160	Brown and grey clay and fine sandy clay with some medium to coarse sand.
170	Brown and grey fine sandy clay, with some chips of pebbles.
180	Brown and grey fine sandy clay, with some chips of pebbles, with some medium grained sand (possibly clayey sand interbeds)
190 - 210	Brown and grey clay with coarse to very coarse subangular to sub rounded sand grains.
220 - 230	Mottled brown and grey clay, with a few medium to very coarse sand grains, including some sub angular ironstone fragments.
240	Grey and brown very fine sandy clay, with some chips of deep red - brown clayey siltstone (or very fine sandstone).
250	Grey and red - brown very fine sandy clay, with a few coarse sand grains (quartz and ironstone)
260	Grey and red - brown very fine sandy clay, with a few coarse sand grains (quartz and ironstone) and chips of red - brown clayey siltstone.
270	Grey and yellow clay, with some chips of red - brown silty claystone.
280	Mottled grey and red - brown very fine very sandy clay.
290	Grey and brown clay, with some medium to coarse sand and chips of red - brown clayey siltstone.
300	Grey and brown very fine very sandy claym with some medium sand grains, and chips of pale grey claystone and deep red - brown clayey ~~xxxx~~ siltstone.
310	Pale grey fine grained (with some medium to coarse) very sandy clay, with few chips of purple clayey siltstone.
320	Medium to coarse grey clayey sand, with some grey fine sandy clay and few chips of red - brown clayey siltstone.

330 - 360	Pale grey fine to medium grained sandy clay.
368	White fine to medium sandy clay.
380	White fine grained sandy clay.
390	White fine grained sandy clay with chips of brown clayey siltstone.
400	Grey and brown fine slightly sandy clay and brown c clayey siltstone.
400 - 410	Grey and brown fine sandy clay.
450	White yellow and brown very sandy very fine to fine grained sandy clay.
460	Fine to medium grey and brown sandy clay.
470	Fine, with some medium, sandy grey and brown clay.
480	Grey and yellow very fine extremely sandy clay and clayey sand.
~~480~~x 482	Grey and yellow very fine to fine clayey sand in ~~xx~~ sample and some quartz pebbles up ½". Few chips of brown ferruginous fine sandstone, probably off bottom.
487	Hard white fine grained sandstone. Consists of colorless sub-angular to rounded moderately even grained quartz fragments, in a white kaolinitic. (? silicified) matrix.
490	Chips of yellow and grey porcellanised clayey sand (very fine to medium grained) and poorly sorted fine to medium grained grey and yellow hard sandstone, with a silicified clayey matrix.
500	Sample contains: a. Lumps of purple, grey, red and yellow very fine very sandy clay. b. Few medium and coarse rounded quartz grains, with patches of grey clay adhering. c. Fine to medium grained grey and yellow sandstone

with a silicified clayey matrix.

d. Chips of ironstone. These consist of fine grained sandy clay, in which the clay has been almost completely feruginised, with a few small patches of clay remaining.

508 Sample consists of:
a. Small lumps (probably cuttings) of grey and brown fine sandy clay, and yellow very fine clayey sand.

b. Grey and cream poorly sorted fine to medium grained silicified clayey sandstone.

c. Dark red - brown slightly silty claystone.

520 Sample consists mainly of dark red - brown slightly silty clay, as small lumps (probably cuttings). Also some lumps of yellow very fine clayey sand and grey sand and grey sandy clay. Few chips of a. ironstone (feruginised micaceous sandstone)

b. Fine grained quartz sandstone with very little (siliceous) matrix.

530 - 540 Cuttings of fine even grained white quartz sandstone with small amount of siliceous cement. Quartz grains are colorless and sub - rounded. Red clay and grey sandy clay in sample may be lag.

546 Chips of two types of sandstone:
a. fine even grained creamy brown quartz sandstone, with yellow limonite coated grains and a siliceous and limonitic matrix.

b. White and cream fine grained quartz sandstone, with colorless sub-rounded grains, in a siliceous (and in patches feruginous) matrix.
Also in the sample is a lot of grey fine sandy clay, which may be lag, or stripped from the wall of the hole.

548 Chips of:
a. Dark red - brown silty claystone.

b. White fine grained well sorted siliceous quartz

sandstone (similar to sandstone from 540)

c. White poorly sorted very fine to medium grained silicified clayey sandstone. (Similar to the sandstone from 500'). One chip only. The chips of sandstone are mixed with grey and brown clay, possibly stripped from the side of the hole.

554 White fine grained siliceous quartz sandstone chips Also a large proportion of small lumps of soft grey and brown fine sandy clay (Mesozoic) which appears to be cuttings from the bottom.

560 Chips of a. Pale grey fine grained slightly sandy claystone.

b. Dark red - brown slightly silty claystone.

c. Yellow - brown poorly sorted fine grained sandstone formed by silicification and feruginisation of a sandy clay.
Also lumps of grey and brown sandy clay.

570 Chips of white fine grained quartz sandstone with a little quartz cement, and brown and grey fine sandy clay.

580 Chips of red and grey fine sandy claystone, and brown and grey sandy clay.

590 Small pieces (almost certainly cuttings) of extremely fine grained white and brown clayey sand. Some chips of red silty claystone.

600 No sample. Circulation lost.

610 White and pale grey poorly sorted very fine to medium grained clayey sand, almost entirely disaggregated. The quartz grains aresub - angular, mostly colorless, but some have a feruginous coating. There appears to have been some silicification, and the smaple contains a few chips of hard silicified sandy clay.

620 Chips of white very fine grained very fine ble quartz sandstone, with very little clayey m

matrix. Also a few chips of porcellanised medium grained white sandy clay.

630 Chips of a. brown porcellanised fine sandy clay

b. White fine grained friable siliceous quartz sandstone.

640 Chips of fine grained friable white siliceous sandstone. Also some lumps of white soft fine to medium grained sandy clay. (These could have come from the wall of the hole)

650 - 660 Grey, Kakhi and brick red poorly sorted very fine to medium grained sandy clay. Largely disaggregated (sample is very sandy) but a few original lumps in sample. The red clay is definitely from the bottom, since it was not penetrated anywhere highest in the hole. (Also chips of fine grained white sandstone at 660')

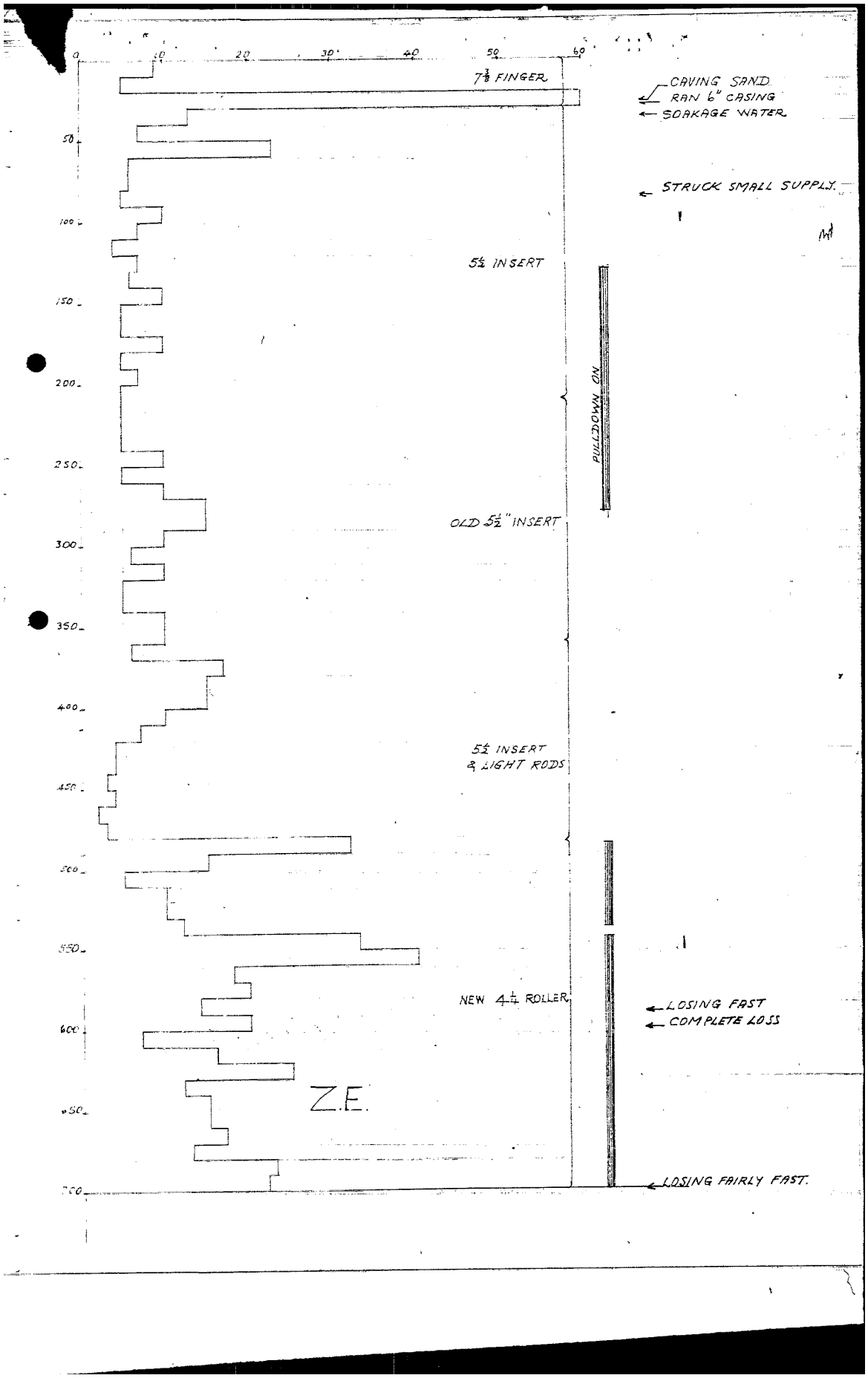
666 Bright red - brown clay, and chips of fine grained white sandstone.

678 Bright yellow and red clay, and chips of fine grained white cream and yellow quartz sandstone, with siliceous , and sometines feruginous matrix Colour of the sandstone is due both to coloured matrix and iron coated grains.

690 - 701 Chips of white, cream and yellow fine grained quartz sandstone, with a small amount of siliceous cement, and some clayey and limonitic matrix, varying from nil to considerable. The quartz grains are sub - rounded and mostly colourless but few have a yellow feruginous coat. Also lumps of red and yellow clay (claystone)

Note. The Mesozoic/Palaeozoic boundary is probably at approximately 600 feet. No undoubted Mesozoic type clay was encounted below this depth.

D. WOOLLEY.
Resident Geologist.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10
20
30
40
50
60
50
100
150
200
250
300
350
400
450
500
550
600
650
700
7⅞ FINGER
CAVING SAND
RAN 6" CASING
SOAKAGE WATER
STRUCK SMALL SUPPLY.
5½ INSERT
PULLDOWN ON
OLD 5½" INSERT
5½ INSERT
& LIGHT RODS
NEW 4¼ ROLLER
LOSING FAST
COMPLETE LOSS
Z.E.
LOSING FAIRLY FAST.

BORE DATA SHEET

NAME ZE

LOCALITY Alice Springs

DEPTH 701

CASINGS 387'/4"

INDEX No. 16/339

REG. No. ... 3602

FILE No. ...

PERFORATIONS

SCREENS NIL

LOCATION / / E N

SURFACE LEVEL R.L.

B M LEVEL R.L.

DATUM

CONTRACTOR W.R.B.

DRILLER HANCRAVE

DATE STARTED 12/1/62

DATE FINISHED 18/1/62

WATER

AQUIFERS		
DEPTH STRUCK	84+	600-7
AQUIFER THICKNESS		
STANDING WATER LEVEL	Seepage	
PUMP TEST G.P.H.	Seepage	
DRAWDOWN LEVEL		
PUMP LEVEL		
DURATION OF TEST HOURS		
R.L. S.W.L.		
WATER TEMPERATURE °C		
TRANSMISSIBILITY		
STORAGE COEFF.		
ANALYSES		
BINOMIAL CLASSIFICATION		
T.D.S.	1,023	
CONDUCTIVITY		
TOTAL HARDNESS	34	
CHLORIDE	335	
BICARBONATE	164	
CARBONATE	9	
SULPHATE	151	
NITRATE	NIL	
FLUORIDE	0.5	
SODIUM	335	
POTASSIUM	20	
CALCIUM	NIL	
MAGNESIUM	8	
pH	9.3	
REG. ANAL. No.		

EQUIPMENT

REMARKS

STRATA SECTION

DEPTH FEET | CASING | AQU. | SEC. | STRATA

Top siol s andy clay sand and gravel. — 80

Yellow and white clay & gravel — 160

Brown and white clay & gravel — 300

White sandy clay — 482

White clay and sandstone — 500

590 Whi te cla y & siliceous s andstone

White & yellow sandstone with odd red brown clay — 590

701

NAME	ZE	INDEX No.	16/329
LOCALITY	A/S	REG. No.	3602
DEPTH	701'	FILE No.	
CASINGS	387 1/4"	PERFORATIONS / SCREENS	
LOCATION	/ / E N	SURFACE LEVEL R.L.	B.M. LEVEL R.L. / DATUM
CONTRACTOR	WRB	DRILLER Hargrave	DATE STARTED 12/1/62 / DATE FINISHED 18/1/62

WATER

AQUIFERS				
DEPTH STRUCK	84+			
AQUIFER THICKNESS				
STANDING WATER LEVEL				
PUMP TEST G.P.H.	Seepage			
DRAWDOWN LEVEL				
PUMP LEVEL				
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES				
BINOMIAL CLASSIFICATION				
T.D.S.				
CONDUCTIVITY				
TOTAL HARDNESS				
CHLORIDE				
BICARBONATE				
CARBONATE				
SULPHATE				
NITRATE				
FLUORIDE				
SODIUM				
POTASSIUM				
CALCIUM				
MAGNESIUM				
REG. ANAL. No.				

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA
				Top soil sandy clay sand and gravel
60				
				Yellow and white clay & gravel
160				
200				Brown and white clay & gravel
300				
400				White sandy clay
442				White clay and sandstone
500				
590				
600				
701				
800				

GAMMA RAY - DRILLERS LOG

DEPT. OF TRANSPORT & WORKS

R.N. 3602

AREA MEREENIE

STATUS Investigation

LOCATION

SHEET NAME ALICE SPRINGS 53-14

GRID REF. 160 033

LAT ____ LONG ____

OTHER SERVICES

ELEVATION METHOD A.H.D.

B.M. ____

C.T. ____

G.L. 544.034 m.

PERMANENT DATUM ____ ELEV. ____

LOG MEASURED FROM ____ m ABOVE PERM DATUM

DRILLING MEASURED FROM ____

DATE	18·2·76
RUN NO.	
DEPTH DRILLER	180·0m
DEPTH LOGGER	148·0m
BTM LOG INTER.	148·0m
TOP LOG INTER.	0·0m
TYPE LOG	GAMMA RAY
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	78·04 m
MAX REC. TEMP. °C	
OPERATING RIG TIME	28·5·62
RECORDED BY	C.J.B.
WITNESSED BY	

BOREHOLE RECORD

NO	BIT FROM	TO

CASING RECORD

SIZE	TYPE	FROM	TO
		21·6·62	

EQUIPMENT DATA

	GAMMA RAY	DRILLERS LOG
RUN NO.		
TOOL MODEL NO.	LMG 15	
DIAMETER	38 mm	
DETECTOR MODEL NO		
TYPE		
LENGTH		
GENERAL		
HOIST NO.		
INSTRUMENT NO.	LMR-D	
TOOL SERIAL NO		

LOGGING DATA

GENERAL				GAMMA RAY				DRILLERS LOG
RUN NO	DEPTHS FROM	TO	SPEED M/MIN	T.C. SECS	SENS SETTINGS	ZERO DIV. L or R	A.P.I. G.R. UNITS PER LOG DIV.	
	148·0m	0·0 m	10	4	Range 5	5 L		

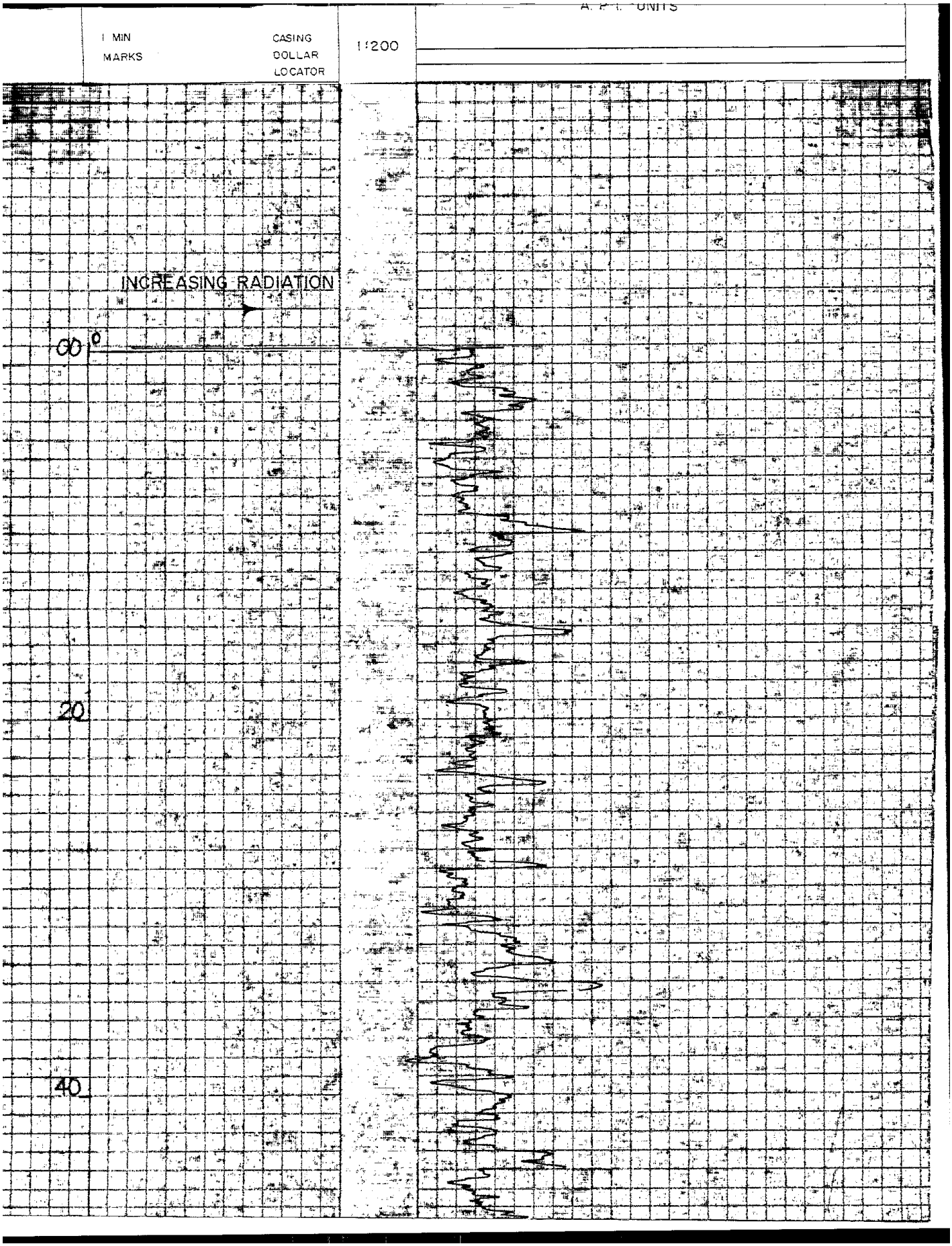
REFERENCE LITERATURE

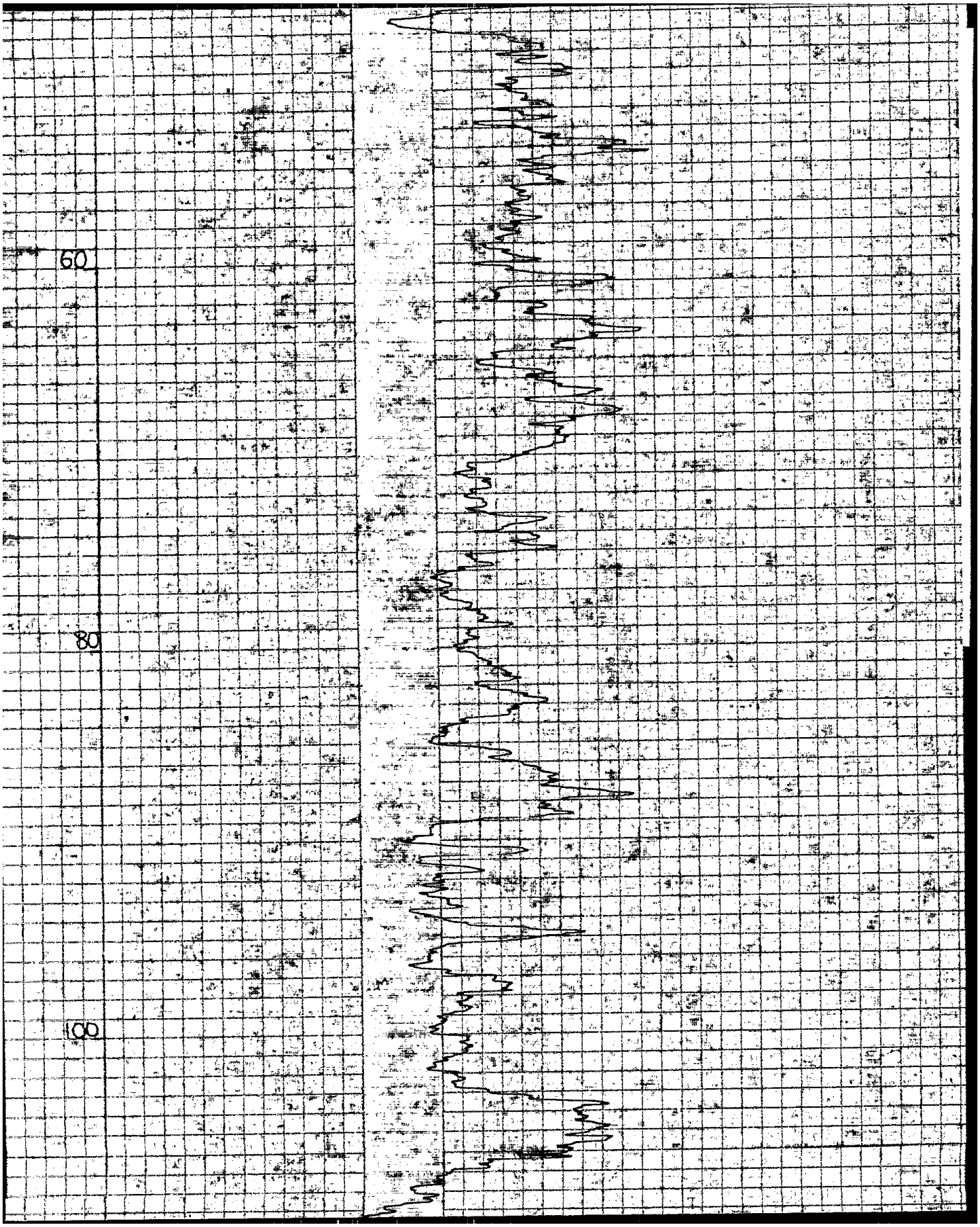
REMARKS

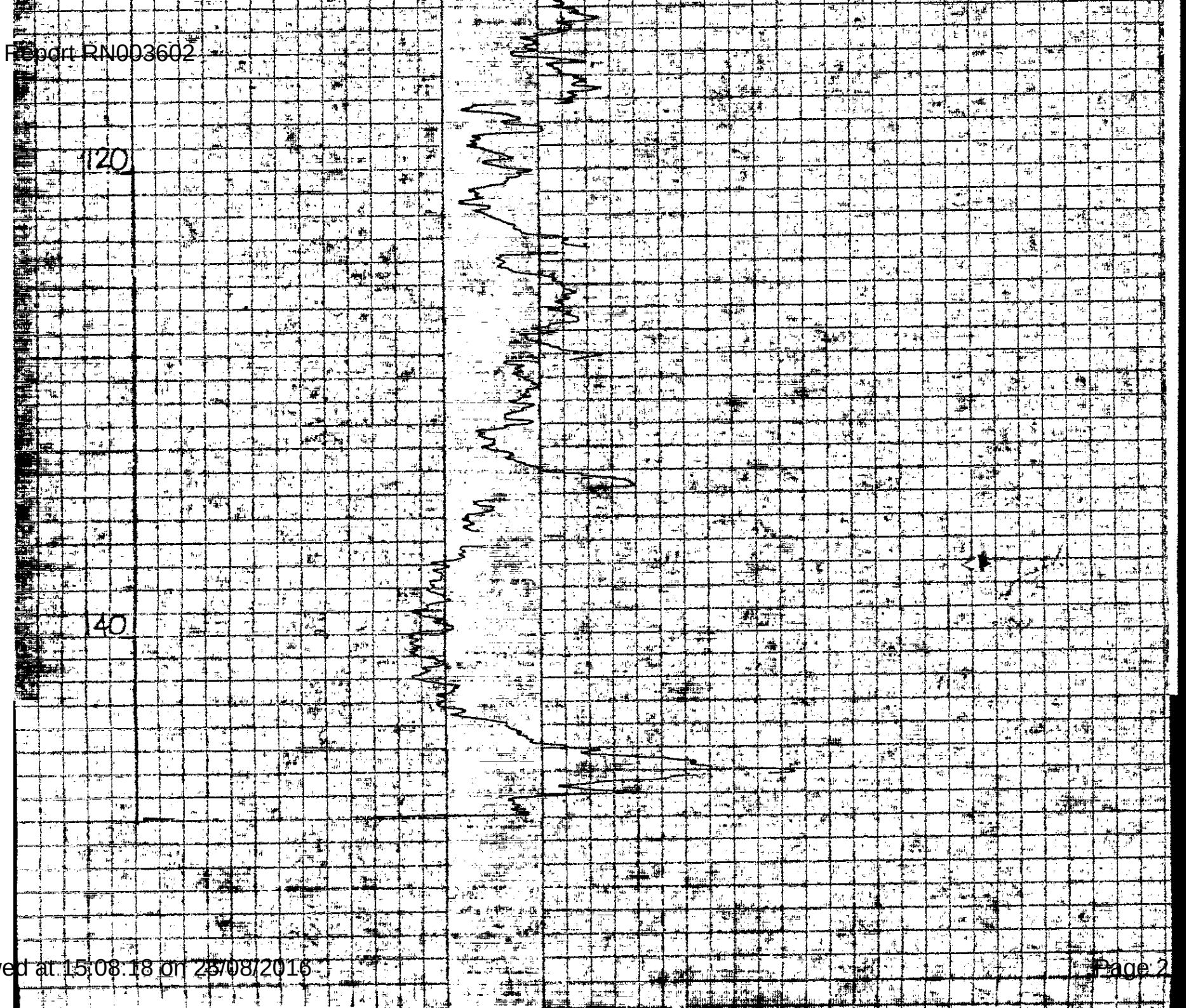
DRILLERS LOG

DEPTH SCALE =

GAMMA RAY


A. P. I. UNITS
1 MIN MARKS
CASING COLLAR LOCATOR
1:200
INCREASING RADIATION
00
20
40


60
80
100


120
140

TEMPERATURE LOG

DEPT. OF TRANSPORT & WORKS

R.N. 3602

AREA MEREENIE

STATUS Investigation

LOCATION

SHEET NAME ALICE SPRINGS SF 53-14

GRID REF 160 033

LAT ____ LONG ____

OTHER SERVICES

ELEVATION METHOD A.H.D.

B M 554.034m

C T

G L

PERMANENT DATUM ____ ELEV ____

LOG MEASURED FROM ____ m ABOVE PERM. DATUM

DRILLING MEASURED FROM ____

DATE	23-11-68
RUN NO.	1
DEPTH DRILLER	180.0m
DEPTH LOGGER	150.6m
BTM. LOG INTER.	150.6m
TOP LOG INTER.	0.0m
TYPE LOG	ABS. TEMP.
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	78.04m
MAX. REC. TEMP. °C	26.5.62
OPERATING RIG TIME	21.6.62
RECORDED BY	C.J.B.
WITNESSED BY	

BORE - HOLE RECORD

NO	BIT	FROM	TO

CASING RECORD

SIZE	TYPE	FROM	TO

TEST DATA

RUN NO	1	2	3
DEPTH FROM	0.0m		
TO	150.6m		
LOGGING SPEED m/min.	2.4m/m		
TIME START			
FINISH			
TEMP LOG ~~°C/cm~~	1" = 4.3°F		
MAX. TEMP			
DIFF. LOG: SENS.			
SPACING			

EQUIPMENT DATA

TOOL: DIAM. 38mm

NO 1MT-1

PANEL NO. LMR-D

TRUCK NO.

OTHER DATA

BORE DATA

REMARKS

ABSOLUTE

TIME MARKER →

DEPTH

SCALE: 1:240

DIFFERENTIAL

INCREASE →

N.T.A. WATER RESOURCES BRANCH

RN003602

BORE DATA SHEET

NAME ZE Road Reserve

INDEX No. 16/329

LOCALITY A/S

REG. No. 3602

DEPTH 704' 213.7m

FILE No.

CASINGS 387'/4"

PERFORATIONS

SCREENS

LOCATION / / E N

SURFACE LEVEL R.L.

B M LEVEL R.L.

DATUM

CONTRACTOR. WRB

DRILLER. Hargrave

DATE STARTED. 12/1/62

DATE FINISHED. 10/1/62

WATER

AQUIFERS				
DEPTH STRUCK	84'			
AQUIFER THICKNESS				
STANDING WATER LEVEL				
PUMP TEST G.P.H.	seepage			
DRAWDOWN LEVEL				
PU LEVEL				
DURATION OF TEST HOURS				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.				
ANALYSES	23/2/65			
BINOMIAL CLASSIFICATION				
T.D.S.	896			
CONDUCTIVITY				
TOTAL HARDNESS				
CHLORIDE				
BICARBONATE				
CARBONATE				
SULPHATE				
NITRATE	5			
FLUORIDE	0.9			
SODIUM				
POTASSIUM				
CALCIUM				
MAGNESIUM				
REG. ANAL. No.				

EQUIPMENT.

REMARKS.

STRATA SECTION

DEPTH FEET | CASING | AQU. | SEC.

	STRATA
80	Top soil sandy clay sand and gravel
160	Yellow & white clay & gravel
	Brown & white clay & gravel
300	
	White sandy clay
482	
500	White clay and sandstone
590	
701	

NORTHERN TERRITORY ADMINISTRATION.
CONTROL OF WATERS ORDINANCE 1938-1959.
WATER RESOURCES BRANCH.

REGULATION 8:

FINAL STATEMENT OF BORE.

3602

FROM	TO	DESCRIPTION OF STRATA
0	80	Top soil sandy clay sand and gravel
80	160	Yellow & white clay + gravel
160	300	Brown & white clay + " "
300	482	White sandy clay
482	500	White clay & sandstone
500	590	White clay & siliceous sandstone
590	701	White & yellow sandstone with odd red brown clay.

Name of Bore.
ZE

Name of Property.
ROAD RESERVE

Description of Property.
AS ABOVE

Name of Owner.
N. T. A

NAME OF CONTRACTOR.
Water Resources Branch

Name of Driller.
L. G. HARGRAVES

LOCATION OF BORE: (or supply sketch on back hereof.)

..... Miles
SHOT POINT 19
Orthesmic
Line Near
Aerodrome

N	NE	of (b)
S	SE	.....
E	NW	
W	SW	.....

(a) Circle appropriate direction
(b) Use known point such as existing bore, homestead, outstation, etc,

Date of Commencement:
12-1-62

Date of Completion:
18-1-62

Total Depth:
701

Particulars of Casing:
387 ' of 4"

ADDITIONAL INFORMATION OF INTEREST
Losing water rapidly after 600

Particulars of Perforations or Screens:
NIL

Samples of strata and Water supplies have been / will be left at the following Trading Place
.....B.M.R.....
.....
(SIGNATURE)

WATER	1st Supply	2nd Supply	3rd Supply
Struck at	84	600 onward	
Standing Water Level	surface	-	
Pumping Supply, G.P.H.		-	
Duration of Pump Test	-	-	
Water Level during Test	-	-	
Quality- good, fair or bad	-	-	

FOR OFFICE USE ONLY.

R.D 37

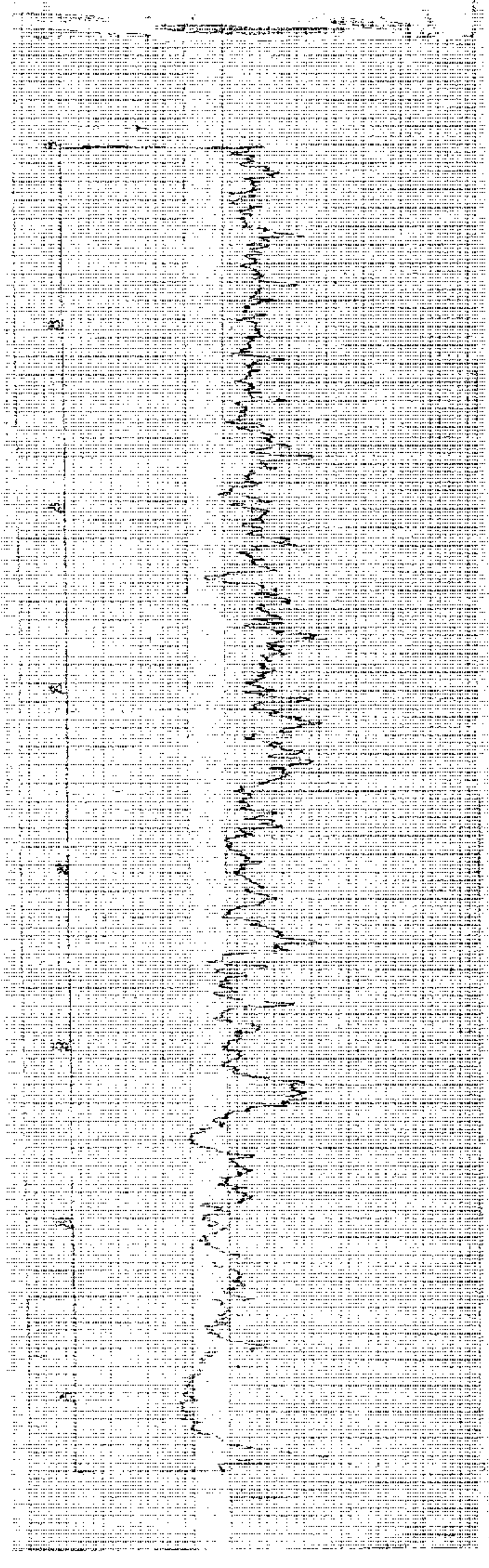
DEPARTMENT OF THE NORTHERN TERRITORY

WATER RESOURCES BRANCH

GEOPHYSICAL BORE LOG

REGIONAL GEOPHYSICAL INVESTIGATION 1975-76

BORE 26 R.N. 3602	STATUS Investigation
GRID [illegible]	ELEVATION 549.034
LOG Gamma	DRILLER NRB
[illegible]	DATE COMMENCED 26-5-82
SPEED 3m/Min	DATE COMPLETED 2-6-82
SENSITIVITY 3x4	BORE CONDITION
T.C. 2 Secs	CASING 0-164.00m S.P.
RANGE 5	DEPTH DRILLER 180.00
FIRST READING 148.00m	DEPTH LOGGER 176.00
LAST READING 0.0m	REMARKS
INTERVAL 178.00m	
INSTRUMENT [illegible]	
SERVICE WRB	
HORIZONTAL	VERTICAL 1:200



REGULATION 8:

FINAL STATEMENT OF BORE.

RN 3609

FROM	TO	DESCRIPTION OF STRATA
0	80	Top soil sandy clay & gravel and sand
80	180	Red white & brown clay
180	282	Soft brown sandstone & white clay
282	426	Yellow sandstone & white clay
426	440	Clay & quartz gravel
440	639	White & grey sandstone with white clay

Name of Bore.
BY 60247

Name of Property.
AIB QUARANTINE RESERVE

Description of Property.
QUARANTINE PADDOCK

Name of Owner.
A.I.B. N.T.A

NAME OF CONTRACTOR.
WATER RESOURCES BRANCH

Name of Driller.
L.G. HARGRAVE & G. RIDGE

LOCATION OF BORE: (or supply sketch on back hereof.)

.....Miles

Grid point 60247

N	NE	of (b) .....
S	SE	
E	NW	
W	SW	.....

(a) Circle appropriate direction
(b) Use known point such as existing bore, homestead, outstation, etc,

Date of Commencement:
17th September,1962

Date of Completion:
20th September,1962

Total Depth:
639

Particulars of Casing:
440' of 6" casing

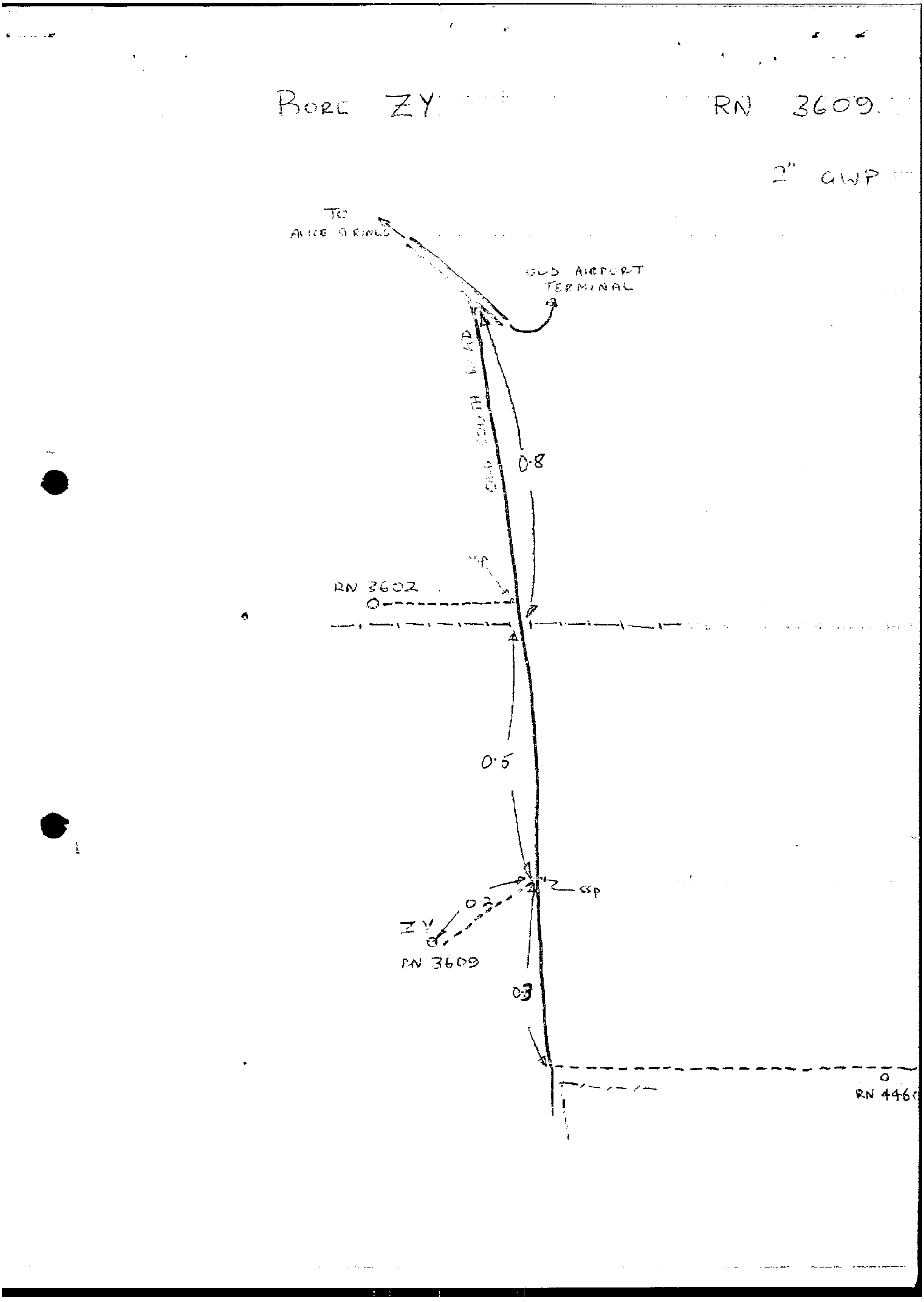
ADDITIONAL INFORMATION OF INTEREST
Cored at 638 - 639 feet
SHOAT LENGTH OF 2" PIPE ABOUT 2 FT IS WELDED INTO PLATE ON TOP OF 6" CASING AND ENCASED IN CONCRETE

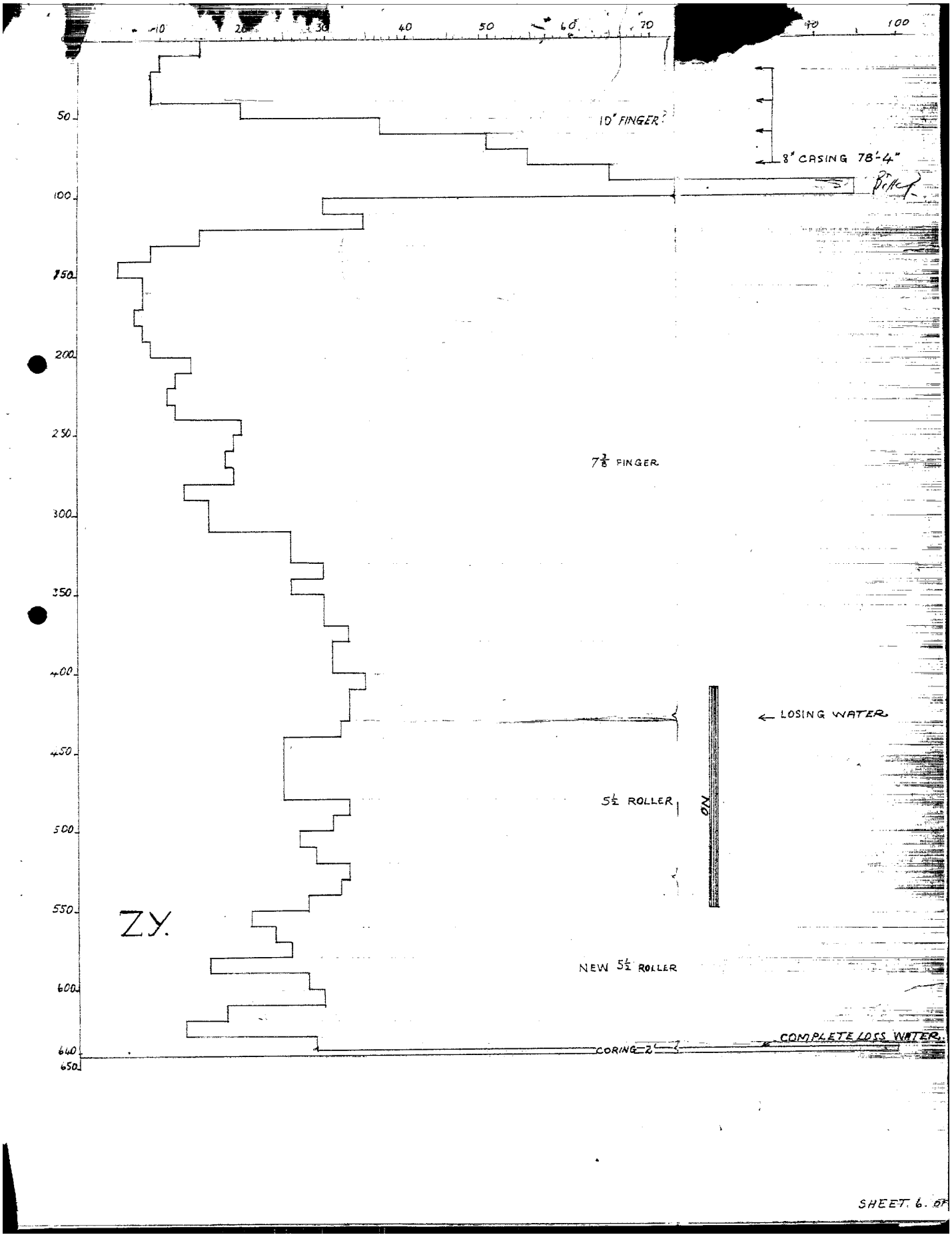
Particulars of Perforations or Screens: NIL

Samples of strata and Water supplies have been / will be left at the following Trading Place
D.M.R.
S.M. BRENNAN
(SIGNATURE)

WATER	1st Supply	2nd Supply	3rd Supply
Struck at	638		
Standing Water Level	301		
Pumping Supply, G.P.H.	—		
Duration of Pump Test	—		
Water Level during Test			
Quality- good, ~~bad~~ or bad	GOOD		

FOR OFFICE USE ONLY.


BORE ZY
RN 3609.
2" GWP
TO
ALICE SPRINGS
OLD AIRPORT
TERMINAL
OLD ALICE SPRINGS ROAD
0·8
RN 3602
0·5
CSP
ZY
0·2
RN 3609
0·3
RN 446


10
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100
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150
200
250
300
350
400
450
500
550
600
640
650
10" FINGER
8" CASING 78'-4"
7⅞ FINGER
LOSING WATER
5½ ROLLER
ON
ZY.
NEW 5½ ROLLER
COMPLETE LOSS WATER.
CORING

SHEET 6. OF

POWER AND WATER AUTHORITY

GEOPHYSICS
LOGGING DATA

RN..3609.....

LOCATION...WESTERN...AIRPORT...BOUNDRY.....

.....

LOG	DATE	INTERVAL LOGGED	CASING DETAILS AT TIME OF LOGGING
FAT GAMMA	6/2/85	130.0 - 1.0m	CASING 440' OF 6"

REMARKS e.g. Hole drilled with foam or mud ?

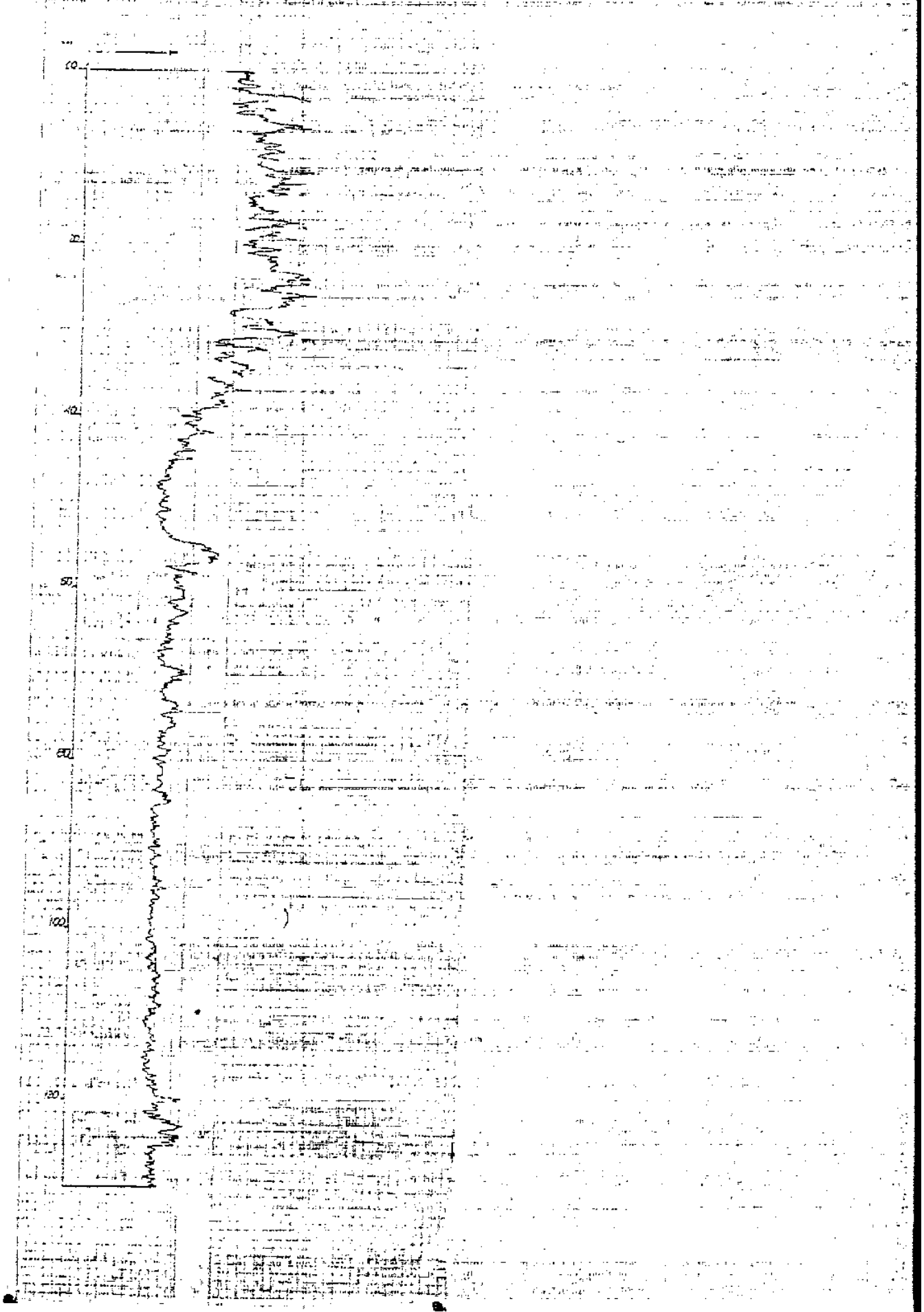
2745-A-90

WATER RESOURCES BRANCH

[illegible] GEOPHYSICAL INVESTIGATION [illegible]

BORE ZY RN 3609 STATUS Investigation
GRID CO-ORD 386 035 252 E 7365 164 318 N ELEVATION 539 749
LOG GAMMA DRILLED WRB
DATE 19-2-76 DATE COMMENCED 20/7/1962
SPEED 10m/Min DATE COMPLETED 20 9 62
SENSITIVITY [illegible] BORE CLASSIFICATION
T/C 4 Secs CASING 0-134.00 6"ø
RANGE 5 DEPTH DRILLED 1948.0
FIRST READING 130.00 DEPTH LOGGED 1300
LAST READING 00 REMARKS
INTERVAL 130.00
INSTRUMENT LMRD
SERVICE WRB

HORIZONTAL [illegible] VERTICAL 1:200



W.R.D.

10'	Red brown fine to medium and coarse grained SILTY SAND.
20'	Red brown fine to medium and coarse grained SAND.
40	Red brown GRAVEL.
50	Red brown fine grained very SILTY SAND.
60 - 70	Red brown fine to medium and coarse grained SILTY SAND.
80	Red brown fine to medium grained CLAYEY and SILTY SAND.
	UNCONFORMITY - TERTIARY TOP.
90	Pink fine to coarse grained CLAYEY SAND.
100	Mottled pink and brown fine grained SANDY CLAY.
120 - 160	Pink and brown fine grained very SANDY CLAY. and CLAYEY SAND with fine pebbles of sandstone, chert etc.
170 - 180	Brown fine with medium grains QUARTZ SAND - some clay matrix.
190	As above with some fragments of white orange and khaki fine grained CLAYEY SANDSTONE.
200 - 220	Cuttings of white orange and khaki fine grained porcellanized CLAYEY SANDSTONE.
230 - 250	Mottled pale brown and white fine grained clayey SAND.
260 - 270	As above with abundant fine pebbles and coarse grains of weathered quartz biotite schist.
280 - 302	White very fine to fine grained CLAYEY SAND and SANDY CLAY.
302 - 313	Pale brown very fine to fine grained clayey sand, with chips of white very fine grained sandy clay.

B/Z.Y.

313 - 323	Pale brown porcellanised very fine sandy clay, with coare sand size grains of quartz quartzite and ironstone.
323 - 343	Pale brown very fine to fine clayey sand.
343 - 364	Pale brown very fine to fine grained clayey sand with chips of white sandy clay.
364 - 416	Pale brown fine grained clayey sand.
416 - 427	Grey laminated claystone (positive indication of Tertiary age) with lag of fine sand, and a few coarse sand grains.
427 - 437	Sample contains grey claystone, fine pale brown sand, and abundant coarse sand grains of quartz and quartzite also one large (¼") chip from a quartzite pebble.

UNCONFORMITY - MEREENIE SANDSTONE TOP.

437 - 447	Pale grey fine grained sand, with a few small sub-rounded quartzite pebbles (?lag)
447 - 477	Pale grey fine grained sand,
477 - 487	White fine grained sand, with some white silty clay.
487 - 523	Pale creamy - grey fine grained sand.
523 - 543	Pale creamy-grey fine grained sand with some white silty clay.
543 - 590	Pale grey fine grained sand.
590 - 600	Pale grey fine grained sand with chips of dead white cl clay.
600 - 610	Medium grained pale grey sand.
610 - 620	Fine grained pale grey sand.
620 - 630	Dead white silty clay.
630 - 639	Dead white silty clay and pale grey fine grained sand. Complete loss of circulation.

T. Quinlan & D. Woolley.
RESIDENT GEOLOGIST.

VAT. SURCL.

BORE DATA SHEET

SF53-14
160033

NAME Z Y. GRID REF. 60 Z 47

LOCALITY A/S. A.I.B. QUARANTINE : PADDOCK

DEPTH 639'

CASINGS 440'/6" + SHORT LENGTH 2" P.V.C. IN R.P.

PERFORATIONS

SCREENS NIL

INDEX No. 16/336

REG. No. ... 3609

FILE No. ...

LOCATION / / E N

SURFACE LEVEL CONE COLLAR R.L. 1774·44

B M LEVEL R.L.

DATUM M.S.L. AUGUSTA.

CONTRACTOR W.R.B.

DRILLER L. HARGRAVE G. RIDGE

DATE STARTED 17-9-62

DATE FINISHED 20-9-62

WATER

AQUIFERS				
DEPTH STRUCK	638'			
AQUIFER THICKNESS..				
STANDING WATER LEVEL	274'			
PUMP TEST G.P.H.				
DRAWDOWN LEVEL..				
PUMP LEVEL				
DURATION OF TEST HOURS ...				
R.L. S.W.L.				
WATER TEMPERATURE °C				
TRANSMISSIBILITY				
STORAGE COEFF.....				
ANALYSES				
BINOMIAL CLASSIFICATION				
T.D.S.				
CONDUCTIVITY				
TOTAL HARDNESS				
CHLORIDE				
BICARBONATE				
CARBONATE				
SULPHATE.....				
NITRATE				
FLUORIDE.....				
SODIUM.....				
POTASSIUM				
CALCIUM				
MAGNESIUM				
REG. ANAL. No.....				

EQUIPMENT

REMARKS

QUALITY: GOOD

AMG - Surveyed
53 E386035 N7384144

STRATA SECTION

DEPTH FEET	CASING	AQU.	SEC.	STRATA
				TOP SOIL SANDY CLAY AND GRAVEL AND SAND
80				RED WHITE AND BROWN CLAY
180				SOFT BROWN SANDSTONE AND WHITE CLAY
282				YELLOW SANDSTONE AND WHITE CLAY
426				CLAY AND QUARTZ GRAVEL
440				WHITE AND GREY SANDSTONE WITH WHITE CLAY
639				

6M—10.61 1838

GAMMA RAY - DRILLERS LOG

DEPT. OF TRANSPORT & WORKS

R.N. 3609

AREA MEREENIE

STATUS Investigation

LOCATION

SHEET NAME ALICE SPRINGS 53-14

GRID REF. 160 033

LAT ____ LONG ____

OTHER SERVICES

ELEVATION METHOD A.H.D.

BM ____

CF ____

GL 539.749m

PERMANENT DATUM ____ ELEV ____

LOG MEASURED FROM ____ m ABOVE PERM DATUM

DRILLING MEASURED FROM ____

DATE	19·2·76
RUN NO.	
DEPTH DRILLER	194·8m
DEPTH LOGGER	130·0m
BTM LOG INTCR.	130.0m
TOP LOG INTER.	0.0m
TYPE LOG	GAMMA RAY
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	91.76m
MAX REC TEMP °C	
OPERATING RIG TIME	17·9·62 — 20·9·62
RECORDED BY	C. J. B.
WITNESSED BY	

BOREHOLE RECORD

NO	BIT	FROM	TO

CASING RECORD

SIZE	TYPE	FROM	TO
6"	Blank	0·0m	134·0m

EQUIPMENT DATA

	GAMMA RAY	DRILLERS LOG
RUN NO		
TOOL MODEL NO	LMG 15	
DIAMETER	38 mm	
DETECTOR MODEL NO		
TYPE		
LENGTH		
GENERAL		
HOIST NO		
INSTRUMENT NO.	LMR-D	
TOOL SERIAL NO		

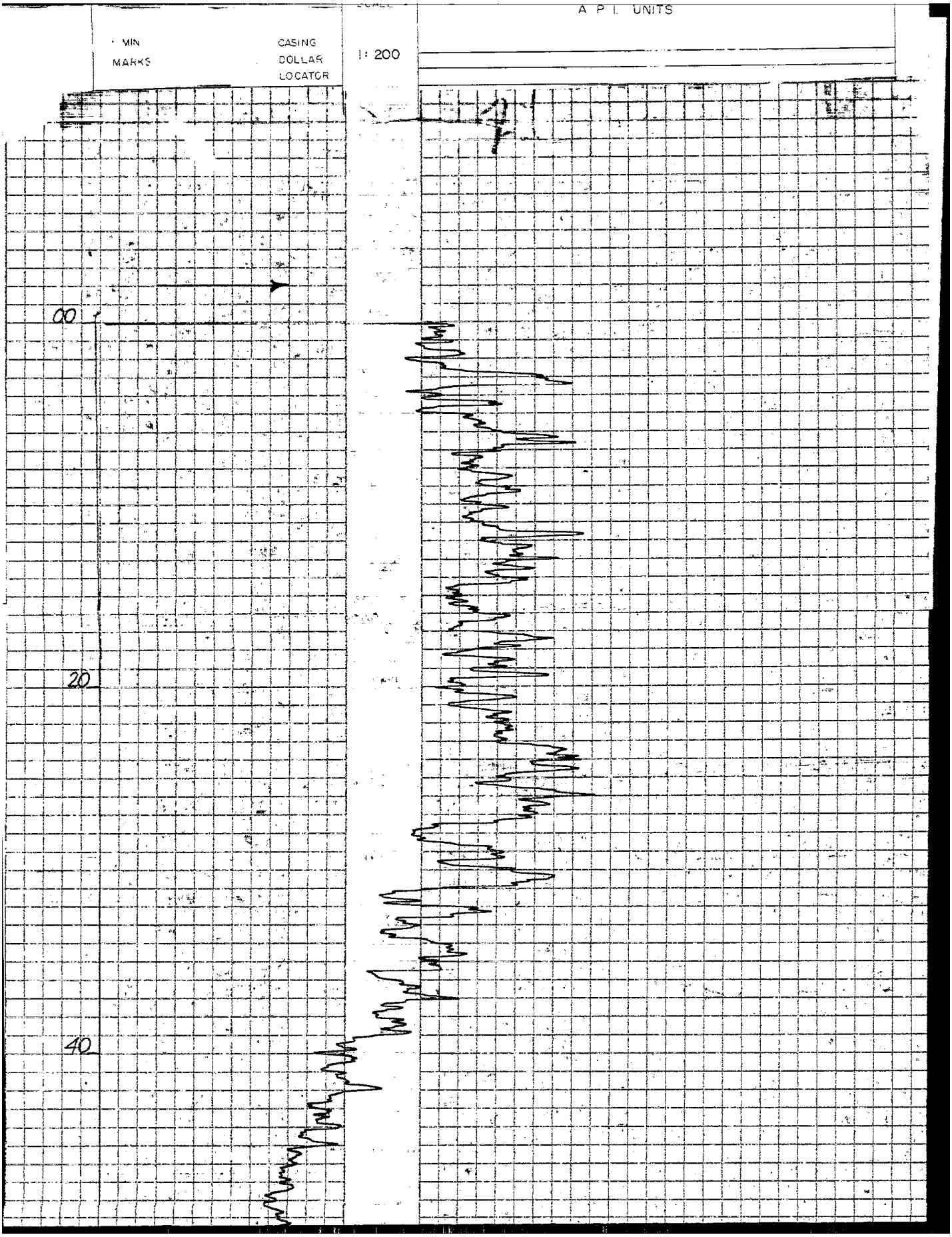
LOGGING DATA

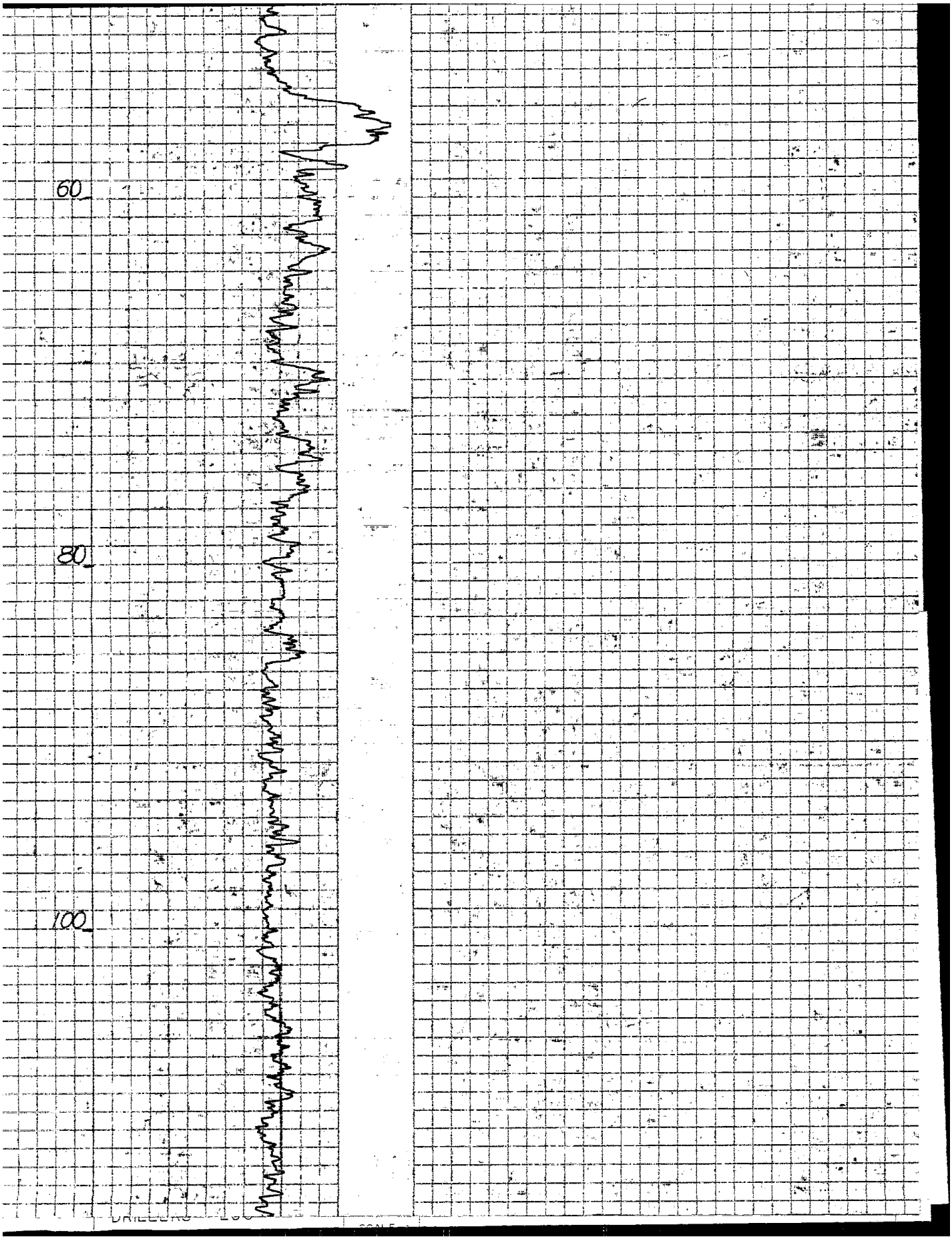
GENERAL RUN NO	DEPTHS FROM	DEPTHS TO	SPEED M/MIN	T.C SECS	GAMMA RAY SENS SETTINGS	GAMMA RAY ZERO DIV. L or R	GAMMA RAY A.P.I. G.R UNITS PER LOG DIV.	DRILLERS LOG
	130·0m	0·0m	10	4	Range 5	5 L		

REFERENCE LITERATURE

REMARKS

DRILLERS LOG | DEPTH SCALE | GAMMA RAY


A P I. UNITS
MIN
MARKS
CASING
DOLLAR
LOCATOR
1: 200
00
20
40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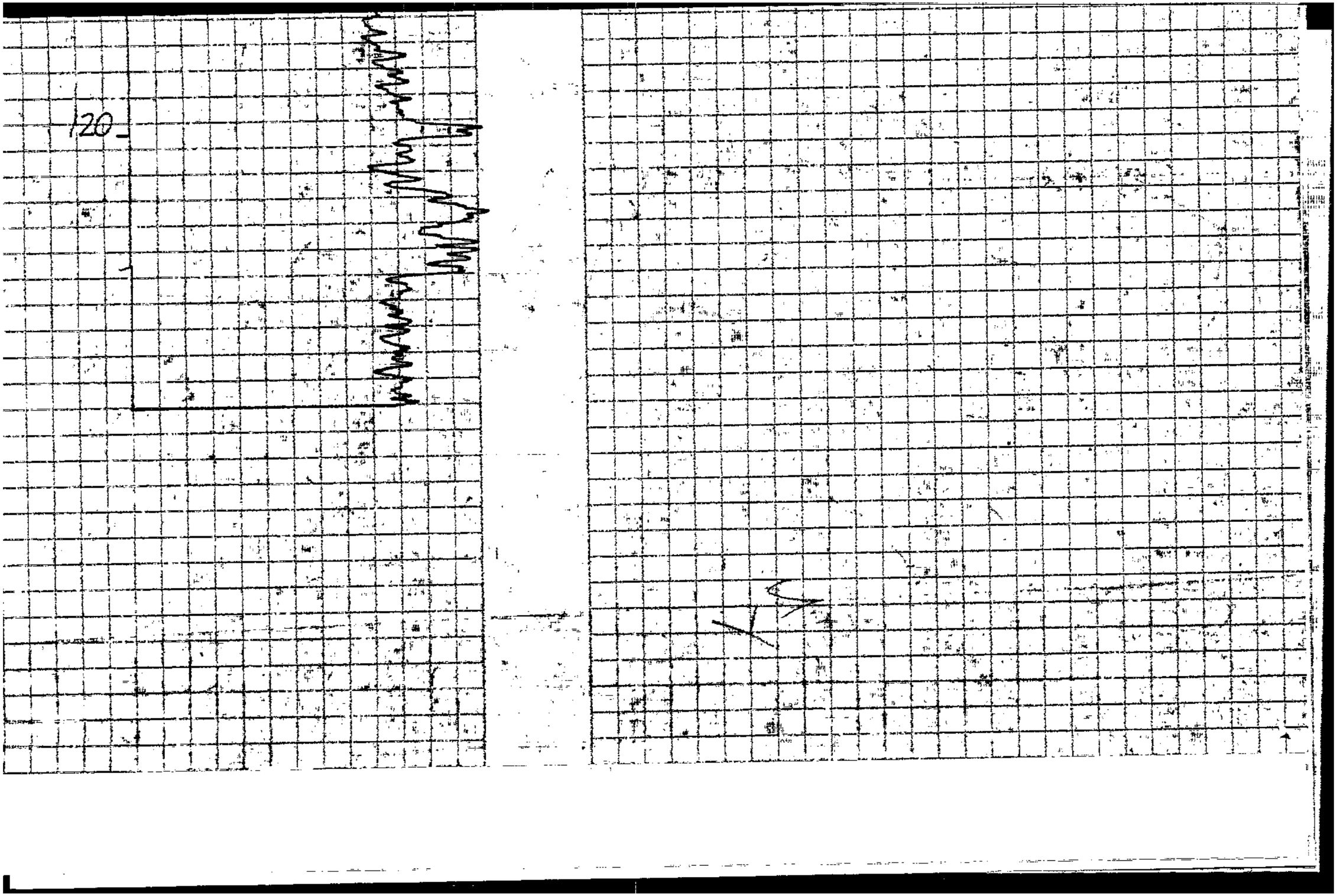
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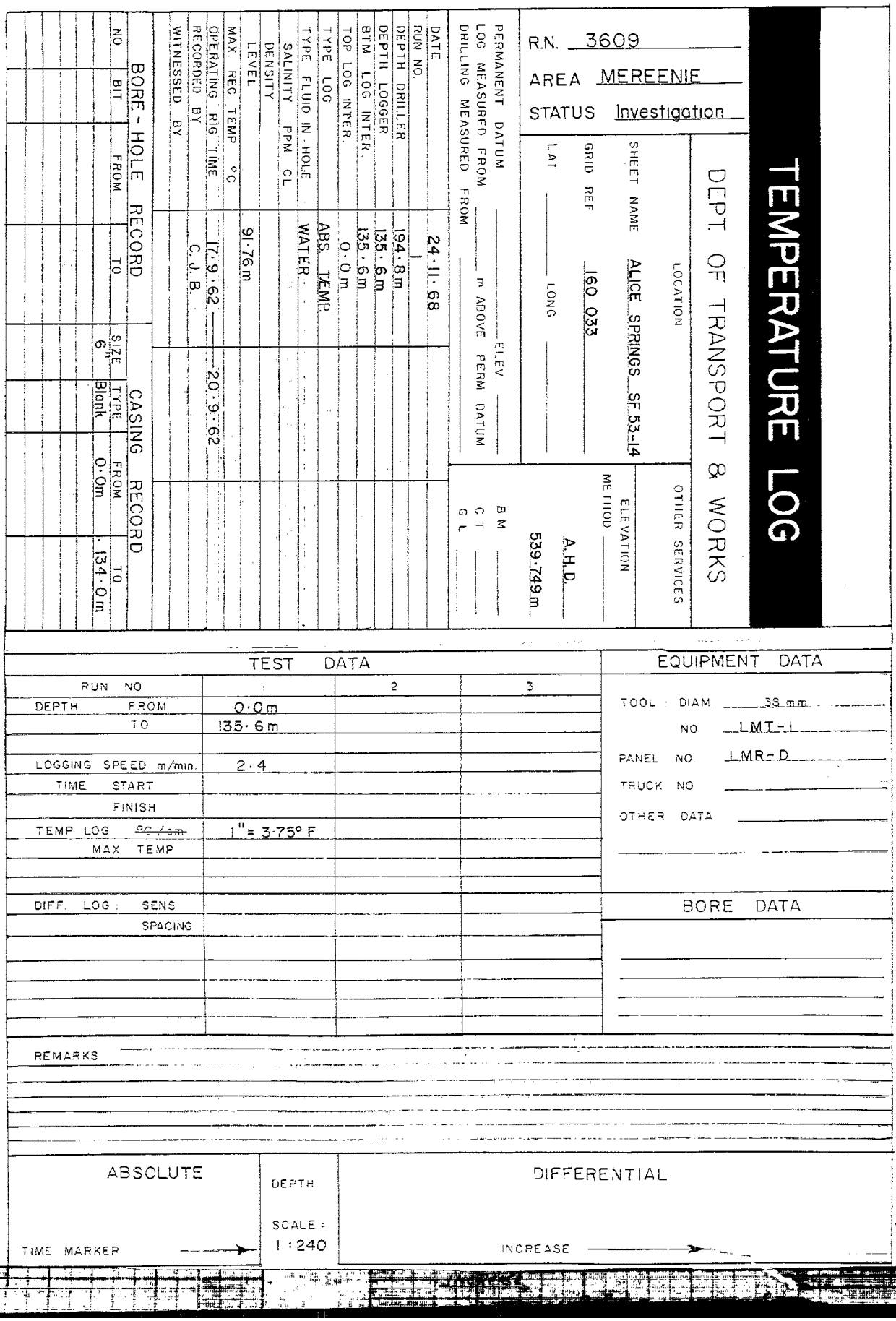


TEMPERATURE LOG

DEPT. OF TRANSPORT & WORKS

R.N. 3609

AREA MEREENIE

STATUS Investigation

LOCATION

SHEET NAME ALICE SPRINGS SF 53-14

GRID REF 160 033

LAT ____ LONG ____

OTHER SERVICES

ELEVATION METHOD A.H.D.

B M 539.749m

C T ____

G L ____

PERMANENT DATUM ____ ELEV ____

LOG MEASURED FROM ____ m ABOVE PERM DATUM

DRILLING MEASURED FROM ____

DATE	24-11-68
RUN NO.	1
DEPTH DRILLER	194.8m
DEPTH LOGGER	135.6m
BTM LOG INTER.	135.6m
TOP LOG INTER.	0.0m
TYPE LOG	ABS. TEMP.
TYPE FLUID IN HOLE	WATER
SALINITY PPM CL	
DENSITY	
LEVEL	91.76m
MAX. REC. TEMP. °C	
OPERATING RIG TIME	17.9.62
RECORDED BY	C.J.B.
WITNESSED BY	

BORE - HOLE RECORD

NO	BIT	FROM	TO

CASING RECORD

SIZE	TYPE	FROM	TO
6"	Blank	0.0m	134.0m
		20.9.62	

TEST DATA

RUN NO	1	2	3
DEPTH FROM	0.0m		
TO	135.6m		
LOGGING SPEED m/min.	2.4		
TIME START			
FINISH			
TEMP LOG ~~°C/cm~~	1" = 3.75° F		
MAX TEMP			
DIFF. LOG: SENS			
SPACING			

EQUIPMENT DATA

TOOL: DIAM. 38 mm

NO LMT-1

PANEL NO LMR-D

TRUCK NO ____

OTHER DATA ____

BORE DATA

REMARKS ____

ABSOLUTE

TIME MARKER →

DEPTH

SCALE: 1:240

DIFFERENTIAL

INCREASE →

RN003609

NORTHERN TERRITORY ADMINISTRATION.
CONTROL OF WATERS ORDINANCE 1938-1959.
WATER RESOURCES BRANCH.

REGULATION 8: FINAL STATEMENT OF BORE. 3609 16/336

FROM	TO	DESCRIPTION OF STRATA
0	80	Top soil, sandy clay & gravel & sand
80	180	Red White & Brown clay.
180	282	Soft Brown Sandstone & white clay
282	426	Yellow Sandstone & white clay
426	440	Clay & quartz Gravel.
440	639	White & grey sandstone with white clay.

Name of Bore. ZY 60247

Name of Property. A1B Quarantine Reserve

Description of Property. Quarantine Paddock

Name of Owner. A1B N.T.A

NAME OF CONTRACTOR. Water Resources Branch

Name of Driller. L.G. HARGRAVE G. RIDGE

Date of Commencement: 17-9-63

Date of Completion: 20-9-63

Total Depth: 639

Particulars of Casing: 440 ft of 6" casing

Particulars of Perforations on Screens: NIL

LOCATION OF BORE: (or supply sketch on back hereof.)

.....Miles GRID point 60247

N	NE	of (b)
S	SE	.....
E	NW	
W	SW	.....

(a) Circle appropriate direction
(b) Use known point such as existing Bore, homestead, outstation, etc,

ADDITIONAL INFORMATION OF INTEREST
CORED AT 638-639 ft.

WATER	1st Supply	2nd Supply	3rd Supply
Struck at	638.		
Standing Water Level	301		
Pumping Supply, G.P.H.	—		
Duration of Pump Test	—		
Water Level during Test	—		
Quality- good, fair or bad	Good		

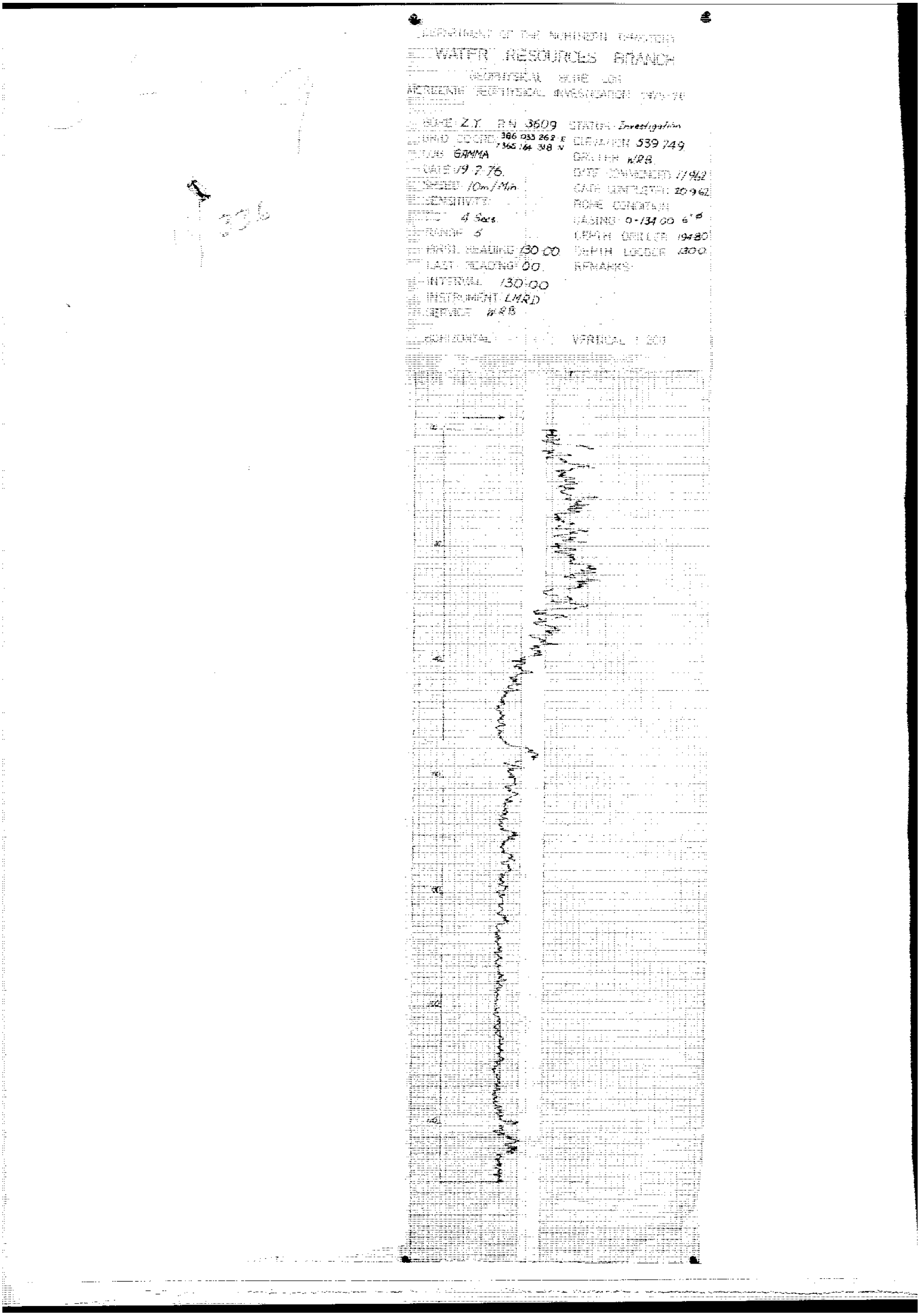
Samples of strata and Water supplies have been / will be left at the following Trading Place

B.M.R.

.....
(SIGNATURE)

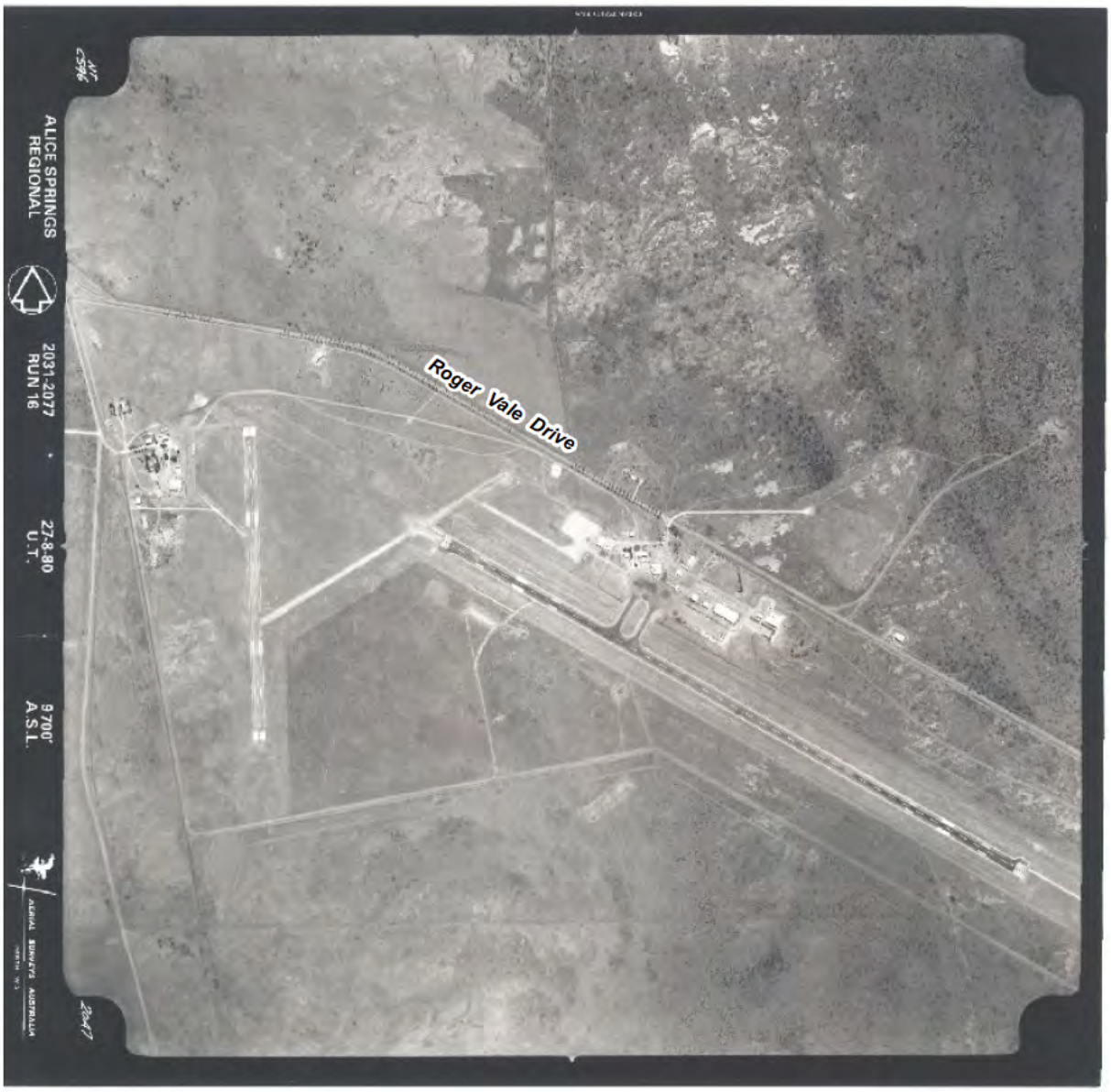
FOR OFFICE USE ONLY.

R.D 37


WATER RESOURCES BRANCH
BORE: Z.Y. RN 3609
STATION: Investigation
GRID REGION: 366 033 262 E 7365 164 38 N
CLIENT NO: 539 749
GAMMA
DATE: 19.7.76.
DATE COMPLETED: 17.9.62
SPEED: 10m/Min.
CASE LENGTH: 20.9.62
SENSITIVITY:
4 Secs.
TOUCH: 5'
CASING: 0-134.00 6"ø
APRIL READING: 130.00
DEPTH DRILLED: 19.8.80
LAST READING: 00.
DEPTH LOGGED: 130.00
INTERVAL: 130.00
REMARKS:
INSTRUMENT: LMRD
OPERATOR: WRB
HORIZONTAL
VERTICAL 1:200

Appendix E – Historical aerial photographs

Document Identification	Run: 16 Film: NTC596 Frame: 2047 Scale: 1 : 20,000 (Black & White)
Photograph Date	Date: 27 August 1980



Document Identification	**Run: 1 Film: NTc1553 Frames: 88 & 89 Scale: 1 : 5,000 (Black and White)**
Photograph Date	**Date: 19 March 1991**

Document Identification	Google Earth (Colour)
Photograph Date	Date: September 2004

Document Identification	Google Earth (Colour)
Photograph Date	Date: February 2016

Appendix F – Interview transcripts

	ALICE SPRINGS	
	[redacted] – Airservices	20/7/2016 - Responses
1	What is the age of the current fire station and fire training ground? What was the previous use of these sites?	MFS approximately 1964. FTG – likely to be late 1990s. FTG has either been vacant land or used as a drill ground.
2	Are you aware of any PFAS investigations and testing that have been undertaken across the wider Airport (i.e. outside of ARFF sites)?	Annual soil sampling around drill ground.
3	Is there an incident log that details where actual fires and fuel spills have been attended that required the use of firefighting foams?	Major incident in 1977 when a disgruntled employee flew a light aircraft into the SkyPort building. Foam was not likely to be used. If it was, it was likely to be a protein foam. *Refer to ORS reports for any other incidents.*
4	If there is not an inventory, can you recall any fires or fuel spills at the Airport? Dates?	No *Note: The ORS reports indicate there was a plane crash 1.5 km north east of airfield in 2000 where 50L of AFFF was used*
5	Is there an inventory of AFFF storage within the Airport?	Not to their knowledge. Ansulite was stored briefly on site after the transition to Solberg in 2010 until it was sent to Darwin in 2011 for disposal.
6	Are you aware of any AFFF use outside of the Airport but within the general vicinity?	No
7	Is there any AFFF still stored within the Airport? If so, where and for what purpose?	Not for use – former bulk storage in the fire station foot print. A bunded area at the fire training ground contained a 1000L totes with "Ansulite" written on the side and larger tanks, likely containing PFAS-impacted wastewater.

	ALICE SPRINGS	
	[redacted] – Airservices	20/7/2016 - Responses
		These are waiting disposal. The bund also has a sign saying "waste water contaminated with AFFF".
8	Has training involving AFFF (e.g. extinguishers, Airport Emergency Planning (AEP) exercises) been undertaken in areas outside of the current fire station and/or training ground? If so, where?	No - Fire training occurred at the FTG and smoke hut. Water was used in the smoke hut rather than foam as the fires were 'carbon' based i.e. wood fires. Foam was used at the FTG.
9	When AFFF was used in training, how often and for how long did this occur?	Approximately once per month. It was deployed using hoses, roof monitor and an underbody system.
10	When AFFF was used in training, what volumes were used and what was the methodology for wash down of waste and equipment?	Could not indicate volumes. Water from the FTG entered a separator and waste water was discharged to a drain. Wash down bay at the fire station. Waste water also entered a separator and waste water was discharged to a drain that joined up with a larger drain running the length of the runway. Drains are not lined.
11	How widely was the AFFF dispersed aerially? Photos?	Unknown. No photos.
12	Was wash down of fire fighting equipment restricted to the fire training areas?	Yes.

	ALICE SPRINGS	
	[redacted] – Airservices	20/7/2016 - Responses
13	Where did the wash down water end up? Do any drains discharge off-site and, if so, where?	As above – via separators to drains. Drains do not appear to discharge off-site but rather water seeps into the underlying soil.
14	Has there been any significant bulk earth works (relevant to AFFF use) on the site that resulted in soil being relocated from one area of the airport to another?	Some stockpiles developed to the north of the runway between the terminal building and the FTG. These are likely to have come from runway extension works.
16	How were spent drums or excess product disposed of?	Unknown. Some was apparently taken off-site for disposal at Melbourne Airport.
17	Does groundwater 'daylight' in areas of the site?	No
18	What was the location of ARFF sites?	Fire training ground and Fire station.
19	Is stormwater harvested within the Airport and if so, for what purposes and where?	No
20	Is groundwater abstracted within the Airport and if so, for what purposes and where?	No

	ALICE SPRINGS - Questions	
	[redacted], – NT Airports [redacted] – Airport Environment Officer	21/7/2016
1	What is the age of the current fire station and fire training ground? What was the previous use of these sites?	Current Terminal building is approximately 25 years old. The original airport was situated a t 7 Mile. The current location was commissioned in 1964.
2	Are you aware of any PFAS investigations and testing that have been undertaken across the wider Airport (i.e. outside of ARFF sites)?	Investigations by Low Ecological for soil and groundwater.
3	Is there an incident log that details where actual fires and fuel spills have been attended that required the use of firefighting foams?	See 1974 incident. Light plane crash around early 2000's. Plane was stolen. Foam may not have been used and it was not clear if this occurred on the airport or off-site.
4	If there is not an inventory, can you recall any fires or fuel spills at the Airport? Dates?	No
5	Is there an inventory of AFFF storage within the Airport?	Not controlled by the airport
6	Are you aware of any AFFF use outside of the Airport but within the general vicinity?	No. there is no other training on site by other entities.
7	Is there any AFFF still stored within the Airport? If so, where and for what purpose?	No. Foam is not used in airport hangars.
8	Has training involving AFFF (e.g. extinguishers, Airport Emergency Planning (AEP) exercises) been undertaken in areas outside of the current fire station and/or training ground? If so, where?	Controlled by Airservices

	ALICE SPRINGS - Questions	
	[redacted], – NT Airports [redacted] – Airport Environment Officer	21/7/2016
9	When AFFF was used in training, how often and for how long did this occur?	Controlled by Airservices
10	When AFFF was used in training, what volumes were used and what was the methodology for wash down of waste and equipment?	Controlled by Airservices
11	How widely was the AFFF dispersed aerially? Photos?	Controlled by Airservices
12	Was wash down of fire fighting equipment restricted to the fire training areas?	Controlled by Airservices
13	Where did the wash down water end up? Do any drains discharge off-site and, if so, where?	Controlled by Airservices
14	Has there been any significant bulk earth works (relevant to AFFF use) on the site that resulted in soil being relocated from one area of the airport to another?	Stockpiles to east of terminal building likely from runways. Placed in approximately 2009.

	ALICE SPRINGS - Questions	
	[redacted], – NT Airports [redacted] – Airport Environment Officer	21/7/2016
16	How were spent drums or excess product disposed of?	Controlled by Airservices. No landfills on site.
17	Does groundwater 'daylight' in areas of the site?	No
18	What was the location of ARFF sites?	NA
19	Is stormwater harvested within the Airport and if so, for what purposes and where?	No. Natural drainage across the site is generally towards the south-east. Stormwater drains on site are not lined. No sewage treatment on site.
20	Is groundwater abstracted within the Airport and if so, for what purposes and where?	No

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
DRAFT						
DRAFT B						11/10/16
DRAFT C						28/03/17
DRAFT D						04/04/17
DRAFT E						02/08/17
DRAFT F						04/08/17
0	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	16/10/17

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