





















































































**BROWN, ERDMAN & ASSOCIATES LTD.**

1409 BEWICKE AVENUE, NORTH VANCOUVER, BRITISH COLUMBIA V7M 3C7  
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Atten: ~~DS~~  
LHDm  
Return to: AWR

80-190

1982 04 26

Westmin Resources Ltd.  
Bentall Centre  
P.O. Box 49066  
904 -1055 Dunsmuir Street  
Vancouver, B.C.  
V7X 1C4

ATTENTION: Mr. A. W. Randall, P. Eng.

SUBJECT: R-190 Report  
"R-190 Aquifer Test Analysis and Preliminary  
Dewatering Design"

Dear Sirs:

As mentioned during our recent conversations in Pine Point, some correction is required in Table 3 of the subject report. Because the original article by Streltsova had erroneous type curve data, the coordinates and labelling of one of the type curves used for the R-190 report were incorrect.

I attach a copy of the corrected Table 3. Only the storativity values are affected and are all reduced by a factor of 10. The resulting mean value, however, is still in the order of  $10^{-2}$  and, because we used  $3 \times 10^{-2}$  for our cost calculations, I feel the dewatering costs outlined in our report were valid for February, 1981.

If you have any questions concerning this correction, please do not hesitate to call.

Yours truly,

BROWN, ERDMAN & ASSOCIATES LTD.

R. I. J. Vogwill

RIJV/dh

Attachment



**TABLE 3**  
**WESTERN MINES LTD.**  
**R-190 AQUIFER TEST**

Aquifer coefficients as calculated using  
Fracture Flow Drawdown Type Curves (n = 40)

<u>Well</u>	<u>igpd/ft</u>	<u>Transmissivity</u> <u>m<sup>2</sup>/day</u>	<u>Storativity</u>
Pumping	95,980	1430	-
412	205,145	3060	0.082
416	199,065	2970	0.003
418	191,955	2860	0.12
422	206,720	3080	0.006
424	Data not used	-	-
426	214,990	3205	0.005
468	237,820	3545	0.003
620	177,970	2655	0.002
621	176,800	2635	0.001
X-25	187,930	2800	3 x 10 <sup>-5</sup>
Mean			
Value	199,800	2980	0.02
Standard			
Deviation	<u>+19,200</u>	<u>+290</u>	0.04

igpd/ft - Imperial gallons per day per foot

## Questions for Noguib

① With elongated drawdown situation established for this imply a uniform recharge from all directions

② Well design (a) Drill 24" dia hole to

700 feet  $\frac{1}{3}$  clean out then run in

16" casing slotted on well logs bond thru

of sufficient # casing slot to impid

water flow into casing but to still maintain

casing strength. -

or (b) 2 <sup>24"</sup> large wells at shaft site cased to full

depth based as above, but, more

permeated shells somewhat further out so they

need not be cased to bottom of hole.

**BROWN, ERDMAN & ASSOCIATES LTD.**  
1409 BEWICKE AVENUE, NORTH VANCOUVER, BRITISH COLUMBIA V7M 3C7  
TELEPHONE 986-1557.

**WESTERN MINES LTD.**  
**GREAT SLAVE REEF PROJECT**

**R-190 ZONE**  
**AQUIFER TEST ANALYSIS AND**  
**PRELIMINARY DEWATERING DESIGN**

**R. I. J. VOGWILL, P.GEOL. (ALTA.)**

**FEBRUARY 1981**

**80-190**

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  - 6.2 Projected Dewatering Costs
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## R E F E R E N C E S

Cooper, H.H. and Jacob, C.E., 1946, A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well-field History, Trans. Amer. Geophys. Union, V. 27, No. 4.

Streltsova, T.D., 1976, Hydrodynamics of Groundwater Flow in a Fractured Formation, Water Resources Research, Vol. 12, No. 3.

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1.0 ABSTRACT

A 23 day aquifer test completed in the R-190 zone of Western Mines Ltd. Great Slave Reef Project, has indicated that the main bedrock aquifer in the area, the Presqu'ile zone, has a transmissivity of 200,000 igpd/foot and a storativity of  $3 \times 10^{-2}$ .

A dewatering analysis, using these aquifer coefficients and a set of assumptions outlined in Section 6.1, indicates that a total pumping rate of between 50,000 igpm and 86,000 igpm will be required to dewater the R-190 zone to 600 feet below ground surface.

Total dewatering costs, which depend on the type of electrical power utilized, are outlined in Section 6.2

$$T = KD = 200000 \text{ igpd/ft.}$$

where  $D = 200 \text{ ft.}$ ,  $K = 1000 \text{ Igpd.} = 1.44 \text{ Igpm, or}$   
 $K = 1.44 \times 7.576 \times 10^{-5} \text{ per day}$   
 $K = 1.09 \times 10^{-4} \text{ m}^3/\text{s}$

## 2.0 INTRODUCTION

Western Mines Ltd. holds a large tract of mineral claims between the Hay River and the Buffalo River in the Northwest Territories, (Figure 1). These claims parallel Highway Number 5 and are on geological strike with the Pine Point lead-zinc ore deposits. Western Mines Ltd. have delineated a number of mineralized zones, most notably R-190 and X-25, on the eastern end of these claims and are presently assessing the economics of mining these mineralized zones by underground methods (Figure 2).

Because these mineralized zones occur well below the water table and because of the large permeability of certain zones in the Devonian bedrock, all proposed mining methods would require extensive dewatering operations to ensure safe and dry mining conditions. Accordingly, aquifer tests had been completed in the X-25 and R-190 zones as part of an overall economic assessment. Because the first aquifer test in the R-190 zone was not satisfactorily completed, Western Mines Ltd. retained Brown, Erdman & Associates Ltd. to comment on the validity of this test and eventually to complete a second aquifer test in the R-190 zone in order to properly evaluate potential dewatering costs. This aquifer test consisted of pumping a 14-inch diameter well, located near the R-190 zone, at a constant flowrate of 2345 igpm (imperial gallons per minute) and measuring

## 2.0 INTRODUCTION continued ...

the hydraulic response of this pumping in ten observation wells which included a well located in the X-25 zone 13,000 feet to the east. Water levels were monitored with electric water level indicators or continuous water level recorders. All observation wells, with the exception of the X-25 well, were exploratory diamond drill holes in which inflatable packers had been installed.

This report describes the results of this aquifer test and the subsequent dewatering analysis and projected costs.

### 2.1 Acknowledgements

Much of the data compilation and data gathering during the R-190 aquifer test was completed by A.W. Randall, P.Eng. and M. Randall both of Western Mines Ltd. Their contribution to a successful aquifer test is thus gratefully acknowledged.

### 3.0 GENERAL GEOLOGY

The R-190 zone is contained within a series of limestone and dolomites associated with a Devonian reef complex which sub-crops in the Pine Point area to the east and continues to the west at greater depth. Thus the Presqu'ile dolomite, an important mineralized horizon and aquifer zone occurs near surface at Pine Point, at 400 to 600 feet on the eastern limit of Western Mines Ltd. claims, and at about 2000 feet below surface southwest of the town of Hay River. Table 1 shows the generalized stratigraphy of the R-190 area and Figure 3 illustrates typical geological cross sections through the area around the R-190 zone.

The R-190 area is mantled with a 100 foot thick layer of clayey glacial till which forms an effective confining layer. This till contains local, discontinuous sand and gravel beds and has a shallow water table established in it. Beneath this overburden layer the 60 foot layer of Hay River shale forms an additional effective confining layer. The Slave Point Formation is predominantly limestone which is locally altered to finely crystalline dolomite and averages 200 feet in thickness in the R-190 area. The Watt Mountain Formation consists of micritic limestone with green waxy shale and is generally 25 feet thick. The basal units, to the depth of interest, are

### 3.0 GENERAL GEOLOGY continued ...

the Presqu'ile zone and B-Facies rocks of the Pine Point Formation. The Presqu'ile zone, consisting of coarsely crystalline, vuggy and fractured dolomite, is approximately 200 feet thick and is underlain by B-Facies rocks consisting of brown sucrosic, vuggy dolomite.

The main geological structures, other than a gentle westerly to south westerly dip, are the folding and fracturing that has occurred. Folding is generally related to differential compaction of sediments over a more rigid basement or reef structure. Fracturing is related both to this folding and tectonics within the basement rocks. Of particular note are east - north easterly trending faults in the basement rocks which may, during movement, have determined the rate and the direction of reef development. As a result of these features a number of "hinge" zones were developed along which draping and fracturing of sediments occurred (Figure 2). On a local scale then the fracture pattern in rocks of the area is isotropic but on a more regional scale fracturing has a preferred orientation in an east - northeast and west - southwest direction. Any preferred direction of fracturing can have an important bearing on groundwater movement and dewatering considerations and it should be noted (Figure 2) that the "Main Hinge Zone" occurs immediately north of the R-190 mineralized zone.

#### 4.0 GENERAL HYDROGEOLOGY

Because of open pit dewatering operations at Pine Point Mines Ltd. during the last 16 years the hydrogeology of the Pine Point district is reasonably well understood. Groundwater occurs both as a shallow phreatic water table associated with the overburden and also under confined pressure conditions in the bedrock. Regional groundwater movement in the bedrock is towards the northeast (Figure 4) and may be locally modified by changes in geological features. Groundwater flow systems developed in the bedrock are a result of large scale topographic features occurring to the south and west. The movement of shallow groundwater associated with the overburden is more dependent on very small local topographic relief but probably also has an overall direction of movement to the northeast. Vertical hydraulic gradients indicate that groundwater movement is downward from the overburden into the bedrock.

The main aquifers in the area occur in the bedrock and are present, with the exception of the Presqu'ile zone, entirely because of fracture permeability. The Presqu'ile zone, the most significant aquifer in the area, is thought to have both vuggy and fracture components in its permeability. Bedrock aquifers are under confined conditions and groundwater occurring in them are therefore under a pressure head. The main confining

#### 4.0 GENERAL HYDROGEOLOGY continued ...

layers (Figure 3 and Table 1) are thought to be the clayey overburden and shaley bedrock units. The depth below ground to the potentiometric (pressure) surface of the bedrock aquifers is dependent on the elevation of the land surface in relation to the pressure head of these aquifers. Thus, as the elevation of the land surface drops towards Lesser Slave Lake flowing artesian conditions and springs are common.

Both the present aquifer test and recent aquifer tests at Pine Point Mines Ltd. has shown that the permeability (hydraulic conductivity) of the bedrock can be anisotropic. This is especially true near "hinge" zones and means that there is a preferred direction of groundwater movement along these features as compared to across them. This fact has only become apparent as mining has progressed into these "hinge" zones because permeability distribution south of these features is isotropic. The recognition of permeability anisotropy should allow a more efficient placement of dewatering wells.

In the R-190 zone the main aquifer is, as expected, the Presqu'ile zone which occurs approximately between 400 feet and 600 feet below ground surface.

#### 4.0 GENERAL HYDROGEOLOGY continued ...

From previous work, it is known that the Slave Point Formation is an aquifer but not of the same order of magnitude as the Presqu'ile. In fact 97% of the groundwater pumped from the R-190 water well is derived from the Presqu'ile. The potentiometric level of the bedrock aquifers is approximately 90 feet below ground surface and because the Presqu'ile zone contains the majority of the lead-zinc mineralization approximately 500 feet of dewatering will be required to safely mine the mineralization using underground methods. Although the overburden contains a much shallower water table (approximately 40 feet below ground surface) the permeability of the glacial till is so small that groundwater within the overburden is not significant in assessing dewatering requirements.

Pre-aquifer test water level measurements (Figures 3 and 4) indicate that groundwater movement, in the bedrock aquifers, was towards the northeast at an average gradient of one foot in 2200 feet. Although the contours shown in Figure 4 can only be considered approximate the change in orientation of contours to the north may indicate the influence of the Main Hinge Zone acting as a collector because of higher permeability.

## 5.0 AQUIFER TESTING

### 5.1 Test Details

The R-190 aquifer test was completed from November 1 to November 24, 1980. Thus, the pumping well (Figures 3, 4 and 5) operated for 33,262 minutes at a constant flow-rate of 2345 igpm. Discharge water was carried away from the test site by a large ditch. During the aquifer test, ten observation wells and the pumping well were monitored on a regular basis using either electric water level indicators or continuous water level recorders. The raw drawdown data are shown in Appendix 2. Of the ten observation wells (Table 2) nine were exploration diamond drill holes, either in or close to the R-190 zone, which had been fitted with inflatable rubber packers in order to separate the potentiometric surface of the bedrock and the water table in the overburden. Observation wells fitted with packers had two measuring tubes, one below and one above the packer (labelled 1 and 2 respectively) in order to measure these levels. The tenth observation well was an existing water well in the X-25 zone (Figure 2) approximately 13,000 feet to the east of R-190. Initially, static water level measurements were taken in both the overburden and in

## 5.1 Test Details continued ...

bedrock. During the test periodical measurements were taken in the overburden both to check the seal of the packers and also to qualitatively determine vertical leakage from the overburden into the bedrock. In addition, an overburden observation well, not mentioned above, was periodically monitored. All overburden water level measurements are shown on the right hand side of the data sheets contained in Appendix 2.

Because of winter conditions, recharge from precipitation did not have to be considered during the aquifer test. It became apparent during the test, however, that atmospheric pressure fluctuations were affecting water levels (Figure 5). Accordingly, barometric pressure readings were obtained from the meteorology office at the Hay River Airport. When these atmospheric pressure fluctuations were plotted on the same time scale as drawdown readings it further became apparent that the drawdown fluctuations caused by changes in atmospheric pressure were large because of the high (80%) barometric efficiency of the bedrock aquifers. In order to remove these barometric effects and smooth the drawdown trends, drawdown readings had to be corrected for changes in atmospheric pressure.

5.1 Test Details continued ...

Figure 5 shows a typical drawdown curve, corrected drawdown curve, and barometric pressure fluctuation during the aquifer test. It can be seen in Figure 5 that even after the barometric corrections, the drawdown data still show a fairly regular fluctuation. This effect is attributed to earth tides and it is not considered necessary to correct the drawdown data for this effect in order to allow proper analysis.

Two groundwater samples, taken during and at the end of the aquifer test, were analyzed for a complete suite of chemical constituents. Results are shown in Appendix 3.

Piezometer 424 was the only observation point in which a satisfactory static water level could not be obtained. Large fluctuations of the water level in this piezometer were caused by gas migrating up the hole and subsequent analysis of the drawdown data for this hole could only be used to calculate transmissivity.

## 5.2 Analysis and Results

Prior to the start of the aquifer test water level measurements indicated that the packers were properly sealed because water levels in the bedrock and overburden were markedly different. Water levels in the bedrock were generally 85 to 100 feet below ground surface while those in the overburden were 25 to 80 feet below ground surface (Appendix 2), indicating downward potential of groundwater movement from the overburden into the bedrock. Periodic measurements of the overburden piezometers during the test indicated that no leakage from the overburden was occurring.

After the test began it became obvious that a highly elongate, very flat drawdown cone was developing in response to pumping (Figures 3 and 6). This drawdown cone migrated very quickly in an east-west direction and the X-25 well responded to pumping approximately 3 1/2 to 4 hours after pumping began. In addition, at the end of the test the amount of drawdown at X-25 was only 0.2 feet less than that at piezometer 621. This elongate drawdown cone is attributed to the presence of the "Main Hinge Zone" (Figure 6) close to R-190 zone and more specifically to a higher permeability

## 5.2 Analysis and Results continued ...

along this feature than across it. The drawdown cone indicates a preferred direction of groundwater movement of east-west and shows that an excellent hydraulic connection exists between R-190 and X-25. Because of the high transmissivity of the bedrock aquifers the drawdown cone was very flat and extended large distances (miles) from the pumping well (Figure 2).

Time-drawdown data (Appendix 1) for the aquifer test have been plotted on semi-log and log-log graphs in order to allow analysis for the aquifer parameters of transmissivity and storativity. Semi-log plots have been analyzed by the straight line method of Cooper and Jacob (1946) while log-log plots have been analyzed by the type curve method for fractured rocks as outlined by Streltsova (1976). All plots have a form that is suggestive of negative hydraulic boundaries. This is especially obvious in the semi-log plots where the drawdown trend steepens with increasing time suggesting the occurrence of multiple negative boundaries. If such boundaries exist they could be attributed to changes in fracture magnitude or to areas of bedrock with differing permeability. Log-log plots, however, are typical of what Streltsova describes as a double-porosity medium in which fracture and block (in this case vugs) hydraulic

## 5.2 Analysis and Results continued ...

properties are of the same order of magnitude but the permeability is still mainly due to the presence of fracturing. In such a medium the time-drawdown response is composed of two components; immediate response of the main water-transmitting medium (fractures) and a later induced response of the lesser pervious material (vugs). Thus the drawdown response forms an S-shaped curve. In the case of the R-190 test the early portion of the curve is missing due to a lack of early drawdown measurements. The main point of the above discussion is to indicate that two approaches to the data analysis have been taken. The semi-log plots have been analyzed using the early and late portions of the drawdown data while the log-log plots have been analyzed using fracture flow type curves. For all practical purposes the analyses of late semi-log data and fissure flow type curve data give equivalent results.

Tables 2 and 3 summarize the aquifer coefficients obtained by the two methods of analysis and Appendix 1 shows the pertinent calculations. Examination of the early data analysis on the semi-log plots reveals that the initial aquifer response to pumping gives a very high transmissivity (caused by fractures alone) which ultimately is

## 5.2 Analysis and Results continued ...

reduced by two to three times in the later data as the transmitting characteristics of the vuggy portion of the Presqu'ile predominate. This type of response could also be attributed to negative hydraulic boundaries but the physical setting of the R-190 zone complicates this interpretation. For the straight line method, aquifer transmissivity ranges from 140,000 to 170,000 igpd/foot and storativity from  $4 \times 10^{-4}$  to 0.1 (Table 4) with mean values of 157,000 igpd/foot and 0.06 respectively. Type curve analysis indicates that aquifer transmissivity ranges from 175,000 to 240,000 igpd/foot and storativity from  $3 \times 10^{-4}$  to 0.06 with mean values of 199,800 igpd/foot and 0.03 respectively (Table 3). The data from two piezometers, 412 and 418, gave meaningless results for storativity, probably because of their proximity to the pumping well, which were not used in the calculation of mean values.

Two other methods, distance-drawdown and specific capacity relationships, can be used to obtain aquifer coefficients. The specific capacity of the pumping well, at the end of the test, was 130 igpm/foot. Because there is an approximate ratio of 1 to 2000 between specific capacity and transmissivity, an estimate of the aquifer transmissivity for R-190 is 250,000 igpd/foot

5.2 Analysis and Results continued ...

using this method. A distance-drawdown plot for the R-190 test was constructed but proved meaningless because of the highly distorted cone of depression.

In summary, if more weighting is given to results using the type curve method and a reasonable safety factor is introduced, it is felt that the most realistic aquifer coefficients for the R-190 bedrock aquifers (Presqu'ile with minor contribution from Slave Point) are a transmissivity of 200,000 igpd/foot and a storativity of  $3 \times 10^{-2}$ . These values are therefore used for subsequent dewatering calculations.

An important unknown in assessing the hydraulics of the dewatering of R-190 is the potential groundwater contribution from the underlying B-Facies rocks. If B-Facies rocks constitute an aquifer then dewatering of the Presqu'ile would induce groundwater to move vertically upwards and therefore reduce expected draw-downs. Because B-Facies rocks are known to be an aquifer at Pine Point, upward leakage at R-190 is certainly a possibility and some effort should be made to determine the hydraulic characteristics of these rocks at R-190.

## 6.0 DEWATERING ANALYSIS

### 6.1 Methods and Assumptions

It is understood that R-190 would be mined using underground methods. In order to mine the R-190 mineralized zone approximately 500 feet of dewatering will be required. The most satisfactory and economical way to achieve this dewatering objective is by means of properly located perimeter dewatering wells which would be pumped in conjunction with the pumping from an access mine shaft. Perimeter dewatering wells are considered a more appropriate dewatering method than underground sump pumps because of the need for overall mine safety in the event of power failures. Dewatering wells should be located to take advantage of the permeability distribution within the bedrock aquifers and would therefore be clustered more closely on the northeast and northwest sides of R-190. Dewatering wells would be drilled and cased 24" diameter to 200 feet below surface and then drilled 20" diameter to total depth (approximately 700 feet).

For this dewatering analysis it is assumed that no pumping will take place from the mine access shaft although it should be realized that this could reduce dewatering

## 6.1 Methods and Assumptions continued ...

costs significantly in the long term as potential pumping from such a large diameter shaft could be tens of thousands of gallons per minute and therefore equivalent to a number of dewatering wells. Lineshaft, 1000 HP pumps have been selected for this analysis and dewatering wells would be located an average of 175 feet from the centre of the mineralized zone. In addition a one year period is allowed to achieve total dewatering requirements.

Once groundwater levels have been lowered to the top of the Presqu'ile zone, aquifer transmissivity should theoretically be reduced as the saturated thickness of the aquifer is reduced. Accordingly a best case has also been considered where average aquifer transmissivity is assumed as 100,000 igpd/foot. Thus in Section 5.2 two hydraulic cases are analyzed for both diesel and non-diesel power.

### Summary of assumptions for dewatering analysis

1. Effective aquifer transmissivity 200,000 or 100,000 igpd/foot.
2. Aquifer storativity  $3 \times 10^{-2}$ .

6.1 Methods and Assumptions continued ...

3. Pump type - Peerless Model 18HXB lineshaft
  - O.D. 16 7/8"
  - average pumping rate over a range of 600 feet of lift is 5,400 igpm
  - motor size is 1,000 HP
4. Drawdown required is 500 feet.
5. Average distance of wells to centre of mineralized zone is 175 feet.
6. Dewatering time allowed is one year.
7. No pumping takes place from shaft.
8. Wells drilled and cased 24" diameter to 200 feet and drilled 20" open hole to T.D. of 700 feet.
9. Fuel cost \$1.50/gallon.
10. Lubricant cost \$5/gallon.

- ABOVE COSTS IN FEBRUARY 1981 DOLLARS

6.2 Projected Dewatering Costs

Using the assumptions outlined in Section 6.1 the following costs can be calculated:

(i) Diesel Power

CASE A -

Transmissivity	200,000 igpd/foot
Storativity	$3 \times 10^{-2}$
Total wells required	16, for a total pumping rate of 86,400 igpm

CAPITAL COSTS	\$ 7,800,000
OPERATING COSTS/YEAR	\$14,900,000

CASE B -

Transmissivity	100,000 igpd/foot
Storativity	$3 \times 10^{-2}$
Total wells required	9, for a total pumping rate of 48,600 igpm

CAPITAL COSTS	\$ 4,400,000
OPERATING COSTS/YEAR	\$ 8,100,000

6.2 Projected Dewatering Costs continued ...

(ii) Non-Diesel Power

CASE C -

Transmissivity	200,000 igpd/foot
Storativity	$3 \times 10^{-2}$
Total wells required	16, for a total pumping rate of 86,400 igpm

CAPITAL COSTS	\$ 4,900,000
OPERATING COSTS/YEAR	\$ 5,500,000

CASE D -

Transmissivity	100,000 igpd/foot
Storativity	$3 \times 10^{-2}$
Total wells required	9, for a total pumping rate of 48,600 igpm

CAPITAL COSTS	\$ 2,800,000
OPERATING COSTS/YEAR	\$ 3,100,000

NOTE: Power costs assumed at \$0.045/kwh.

## 7.0 SUMMARY AND CONCLUSIONS

1. During November 1980 a 23 day constant rate aquifer test was completed in the R-190 zone. Ten observation wells were used to measure the hydraulic response of the bedrock aquifers to this pumping. The aquifer test has been analyzed using both the straight line method and the pore flow - fractured rock type curve method.
2. The elongate drawdown cone that developed during pumping indicated that a large area of aquifer had been affected. The shape and orientation of the drawdown cone indicated that the "Main Hinge Zone", a linear structural feature, imparts an anisotropy to the regional permeability distribution.
3. Aquifer test analysis has indicated that the main bedrock aquifer, the Presqu'ile zone, has a transmissivity of 200,000 igpd/foot and a storativity of  $3 \times 10^{-2}$ .
4. Dewatering analysis, based upon the assumptions in Section 6.1, has indicated that total pumping rates of 50,000 igpm to 86,000 igpm will be needed to dewater the R-190 zone within a one year period. Total dewatering requirements are to 600 feet below ground surface and total drawdown needed is therefore 500 feet.

7.0 SUMMARY AND CONCLUSIONS continued ...

5. Based upon the assumptions of Section 6.1, dewatering costs are:

(i) Diesel Power

CAPITAL COSTS	$\$4.4 \times 10^6$	-	$\$7.8 \times 10^6$
OPERATING COSTS/YEAR	$\$8.1 \times 10^6$	-	$\$14.9 \times 10^6$

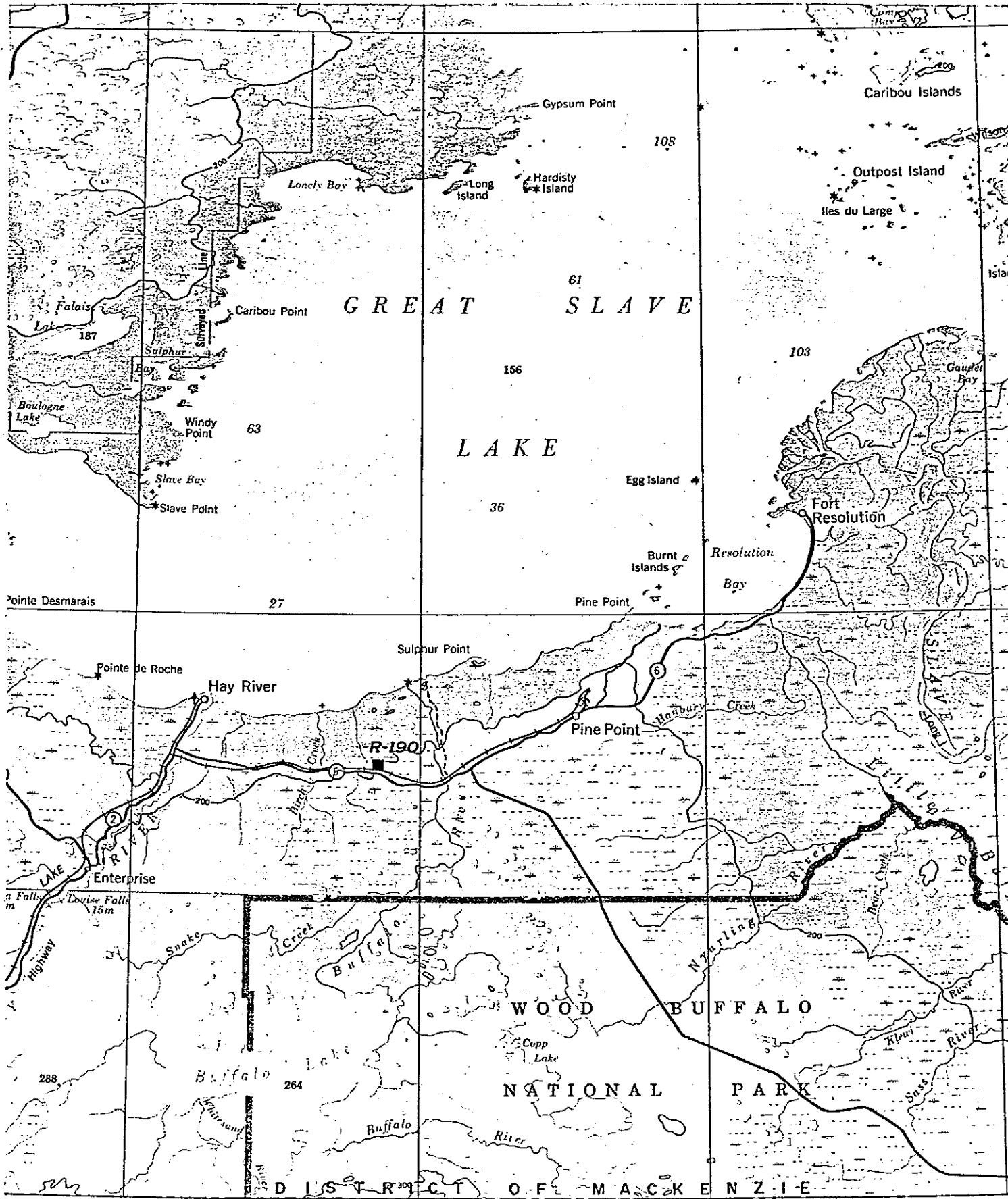
(ii) Non-Diesel Power

CAPITAL COSTS	$\$2.8 \times 10^6$	-	$\$4.9 \times 10^6$
OPERATING COSTS/YEAR	$\$3.1 \times 10^6$	-	$\$5.5 \times 10^6$

These costs indicate that diesel power is extremely expensive and may not be a viable alternative.

## FIGURES

- Figure 1 REGIONAL LOCATION MAP
- Figure 2 LOCAL LOCATION MAP
- Figure 3 R-190 GEOLOGIC SECTIONS
- Figure 4 R-190 DRILLHOLE LOCATIONS AND POTENTIOMETRIC  
SURFACE CONTOURS
- Figure 5 DRAWDOWN AND ATMOSPHERIC FLUCTUATIONS
- Figure 6 AQUIFER TEST DRAWDOWN CONTOURS



SCALE 1:1,000,000



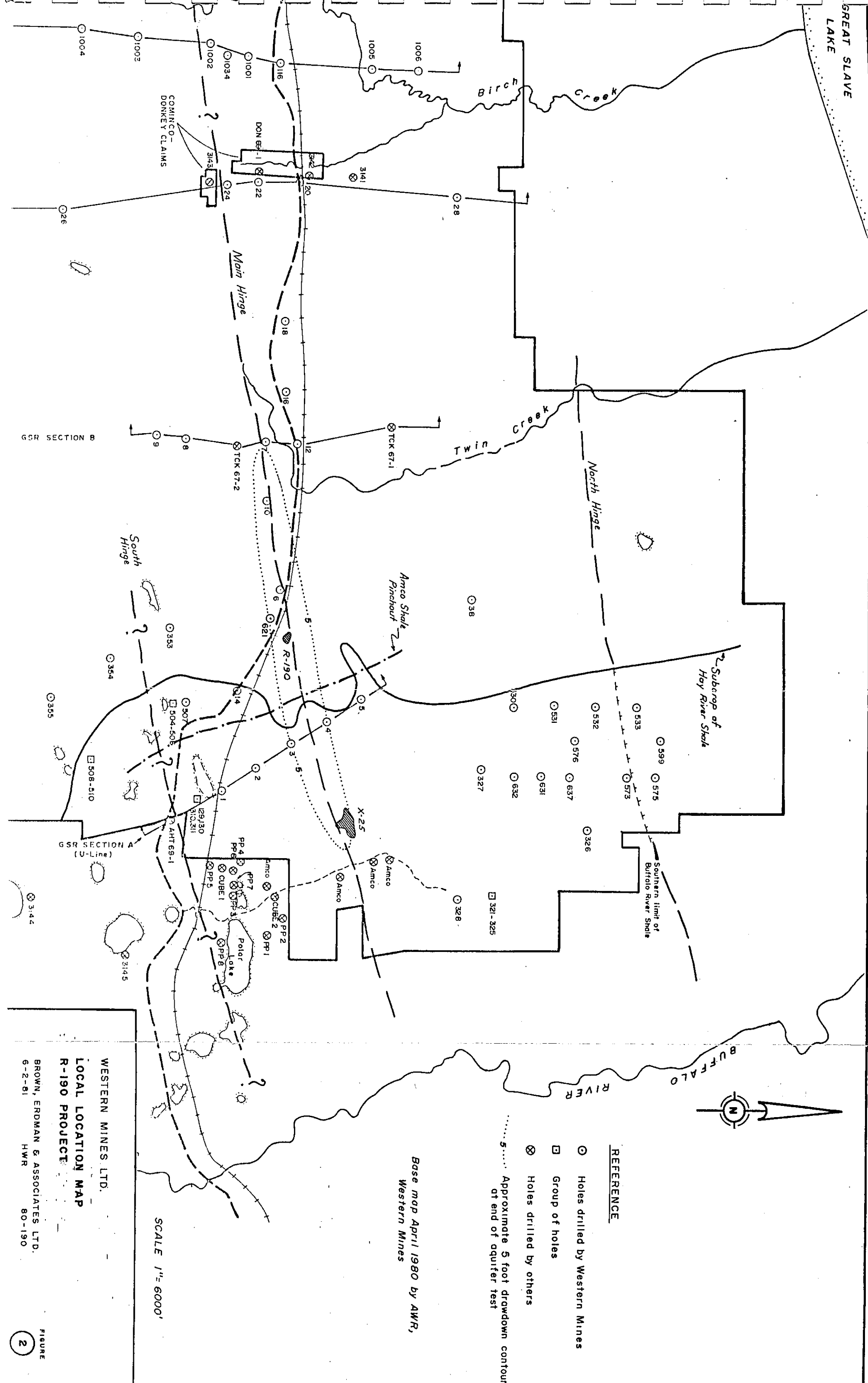
WESTERN MINES LTD.

REGIONAL LOCATION MAP  
R-190 PROJECT

BROWN, ERDMAN & ASSOCIATES LTD.

FIGURE

1



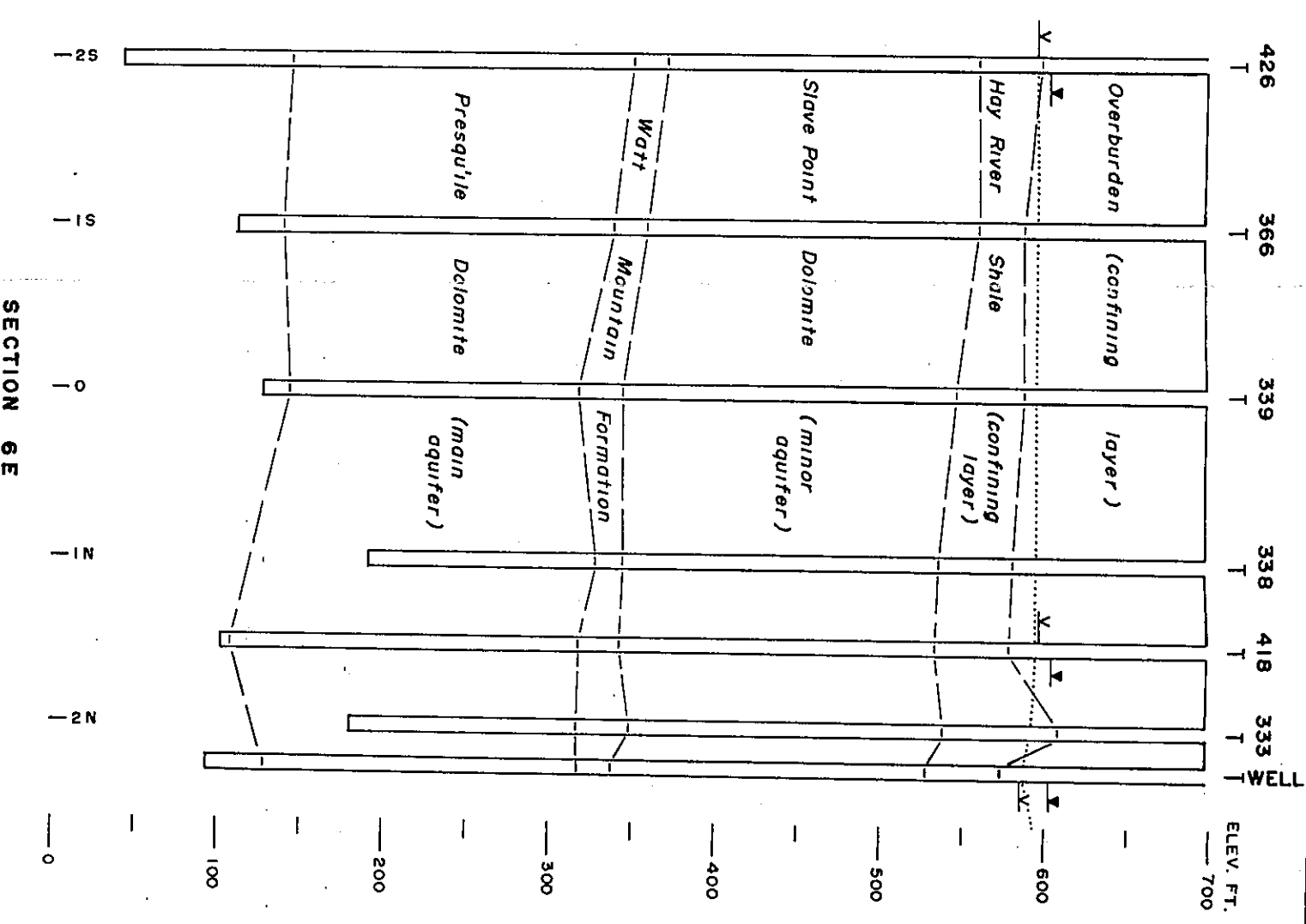
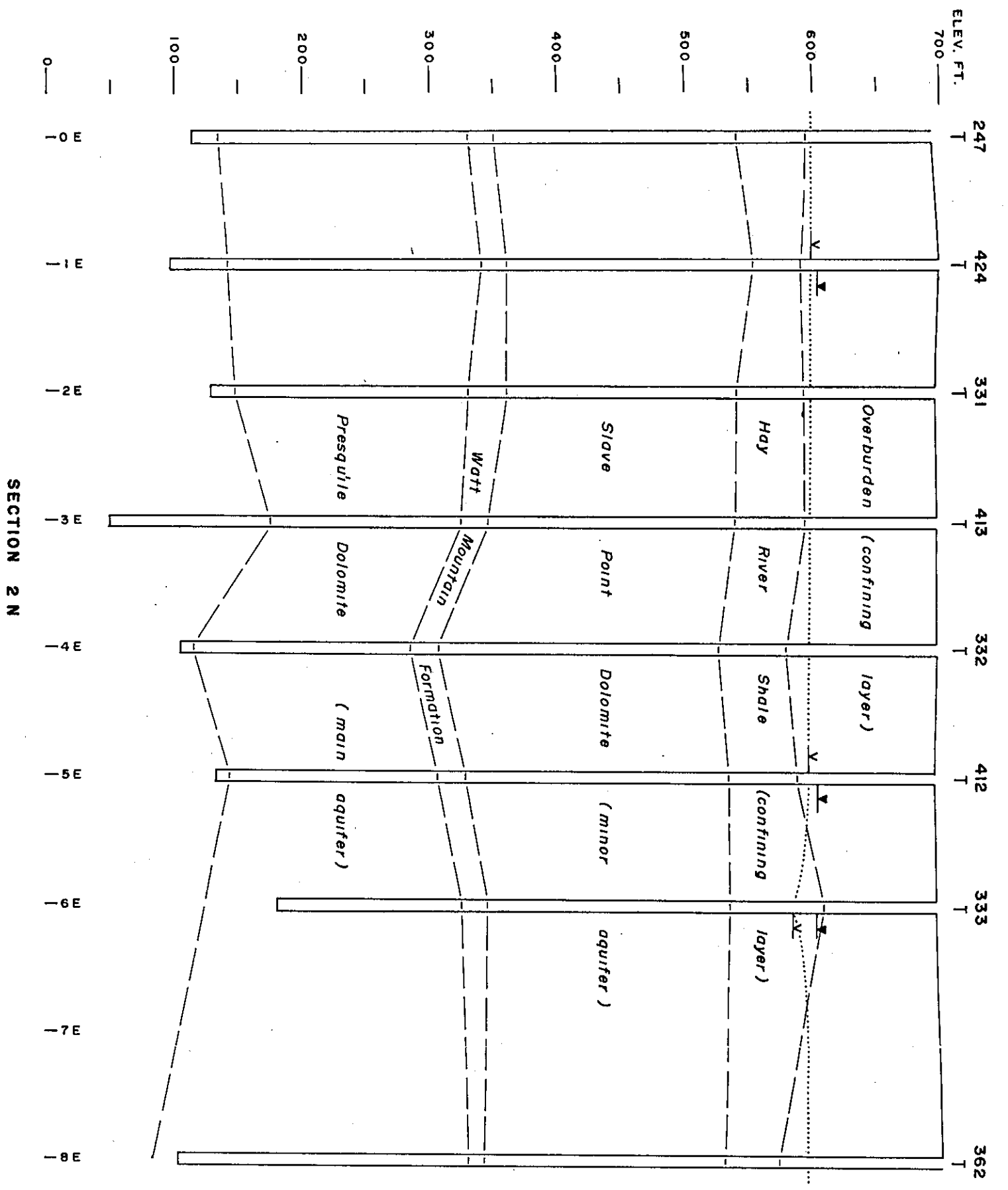
- REFERENCE**
- Holes drilled by Western Mines
  - Group of holes
  - ⊗ Holes drilled by others
  - ..... 5' Approximate 5 foot drawdown contour at end of aquifer test

Base map April 1980 by AWR,  
Western Mines

SCALE 1" = 6000'

WESTERN MINES LTD.  
LOCAL LOCATION MAP  
R-190 PROJECT

BROWN, ERDMAN & ASSOCIATES LTD.  
6-2-81 HWR 80-190



**REFERENCE**

- ▼ Static water level
- .....▼ Pumping water level

Base drawing August 1979 by LGC,  
Western Mines

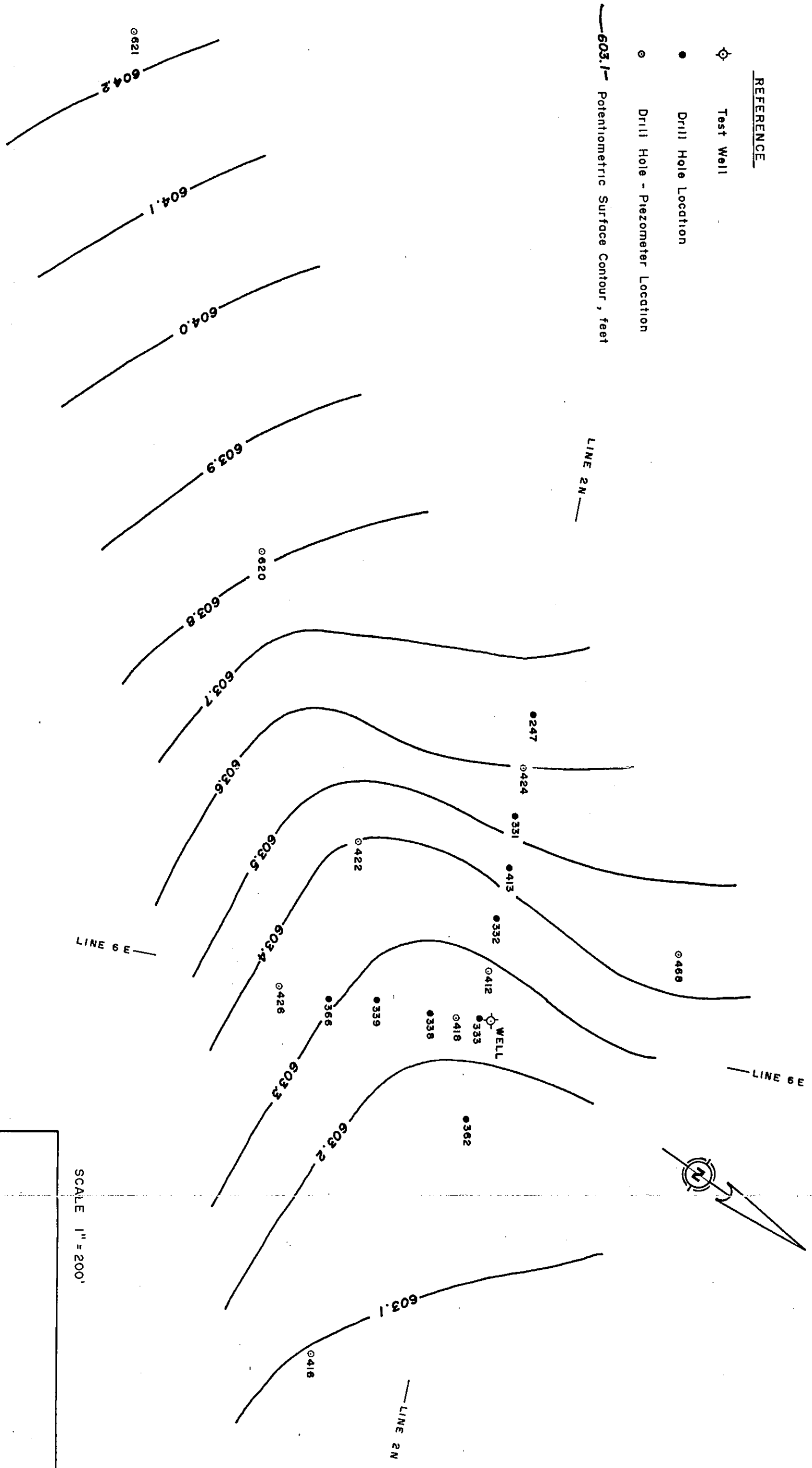
HORIZONTAL SCALE 1" = 100'  
VERTICAL SCALE 1" = 100'

WESTERN MINES LTD.  
**R-190 GEOLOGIC SECTIONS**

BROWN, ERDMAN & ASSOCIATES LTD.  
8-12-80 H.W.R. 80-190

REFERENCE

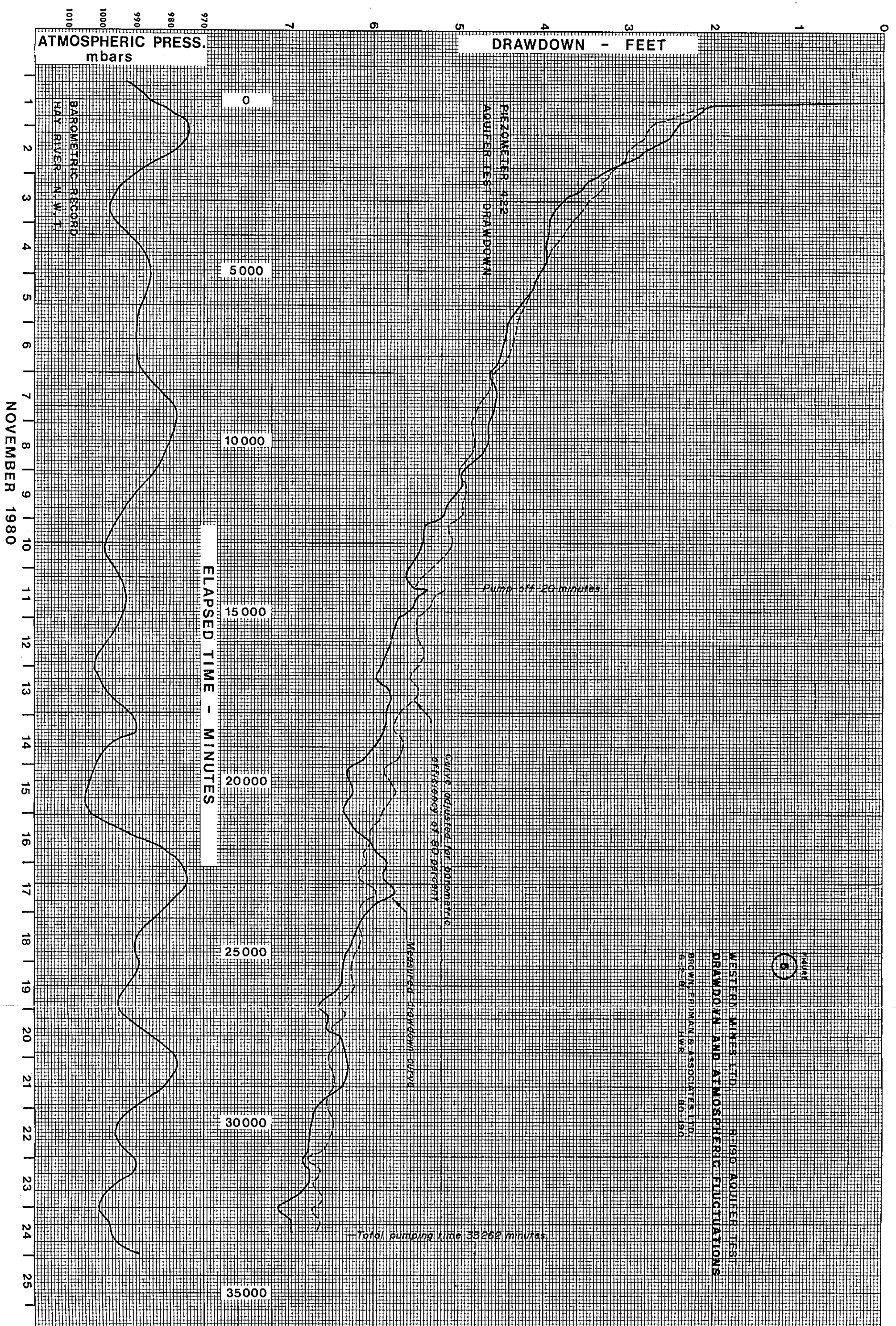
- ⊕ Test Well
- Drill Hole Location
- Drill Hole - Piezometer Location
- 603.1— Potentiometric Surface Contour, feet



SCALE 1" = 200'

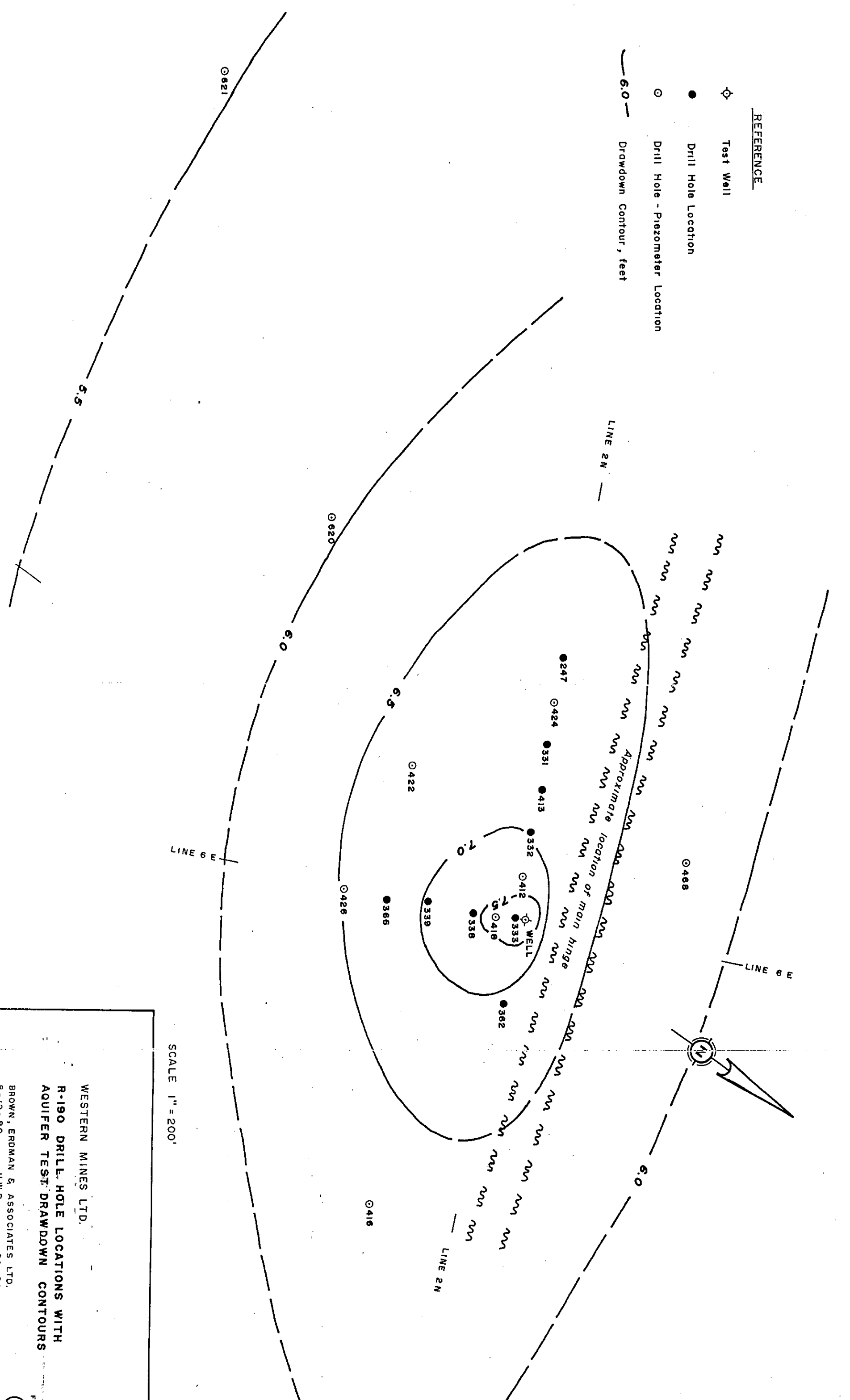
Note: Anomalous data excluded from  
Drill Holes 418, 424, 426

WESTERN MINES LTD.  
R-190 DRILL HOLE LOCATIONS WITH  
POTENTIOMETRIC SURFACE CONTOURS  
BROWN, ERDMAN & ASSOCIATES LTD.  
8-12-80 HWR 80-190



REFERENCE

- ⊕ Test Well
- Drill Hole Location
- Drill Hole - Piezometer Location
- 6.0- Drawdown Contour, feet



SCALE 1" = 200'

WESTERN MINES LTD.  
 R-190 DRILL HOLE LOCATIONS WITH  
 AQUIFER TEST DRAWDOWN CONTOURS

BROWN, ERDMAN & ASSOCIATES LTD.  
 8-12-80 HWR 80-190

T A B L E S

Table 1 GENERALIZED GEOLOGY AND HYDROGEOLOGY

Table 2 PERTINENT WELL DETAILS

Table 3 AQUIFER COEFFICIENTS - TYPE CURVE

Table 4 AQUIFER COEFFICIENTS - STRAIGHT LINE

Table 1  
 WESTERN MINES LTD.  
 R-190 AREA  
 GENERALIZED GEOLOGY AND HYDROGEOLOGY

<u>Unit</u>	<u>Thickness</u>	<u>Geology</u>	<u>Hydrogeology</u>
Overburden	<u>±</u> 100 ft.	Mainly clayey glacial till, minor sand and gravel lenses	Confining layer. Minor local discontinuous aquifer zones
Hay River Shale	<u>±</u> 60 ft.	Shale to silt, sub-crops to the east	Confining layer
Slave Point Formation	<u>±</u> 200 ft.	Fractured dolomite and limestone	Minor aquifer
Watt Mountain Formation	<u>±</u> 25 ft.	Shale and limestone	Aquitard
Pine Point Formation -			
-Presqu'ile Zone	<u>±</u> 200 ft.	Coarse, vuggy fractured dolomite. Top of Pine Point Formation	Main aquifer, high hydraulic conductivity
-B-Facies	?	Sucrosic, vuggy dolomite	Aquifer ?

Table 2

## WESTERN MINES LTD.

## R-190 ZONE

## PERTINENT WELL DETAILS BEDROCK AQUIFERS

<u>Well</u>	<u>Depth (ft)</u>	<u>Elev. of Measuring Pt. (ft)</u>	<u>S.W.L. (ft)</u>	<u>Dist. to Pump Well (ft)</u>	<u>Depth To Main Aquifer (ft)</u>	<u>Construction Details</u>
Pumping	605	691.8	88.62	-	385	16" casing to 130 ft. 14" O.D. casing to 185 ft Open hole to T.D.
412-1	565	689.1	85.12	103	394	Packer set at 158 ft. Cased to 150 ft.
416-1	616	703.3	100.16	766	396	Packer set at 176 ft. Cased to 150 ft.
418-1	595	688.4	84.67	70	379	Packer set at 159 ft. Cased to 120 ft.
422-1	612	689.7	86.30	437	372	Packer set at 151 ft. Cased to 110 ft.
424-1	605	689.0	85.18	481	362	Packer set at 119 ft. Cased to 110 ft.
426-1	586	684.9	83.94	428	360	Packer set at 131 ft. Cased to 100 ft.
468-1	579	687.1	83.70	582	355	Packer set at 139 ft. Cased to 112 ft.
620	600	687.3	83.45	1,187	383	Cased to 175 ft.
621-1	635	686.4	82.15	2,114	388	Packer set at 170 ft. Cased to 160 ft.
X-25	560	682.5	76.45	13,546	408	14" Open Hole.

Table 3

WESTERN MINES LTD.  
R-190 AQUIFER TEST

Aquifer coefficients as calculated using Pore Flow Drawdown Type  
Curves {  $\eta = 10$  }

<u>Well</u>	<u>Transmissivity</u>		<u>Storativity</u>
	<u>igpd/ft</u>	<u>m<sup>2</sup>/day</u>	
Pumping	95,980*	1430*	-
412	205,145	3060	0.82*
416	199,065	2970	0.03
418	191,955	2860	1.20*
422	206,720	3080	0.06
424	Data not used		-
426	214,990	3205	0.05
468	237,820	3545	0.03
620	177,970	2655	0.02
621	176,800	2635	0.01
X-25	187,930	2800	$3 \times 10^{-4}$
Mean Value	199,800	2980	0.03
Standard Deviation	<u>+19,200</u>	<u>+290</u>	0.02

\* These results not used in calculation of mean values.

igpd/ft - imperial gallons per day per foot

Table 4

WESTERN MINES LTD.  
R-190 AQUIFER TEST

Aquifer coefficients as calculated using late drawdown data and the Cooper and Jacob (straight line) method

<u>Well</u>	<u>Transmissivity</u>		<u>Storativity</u>
	<u>igpd/ft</u>	<u>m<sup>2</sup>/day</u>	
Pumping	165,090	2460	--
412	162,915	2430	1.60*
416	154,770	2305	0.06
418	150,995	2250	3.44*
422	158,740	2365	0.11
424	151,000	2250	--
426	171,970	2565	0.10
468	158,740	2370	0.096
620	150,995	2250	0.03
621	158,740	2365	0.013
X-25	143,970	2145	$4 \times 10^{-4}$
Mean Value	157,100	2340	0.06
Standard Deviation	<u>+ 8,000</u>	<u>+120</u>	<u>+0.04</u>

\* These results not used in calculation of mean values.

igpd/ft - imperial gallons per day per foot

## A P P E N D I C E S

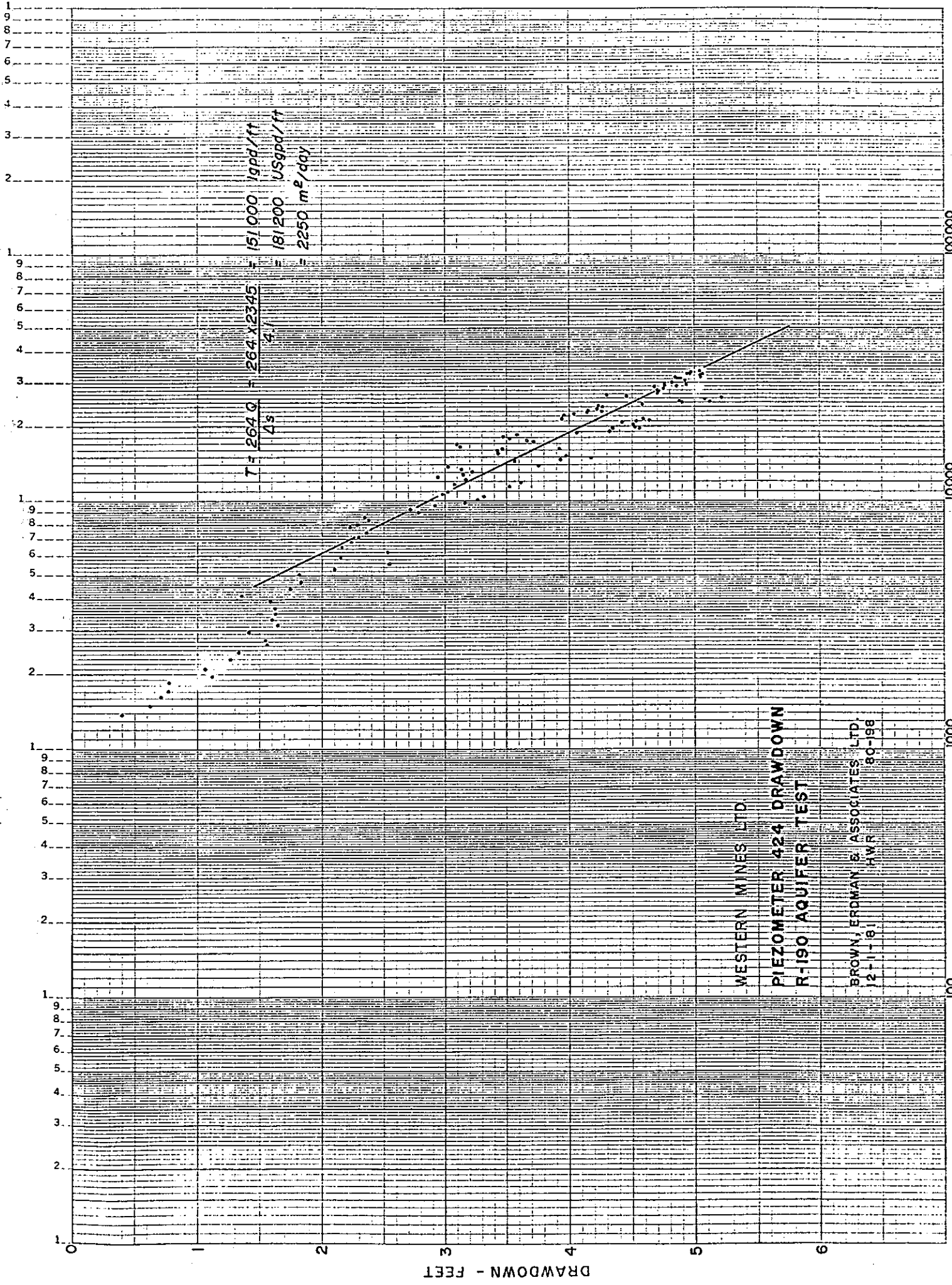
Appendix 1    AQUIFER TEST PLOTS AND ANALYSES

Appendix 2    DRAWDOWN DATA

Appendix 3    CHEMICAL ANALYSES OF GROUNDWATER

APPENDIX 1

AQUIFER TEST PLOTS AND ANALYSES



$$\begin{aligned}
 T &= \frac{264 Q}{4s} &= \frac{264 \times 2345}{4} &= 151,000 \text{ USgal/ft} \\
 & & &= 181,200 \text{ USgal/ft} \\
 & & &= 2250 \text{ m}^3/\text{day}
 \end{aligned}$$

WESTERN MINES LTD.

PIEZOMETER 424 DRAWDOWN  
R-190 AQUIFER TEST

BROWN, ERDMAN & ASSOCIATES LTD.  
12-11-61 HWR 80-198

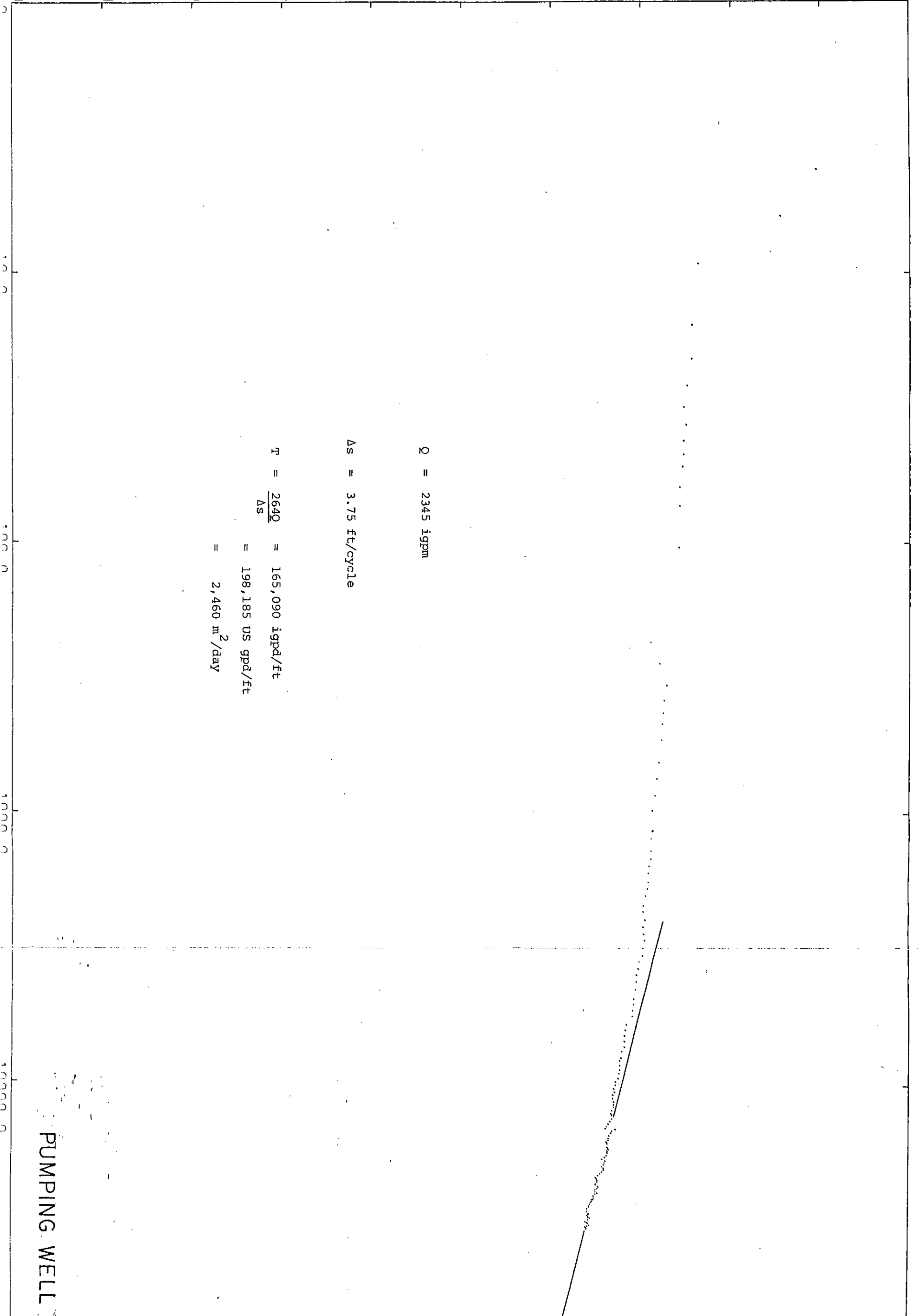
100 1000 10000 100000

DRAWDOWN - FEET

BEAL PLOT# 02082020.

DRAWDOWN FT.

0.000  
5.000  
10.000  
15.000  
20.000  
25.000  
30.000  
35.000  
40.000  
45.000  
50.000



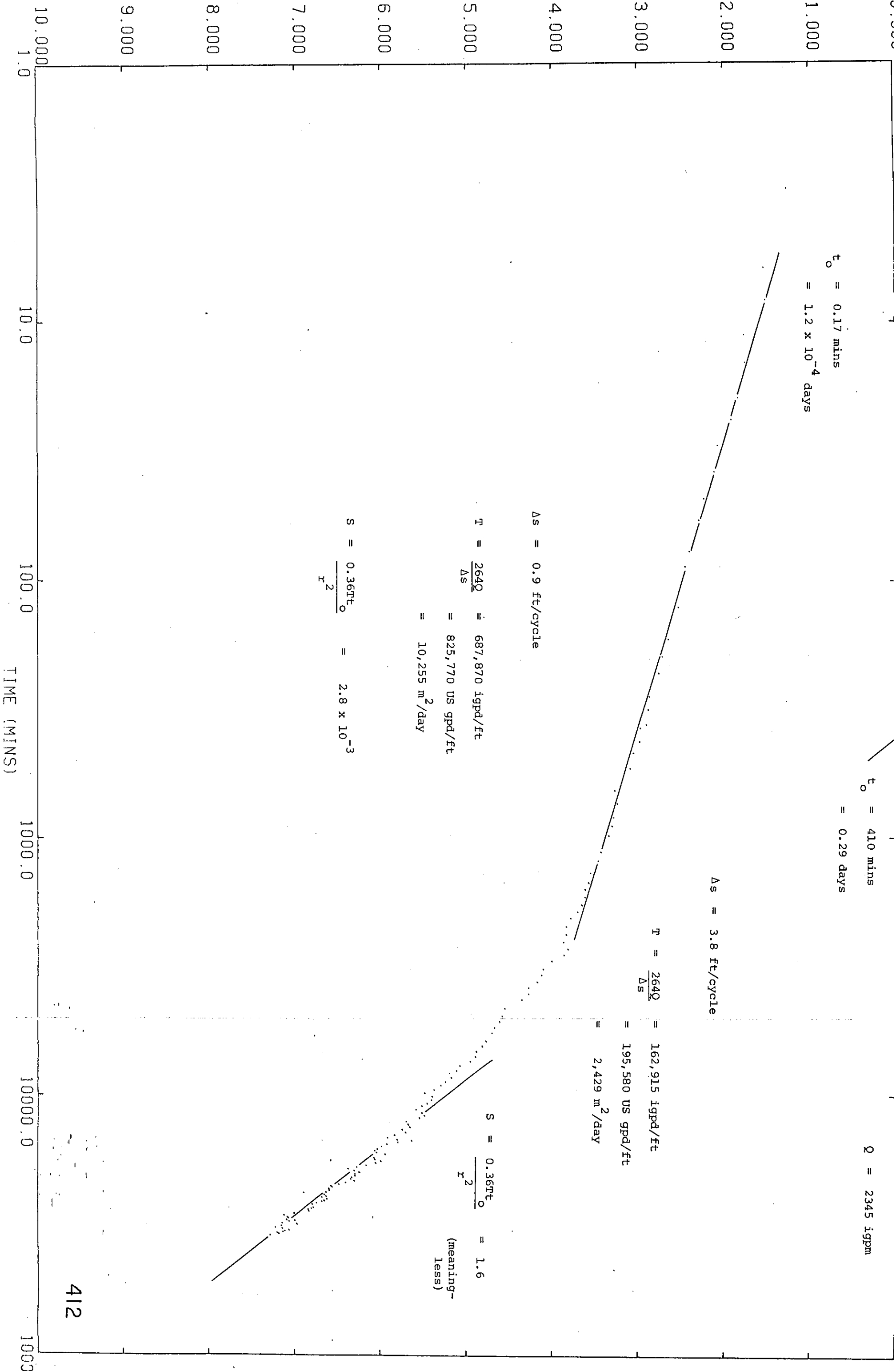
Q = 2345 igpm

Δs = 3.75 ft/cycle

$\pi = \frac{264Q}{\Delta s} = 165,090 \text{ igpd/ft}$   
 $= 198,185 \text{ US gpd/ft}$   
 $= 2,460 \text{ m}^2/\text{day}$

PUMPING WELL

DRAWDOWN FT.



$t_0 = 0.17$  mins  
 $= 1.2 \times 10^{-4}$  days

$t_0 = 410$  mins  
 $= 0.29$  days

$Q = 2345$  igpm

$\Delta s = 0.9$  ft/cycle

$\Delta s = 3.8$  ft/cycle

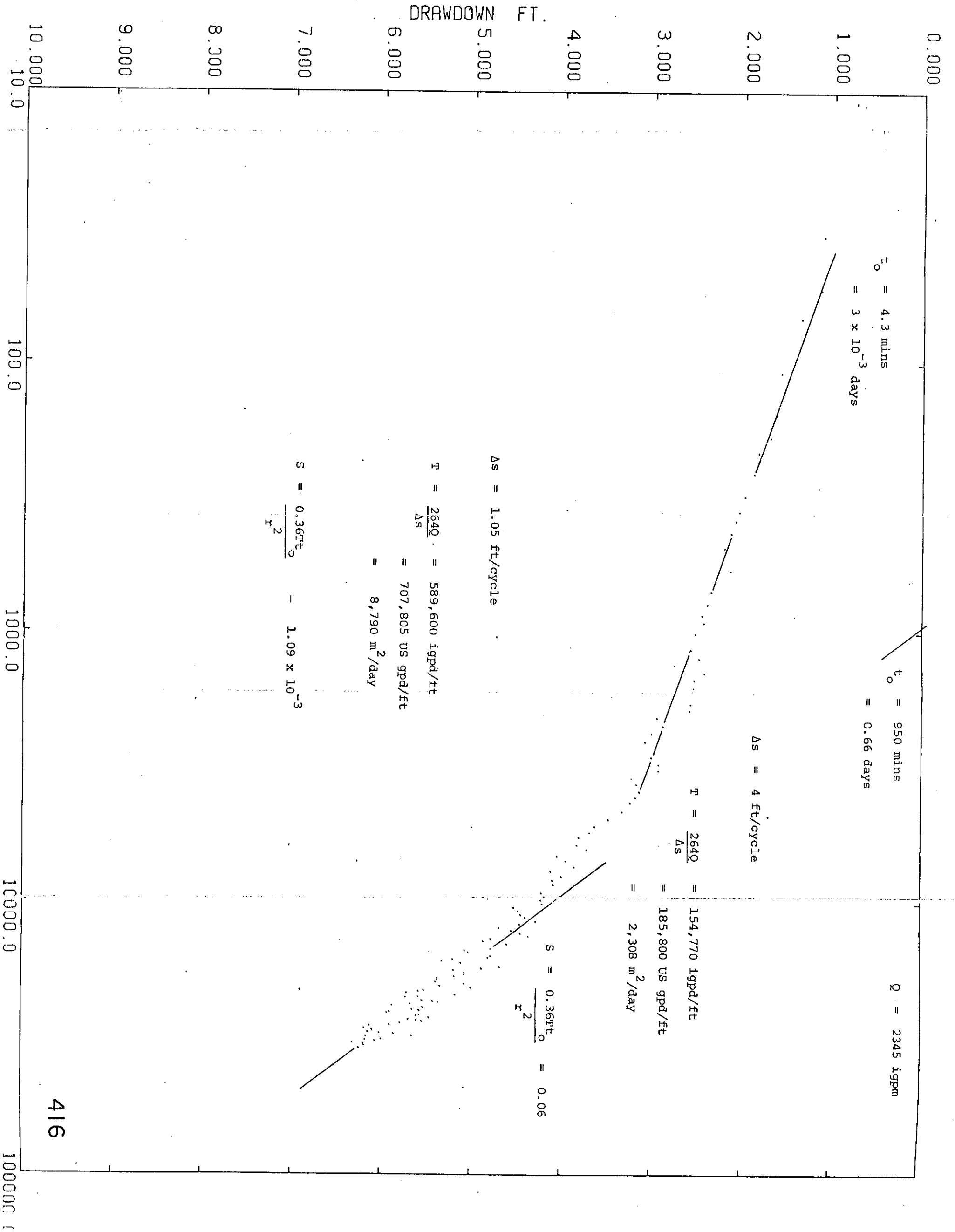
$T = \frac{264Q}{\Delta s} = 687,870$  igpd/ft  
 $= 825,770$  US gpd/ft  
 $= 10,255$  m<sup>2</sup>/day

$T = \frac{264Q}{\Delta s} = 162,915$  igpd/ft  
 $= 195,580$  US gpd/ft  
 $= 2,429$  m<sup>2</sup>/day

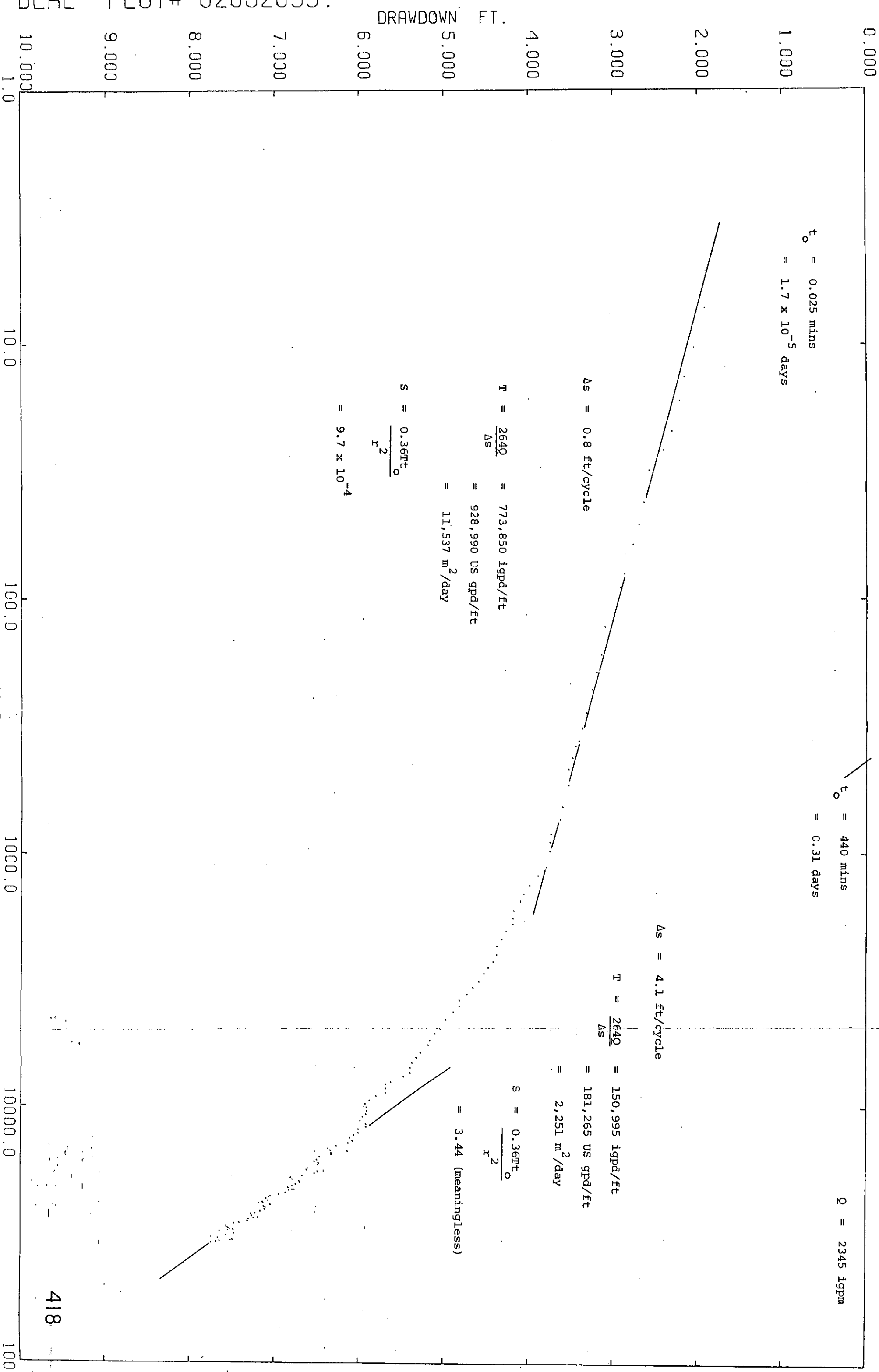
$S = \frac{0.36T_0}{r^2} = 2.8 \times 10^{-3}$

$S = \frac{0.36T_0}{r^2} = 1.6$   
 (meaningless)

BEAL PLOT# 02082023.



416



$t_0 = 0.025$  mins  
 $= 1.7 \times 10^{-5}$  days

$t_0 = 440$  mins  
 $= 0.31$  days

$Q = 2345$  igpm

$\Delta s = 0.8$  ft/cycle

$\Delta s = 4.1$  ft/cycle

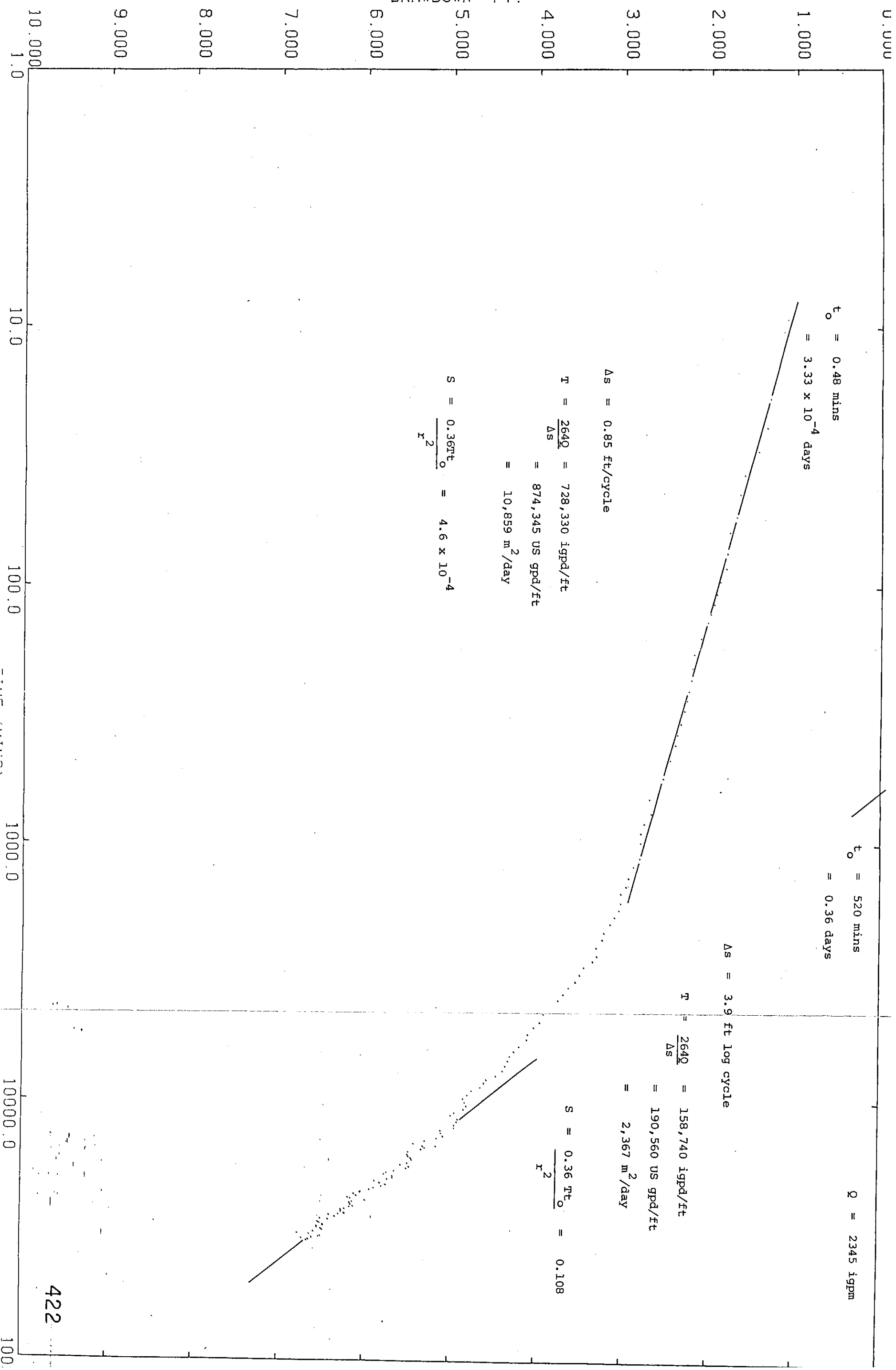
$T = \frac{264Q}{\Delta s} = 773,850$  igpd/ft  
 $= 928,990$  US gpd/ft  
 $= 11,537$  m<sup>2</sup>/day

$T = \frac{264Q}{\Delta s} = 150,995$  igpd/ft  
 $= 181,265$  US gpd/ft  
 $= 2,251$  m<sup>2</sup>/day

$S = \frac{0.36Tt_0}{r^2} = 9.7 \times 10^{-4}$

$S = \frac{0.36Tt_0}{r^2} = 3.44$  (meaningless)

DRAWDOWN FT.



$t_0 = 0.48$  mins  
 $= 3.33 \times 10^{-4}$  days

$t_0 = 520$  mins  
 $= 0.36$  days

$Q = 2345$  igpm

$\Delta s = 0.85$  ft/cycle

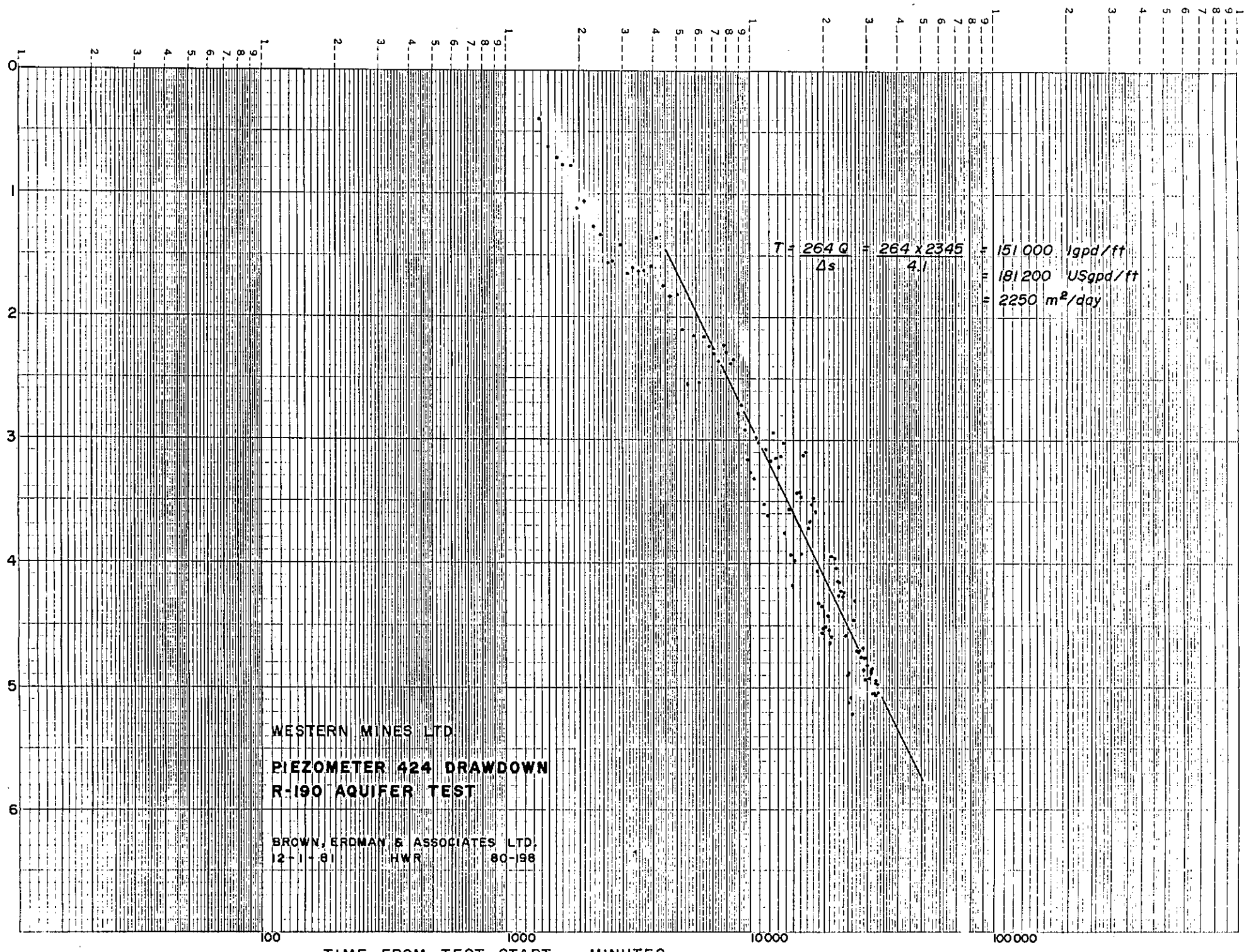
$\Delta s = 3.9$  ft log cycle

$\tau = \frac{264Q}{\Delta s} = 728,330$  igpd/ft  
 $= 874,345$  US gpd/ft  
 $= 10,859$  m<sup>2</sup>/day

$\tau = \frac{264Q}{\Delta s} = 158,740$  igpd/ft  
 $= 190,560$  US gpd/ft  
 $= 2,367$  m<sup>2</sup>/day

$S = \frac{0.36\tau t_0}{r^2} = 4.6 \times 10^{-4}$

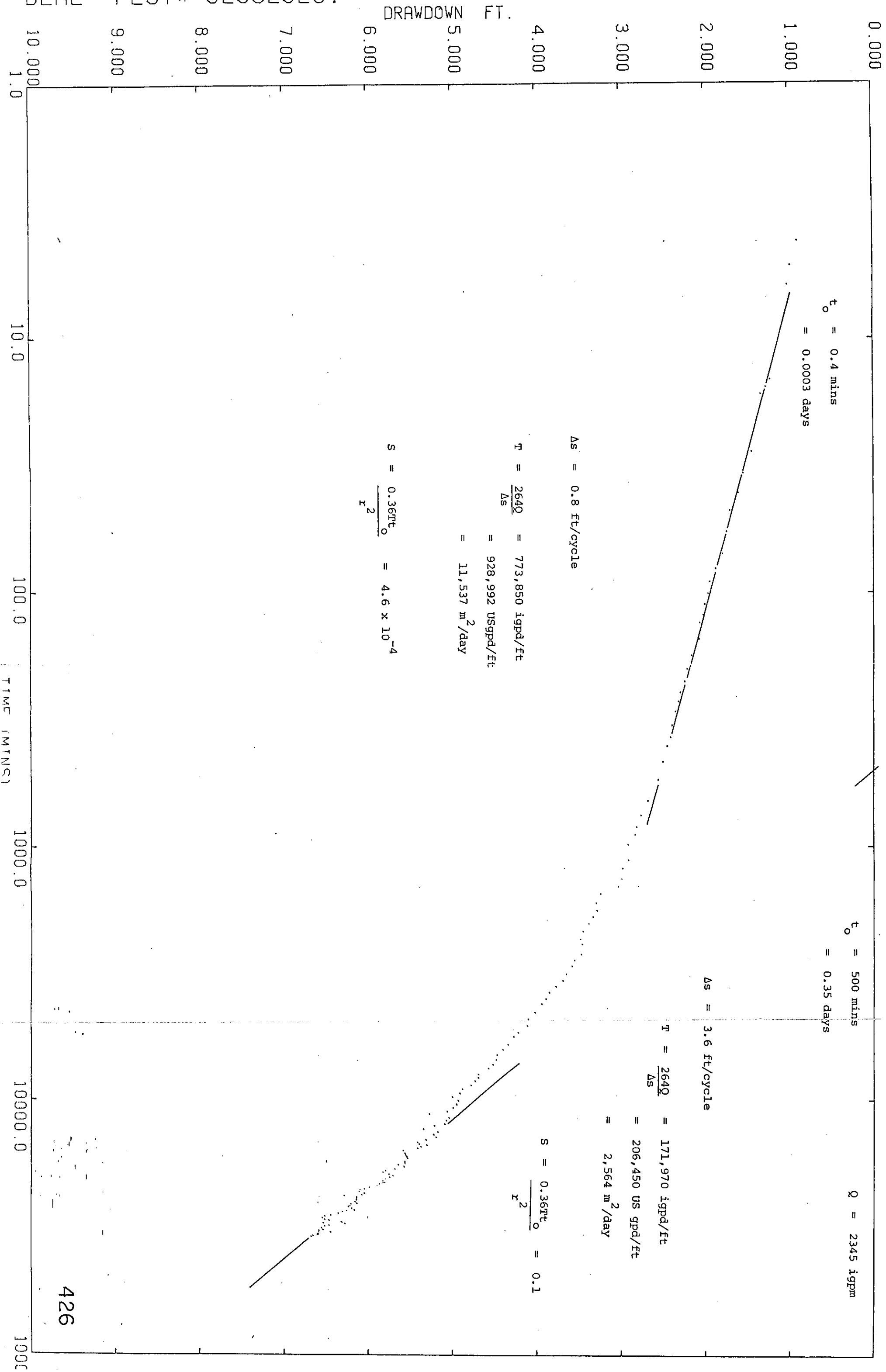
$S = \frac{0.36\tau t_0}{r^2} = 0.108$

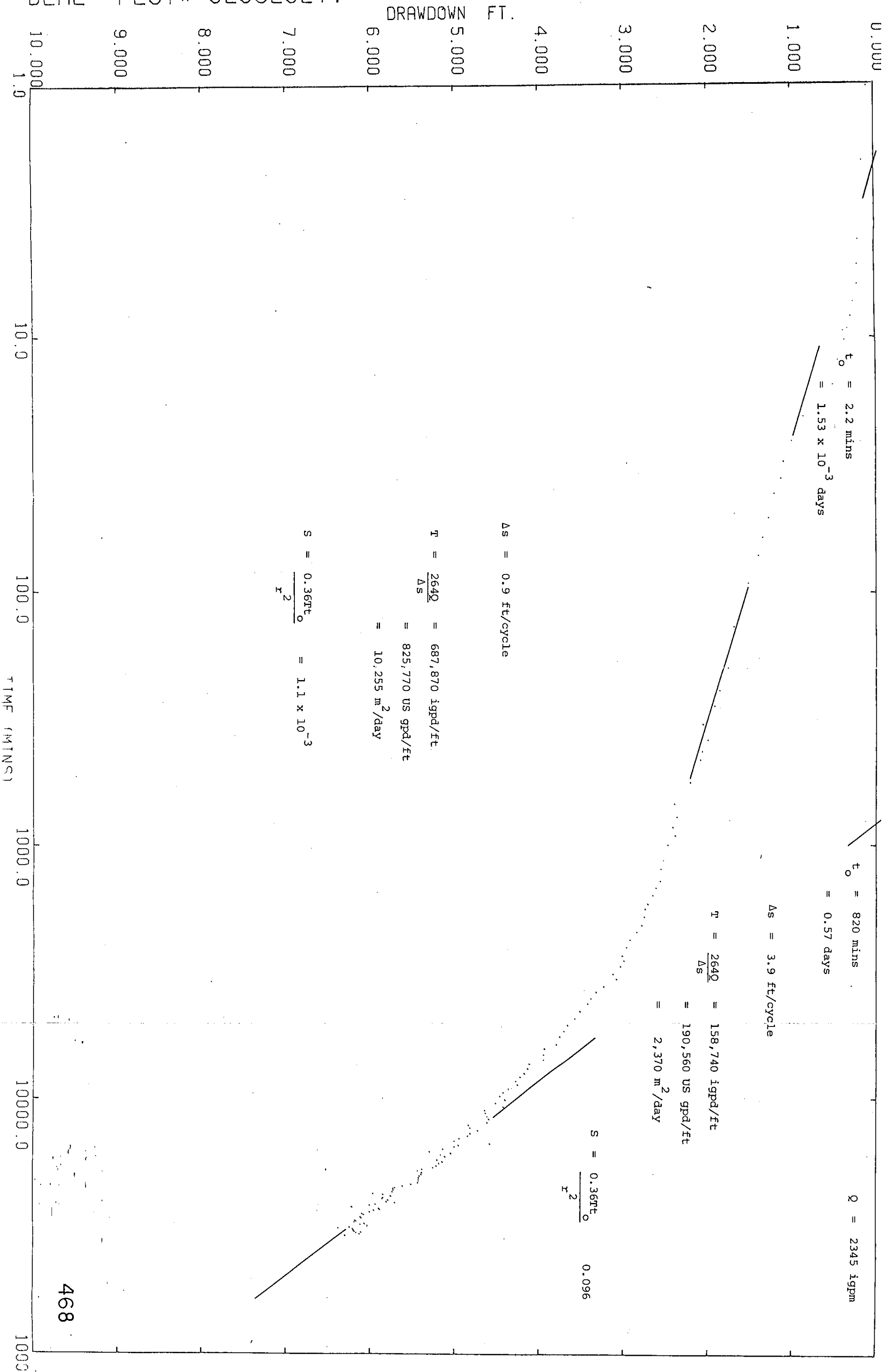


WESTERN MINES LTD.  
**PIEZOMETER 424 DRAWDOWN**  
**R-190 AQUIFER TEST**

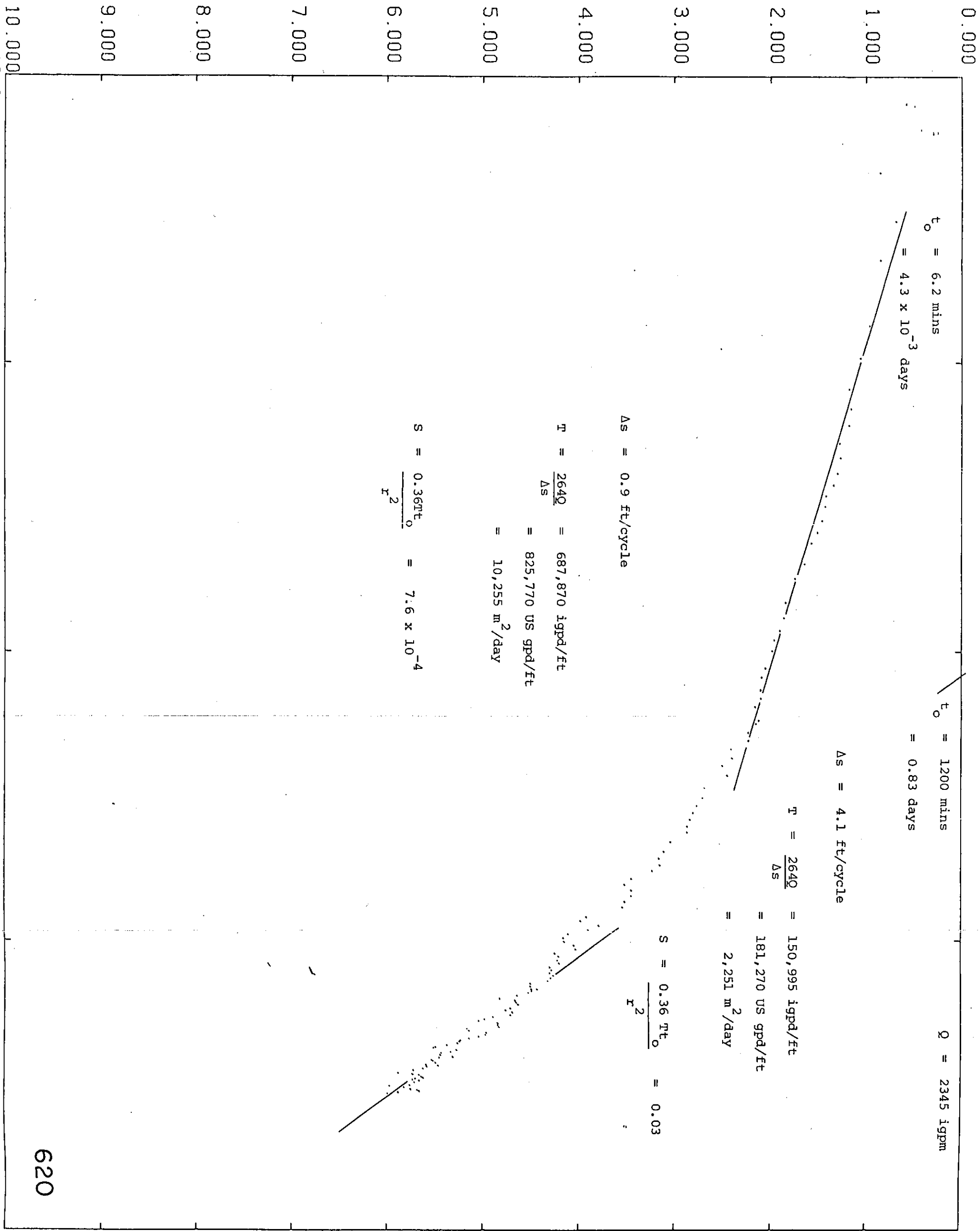
BROWN, ERDMAN & ASSOCIATES LTD.  
 12-1-81 HWR 80-198

TIME FROM TEST START - MINUTES

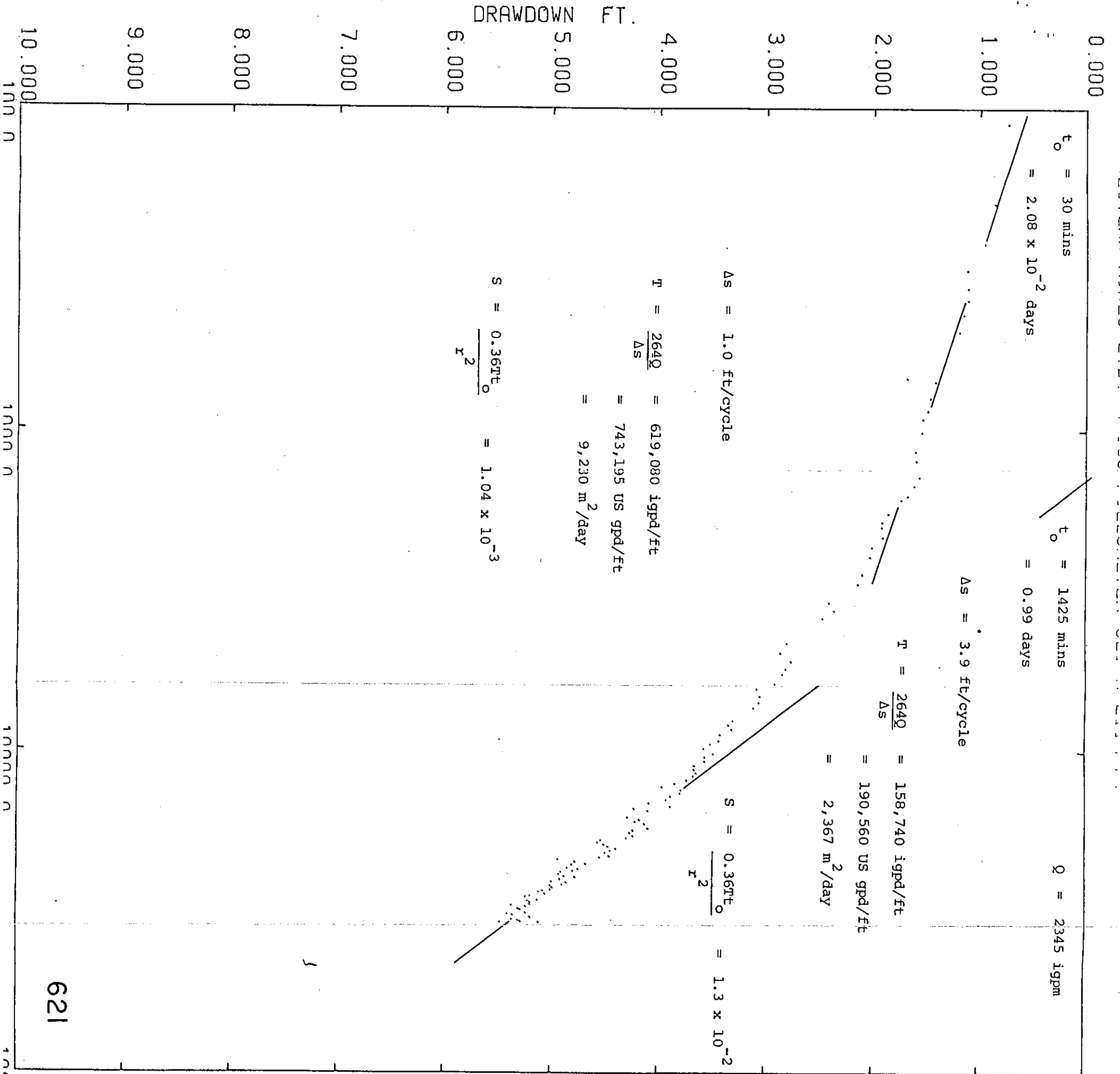




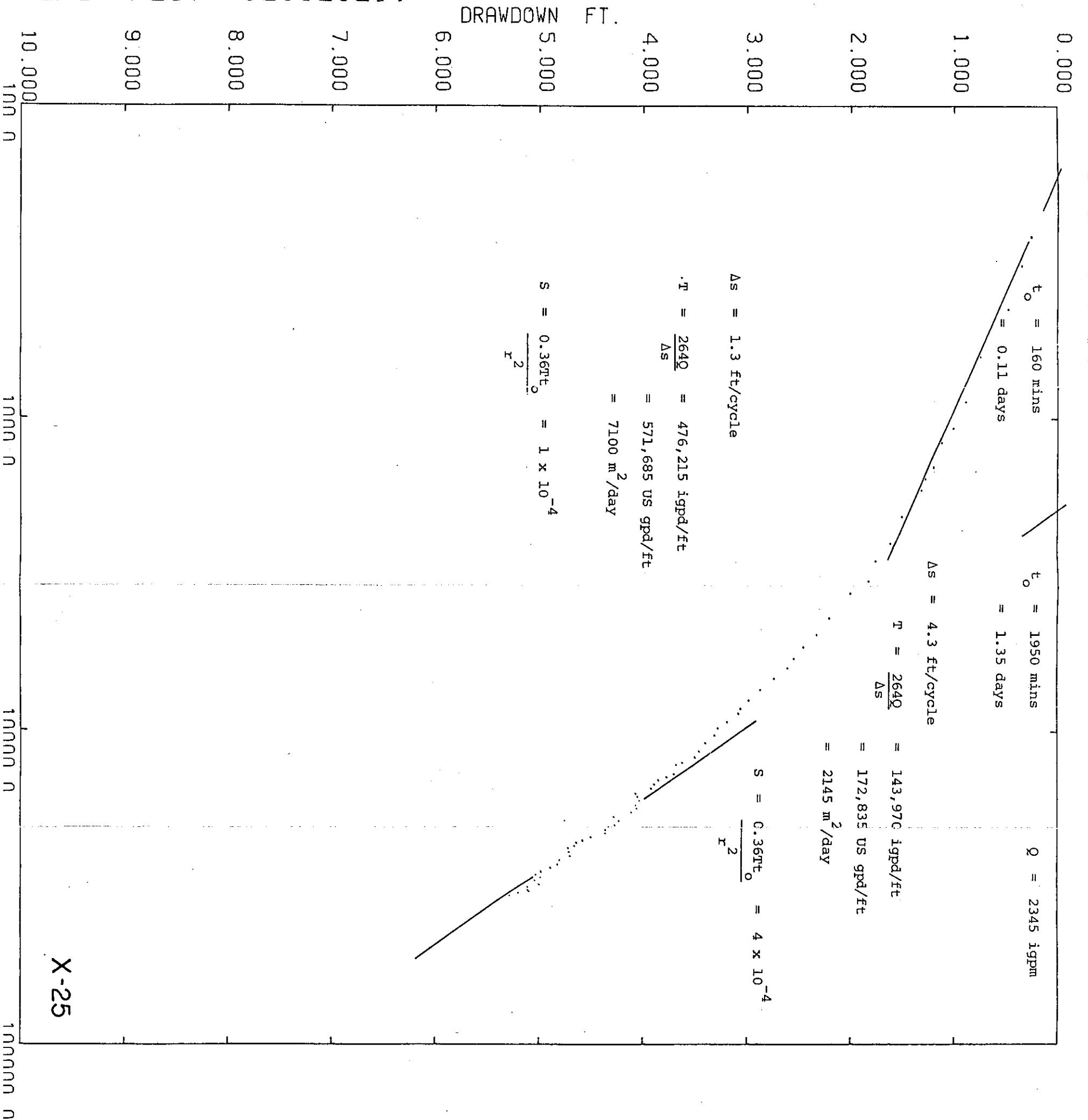
BEAL PLOT# 02082028.



BEAL PLOT# 02082029.



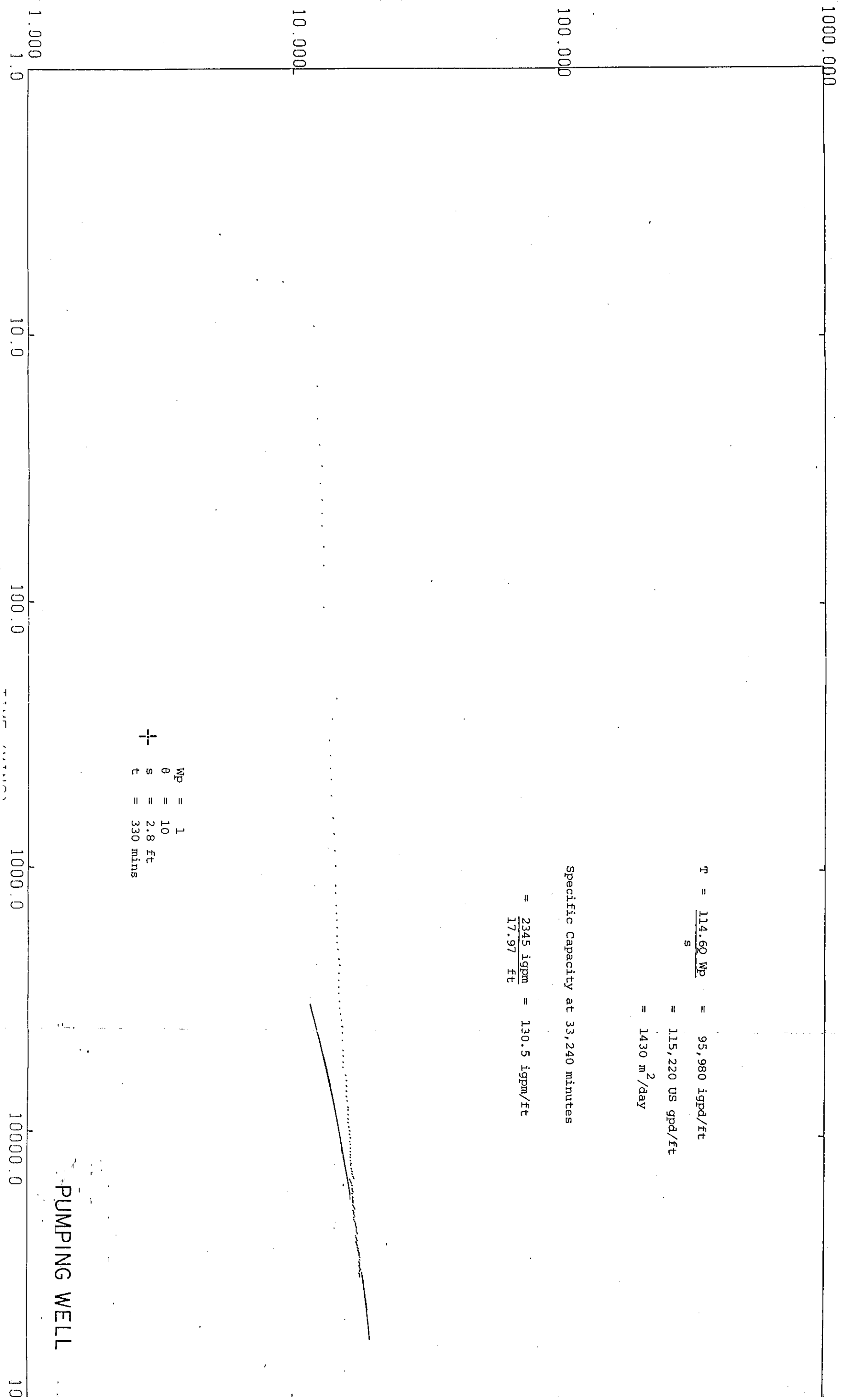
BEAL PLOT# 02082021.



BEAL PLOT# 02082030.

DRAWDOWN FT.

WESTERN MINES LTD. R-190 PUMPING WELL



$$\begin{aligned}
 T &= \frac{114.60 \text{ WP}}{S} &= 95,980 \text{ igpd/ft} \\
 & &= 115,220 \text{ US gpd/ft} \\
 & &= 1430 \text{ m}^2/\text{day}
 \end{aligned}$$

Specific Capacity at 33,240 minutes

$$= \frac{2345 \text{ igpm}}{17.97 \text{ ft}} = 130.5 \text{ igpm/ft}$$

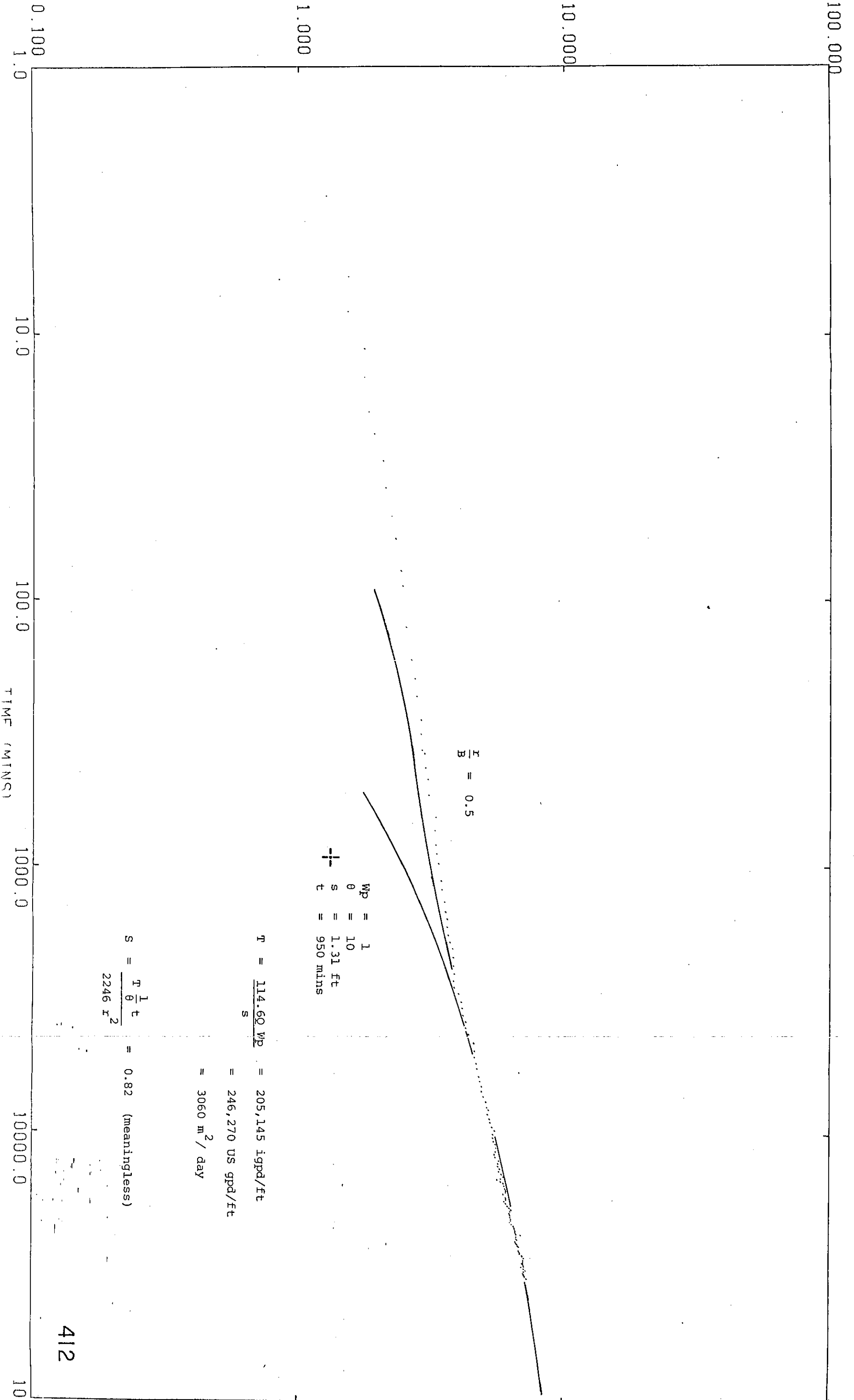
+ WP = 1  
 θ = 10  
 s = 2.8 ft  
 t = 330 mins

PUMPING WELL

BEAL PLOT# 02082035.

DRAWDOWN FT.

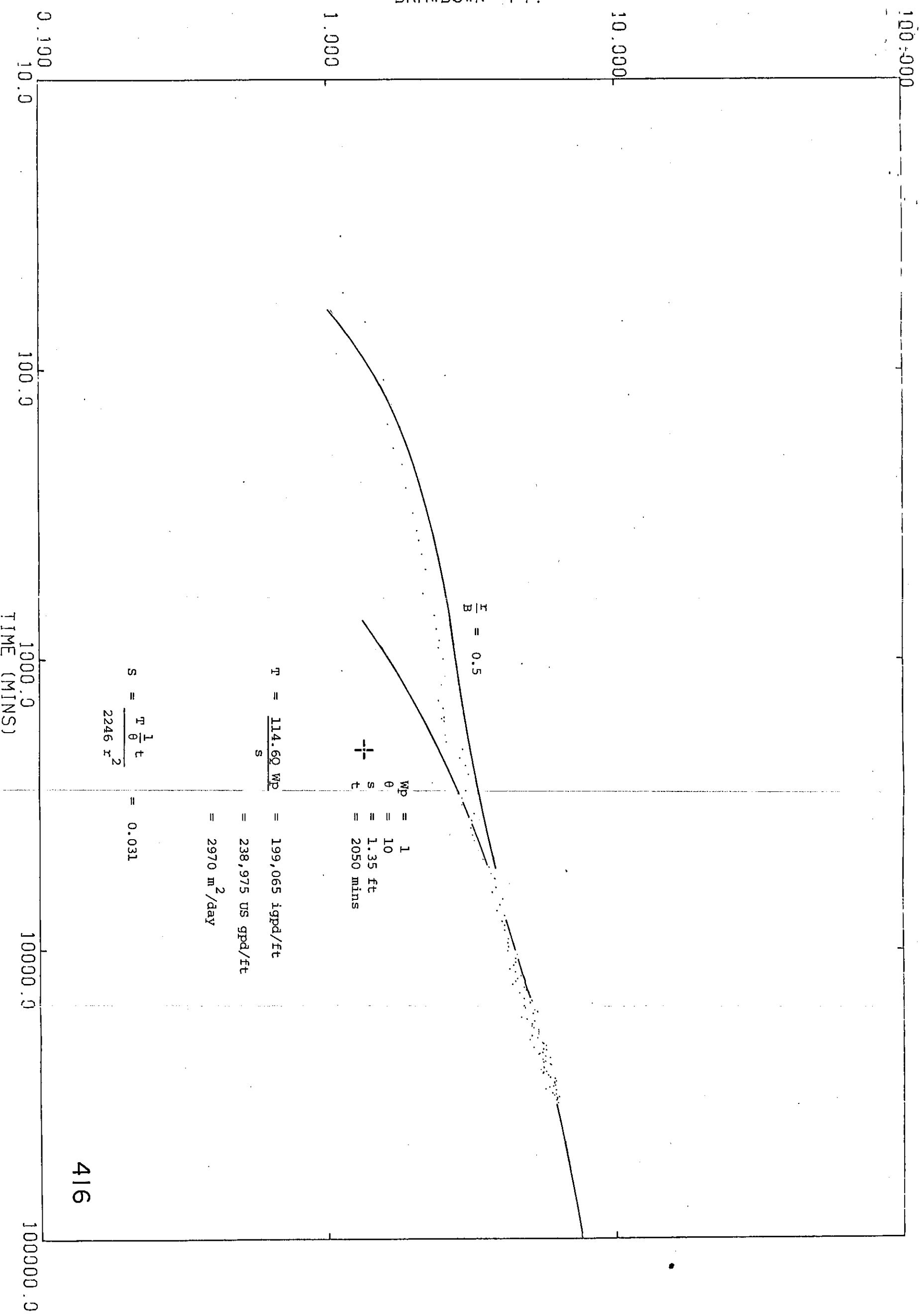
WESTERN MINES LTD. R-190 PIEZOMETER 412 R=103 FT.



WESTERN MINES LTD. R-190 PIEZOMETER 416 R=766 FT.

BEAL PLOT# 02082010.

DRAWDOWN FT.



$\frac{r}{B} = 0.5$

+  
 WP = 1  
 θ = 10  
 S = 1.35 ft  
 t = 2050 mins

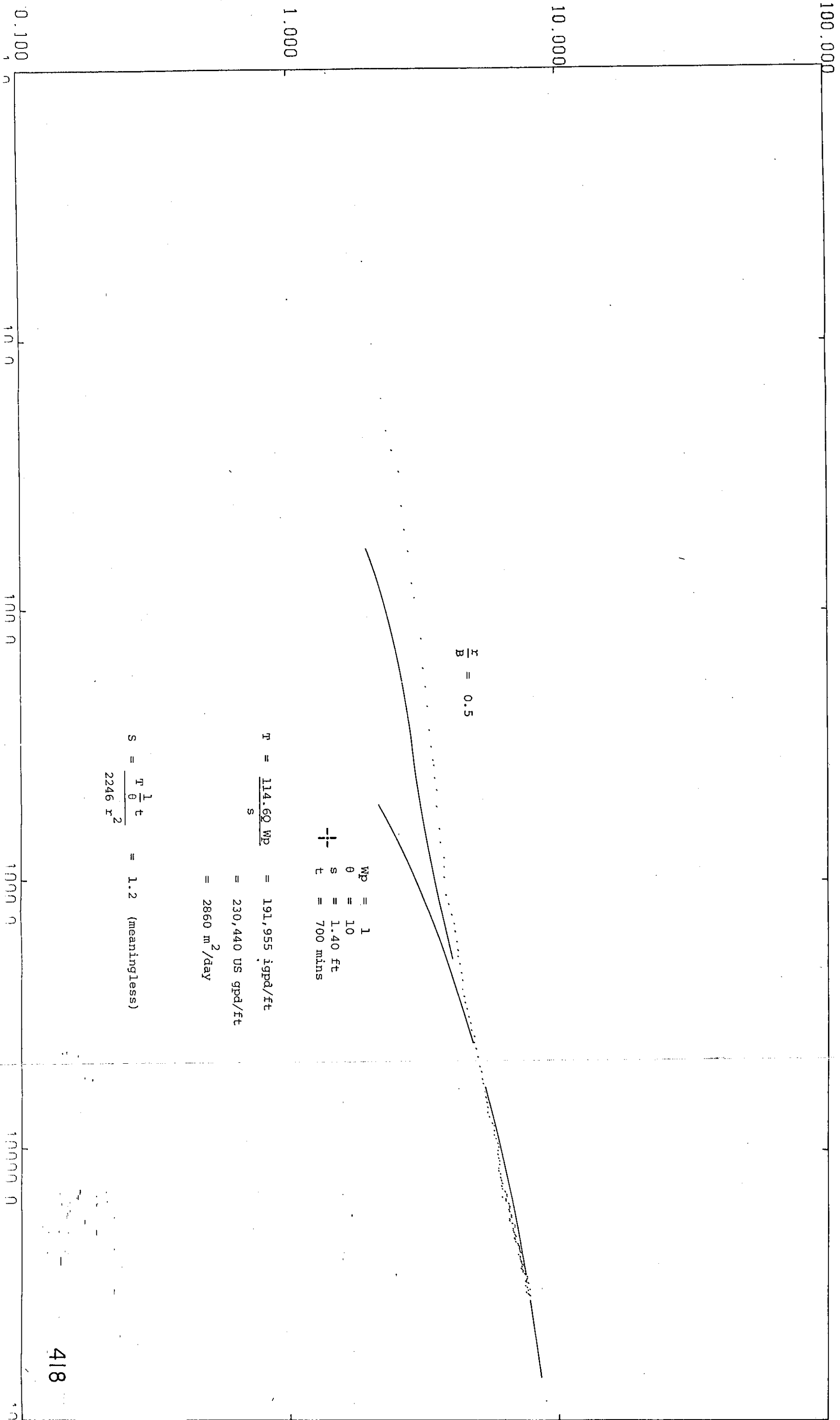
$T = \frac{114.6Q}{S}$   
 = 199,065 l/gpd/ft  
 = 238,975 US gpd/ft  
 = 2970 m<sup>2</sup>/day

$S = \frac{T \theta t}{2246 r^2}$   
 = 0.031

416

DRAWDOWN FT.

WESTERN MINES LTD. R-190 PIEZOMETER 418 R=70 FT.



$\frac{r}{B} = 0.5$

+  
 wp = 1  
 θ = 10  
 s = 1.40 ft  
 t = 700 mins

$T = \frac{114.6Q}{S} WP = 191,955 \text{ igpd/ft}$   
 $= 230,440 \text{ US gpd/ft}$   
 $= 2860 \text{ m}^2/\text{day}$

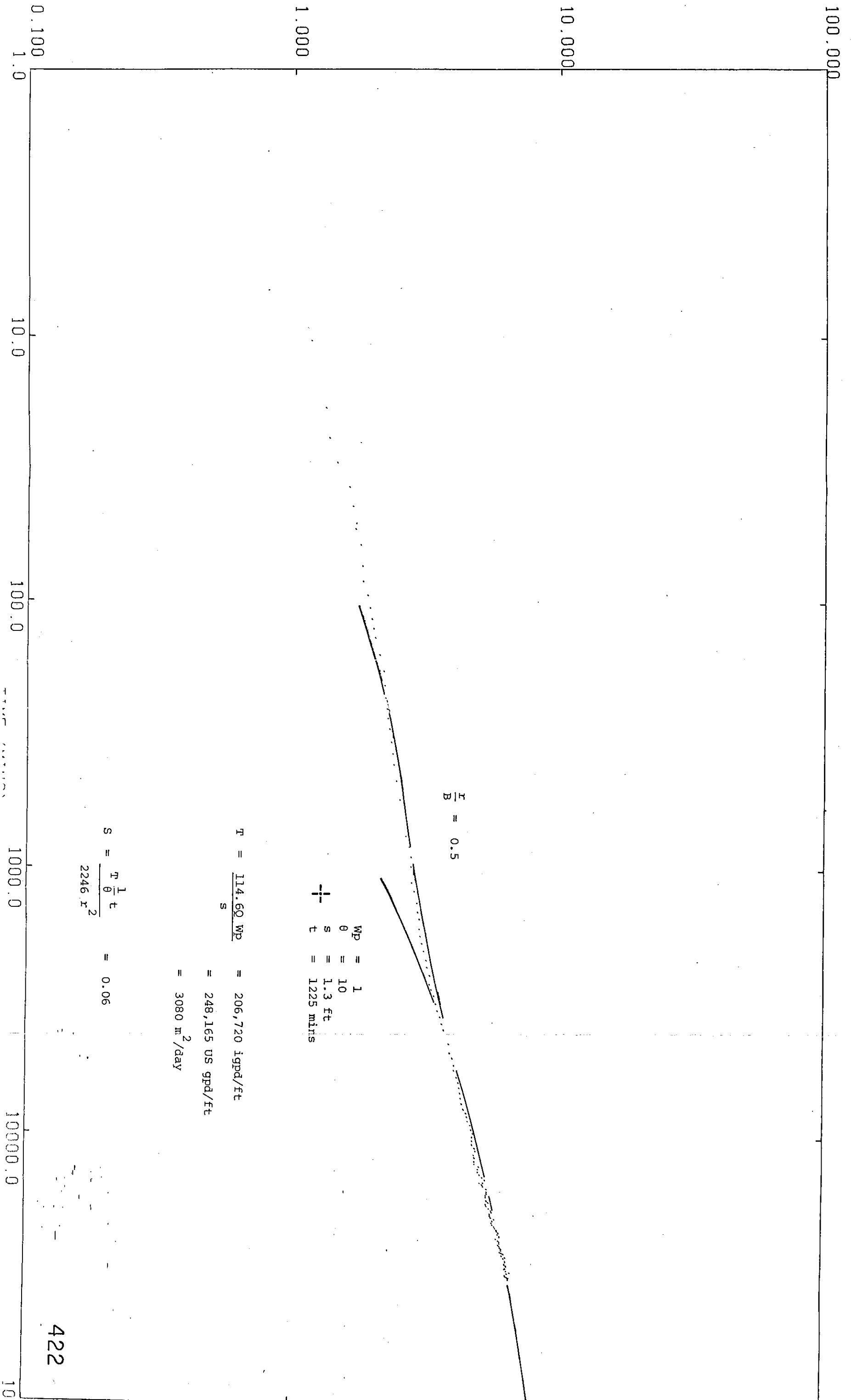
$S = \frac{r}{\theta} \frac{1}{t} = 1.2 \text{ (meaningless)}$   
 $2246 \text{ r}^2$

418

BEAL PLOT# 02082037.

DRAWDOWN FT.

WESTERN MINES LTD. R-190 PIEZOMETER 422 R=437 FT.



$\frac{r}{B} = 0.5$

+  
 WP = 1  
 θ = 10  
 S = 1.3 ft  
 t = 1225 mins

$T = \frac{114.6Q}{S}$  WP = 206,720 igpd/ft  
 = 248,165 US gpd/ft  
 = 3080 m<sup>2</sup>/day

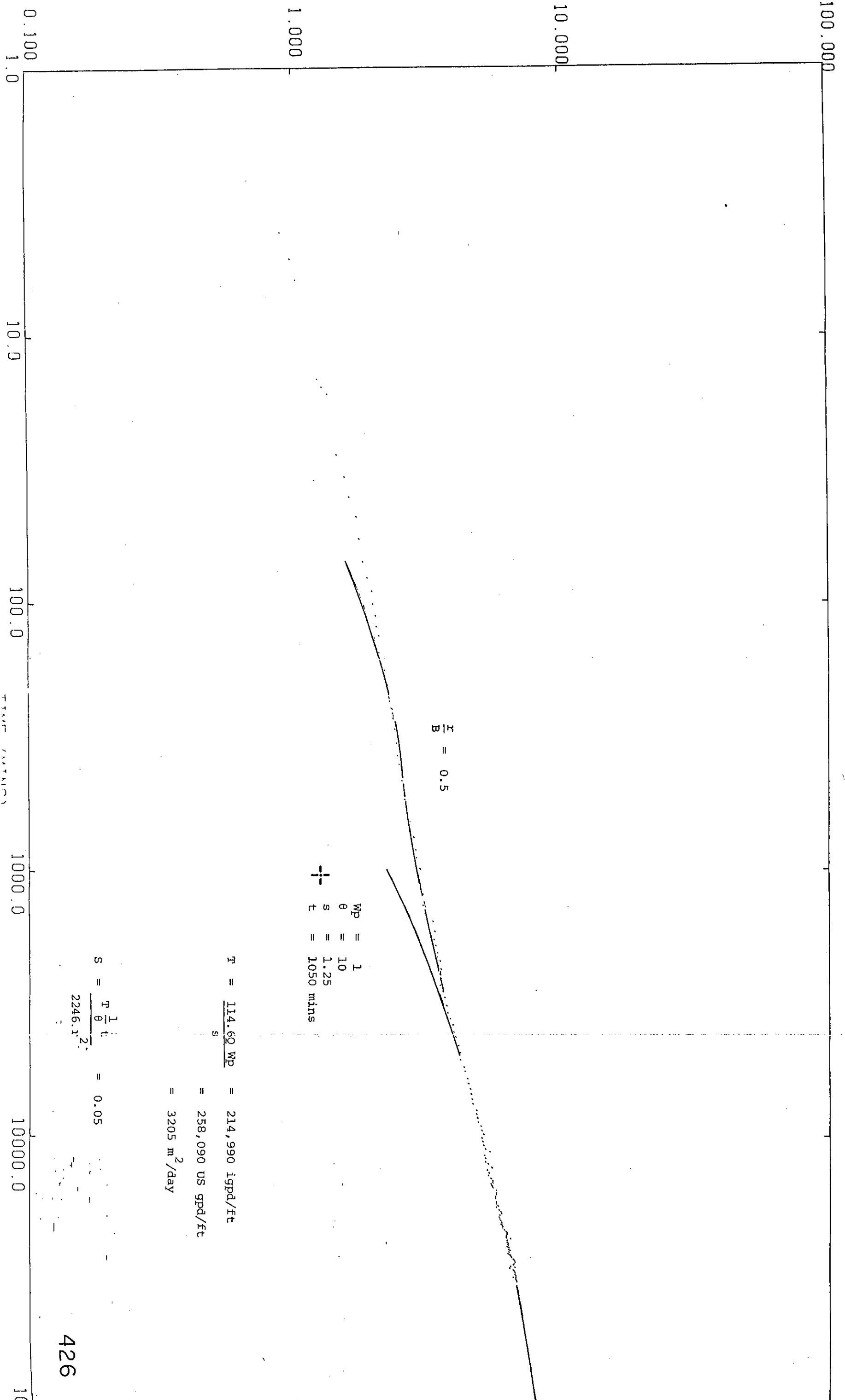
$S = \frac{T}{2246} \frac{1}{r^2} t$  = 0.06

422

BEAL PLOT# 02082038.

DRAWDOWN FT.

WESTERN MINES LTD. R-190 PIEZOMETER 426 R=428 FT.



$\frac{r}{B} = 0.5$

+  
 WP = 1  
 θ = 10  
 S = 1.25  
 t = 1050 mins

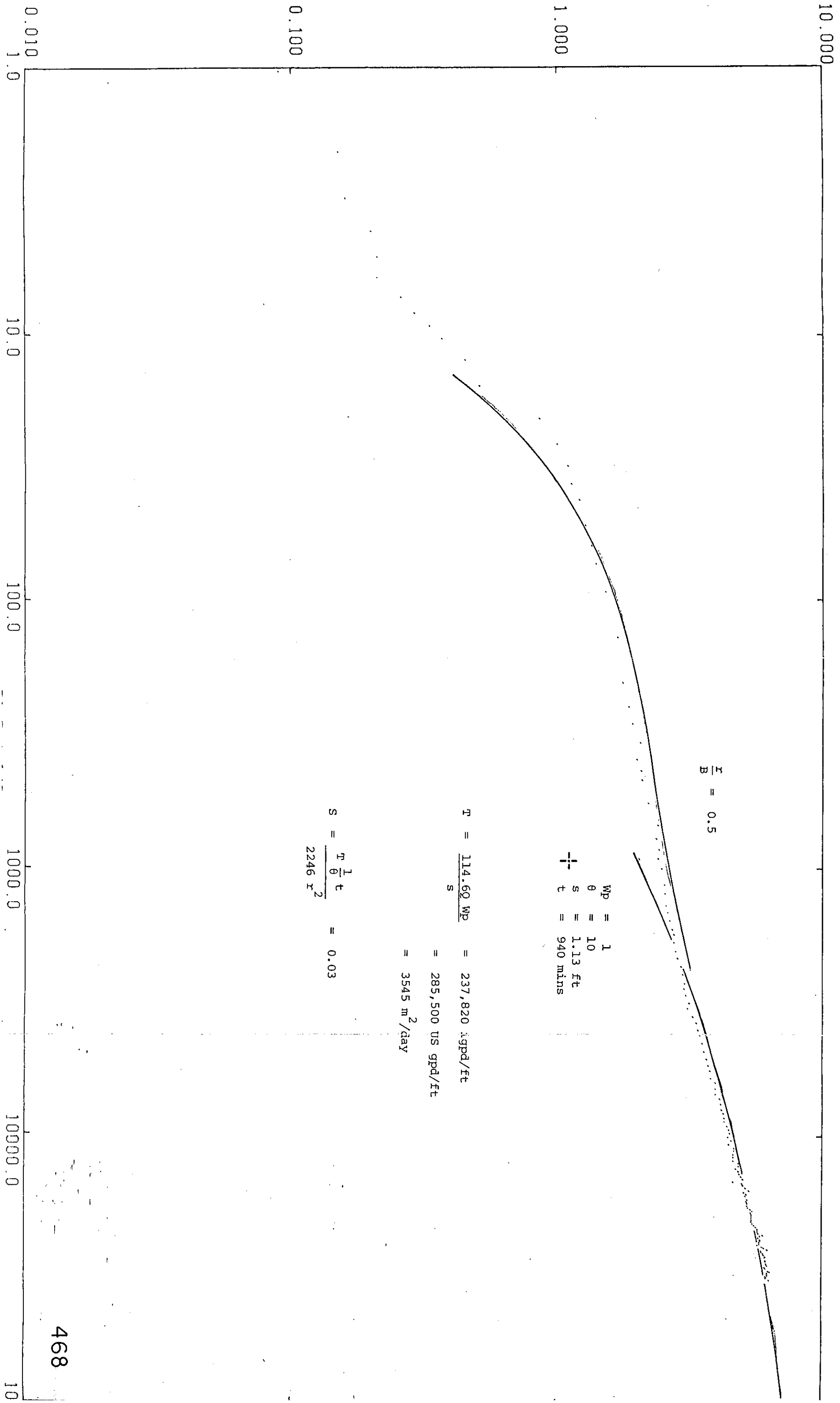
$T = \frac{114.6Q}{S} WP = 214,990 \text{ igpd/ft}$   
 $= 258,090 \text{ US gpd/ft}$   
 $= 3205 \text{ m}^2/\text{day}$

$S = \frac{r}{\theta} \frac{1}{t} = 0.05$   
 $2246.1^2$

426

DRAWDOWN FT.

WESTERN MINES LTD. R-190 PIEZOMETER 468 R=582 FT



$\frac{r}{R} = 0.5$

$\begin{matrix} \text{WP} & = & 1 \\ \theta & = & 10 \\ S & = & 1.13 \text{ Ft} \\ t & = & 940 \text{ mins} \end{matrix}$

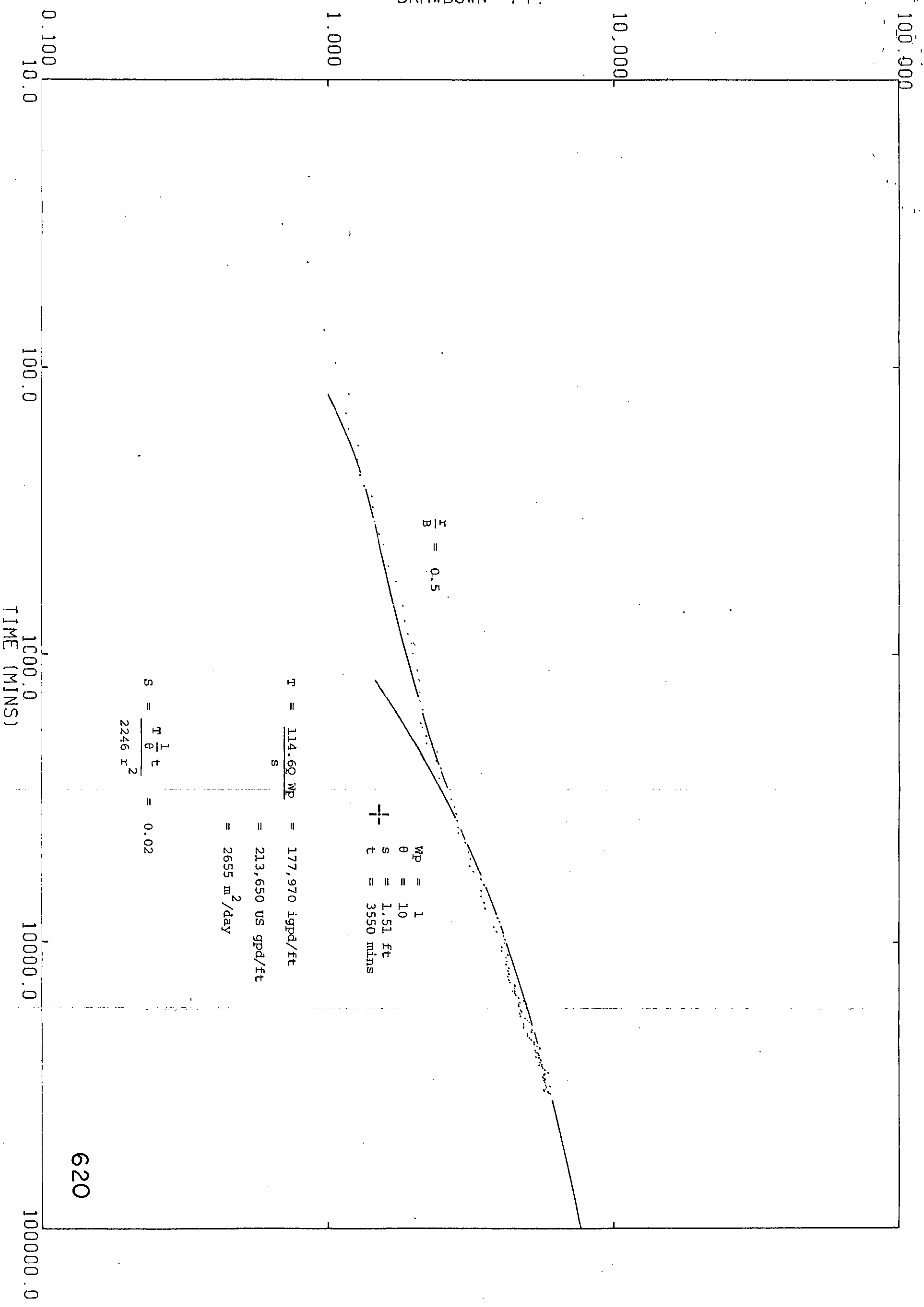
$\begin{matrix} T & = & \frac{114.6Q}{S} \text{ WP} & = & 237,820 \text{ gpd/Ft} \\ & & & = & 285,500 \text{ US gpd/Ft} \\ & & & = & 3545 \text{ m}^2/\text{day} \end{matrix}$

$S = \frac{T \frac{1}{\theta} t}{2246 r^2} = 0.03$

WESTERN MINES LTD. R-190 PIEZOMETER 620 R=1187FT.

BEAL PLOT# 02082040.

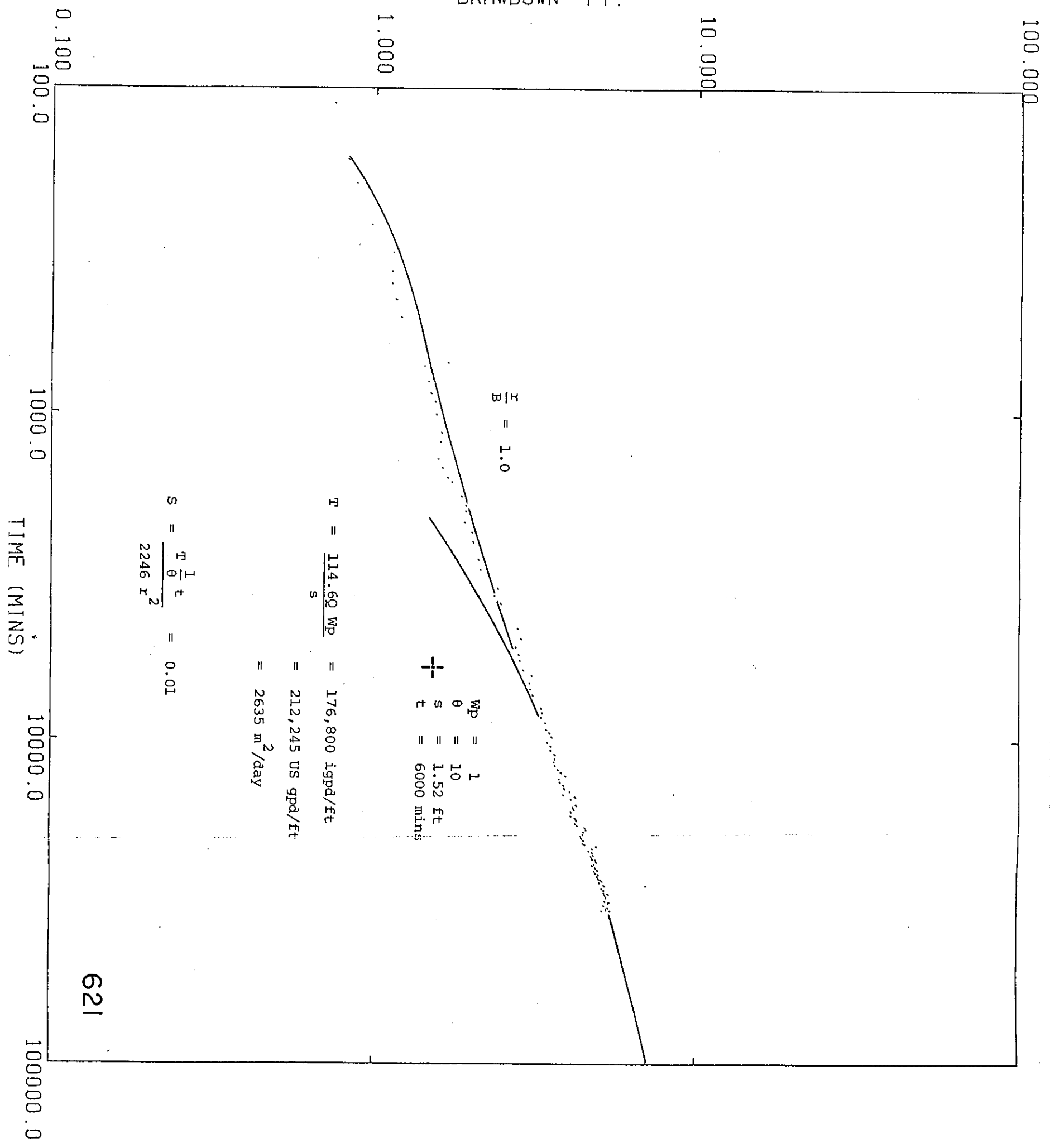
DRAWDOWN FT.



WESTERN MINES LTD. R-190 PIEZOMETER 621 R=2114 FT

BEAL PLOT# 02082041.

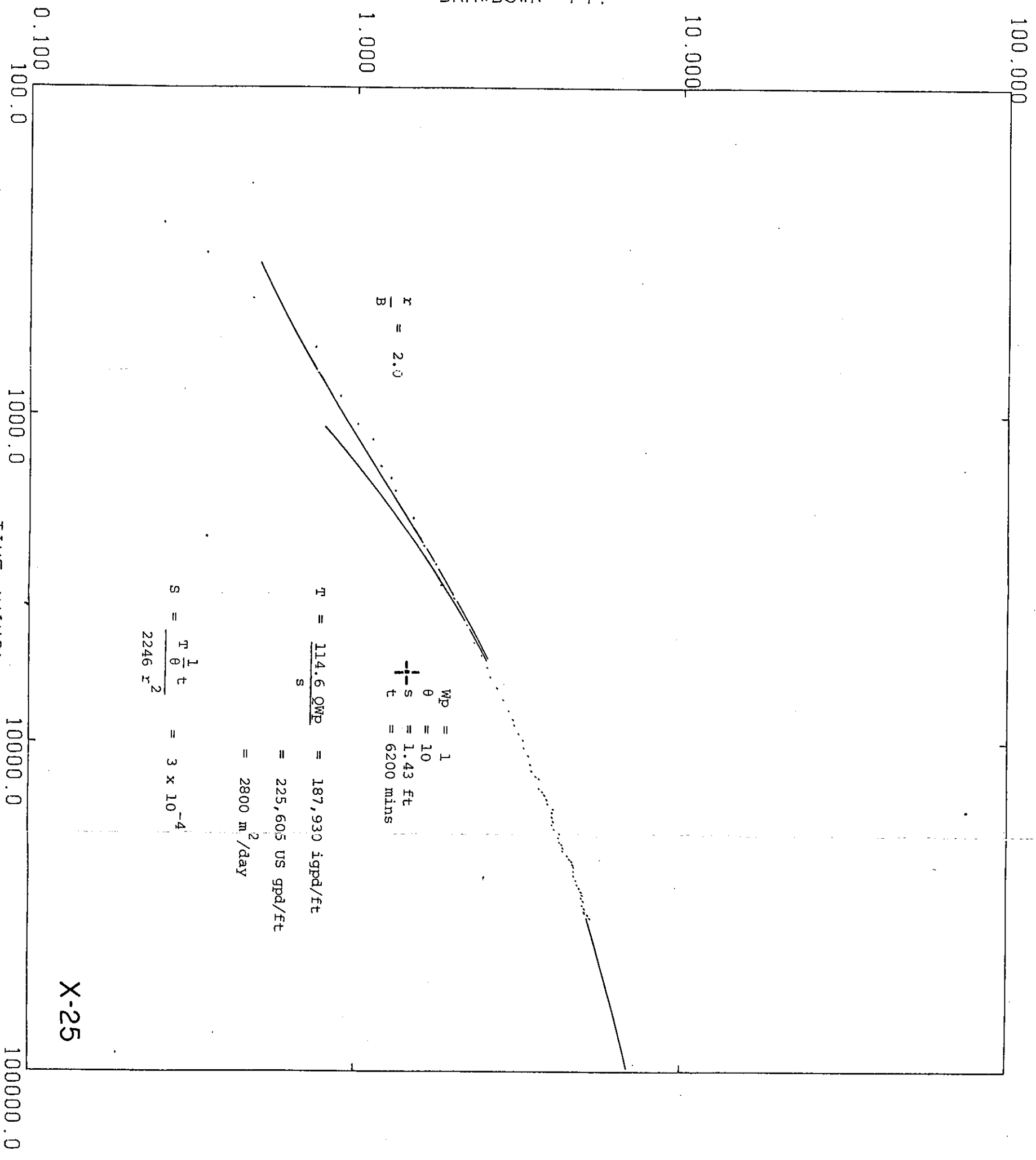
DRAWDOWN FT.



WESTERN MINES LTD. R-190 X-25 WELL R=13,546 FT

BEAL PLOT# 02082031.

DRAWDOWN FT.



$\frac{r}{B} = 2.0$

$W_p = 1$   
 $\theta = 10$   
 $s = 1.43 \text{ ft}$   
 $t = 6200 \text{ mins}$

$T = \frac{114.6 \text{ QWP}}{s} = 187,930 \text{ gpd/ft}$   
 $= 225,605 \text{ US gpd/ft}$   
 $= 2800 \text{ m}^2/\text{day}$

$S = \frac{T}{\theta} \frac{1}{t} = 3 \times 10^{-4}$   
 $\frac{2246}{r^2}$

X-25

SAMPLE #  
CLIENT SAMPLE I.D.1  
PUMP TEST

## TOTAL METALS (mg/L)

Aluminum	Al	< 0.15
Antimony	Sb	< 0.15
Arsenic	As	< 0.001
Barium	Ba	0.010
Beryllium	Be	< 0.003
Bismuth	Bi	< 0.5
Boron	B	0.44
Cadmium	Cd	< 0.001
Calcium	Ca	602.
Chromium	Cr	< 0.03
Cobalt	Co	< 0.02
Copper	Cu	0.006
Iron	Fe	0.050
Lead	Pb	0.002
Magnesium	Mg	178.
Manganese	Mn	0.011
Molybdenum	Mo	0.005
Nickel	Ni	< 0.025
Phosphorus	PO4	0.60
Potassium	K	4.45
Silicon	SiO2	11.3
Silver	Ag	< 0.03
Sodium	Na	92.4
Strontium	Sr	10.3
Tin	Sn	< 0.03
Titanium	Ti	< 0.006
Vanadium	V	< 0.010
Zinc	Zn	0.021

mg/L - milligrams per liter

9



# can test ltd.

1650 PANDORA STREET, VANCOUVER, B.C. V5L 1L6 • TELEPHONE 254-7278 • TELEX 04-54210

REPORTED TO BROWN, ERDMAN & ASSOCIATES LTD.  
1409 BEWICKE AVENUE  
NORTH VANCOUVER, B.C.

W/O NO. W-801204-002  
DATE JANUARY 7, 1981  
FILE NO: 9185D

ATTENTION MR. RICHARD VOGWILL  
SAMPLE TYPE WATER

We have tested the sample of water submitted by you on Dec. 3, 1980 and report as follows:

SAMPLE IDENTIFICATION:

The sample was submitted in a plastic bottles labelled:

WESTERN MINES  
80 - 190

R-190 End of Test  
12:50 Nov. 24/80  
5°C Pump Off 13:07

METHOD OF TESTING:

The analyses were carried out in accordance with procedures described in "Standard Methods for the Examination of Water and Wastewater (14th Edition)" published by the American Public Health Association, 1975.

RESULTS OF TESTING:

(on the following page)

REMARKS:

(on the following pages)

CAN TEST LTD.

Judi M. Mitchell, B.Sc.,  
Chemist

/cs

SAMPLE #  
CLIENT SAMPLE I.D.1  
WESTERN MINES

## PHYSICAL TESTS

pH	7.85
Conductivity (micromhos/cm)	3400.
Colour [Pt-Co scale] (CU)	15.
Turbidity (JTU)	7.3
Hardness (mg/L)	1950.

## SOLIDS (mg/L)

Total Suspended	< 0.5
Total Dissolved	3140.

## DISSOLVED ANIONS (mg/L)

Alkalinity: Bicarbonate	HCO <sub>3</sub>	382.
Alkalinity: Carbonate	CO <sub>3</sub>	Nil
Alkalinity: Hydroxide	OH	Nil
Chlorides	Cl	46.0
Sulfates	SO <sub>4</sub>	1780.
Nitrates and Nitrites	N	< 0.002
Ortho Phosphates	o-PO <sub>4</sub>	< 0.03
Fluorides	F	1.25

## DISSOLVED METALS (mg/L)

Arsenic	As	< 0.001
Cadmium	Cd	< 0.001
Calcium	Ca	520.
Copper	Cu	< 0.001
Iron	Fe	< 0.030
Lead	Pb	< 0.001
Magnesium	Mg	159.
Manganese	Mn	0.006
Molybdenum	Mo	0.006
Nickel	Ni	< 0.005
Potassium	K	4.54
Silicon	SiO <sub>2</sub>	9.75
Sodium	Na	79.8
Zinc	Zn	0.016

## TOTAL METALS (mg/L)

Iron	Fe	< 0.030
Manganese	Mn	0.007
Mercury	Hg	0.00007

## POLLUTANT TESTS (mg/L)

Total Organic Carbon	C	5.
Total Phosphate	PO <sub>4</sub>	0.18
Sulfides	S	66.


mg/L - milligrams per liter

REMARKS:

The water represented by the sample submitted can be characterized as a very hard water, also very high in dissolved mineralization.

For the parameters tested, the sample met the limit set by "Guidelines for Canadian Drinking Water Quality, 1978", published by authority of Health and Welfare, Canada, with the exception of turbidity (limit = 5.0 J.T.U.) total dissolved solids (limit = 500 mg/L), sulfates (limit = 500 mg/L) and sulfide (limit = 0.05 mg/L). The sample was also noted to be borderline with respect to color, to be approaching the limit for fluoride (1.5 mg/L) and to be high in calcium, magnesium and hardness.

Examination of these test results would indicate that the water represented by this sample is not acceptable as potable water.



APPENDIX 2

DRAWDOWN DATA



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE <input type="checkbox"/> USGPM <input type="checkbox"/> ICPM <input type="checkbox"/> LPS	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
							OVERBURDEN HOLE
							STATIC WATER LEVEL 23.27
Nov 1/80	10:31		88.62				1. BEA PROBE
							10" x 12" ORIFICE
							TEST START 10:45
Nov 1/80	10:49	4	93.87		5.25	5.25	COOLING LINE 10 gpm
	10:51	6	95.85	32½"	7.23	7.23	FLOW DOWN ½"
	10:54	9	100.45		11.83	11.83	
	11:00	15	100.82		12.20	12.21	
	11:05	20	100.80		12.18	12.19	
	11:10	25	101.05		12.43	12.44	
	11:15	30	101.25		12.63	12.65	
	11:20	35	101.10		12.48	12.50	
	11:25	40	101.27		12.65	12.67	
	11:30	45	101.26		12.64	12.66	
	11:35	50	101.27		12.65	12.68	
	11:45	60	101.45		12.83	12.86	
	11:55	70	101.45		12.83	12.87	
	12:05	80					
	12:15	90					
	12:26	101	101.50	32½"	12.88	12.91	FLOW ADJ. AT 12:45
	14:20	215					FLOW ADJ. AT 13:51
	14:31	226	102.94		14.32	14.44	103.4 FT (OLYMPIC PROBE)
	15:15	270	102.40		13.78	13.93	
	16:09	324	102.01		13.39	13.56	
	16:55	370	102.15		13.53	13.71	
	17:36	411	102.17		13.55	13.74	
	18:15	450	102.20		13.58	13.79	
	19:23	518	102.21		13.59	13.84	
	21:10	625	102.30		13.68	13.98	
	22:42	717	102.41		13.79	14.09	
Nov 2/80	00:38	833	102.51	32½-3/4"	13.89	14.20	FLOW ADJ. 23:20
	02:36	951	102.69		14.07	14.37	GOOD READING!
	05:30	1125	102.62		14.00	14.29	
	05:34	1129	102.68		14.06	14.35	GOOD READING!



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER □ FT □ M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				□ USGPM □ IOPM □ LPS			
Nov 2/80	06:49	1204	102.73	32½-3/4"	14.11	14.39	
	09:00	1335	102.78		14.16	14.40	
	10:35	1430	102.82		14.20	14.41	
	12:16	1531	102.94		14.32	14.51	
	13:50	1625	103.01		14.39	14.54	
	15:59	1754	103.10		14.48	14.56	
	17:35	1850	103.18	32½-3/4"	14.56	14.59	
	19:24	1959	103.35	32½-3/4"	14.73	14.72	FLOW MAY BE SLIGHTLY HIGH
	22:20	2135	103.55	32 3/4"	14.93	14.84	24.21 FT (OB) 20:40 Nov 2
Nov 3/80	00:18	2253	103.62	33" <sup>±</sup>	15.00	14.87	VALVE CLOSED SLIGHTLY
	02:54	2409	103.55	32½-3/4"	14.93	14.76	
	05:45	2580	103.69	32½-3/4"	15.07	14.83	
	08:15	2730	103.67		15.05	14.78	
	10:39	2874	103.68		15.06	14.77	
	14:14	3089	103.79		15.17	14.86	
	17:20	3275	103.81		15.19	14.87	
	20:30	3465	103.95	32½"	15.33	15.04	
	23:46	3661	103.96		15.34	15.09	
Nov 4/80	03:10	3865	104.02		15.40	15.21	
	06:30	4065	103.98		15.36	15.21	
	11:30	4365	103.94		15.32	15.26	
	17:53	4748	103.97	32½"	15.35	15.34	OPENED VALVE ¼ TURN AT
	21:30	4965	103.97	32½" <sup>±</sup>	15.35	15.35	22:35
Nov 5/80	02:30	5265	104.02		15.40	15.40	
	06:30	5505	104.01		15.39	15.38	
	12:34	5869	104.42	32½"	15.80	15.75	
	07:26	6161	104.50	32½-3/4"	15.88	15.81	
	22:21	6456	104.58	32½"	15.96	15.85	
Nov 6/80	03:30	6765	104.56	32½"	15.94	15.83	
	08:36	7071	104.58	32½"	15.96	15.85	WT in OB Hole 24.23 ft
	13:45	7380	104.75		16.13	16.02	
	19:48	7743	104.77	32½"	16.15	16.07	
	23:30	7965	104.78		16.16	16.12	
Nov 7/80	04:30	8265	104.70	32½"	16.08	16.10	
	09:41	8576	104.61	32½"	15.99	16.09	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> ICPM <input type="checkbox"/> LPS			
Nov 7/80	14:25	8860	104.60	32½"	15.98	16.15	
	19:30	9165	104.63	32½"	16.01	16.22	
Nov 8/80	00:30	9465	104.75	32½"	16.13	16.33	
	05:30	9765	104.78	32½"	16.16	16.34	
	10:24	10059	104.90	32½"	16.28	16.44	
	15:44	10379	104.9	32½"	16.28	16.39	
	20:30	10665	105.02	32½"	16.40	16.49	
Nov 9/80	01:30	10965	105.08	32½"	16.46	16.48	
	06:30	11265	105.12	32½"	16.50	16.45	
	11:31	11566	105.21	32½"	16.59	16.47	
	16:44	11879	105.25	32½"	16.63	16.45	
	21:30	12165	105.37	32½"	16.75	16.53	
Nov 10/80	02:30	12465	105.53	32½"	16.90	16.62	
	07:00	12735	105.47	32½"	16.85	16.53	
	12:35	13070	105.52	32½"	16.90	16.55	
	17:09	13344	105.62	32½"	17.00	16.66	
	22:30	13665	105.68	32½"	17.06	16.77	
Nov 11/80	03:30	13965	105.73	32½"	17.11	16.86	
	08:40	14275	105.75	32½"	17.13	16.92	
	09:55	14350	105.18	32-32¼"	16.56	16.35	ENGINE QUIT AT 09:00 a.m.
	13:38	14573	105.34	32-32½"	16.72	16.53	RESTARTED AT 09:25 a.m.
	17:27	14802	105.41	32-32½"	16.79	16.60	VALVE OPENED 1/4 TURN
Nov 12/80	23:30	15165	105.55	32-32½"	16.93	16.71	at 10:20 a.m.
	04:30	15465	105.62	32-32½"	17.00	16.74	
	08:30	15705	105.67	32½"	17.05	16.76	
	13:09	15984	105.80	32½"	17.18	16.83	
	16:35	16190	105.80	32½"	17.18	16.78	
Nov 13/80	00:30	16665	105.85	32½"	17.23	16.80	
	05:30	16965	105.78	32½"	17.17	16.76	
	10:20	17255	105.79	32½"	17.17	16.81	
	15:34	17569	105.71	32½"	17.09	16.80	
	20:30	17865	105.68	32½"	17.06	16.87	
Nov 14/80	01:30	18165	105.72	32½"	17.10	16.97	
	06:30	18465	105.83	32½"	17.21	17.10	
	11:25	18760	105.78	32½"	17.16	16.90	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER □ FT □ M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				□ USGPM □ IGPM □ LPS			
Nov 14/80	16:16	19051	105.94	32½"	17.32	16.96	
	21:30	19365	106.02	32½"	17.40	16.99	
Nov 15/80	02:30	19665	106.14	32½"	17.52	17.08	
	07:00	19935	106.09	32½"	17.47	16.99	
	13:15	20310	106.14	32½"	17.52	17.02	24.37 FT (OB)
	17:15	20550	106.21	32½"	17.59	17.08	
	22:30	20865	106.28	32½"	17.66	17.19	
Nov 16/80	03:30	21165	106.26	32½"	17.64	17.29	
	08:35	21470	106.22	32½"	17.60	17.43	
	13:23	21758	106.02	32½"	17.40	17.41	
	19:00	22095	105.80	32½"	17.18	17.34	
	20:00	22155	-----	32¼" INCREASED TO	32½"-----		
	23:30	22365	105.76	32½"	17.14	17.37	
Nov 17/80	04:30	22665	105.78	32½"	17.16	17.45	
	08:30	22905	105.80	32½"	17.18	17.47	
	14:32	23267	105.69	32½"	17.07	17.30	
	19:30	23565	105.84	32½"	17.22	17.37	
Nov 18/80	00:30	23865	105.98	32½"	17.36	17.43	
	05:30	24165	106.09	32½"	17.47	17.45	
	10:22	24457	106.08	32½"	17.46	17.37	
	15:30	24765	106.16	32½"	17.54	17.44	
	20:30	25065	106.30	32½"	17.68	17.57	
Nov 19/80	01:30	25365	106.24	32½"	17.62	17.54	
	06:30	25665	106.28	32½"	17.66	17.54	
	09:50	25865	106.38	32-32½"	17.76	17.63	VALVE OPENED 1/4 TURN
	11:47	25982	106.38	32½"	17.76	17.59	
	16:30	26265	106.48	32½"	17.86	17.64	
	21:30	26565	106.56	32½"	17.94	17.70	
Nov 20/80	02:30	26865	106.56	32½"	17.94	17.73	
	09:15	27270	106.48		17.86	17.80	
	12:49	27484	106.42		17.80	17.82	
	22:30	28065	106.32	32½"	17.70	17.90	
Nov 21/80	03:30	28365		GAUGE O/S			
	08:24	28659	106.35		17.73	17.90	
	13:49	28984	106.30		17.18	17.79	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER □ FT □ M	t	RESIDUAL DRAW- DOWN	t/t	REMARKS
				RECOVERY			
Nov 24/80	13:20	33275	94.10	13	5.48	2559.6	
	13:55	33310	93.73	48	5.11	693.96	
	14:34	33349	93.50	87	4.88	383.3	
	16:16	33451	93.20	189	4.58	176.99	
	17:20	33515	93.05	253	4.43	132.5	
	19:43	33658	92.82	396	4.20	84.99	
	21:00	33735	92.75	473	4.13	71.3	
	22:00	33795	92.66	533	4.04	63.4	
	23:00	33855	92.70	593	4.08	57.1	
Nov 25/80	00:00	33915	92.58	653	3.96	51.94	
	01:00	33975	92.55	713	3.93	47.7	
	02:00	34035	92.47	773	3.85	44.0	
	03:00	34095	92.37	833	3.75	40.9	
	04:00	34155	92.35	893	3.73	38.2	
	05:00	34215	92.27	953	3.65	35.9	
	06:00	34275	92.20	1013	3.58	33.8	
	07:00	34335	92.08	1073	3.46	32.01	
	09:13	34468	92.01	1206	3.39	28.6	
	10:19	34534	91.96	1272	3.34	27.1	
	11:49	34624	91.88	1362	3.26	25.4	
	12:49	34684	91.88	1422	3.26	24.4	
	14:43	34798	91.79	1536	3.17	22.7	
	16:20	34895	91.74	1633	3.12	21.4	
	17:53	34988	91.70	1726	3.08	20.3	
	19:45	35100	91.61	1838	2.99	19.1	
	21:05	35180	91.54	1918	2.92	18.3	
	22:30	35265	91.60	2003	2.98	17.6	
Nov 26/80	00:00	35355	91.70	2093	3.08	16.9	
	01:30	35445	91.76	2183	3.14	16.2	
	09:00	35895	91.59	2633	2.97	13.6	
	14:00	36195	91.47	2933	2.85	12.3	
	16:00	36315	91.25	3053	2.63	11.9	
Nov 27/80	10:25	37420	90.26	4158	1.64	08.999	
							WELL MEASURED AT 535 FT.



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80	10:03		85.18				1. BEA PROBE (BDRX)
	10:05		30.84				2. BEA PROBE (OB)
Nov 1/80	10:04		30.97				2. WELL SOUNDER
	10:05		85.00				1. WELL SOUNDER
	10:45						<u>START 10:45</u>
	10:46	1	85.25		0.25	0.25	
	10:47	2	84.58				
	10:49	4	83.10				
	10:50	5	83.45				
	10:52	7	82.74				
	10:53	8	81.36				
	10:55	10	83.89				
	10:57	12	83.69				
	11:00	15	83.81				
	11:11	26	83.91				
	11:21	36	83.91				
	11:27	42	83.99				
	11:40	55	84.17				
	11:49	64	84.20				
	12:03	78	84.27				
	12:13	88	84.30				
	12:27	102	84.46				
	12:51	126	84.34				
	13:09	144	84.23				
	13:28	163	84.37				13:30, 30.95 ft (OB)
	13:53	188	84.33				
	14:15	210	84.34				
	14:24	237	84.35				
	15:04	259	84.38				
	15:28	283	84.41				
	15:52	307	84.45				
	16:28	343	84.52				GAS BUBBLES CAUSING WATER
	17:05	380	84.53				LEVEL FLUCTUATIONS.
	17:39	414	84.55				



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> ICPM <input type="checkbox"/> LPS			
Nov 1/80	18:34	469	84.56				
	19:54	549	84.52				
	21:54	669	84.51				
	23:12	747	84.62				
Nov 2/80	00:15	780	84.56				
	01:21	846	84.90				
	02:40	925	84.68				
	05:05	1070	84.88				
	06:33	1158	85.00				
	08:48	1293	84.98				
	10:33	1365	85.16		0.16	0.40	
	12:05	1490	85.42		0.42	0.62	
	14:07	1612	85.55		0.55	0.71	
	15:35	1700	85.66		0.66	0.77	
	17:51	1836	85.74		0.74	0.78	
	19:35	1940	86.13		1.13	1.12	FIRST FLICK
	22:12	2097	86.13		1.13	1.06	
Nov 3/80	00:45	2280	86.40		1.40	1.27	BLEACH ADDED
	03:12	2427	86.51		1.51	1.33	
	06:31	2616	86.81		1.81	1.57	FLUCTUATING
	08:40	2755	86.81		1.81	1.54	
	11:09	2904	86.70		1.70	1.41	VERY ERRATIC
	14:38	3113	86.95		1.95	1.64	
	17:51	3306	86.91		1.91	1.60	
	20:55	3490	86.92		1.92	1.63	
Nov 4/80	00:13	3688	86.87		1.87	1.62	
	03:45	3900	86.78		1.78	1.59	
	07:00	4095	86.50		1.50	1.37	
	12:17	4412	86.80		1.80	1.75	
	17:28	4723	86.84		1.84	1.83	
	22:18	5013	86.82		1.82	1.82	
Nov 5/80	02:58	5293	87.10		2.10	2.10	
	07:00	5535	87.56		2.56	2.54	
	12:50	5885	87.20		2.20	2.15	OB WATER TABLE 30.80 FT
	17:34	6169	87.61		2.61	2.53	METER CHECKED, WORKS
	23:00	6495	87.28		2.28	2.17	WELL IN FRESH WATER



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 6/80	04:09	6804	87.35		2.35	2.24	
	08:55	7090	87.40		2.40	2.29	
	14:12	7407	87.47		2.47	2.36	
	20:13	7768	87.30		2.30	2.22	
	23:58	7993	87.32		2.32	2.28	
Nov 7/80	04:57	8292	87.35		2.35	2.38	
	09:52	8587	87.24		2.24	2.34	
	14:55	8890	87.60		2.60	2.79	
	19:53	9188	87.50		2.50	2.71	
Nov 8/80	00:54	9489	87.72		2.72	2.92	
	05:55	9790	87.98		2.98	3.16	
	10:53	10088	88.12		3.12	3.27	
	16:08	10403	88.20		3.20	3.31	
	20:55	10690	87.90		2.90	2.98	
Nov 9/80	01:56	10991	88.01		3.01	3.02	
	06:58	11293	88.58		3.58	3.53	
	11:40	11575	88.20		3.20	3.08	
	17:15	11910	88.80		3.80	3.61	
	21:55	12190	88.40		3.40	3.17	
Nov 10/80	02:53	12488	88.22		3.22	2.94	
	07:23	12758	88.46		3.46	3.14	
	13:08	13103	88.56		3.56	3.21	
	17:29	13335	88.47		3.47	3.13	
	22:54	13689	88.30		3.30	3.02	
Nov 11/80	03:55	13990	89.00		4.00	3.76	
	09:41	14336	88.77		3.77	3.57	AFTER PUMP STOPPED
	13:52	14587	89.12		4.12	3.93	
	17:50	14825	89.37		4.37	4.18	
	23:53	15188	89.20		4.20	3.98	
Nov 12/80	04:53	15488	88.70		3.70	3.43	
	08:51	15726	88.72		3.72	3.43	
	13:27	16002	88.81		3.81	3.46	
	16:53	16208	89.32		4.32	3.92	
Nov 13/80	00:52	16687	88.55		3.55	3.12	
	05:53	16988	88.50		3.50	3.10	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER		RATE <input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
			<input type="checkbox"/> FT	<input type="checkbox"/> M				
Nov 13/80	10:38	17273	89.07			4.07	3.72	
	15:55	17590	88.95			3.95	3.67	
	20:55	17890	88.70			3.70	3.51	
Nov 14/80	01:57	18192	88.60			3.60	3.48	
	06:53	18488	88.70			3.70	3.59	
	11:42	18777	89.34			4.34	4.07	
	17:00	19095	89.68			4.68	4.32	
	21:53	19388	89.75			4.75	4.34	
Nov 15/80	02:53	19688	90.00			5.00	4.56	
	07:23	19965	90.00			5.00	4.52	
	13:30	20325	90.00			5.00	4.50	30.91 ft (OB)
	17:32	20567	89.92			4.92	4.41	
	22:54	20889	90.00			5.00	4.53	
Nov 16/80	03:54	21189	90.00			5.00	4.65	
	08:52	21487	89.76			4.76	4.59	
	13:40	21775	88.93			3.93	3.94	
	19:22	22117	88.80			3.80	3.96	
	23:53	22388	88.80			3.80	4.04	
Nov 17/80	04:52	22687	88.85			3.85	4.15	
	08:40	22915	88.97			3.97	4.27	
	14:49	23284	88.92			3.92	4.15	
	19:52	23587	89.07			4.07	4.22	
Nov 18/80	00:55	23890	89.20			4.20	4.27	
	05:53	24188	89.25			4.25	4.23	
	10:38	24473	89.68			4.68	4.59	
	15:46	24781	90.00			5.00	4.90	
	20:52	25087	90.00			5.00	4.89	
Nov 19/80	01:52	25387	90.20			5.20	5.11	
	06:52	25687	90.12			5.20	5.08	
	12:36	26031	90.39			5.39	5.21	
	16:47	26282						
	21:52	26587	89.70			4.70	4.46	
Nov 20/80	02:52	26887	89.50			4.50	4.30	
	09:43	27298	89.75			4.75	4.70	
	13:13	27508	89.68			4.68	4.71	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80	09:45		83.94				1. BEA PROBE (BDRX)
	09:48		52.22				2. BEA PROBE (OB)
Nov 1/80	09:46		52.55				2. OLYMPIC PROBE
	09:48		84.39				1. OLYMPIC PROBE TEST START 10:45
Nov 1/80	10:49	4	85.29		0.90	0.90	
	10:50	5	85.37		0.98	0.98	
	10:51	6	85.41		1.02	1.02	
	10:59	14	85.62		1.23	1.23	
	11:00	15	85.66		1.27	1.28	
	11:01	16	85.72		1.33	1.34	
	11:12	27	85.83		1.44	1.45	
	11:17.5	32.5	85.92		1.53	1.55	
	11:24	39	85.98		1.59	1.61	
	11:31	46	86.07		1.68	1.71	
	11:40	55					2. 52.59 FT (OB)
	11:41	56	86.11		1.72	1.75	
	11:53	68	86.15		1.76	1.80	
	12:01	76					2. 52.58 FT (OB)
	12:03	78	86.23		1.84	1.88	
	12:13	88	86.29		1.90	1.95	
	12:23	98	86.31		1.92	1.97	
	12:33	108	86.34		1.95	2.01	
	12:43	118	86.36		1.97	2.03	
	12:53	128	86.38		2.00	2.07	
13:13	148	86.39		2.00	2.08		
13:37	172	86.47		2.08	2.17		
14:00	195	86.51		2.12	2.22		
14:23	218	86.52		2.13	2.25		
14:47	242	86.56		2.17	2.30		
15:09	264	86.57		2.18	2.32		
15:34	289	86.39		2.20	2.36		
16:10	325	86.62		2.23	2.40		
16:48	363	86.63		2.24	2.42		



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER □ FT □ M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				□ USGPM □ IGPM □ LPS			
Nov 1/80	17:17	392	86.66		2.27	2.46	
	18:16	451	86.69		2.30	2.51	
	19:35	530	86.70		2.31	2.57	
	21:26	641	86.79		2.40	2.69	
	22:54	729	86.86		2.47	2.77	
Nov 2/80	00:15	810	86.90		2.51	2.82	
	01:13	868	86.92		2.53	2.84	
	02:40	955	87.01		2.62	2.92	
	05:00	1095	87.02		2.63	2.92	
	06:29	1184	87.10		2.71	2.99	
	08:30	1305	87.14		2.75	3.00	
	10:09	1404	87.22		2.83	3.04	
	11:48	1503	86.74		3.05	3.25	NEW PROBE
	13:59	1634	86.84		3.15	3.30	
	15:52	1747	86.90		3.21	3.29	
	17:31	1846	87.00		3.31	3.34	
	19:29	1964	87.08		3.39	3.39	
	21:56	2111	87.22		3.53	3.46	
Nov 3/80	00:24	2259	87.30		3.61	3.49	
	02:57	2355	87.31		3.62	3.47	
	06:00	2595	87.41		3.72	3.48	
	08:24	2739	87.52		3.83	3.56	
	10:48	2883	87.57		3.88	3.59	
	14:23	3098	87.66		3.97	3.66	
	17:24	3279	87.71		4.02	3.70	
	20:38	3473	87.76		4.07	3.78	
	23:56	3671	87.80		4.11	3.86	
Nov 4/80	03:24	3879	87.78		4.09	3.90	
	06:40	4075	87.78		4.09	3.95	
	11:50	4385	87.76		4.09	4.03	
	17:43	4695	87.81		4.12	4.11	
	21:40	4975	87.88		4.19	4.12	
Nov 5/80	02:39	5274	87.92		4.23	4.23	
	06:40	5515	87.98		4.29	4.28	
	12:46	5881	88.09		4.40	4.35	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 5/80	17:34	6169	88.17		4.48	4.41	
	22:30	6465	88.28		4.59	4.48	
Nov 6/80	03:37	6772	88.29		4.60	4.49	
	08:47	7082	88.33		4.64	4.53	
	13:45	7380	88.38		4.69	4.58	2. 52.32 FT (OB)
	19:59	7754	88.47		4.78	4.70	
	23:39	7974	88.44		4.75	4.70	
	04:40	8275	88.41		4.72	4.74	
	09:43	8578	88.38		4.69	4.79	
	14:37	8872	88.40		4.71	4.89	
Nov 8/80	19:39	9174	88.40		4.71	4.92	
	00:38	9473	88.50		4.81	5.01	
	05:39	9774	88.45		4.76	4.94	
	10:29	10064	88.50		4.81	4.96	
	15:52	10387	88.58		4.89	5.00	
Nov 9/80	20:40	10675	88.68		4.99	5.07	
	01:39	10974	88.78		5.09	5.28	
	06:43	11278	88.79		5.10	5.05	
	11:34	11569	88.89		5.20	5.08	
	16:55	11890	88.97		5.28	5.10	
Nov 10/80	21:21	12156	89.13		5.44	5.22	
	02:38	12473	89.22		5.63	5.35	
	07:09	12744	89.19		5.50	5.18	
	12:53	13088	89.27		5.58	5.23	
	17:15	13350	89.23		5.54	5.20	
Nov 11/80	22:40	13675	89.30		5.61	5.32	
	03:40	13975	89.36		5.67	5.42	
	08:53	14288	89.29		5.60	5.40	
	10:10	14365	89.20		5.51	5.31	AFTER PUMP SHUTDOWN
	13:42	14577	89.26		5.57	5.38	
Nov 12/80	17:35	14810	89.30		5.61	5.42	
	23:39	15174	89.50		5.81	5.59	
	04:37	15472	89.52		5.83	5.57	
	08:38	15713	89.54		5.85	5.56	
	13:16	15991	89.58		5.89	5.55	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 12/80	16:43	16198	89.63		5.94	5.54	
Nov 13/80	00:38	16673	89.68		5.99	5.57	
	05:38	16973	89.66		5.97	5.57	
	10:26	17261	89.69		6.00	5.65	
	15:40	17575	89.55		5.86	5.58	
	20:38	17873	89.57		5.88	5.69	
Nov 14/80	01:39	18174	89.62		5.93	5.80	
	06:38	18473	89.63		5.94	5.83	
	11:32	18767	89.71		6.02	5.76	
	16:23	19058	89.76		6.07	5.71	
	21:38	19373	89.85		6.16	5.75	
Nov 15/80	02:38	19673	89.93		6.24	5.80	
	07:07	19942	90.00		6.31	5.83	
	12:00	20235	90.01		6.32	5.83	
	13:25	20320	90.00		6.31	5.81	2. 52.60 FT (OB)
	17:22	20557	90.07		6.38	5.87	
	22:37	20872	90.06		6.37	5.90	
Nov 16/80	03:38	21173	90.03		6.34	5.99	
	08:41	21476	89.91		6.22	6.05	
	13:30	21765	89.78		6.09	6.10	
	19:09	22104	89.64		5.95	6.11	
	23:38	22373	89.58		5.81	6.05	
Nov 17/80	04:37	22672	89.56		5.79	6.08	
	08:30	22905	89.69		6.00	6.29	
	14:38	23273	89.60		5.91	6.14	
	19:38	23573	89.68		5.99	6.14	
Nov 18/80	00:38	23873	89.77		6.08	6.15	
	05:38	24173	89.87		6.18	6.16	
	10:27	24462	89.92		6.23	6.14	
	15:36	24771	90.00		6.31	6.21	
	20:37	25062	90.02		6.33	6.22	
Nov 19/80	01:37	25372	90.01		6.32	6.24	
	06:37	25672	90.01		6.32	6.20	
	12:20	26015	90.04		6.35	6.17	
	16:36	26271	90.17		6.48	6.26	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER □ FT □ M	t	RESIDUAL DRAW-DOWN	t/t	REMARKS
Nov 24/80	13:27	33282	89.30	20	5.91	1664.1	
	13:58	33313	88.99	51	5.30	653.2	
	14:42	33357	88.78	95	5.09	351.1	
	16:21	33456	88.64	194	4.95	172.5	
	17:22	33517	88.56	255	4.87	131.4	
	19:50	33665	88.35	403	4.66	83.5	
	21:06	33741	88.16	479	4.47	70.4	
	22:07	33802	88.13	540	4.44	62.6	
	23:07	33862	88.13	600	4.44	56.4	
Nov 25/80	00:07	33922	88.05	660	4.36	51.4	
	01:07	33982	87.90	720	4.21	47.2	
	02:07	34042	87.80	780	4.11	43.6	
	03:07	34102	87.77	840	4.08	40.6	
	04:07	34162	87.72	900	4.03	37.95	
	05:07	34222	87.64	960	3.95	35.6	
	06:07	34282	87.53	1020	3.84	33.6	
	07:07	34342	87.56	1080	3.87	31.8	
	09:18	34473	87.50	1211	3.81	28.5	
	10:23	34538	87.43	1276	3.74	27.1	
	11:56	34631	87.41	1369	3.72	25.3	
	12:52	34687	87.38	1425	3.69	24.3	
	14:49	34804	87.29	1542	3.60	22.6	
	16:22	34897	87.24	1635	3.55	21.3	
	17:59	34994	87.24	1732	3.55	20.2	
	19:52	35107	87.20	1845	3.51	19.0	
	21:10	35185	87.16	1923	3.47	18.3	
	22:37	35272	87.20	2010	3.51	17.5	
Nov 26/80	00:05	35360	87.32	2098	3.63	16.9	
	01:36	35451	87.27	2189	3.58	16.2	
	09:08	35903	87.23	2641	3.54	13.6	
	14:05	36200	87.08	2938	3.39	12.3	
	16:08	36323	87.05	3061	3.36	11.9	
Nov 27/80	10:45	37440	86.33	4178	2.64	8.96	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80	09:38		71.13				2. BEA PROBE (OB)
	09:39		84.67				1. BEA PROBE (BDRX)
Nov 1/80	09:41		71.07				2. OLYMPIC
	09:42		84.65				1. OLYMPIC
	09:45		84.65				S.W.L. <u>TEST START 10:45</u>
Nov 1/80	10:46	1	86.06		1.41	1.41	
	10:50	5	86.56		1.91	1.91	
	10:52	7	86.57		1.92	1.92	
	10:55	10	86.70		2.05	2.05	
	10:58	13	86.80		2.15	2.16	
	11:01	16	86.86		2.21	2.22	
	11:06	21	86.95		2.30	2.31	
	11:10	25	87.05		2.40	2.41	784
	11:15	30	87.21		2.56	2.58	
	11:25	40	87.25		2.60	2.64	
	11:34	49	87.32		2.67	2.70	
	11:44	59	87.39		2.74	2.77	
	12:02	77	87.48		2.83	2.87	
	12:12	87	87.52		2.87	2.92	
	12:49	124	87.68		3.03	3.10	
	13:25	160	87.70		3.05	3.14	
	13:52	187	87.75		3.10	3.20	
	14:25	220	87.78		3.13	3.25	
	15:17	272	87.83		3.18	3.32	
15:58	313	87.86		3.21	3.37		
16:36	351	87.89		3.24	3.41		
16:55	370	87.92		3.27	3.45		
17:35	410	87.94		3.29	3.48		
18:17	452	87.91		3.32	3.53		
19:27	522	87.93		3.28	3.53		
21:17	632	87.95		3.30	3.60		
22:34	709	87.99		3.34	3.63		
Nov 2/80	00:10	805	88.08		3.43	3.74	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> ICPM <input type="checkbox"/> LPS			
Nov 2/80	01:13	868	88.09		3.44	3.75	
	02:32	947	88.10		3.45	3.75	
	04:59	1094	88.18		3.49	3.79	
	06:25	1180	88.26		3.61	3.89	
	08:24	1299	88.39		3.74	3.99	
	10:04	1399	88.50		3.85	4.06	
	11:41	1496	88.55		3.90	4.10	
	11:44	1499	89.14		3.90	4.10	PROBE FROM 412
	13:57	1632	89.27		4.03	4.18	ALL DEPTH TO WATER
	15:57	1752	89.35		4.11	4.19	MEASUREMENTS FROM
	17:37	1852	89.40		4.16	4.19	HERE HAVE TO HAVE
	19:30	1965	89.52		4.28	4.27	0.59 FT SUBTRACTED
	22:03	2118	89.63		4.39	4.32	FROM THEM TO BE CON-
Nov 3/80	00:26	2261	89.75		4.51	4.38	SISTENT. DRAWDOWNS
	03:17	2432	89.80		4.56	4.38	HAVE ALREADY BEEN
	05:55	2590	89.90		4.66	4.42	CHANGED.
	08:17	2732	89.99		4.75	4.48	
	10:46	2881	90.06		4.82	4.53	
	14:17	3092	90.14		4.90	4.59	
	17:17	3272	90.22		4.98	4.66	
	20:31	3466	90.26		5.02	4.73	
	23:53	3668	90.30		5.06	4.82	
Nov 4/80	03:15	3870	90.25		5.01	4.82	
	06:37	4072	90.27		5.03	4.89	
	11:44	4379	90.28		5.04	4.98	
	17:49	4744	90.30		5.06	5.05	
	21:32	4967	90.35		5.11	5.11	
Nov 5/80	02:36	5271	90.41		5.17	5.17	
	06:32	5507	90.44		5.20	5.19	
	12:38	5873	90.57		5.33	5.28	
	17:25	6160	90.64		5.40	5.33	
	22:26	6461	90.73		5.49	5.38	
Nov 6/80	03:32	6767	90.75		5.51	5.40	
	08:44	7079	90.75		5.51	5.40	
	13:48	7383	90.83		5.59	5.48	71.31 FT (OB)
	19:56	7751	90.95		5.71	5.63	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 6/80	23:32	7967	90.98		5.74	5.69	
Nov 7/80	04:36	8271	90.91		5.67	5.69	71.28 FT (OB)
	09:45	8580	90.83		5.59	5.69	
	14:34	8869	90.87		5.63	5.80	
	19:32	9167	90.91		5.67	5.88	
Nov 8/80	00:35	9470	90.97		5.73	5.93	
	05:32	9767	90.97		5.73	5.91	
	10:33	10068	91.00		5.76	5.91	
	15:46	10381	91.05		5.81	5.92	
	20:36	10671	91.12		5.88	5.96	
Nov 9/80	01:32	10967	91.22		5.98	5.99	
	06:38	11273	91.21		5.97	5.92	
	11:31	11566	91.28		6.04	5.92	
	16:49	11884	91.43		6.19	6.01	
	21:32	12167	91.57		6.23	6.01	
Nov 10/80	02:35	12470	91.65		6.34	6.06	
	07:02	12737	91.67		6.43	6.11	
	12:44	13079	91.66		6.42	6.08	
	17:10	13345	91.71		6.47	6.13	
	22:35	13670	91.80		6.56	6.27	
Nov 11/80	03:33	13968	91.85		6.61	6.37	
	08:50	14285	91.78		6.54	6.34	
	09:58	14353	91.58		6.34	6.14	AFTER PUMP STOPPED
	13:39	14574	91.76		6.52	6.33	
	17:30	14805	91.76		6.52	6.33	
	23:35	15170	91.93		6.69	6.47	
Nov 12/80	04:32	15467	92.00		6.76	6.50	
	08:36	15711	92.06		6.82	6.53	
	13:10	15985	92.07		6.83	6.48	
	16:40	16195	92.13		6.89	6.49	
Nov 13/80	00:32	16667	92.28		7.04	6.61	
	05:35	16970	92.27		7.03	6.62	
	10:21	17256	92.09		6.85	6.49	
	15:38	17573	92.06		6.82	6.53	
	20:32	17867	92.10		6.86	6.67	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> ICFM <input type="checkbox"/> LPS			
Nov 14/80	01:35	18170	92.18		6.94	6.81	
	06:32	18467	92.14		6.90	6.79	
	11:29	18764	92.20		6.96	6.71	
	16:18	19053	92.29		7.05	6.70	
	21:35	19370	92.40		7.16	6.75	
Nov 15/80	02:32	19667	92.47		7.23	6.79	
	07:05	19940	92.56		7.32	6.84	
	11:55	20230	92.52		7.28	6.79	
	13:20	20315	92.51		7.27	6.77	71.96 FT (OB)
	15:17	20432	92.57		7.33	6.83	
	22:35	20870	92.58		7.34	6.87	
Nov 16/80	03:32	21167	92.54		7.30	6.95	
	08:38	21473	92.46		7.22	7.05	
	13:25	21760	92.30		7.06	7.07	
	19:05	22100	92.18		6.94	7.10	
	23:32	22367	92.09		6.85	7.08	
Nov 17/80	04:35	22670	92.09		6.85	7.14	
	08:34	22909	92.14		6.90	7.19	
	14:36	23271	92.09		6.82	7.05	
	19:32	23567	92.22		6.98	7.13	
Nov 18/80	00:35	23870	92.28		7.04	7.11	
	05:32	24167	92.38		7.14	7.12	
	10:26	24461	92.49		7.25	7.17	
	15:31	24766	92.51		7.27	7.17	
	20:35	25070	92.58		7.34	7.23	
Nov 19/80	01:32	25367	92.60		7.36	7.28	
	06:35	25670	92.62		7.38	7.27	
	12:12	26007	92.61		7.37	7.20	
	16:34	26269	92.71		7.47	7.25	
	21:32	26567	92.79		7.55	7.31	
Nov 20/80	02:35	26870	92.77		7.53	7.32	
	09:14	27274	92.72		7.48	7.42	
	12:55	27490	92.69		7.45	7.48	
	22:32	28067	92.61		7.37	7.57	
Nov 21/80	03:35	28370	92.60		7.36	7.57	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80	09:11		83.45				1. BEA PROBE (BDRX)
Nov 1/80	09:14		83.42				1. WELL SOUNDER TEST START 10:45
Nov 1/80	11:06	21	84.27		0.85	0.86	
	11:16	31	84.09		0.67	0.69	
	11:27	42	84.25		0.83	0.85	
	11:57	72	84.35		0.93	0.97	
	12:18	93	84.43		1.01	1.06	
	12:44	119	84.54		1.12	1.18	
	13:04	139	84.50		1.08	1.16	
	13:23	158	84.51		1.09	1.18	
	13:47	182	84.60		1.18	1.28	
	14:09	204	84.58		1.16	1.27	
	14:35	230	84.60		1.18	1.30	
	14:58	253	84.63		1.21	1.34	
	15:20	275	84.69		1.27	1.42	
	15:44	299	84.69		1.27	1.43	
	16:20	335	84.71		1.29	1.46	
	16:57	372	84.75		1.33	1.51	
	17:30	405	84.80		1.38	1.57	
	18:45	480	84.82		1.40	1.64	
	19:47	542	84.90		1.48	1.74	
	21:43	658	84.97		1.55	1.84	
	23:04	739	84.98		1.56	1.86	
Nov 2/80	00:22	817	85.01		1.59	1.90	
	01:27	882	85.07		1.65	1.96	
	02:48	963	85.10		1.68	1.98	
	05:12	1107	85.18		1.76	2.05	
	06:36	1191	85.23		1.81	2.09	
	08:42	1317	85.27		1.85	2.10	
	10:21	1416	85.31		1.89	2.10	
	11:58	1513	85.38		1.96	2.16	
	14:48	1683	85.43		2.01	2.12	
	15:42	1737	85.48		2.06	2.15	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 2/80	17:43	1858	85.62		2.20	2.23	
	19:40	1975	85.78		2.36	2.34	
	22:05	2120	85.90		2.48	2.41	
Nov 3/80	00:33	2268	85.94		2.52	2.40	
	03:05	2420	86.09		2.67	2.50	
	06:12	2607	86.11		2.69	2.45	
	08:34	2749	86.21		2.79	2.52	
	10:59	2894	86.40		2.98	2.69	
	14:32	3107	86.44		3.02	2.71	
	17:45	3300	86.50		3.08	2.77	
	20:47	3482	86.52		3.10	2.81	
Nov 4/80	00:07	3682	86.51		3.09	2.84	
	03:36	3891	86.48		3.06	2.87	
	06:51	4086	86.43		3.01	2.87	
	11:59	4394	86.51		3.09	3.04	
	17:37	4732	86.54		3.12	3.11	
	22:25	5020	86.58		3.16	3.16	
Nov 5/80	02:51	5286	86.57		3.15	3.15	
	06:52	5527	86.67		3.25	3.23	
	13:04	5899	86.92		3.50	3.45	
	17:51	6186	87.02		3.60	3.52	
	22:41	6476	86.98		3.56	3.45	
Nov 6/80	03:49	6784	86.98		3.56	3.45	
	08:48	7083	87.05		3.63	3.52	
	14:01	7396	87.07		3.65	3.54	
	23:50	7985	87.38		3.96	3.92	
Nov 7/80	04:50	8285	87.37		3.95	3.98	
	09:33	8568	87.11		3.69	3.79	
	14:45	8880	87.13		3.71	3.90	
	19:47	9182	87.32		3.90	4.11	
Nov 8/80	00:47	9482	87.38		3.96	4.16	
	05:46	9781	87.39		3.97	4.15	
	10:45	10080	87.32		3.90	4.05	
	16:00	10395	87.34		3.92	4.03	
	20:49	10684	87.59		4.17	4.25	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
			<input type="checkbox"/> FT <input type="checkbox"/> M	<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 9/80	00:50	10985	87.61		4.19	4.21	
	06:52	11287	87.69		4.27	4.22	
	11:45	11580	87.74		4.32	4.20	
	17:10	11905	87.91		4.49	4.30	
	21:49	12184	87.93		4.51	4.28	
Nov 10/80	02:46	12481	88.00		4.58	4.30	
	07:17	12752	88.00		4.58	4.26	
	13:01	13096	88.06		4.64	4.29	
	17:24	13359	88.08		4.66	4.32	
	22:49	13684	88.20		4.78	4.50	
Nov 11/80	03:48	13983	88.25		4.83	4.50	
	09:00	14295	88.11		4.69	4.49	
	09:47	14342	88.05		4.63	4.43	AFTER PUMP SHUTDOWN
	13:45	14580	88.10		4.68	4.49	
	17:43	14818	88.13		4.71	4.52	
	23:47	15182	88.28		4.86	4.64	
Nov 12/80	04:46	15481	88.50		5.08	4.82	
	08:46	15721	88.37		4.95	4.66	
	13:21	15996	88.42		5.00	4.65	
	16:49	16204	88.45		5.03	4.63	
Nov 13/80	00:46	16681	88.56		5.14	4.71	
	05:47	16982	88.58		5.16	4.76	
	10:33	17268	88.46		5.04	4.69	
	15:58	17593	88.41		4.99	4.71	
	20:47	17882	88.50		5.08	4.89	
Nov 14/80	01:50	18185	88.52		5.10	4.98	
	06:47	18482	88.57		5.15	5.04	
	11:38	18773	88.52		5.10	4.84	
	16:29	19064	88.62		5.20	4.84	
	21:47	19382	88.66		5.24	4.83	
Nov 15/80	02:47	19682	89.02		5.60	5.16	
	07:16	19951	89.04		5.62	5.14	
	13:37	20332	88.88		5.46	4.96	
	17:28	20563	88.90		5.48	4.97	
	22:47	20882	88.93		5.51	5.04	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 16/80	03:47	21182	88.91		5.49	5.14	
	08:48	21483	88.81		5.39	5.23	
	13:36	21771	88.65		5.23	5.24	
	19:16	22111	88.52		5.10	5.26	
	23:47	22382	88.55		5.13	5.37	
Nov 17/80	04:46	22681	88.62		5.20	5.49	
	08:43	22918	88.64		5.22	5.51	
	14:15	23250	88.46		5.04	5.27	
	19:47	23582	88.60		5.18	5.33	
Nov 18/80	00:49	23884	88.78		5.36	5.43	
	05:48	24183	88.88		5.46	5.44	
	10:34	24469	88.82		5.40	5.31	
	13:42	24657	88.97		5.55	5.45	
	20:46	25081	89.06		5.64	5.53	
Nov 19/80	01:46	25381	89.01		5.59	5.52	
	06:46	25681	89.03		5.61	5.49	
	12:28	26023	89.18		5.76	5.59	
	16:44	26279	89.10		5.68	5.46	
	21:46	26581	89.24		5.82	5.58	
Nov 20/80	02:46	26881	89.24		5.82	5.62	
	07:35	27290	89.20		5.78	5.72	
	13:07	27892	89.13		5.71	5.88	
	22:47	28082	88.95		5.53	5.73	
Nov 21/80	03:47	28382	88.87		5.45	5.66	
	09:40	28735	88.90		5.48	5.64	
	14:07	29002	88.93		5.51	5.62	
	19:30	29325	89.13		5.71	5.70	
	23:50	29585	89.28		5.86	5.73	
Nov 22/80	00:50	29645	89.22		5.80	5.66	
	09:52	30187	89.39		5.97	5.71	
	19:50	30785	89.37		5.95	5.76	
Nov 23/80	00:52	31087	89.50		6.08	5.97	
	05:47	31382	89.36		5.94	5.82	
	12:15	31770	89.43		6.01	5.75	
	17:55	32110	89.45		6.03	5.68	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80			83.70				1. BEA PROBE
			45.82				2. BEA PROBE
			84.13				1. OLYMPIC
			46.21				2. OLYMPIC
							TEST START 10:45
Nov 1/80	10:45		84.13				
	10:46	1	84.22		0.09	0.09	
	10:47	2	84.28		0.15	0.15	
	10:48	3	84.29		0.16	0.16	
	10:49	4	84.33		0.20	0.20	
	10:50	5	84.34		0.21	0.21	
	10:51	6	84.34		0.21	0.21	
	10:52	7	84.39		0.26	0.26	
	10:53	8	84.42		0.29	0.29	
	10:54	9	84.45		0.32	0.33	
	10:55	10	84.49		0.36	0.37	
	10:57	12	84.57		0.44	0.45	
	11:00	15	84.63		0.50	0.51	
	11:05	20	84.98		0.85	0.86	
	11:10	25	85.12		0.99	1.00	
	11:15	30	85.21		1.08	1.10	
	11:20	35	85.24		1.11	1.13	
	11:25	40	85.32		1.19	1.21	
	11:35	50	85.38		1.25	1.28	
	11:45	60	85.45		1.32	1.35	
	11:55	70	85.49		1.36	1.40	
	12:15	90	85.60		1.47	1.52	
	12:58	133	85.745		1.615	1.69	
	14:00	195	85.79		1.66	1.76	
	14:45	240	85.86		1.73	1.86	
	15:23	278	85.90		1.77	1.92	
	16:13	328	86.01		1.88	2.06	
	17:05	380	85.95		1.82	2.00	
	17:45	420	86.00		1.87	2.07	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
			WATER				
Nov 1/80	18:20	455	86.01		1.88	2.09	
	19:59	554	86.07		1.94	2.21	
	21:58	673	86.23		2.10	2.40	
	23:16	751	86.20		2.07	2.37	
Nov 2/80	00:30	825	86.24		2.11	2.42	
	01:37	892	86.21		2.08	2.39	
	02:57	972	86.31		2.18	2.48	
	05:22	1117	86.37		2.24	2.53	
	06:45	1200	86.41		2.28	2.56	
	08:59	1334	86.46		2.33	2.57	
	10:30	1425	86.54		2.41	2.62	
	12:12	1527	86.60		2.47	2.66	
	14:13	1648	86.72		2.59	2.72	
	15:30	1725	86.78		2.65	2.75	
	17:30	1845	86.86		2.73	2.76	
	19:53	1988	86.94		2.81	2.79	
	22:13	2128	87.05		2.92	2.85	
Nov 3/80	00:41	2276	87.19		3.06	2.93	
	03:14	2429	87.29		3.16	2.97	
	06:26	2621	87.40		3.27	3.02	
	08:44	2759	87.41		3.28	3.00	
	11:14	2909	87.46		3.33	3.04	
	14:45	3120	87.58		3.45	3.13	
	17:10	3265	87.54		3.41	3.09	
	21:00	3495	87.66		3.53	3.24	
Nov 4/80	00:19	3694	87.70		3.57	3.33	
	03:53	3908	87.71		3.58	3.39	
	07:04	4099	87.69		3.56	3.43	
	12:20	4415	87.70		3.57	3.52	
	17:25	4720	87.72		3.59	3.58	
	22:07	5002	87.80		3.67	3.67	
Nov 5/80	03:07	5302	87.84		3.71	3.71	
	07:05	5540	87.91		3.78	3.76	
	13:17	5912	87.98		3.85	3.80	
	17:40	6175	88.15		4.02	3.94	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 5/80	23:06	6501	88.19		4.06	3.95	
Nov 6/80	04:15	6810	88.19		4.06	3.95	
	08:52	7087	88.36		4.23	4.12	
	14:03	7398	88.38		4.25	4.14	46.00 FT (OB)
	20:18	7773	88.39		4.26	4.18	
Nov 7/80	00:02	7997	88.40		4.27	4.23	
	05:02	8297	88.38		4.25	4.28	
	09:52	8587	88.30		4.17	4.26	46.05 FT (OB)
	15:04	8899	88.31		4.18	4.37	READING VARIABLE,
	19:56	9191	88.35		4.22	4.43	OIL IN HOLE?
Nov 8/80	00:59	9494	88.40		4.27	4.47	
	06:00	9795	88.37		4.24	4.41	
	10:45	10080	88.50		4.37	4.52	
	16:16	10411	88.45		4.32	4.43	
	21:00	10695	88.70		4.57	4.65	
Nov 9/80	01:00	10935	88.75		4.62	4.64	
	07:05	11300	88.80		4.67	4.62	
	11:45	11580	88.85		4.72	4.60	
	17:20	11915	88.94		4.81	4.62	
	22:00	12195	89.20		5.07	4.84	
Nov 10/80	02:58	12493	89.23		5.10	4.82	
	07:30	12765	89.18		5.05	4.73	
	13:15	13110	89.20		5.17	4.82	
	17:34	13369	89.22		5.19	4.85	
	23:00	13695	89.36		5.23	4.95	
Nov 11/80	04:00	13995	89.38		5.25	5.01	
	09:36	14331	88.12		4.79	4.59	AFTER PUMP STOPPED
	13:51	14586	89.28		5.15	4.96	
	17:55	14830	89.33		5.20	5.01	
	23:58	15193	89.50		5.37	5.14	
Nov 12/80	04:58	15493	89.70		5.57	5.30	
	08:55	15730	89.57		5.34	5.05	
	13:31	16006	89.65		5.52	5.17	
	16:57	16212	89.65		5.52	5.12	
Nov 13/80	00:58	16693	89.77		5.64	5.21	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 13/80	05:58	16993	89.68		5.55	5.15	
	10:43	17278	89.67		5.54	5.19	
	15:47	17582	89.63		5.50	5.22	
	20:59	17894	89.58		5.45	5.26	
Nov 14/80	02:00	18195	89.64		5.51	5.39	
	07:00	18495	89.68		5.55	5.44	
	11:46	18781	89.79		5.66	5.39	
	16:27	19062	89.89		5.76	5.40	
	21:58	19393	89.96		5.83	5.42	
Nov 15/80	02:58	19693	90.00		5.87	5.43	
	07:28	19963	90.04		5.91	5.43	
	13:40	20335	90.06		5.93	5.43	45.72 FT (OB)
	17:36	20571	90.08		5.95	5.44	
	22:58	20893	90.12		5.99	5.52	
Nov 16/80	03:58	21193	90.10		5.97	5.62	
	08:55	21490	90.00		5.87	5.71	
	13:45	21780	89.85		5.72	5.73	
	19:28	22123	89.70		5.57	5.73	
	23:58	22340	89.64		5.51	5.74	
Nov 17/80	04:57	22692	89.70		5.67	5.97	
	08:45	22920	89.68		5.55	5.85	
	14:53	23288	89.66		5.53	5.76	
	19:57	23592	89.83		5.70	5.85	
Nov 18/80	01:00	23895	89.92		5.79	5.86	
	05:58	24193	89.95		5.82	5.79	
	10:41	24476	90.03		5.90	5.81	
	15:50	24785	89.95		5.82	5.71	
	20:56	25091	90.18		6.05	5.94	
Nov 19/80	01:57	25392	90.22		6.09	6.01	
	01:58	25693	90.20		6.07	6.22	
	12:44	26039	90.20		6.07	5.90	
	16:52	26287	90.25		6.12	5.89	
	21:58	26593	90.33		6.20	5.96	
Nov 20/80	02:57	26892	90.34		6.21	6.01	
	09:48	27303	90.28		6.15	6.10	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER □ FT □ M	t' t'	RESIDUAL DRAW-DOWN	t/t'	REMARKS
				RECOVERY			
Nov 24/80	13:19	33274	90.00	12	5.87	2772.8	
	13:33	33288	89.85	26	5.72	1280.3	
	13:35	33290	89.75	28	5.62	1188.9	
	13:40	33295		33		1008.9	45.36 FT (OB)
	13:55	33310	89.61	48	5.48	693.96	
	14:36	33351	89.38	89	5.25	374.7	
	16:11	33446	89.13	184	5.00	181.8	
	17:27	33522	89.00	260	4.87	128.9	
	19:55	33670	88.78	408	4.65	82.5	
	21:12	33747	88.60	485	4.47	69.6	
	22:12	33807	88.65	545	4.52	62.0	
	23:12	33867	88.40	605	4.27	55.98	
Nov 25/80	00:12	33927	88.51	665	4.38	51.0	
	01:12	33987	88.48	725	4.35	46.9	
	02:12	34047	88.39	785	4.26	43.4	
	03:12	34107	88.30	845	4.17	40.4	
	04:12	34167	88.33	905	4.20	37.8	
	05:12	34227	88.09	965	3.96	35.5	
	06:12	34287	88.03	1025	3.90	33.5	
	07:12	34347	88.05	1085	3.92	31.7	
	09:09	34464	88.00	1202	3.87	28.7	
	10:15	34530	87.93	1268	3.80	27.2	
	11:45	34620	87.85	1358	3.72	25.5	
	12:42	34677	87.84	1415	3.71	24.5	
	14:35	34760	87.78	1498	3.65	23.2	
	16:15	34890	87.72	1628	3.59	21.4	
	17:49	34984	87.71	1722	3.58	20.3	
	20:00	35115	87.65	1853	3.52	18.95	
	21:17	35192	87.60	1930	3.47	18.2	
	22:43	35278	87.72	2016	3.59	17.5	
Nov 26/80	00:12	35367	87.72	2105	3.59	16.8	
	01:40	35455	87.68	2193	3.55	16.2	
	08:55	35890	87.66	2628	3.53	13.7	
	13:55	36190	87.65	2928	3.52	12.4	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80	09:52		86.30				1. BEA PROBE (BDRX)
			77.58				2. BEA PROBE (OB)
Nov 1/80	10:13		78.02				2. OLYMPIC (OB)
	10:15		86.63				1. OLYMPIC (BDRX)
							<u>TEST START 10:45</u>
Nov 1/80	10:45		86.63				
	10:46	1	87.11		0.48	0.481	
	10:47	2	87.42		0.79	0.791	
	10:54	9	87.74		1.11	1.1148	
	10:55	10	87.77		1.14	1.145	
	11:03	18	87.93		1.30	1.31	
	11:085	23.5	87.97		1.34	1.35	
	11:14	29	88.06		1.43	1.45	
	11:21	36	88.22		1.59	1.61	
	11:275	42.5	88.27		1.64	1.66	
	11:34	49					78.02 ft (OB)
	11:37	52	88.30		1.67	1.70	
	11:45	60	88.38		1.75	1.78	
	11:57	72	88.40		1.77	1.81	
	12:07	82	88.41		1.78	1.82	
	12:17	92	88.47		1.84	1.89	
	12:27	102	88.50		1.87	1.93	
	12:37	112	88.53		1.90	1.96	
	12:47	122	88.56		1.93	2.00	
	12:57	132	88.59		1.96	2.03	
13:18	153	88.66		2.03	2.11		
13:41	176	88.73		2.10	2.19		
14:04	199	88.74		2.11	2.21		
14:28	223	88.73		2.10	2.22		
14:50	245	88.75		2.12	2.25		
15:13	268	88.76		2.13	2.27		
15:38	293	88.77		2.14	2.30		
16:13	328	88.80		2.17	2.34		
16:48	363	88.83		2.20	2.38		



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80	17:23	398	88.84		2.21	2.40	
	18:22	457	88.87		2.24	2.46	
	19:40	535	88.91		2.28	2.54	
	21:32	647	89.04		2.41	2.70	
	22:59	734	89.01		2.38	2.68	
Nov 2/80	00:10	805	89.08		2.45	2.76	
	01:20	875	89.12		2.49	2.80	
	02:39	954	89.12		2.49	2.80	
	05:05	1100	89.15		2.52	2.81	
	06:25	1180	89.23		2.60	2.88	
	08:34	1309	89.32		2.69	2.94	
	10:14	1409	89.39		2.76	2.97	
	11:52	1507	89.46		2.83	3.03	
	14:05	1640	89.52		2.89	3.03	
	15:47	1742	89.60		2.97	3.05	
	17:35	1850	89.70		3.07	3.10	
	19:33	1968	89.79		3.16	3.15	
	22:00	2115	89.92		3.29	3.22	
Nov 3/80	00:27	2262	90.00		3.37	3.24	
	03:00	2415	90.12		3.49	3.31	
	06:06	2601	90.17		3.54	3.30	
	08:27	2742	90.25		3.62	3.35	
	10:52	2887	90.37		3.74	3.45	
	14:26	3101	90.44		3.81	3.50	
	17:28	3283	90.50		3.87	3.55	
	20:41	3476	90.55		3.92	3.63	
Nov 4/80	00:00	3675	90.57		3.94	3.69	
	03:30	3885	90.57		3.94	3.75	
	11:53	4388	90.61		3.98	3.92	
	17:38	4733	90.60		3.97	3.96	
	21:44	4979	90.66		4.03	4.03	
Nov 5/80	02:42	5277	90.73		4.10	4.10	
	06:45	5520	90.76		4.13	4.11	
	12:50	5885	90.88		4.25	4.20	
	17:41	6176	90.97		4.34	4.26	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 5/80	22:35	6470	91.05		4.42	4.31	
Nov 6/80	03:41	6776	91.07		4.44	4.33	
	08:40	7075	91.10		4.47	4.36	
	13:50	7385	91.13		4.50	4.39	
	13:52	7387					80.39 ft (OB)
	20:03	7758	91.18		4.55	4.47	
	23:43	7978	91.26		4.63	4.58	
Nov 7/80	04:44	8279	91.22		4.59	4.61	
	09:40	8575	91.18		4.55	4.65	
	14:40	8875	91.20		4.57	4.75	
	19:41	9176	91.22		4.59	4.80	
Nov 8/80	00:42	9477	91.28		4.65	4.85	
	05:42	9777	91.28		4.65	4.83	
	10:35	10070	91.29		4.66	4.81	
	15:55	10390	91.36		4.73	4.84	
	20:43	10678	91.50		4.87	4.95	
Nov 9/80	01:42	10977	91.60		4.97	4.99	
	06:47	11282	91.59		4.96	4.91	
	11:37	11572	91.67		5.04	4.92	
	16:54	11889	91.76		5.13	4.95	
	21:45	12180	91.80		5.17	4.95	
Nov 10/80	02:41	12476	92.02		5.39	5.11	
	07:17	12747	92.04		5.41	5.10	
	12:56	13091	92.06		5.43	5.08	
	17:20	13355	92.12		5.49	5.15	
	22:43	13678	92.20		5.57	5.29	
Nov 11/80	03:43	13978	92.25		5.62	5.42	
	08:56	14291	92.15		5.52	5.31	
	10:05	14360	91.99		5.36	5.16	AFTER PUMP STOPPED
	13:40	14575	92.11		5.48	5.29	
	17:38	14813	92.15		5.52	5.33	
	23:42	15177	92.33		5.70	5.48	
Nov 12/80	04:40	15475	92.38		5.75	5.49	
	08:41	15716	92.41		5.78	5.48	
	13:18	15993	92.43		5.80	5.45	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
			<input type="checkbox"/> FT <input type="checkbox"/> M				
Nov 12/80	16:45	16200	92.47		5.84	5.44	
Nov 13/80	00:40	16675	92.55		5.92	5.49	
	05:41	16976	92.60		5.97	5.57	
	10:29	17264	92.46		5.83	5.47	
	15:42	17577	92.42		5.79	5.50	
	20:42	17877	92.46		5.83	5.64	
Nov 14/80	01:43	18178	92.48		5.85	5.73	
	06:42	18477	92.50		5.87	5.76	
	11:34	18769	92.56		5.93	5.66	
	16:25	19060	92.65		6.02	5.66	
	21:41	19376	92.76		6.13	5.72	
Nov 15/80	02:40	19675	92.94		6.31	5.87	
	07:11	19946	92.92		6.29	5.81	
	13:30	20325	92.87		6.24	5.74	81.60 FT (OB)
	17:25	20560	92.93		6.30	5.79	
	22:41	20876	92.98		6.35	5.88	
Nov 16/80	03:42	21177	92.91		6.28	5.93	
	08:44	21479	92.83		6.20	6.03	
	13:32	21767	92.67		6.04	6.04	
	19:12	22107	92.58		5.95	6.11	
	23:41	22376	92.47		5.84	6.08	
Nov 17/80	04:41	22676	92.52		5.89	6.18	
	08:36	22911	92.49		5.86	6.15	
	14:41	23276	92.38		5.75	5.98	
	19:41	23576	92.61		5.98	6.13	
Nov 18/80	00:42	23877	92.72		6.09	6.16	
	05:42	24177	92.80		6.17	6.15	
	10:30	24465	92.84		6.21	6.12	
	15:38	24773	92.89		6.26	6.16	
	20:40	25075	92.96		6.33	6.22	
Nov 19/80	01:40	25375	92.98		6.35	6.26	
	06:40	25675	93.00		6.37	6.26	
	12:22	26017	92.02		6.39	6.22	
	16:39	26274	93.14		6.51	6.29	
	21:41	26576	93.27		6.64	6.40	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FT M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 1/80	10:23		85.12				1. BEA PROBE
Nov 1/80	10:19		85.53				1. OLYMPIC PROBE TEST START 10:45
Nov 1/80	10:48	3	86.80		1.27	1.27	
	10:51	6	87.07		1.54	1.54	
	10:53	8	87.05		1.52	1.52	
	10:56	11	87.29		1.76	1.77	
	10:59	14	87.28		1.75	1.76	
	11:04	19	87.36		1.83	1.84	
	11:08	23	87.42		1.91	1.92	
	11:14	29	87.59		2.06	2.08	
	11:22	37	87.63		2.10	2.12	
	11:32	47	87.74		2.21	2.24	
	11:42	57	87.80		2.27	2.30	
	12:00	75	87.90		2.37	2.41	
	12:11	86	87.94		2.41	2.46	
	12:47	122	88.00		2.47	2.54	
	13:27	162	88.10		2.57	2.66	
	13:55	190	88.16		2.63	2.73	
	14:28	223	88.18		2.65	2.77	
	15:18	273	88.26		2.73	2.88	
	15:54	309	88.26		2.73	2.89	
	16:39	354	88.27		2.74	2.91	
	16:52	367	88.33		2.80	2.98	
	17:39	414	88.33		2.80	2.99	
	18:22	457	88.37		2.84	3.06	
	19:30	525	88.38		2.85	3.10	
	21:22	637	88.52		2.99	3.28	
	22:37	712	88.48		2.95	3.25	
Nov 2/80	00:13	808	88.51		2.98	3.29	
	01:15	870	88.53		3.00	3.31	
	02:34	949	88.58		3.05	3.35	
	05:01	1096	88.68		3.15	3.44	
	06:28	1183	88.72		3.19	3.47	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER ■ FT □ M	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 2/80	08:48	1323	88.83		3.30	3.56	
	10:37	1432	88.90		3.37	3.58	
	12:12	1527	88.96		3.43	3.62	
	13:55	1630	89.00		3.47	3.62	
	15:55	1750	89.11		3.58	3.66	
	17:42	1857	89.21		3.68	3.71	
	19:26	1961	89.33		3.80	3.79	
	22:12	2127	89.42		3.89	3.84	
Nov 3/80	00:37	2272	89.49		3.96	3.84	
	03:20	2435	89.58		4.05	3.87	
	05:50	2585	89.58		4.05	3.82	
	08:20	2735	89.67		4.14	3.87	
	10:43	2878	89.83		4.30	4.01	
	14:20	3095	89.95		4.42	4.11	
	17:13	3268	89.98		4.45	4.13	
	20:35	3470	90.00		4.47	4.18	
	23:49	3664	90.06		4.53	4.28	
Nov 4/80	03:20	3875	90.00		4.47	4.28	
	06:35	4070	90.03		4.50	4.36	
	11:47	4382	90.15		4.62	4.56	
	17:46	4730	90.13		4.60	4.59	
	21:35	4970	90.15		4.62	4.62	
Nov 5/80	02:32	5267	90.21		4.68	4.68	
	06:36	5511	90.25		4.72	4.71	
	12:35	5870	90.36		4.83	4.78	
	17:29	6164	90.43		4.90	4.82	
	22:23	6458	90.53		5.00	4.89	
Nov 6/80	03:35	6770	90.54		5.01	4.90	
	08:40	7075	90.60		5.07	4.96	
	13:56	7391	90.72		5.19	5.08	
	19:53	7748	90.73		5.20	5.12	
	23:35	7970	90.78		5.25	5.20	
Nov 7/80	04:33	8268	90.69		5.16	5.18	
	09:47	8582	90.68		5.15	5.25	
	14:30	8865	90.65		5.12	5.30	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER ■ FT □ M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> ICGPM <input type="checkbox"/> LPS			
Nov 7/80	19:36	9171	90.70		5.17	5.38	
Nov 8/80	00:32	9467	90.82		5.29	5.49	
	05:35	9770	90.76		5.23	5.40	
	10:28	10063	90.78		5.25	5.41	
	15:49	10384	90.88		5.35	5.46	
	20:32	10667	90.97		5.44	5.52	
Nov 9/80	01:35	10970	91.11		5.58	5.59	
	06:33	11268	91.10		5.57	5.52	
	11:35	11570	91.14		5.61	5.49	
	16:46	11881	91.27		5.74	5.55	
	21:36	12171	91.45		5.92	5.70	
Nov 10/80	02:32	12467	91.49		5.96	5.68	
	07:05	12740	91.50		5.97	5.66	
	12:38	13073	91.62		6.09	5.75	
	17:14	13349	91.58		6.05	5.71	
	22:33	13668	91.66		6.13	5.84	
Nov 11/80	03:36	13971	91.70		6.17	5.92	
	08:47	14282	91.55		6.02	5.81	
	10:13	14368	91.37		5.84	5.64	AFTER PUMP SHUTDOWN
	13:36	14571	91.52		5.99	5.80	
	17:32	14807	91.65		6.12	5.93	
	23:32	15167	91.74		6.21	5.99	
Nov 12/80	04:35	15470	91.83		6.30	6.04	
	08:33	15708	91.90		6.37	6.07	
	13:12	15987	91.92		6.39	6.05	
	16:38	16209	91.88		6.35	5.95	
Nov 13/80	00:35	16670	92.03		6.50	6.08	
	05:32	16967	92.00		6.47	6.07	
	10:24	17259	91.89		6.36	6.00	
	15:36	17571	91.87		6.34	6.06	
	20:34	17869	91.89		6.36	6.17	
Nov 14/80	01:32	18167	91.94		6.41	6.28	
	06:35	18470	92.02		6.49	6.38	
	11:27	18762	92.00		6.57	6.31	
	16:20	19055	92.13		6.60	6.25	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
			<input type="checkbox"/> FT <input type="checkbox"/> M	<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 14/80	21:32	19367	92.24		6.71	6.30	
Nov 15/80	02:35	19670	92.27		6.74	6.30	
	07:02	19937	92.35		6.82	6.34	
	13:20	20315	92.37		6.84	6.35	
	17:19	20554	92.35		6.82	6.31	
	22:32	20867	92.41		6.88	6.41	
Nov 16/80	03:35	21170	92.37		6.84	6.49	
	08:37	21472	92.28		6.75	6.58	
	13:27	21762	92.09		6.56	6.57	
	19:02	22097	91.98		6.45	6.61	
	23:35	22370	91.90		6.37	6.60	
Nov 17/80	04:32	22667	91.88		6.35	6.64	
	08:37	22912	92.20		6.67	6.90	
	14:34	23269	91.96		6.43	6.66	
	19:35	23570	92.03		6.50	6.64	
Nov 18/80	00:32	23867	92.15		6.62	6.69	
	05:35	24170	92.18		6.65	6.63	
	10:24	24459	92.28		6.75	6.66	
	15:34	24769	92.32		6.79	6.69	
	20:32	25067	92.39		6.86	6.75	
Nov 19/80	01:35	25370	92.42		6.89	6.80	
	06:32	25667	92.43		6.90	6.78	
	12:15	26010	92.49		6.96	6.79	
	16:32	26267	92.56		7.03	6.81	
	21:35	26570	92.62		7.09	6.85	
Nov 20/80	02:32	26867	92.57		7.04	6.84	
	09:21	27276	92.60		7.07	7.01	
	12:52	27487	92.52		6.99	7.01	
	22:35	28070	92.46		6.93	7.13	
Nov 21/80	03:32	28367	92.41		6.88	7.09	
	09:27	28722	92.45		6.92	7.08	
	13:51	28986	92.52		6.99	7.10	
	19:15	29310	92.54		7.01	7.00	
	23:32	29567	92.73		7.20	7.07	
Nov 22/80	04:35	29870	92.90		7.37	7.15	





DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER ■ FT □ M	RESIDUAL DRAW-DOWN	t'	t/t'	REMARKS
				RECOVERY			
Nov 24/80	13:25	33280	91.37	5.84	18	1848.9	
	13:45	33300	91.10	5.57	38	876.3	
	13:56	33311	91.00	5.47	49	679.8	
	14:13	33316	90.87	5.34	54	616.96	
	14:36	33351	90.83	5.30	89	374.7	
	16:19	33454	90.62	5.09	192	174.2	
	17:23	33518	90.42	4.89	256	130.9	
	19:46	33661	90.12	4.59	399	84.4	
	21:02	33737	90.11	4.58	475	71.0	
	22:03	33798	90.03	4.50	536	63.1	
	23:03	33858	89.97	4.44	596	56.8	
Nov 25/80	00:02	33917	89.90	4.37	655	51.8	
	01:02	33977	89.88	4.35	715	47.5	
	02:02	34037	89.80	4.27	775	43.9	
	03:02	34097	89.77	4.24	835	40.8	
	04:02	34157	89.70	4.17	895	38.2	
	05:02	34217	89.54	4.01	955	35.8	
	06:02	34277	89.51	3.98	1015	33.8	
	07:02	34337	89.49	3.96	1075	31.9	
	09:15	34470	89.34	3.81	1208	28.5	
	10:20	34535	89.28	3.75	1273	27.1	
	11:51	34626	89.23	3.70	1364	25.4	
	12:50	34685	89.26	3.73	1423	24.4	
	14:45	34800	89.14	3.61	1538	22.6	
	16:22	34897	89.10	3.57	1635	21.3	
	17:55	34990	89.08	3.55	1728	20.2	
	19:48	35103	89.11	3.58	1841	19.1	
	21:07	35182	89.14	3.61	1920	18.3	
	22:32	35267	89.13	3.60	2005	17.6	
Nov 26/80	00:02	35357	89.10	3.57	2095	16.9	
	01:32	35447	89.18	3.65	2185	16.2	
	09:05	35900	89.03	3.50	2638	13.6	
	14:00	36195	88.99	3.46	2933	12.3	
	16:00	36315	88.99	3.46	3053	11.9	
Nov 27/80	10:52	37447	88.22	2.69	4185	08.9	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> L/GPM <input type="checkbox"/> LPS			
Nov 1/80	09:30		100.16				BEA PROBE (BDRX)
Nov 1/80	09:33		100.62				M-SCOPE <u>TEST START 10:45</u>
Nov 1/80		33	101.72		1.10	1.12	
		52	101.74		1.12	1.15	
		66	101.95		1.33	1.37	
	12:30	105	102.15		1.53	1.59	
	13:14	149	102.18		1.56	1.64	OLYMPIC PROBE
	13:46	181	102.23		1.61	1.71	OLYMPIC PROBE
	14:11	206	102.35		1.73	1.84	M-SCOPE-FULL DEFLECTION
	14:53	248	102.38		1.76	1.89	
	15:47	302	102.45		1.83	1.99	
	16:33	348	102.50		1.88	2.05	
	16:59	374	102.53		1.91	2.09	
	17:43	418	102.57		1.95	2.14	
	18:38	473	102.60		1.98	2.21	
	20:15	570	102.49		1.87	2.15	
	22:06	681	102.69		2.07	2.36	
	23:26	761	102.72		2.10	2.40	
Nov 2/80	00:34	829	102.77		2.15	2.46	
	01:31	886	102.75		2.13	2.44	
	02:33	968	102.85		2.23	2.53	
	05:16	1111	102.91		2.29	2.58	
	06:41	1196	102.83		2.21	2.49	
	09:09	1344	102.81		2.19	2.43	
	10:42	1437	102.95		2.33	2.54	
	12:22	1537	102.98		2.36	2.55	
	13:15	1590	103.02		2.40	2.56	FULL DEFLECTION
	16:04	1759	103.12		2.50	2.58	
	17:47	1862	103.18		2.56	2.59	
	19:41	1976	103.58		2.96	2.95	
	21:59	2114	103.57		2.95	2.88	
Nov 3/80	00:26	2261	103.76		3.14	3.01	
	03:05	2420	103.88		3.26	3.08	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 3/80	08:32	2747	103.90		3.28	3.01	
	11:32	2927	103.85		3.23	2.93	
	14:07	3082	103.86		3.24	2.93	
	18:02	3317	104.16		3.54	3.23	
	21:10	3505	104.08		3.46	3.17	
Nov 4/80	00:27	3702	104.00		3.38	3.14	POOR READINGS
	04:02	3917	103.99		3.37	3.18	
	07:20	4115	103.99		3.37	3.24	
	12:31	4426	104.00		3.38	3.33	
	17:57	4752	104.10		3.48	3.48	
	22:45	5040	104.25		3.63	3.63	
Nov 5/80	03:15	5310	104.31		3.69	3.69	
	07:15	5550	104.45		3.83	3.81	
	13:34	5929	104.5		3.88	3.83	
	17:46	6181	104.42		3.80	3.72	
	23:14	6509	104.78		4.16	4.05	
Nov 6/80	04:25	6820	104.68		4.06	3.95	
	09:13	7108	104.59		3.97	3.86	
	14:37	7432	104.85		4.23	4.12	
	20:27	7782	104.70		4.08	4.00	
Nov 7/80	00:12	8007	104.76		4.14	4.10	
	05:10	8305	104.68		4.06	4.09	
	15:45	8940	104.65		4.03	4.22	
	20:02	9197	104.60		3.98	4.19	
Nov 8/80	01:08	9503	104.65		4.03	4.23	
	06:10	9805	104.66		4.04	4.21	
	11:10	10105	105.00		4.38	4.53	
	16:26	10421	104.99		4.37	4.48	
	21:10	10705	104.99		4.37	4.45	
Nov 9/80	02:10	11005	105.01		4.39	4.40	
	07:17	11312	104.95		4.33	4.28	
	11:50	11585	105.20		4.58	4.46	
	17:25	11920	105.50		4.88	4.69	
	22:25	12220	105.40		4.78	4.55	
Nov 10/80	03:06	12501	105.35		4.73	4.45	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 10/80	07:41	12776	105.30		4.68	4.36	
	13:25	13120	105.75		5.13	4.78	
	17:40	13375	105.82		5.20	4.86	
	23:10	13705	105.50		4.88	4.60	
Nov 11/80	04:10	14005	105.60		4.98	4.74	
	10:23	14378	105.60		4.98	4.78	AFTER PUMP SHUT DOWN
	14:07	14602	105.88		5.26	5.07	
	18:05	14840	105.84		5.22	5.03	
Nov 12/80	00:07	15202	105.63		5.01	4.78	
	05:08	15503	105.70		5.08	4.81	
	09:00	15735	106.12		5.50	5.20	
	13:38	16013	106.29		5.67	5.32	
	17:02	16220	106.13		5.51	5.11	
Nov 13/80	01:09	16704	105.83		5.11	4.68	
	06:10	17005	105.90		5.28	4.88	
	10:47	17282	106.16		5.54	5.19	
	16:07	17602	105.97		5.35	5.07	
	21:08	17903	105.88		5.26	5.07	
Nov 14/80	02:12	18207	105.92		5.30	5.18	
	07:10	18505	106.10		5.48	5.37	
	11:52	18787	106.25		5.63	5.37	
	16:41	19076	106.37		5.75	5.39	
	22:08	19403	106.10		5.48	5.07	
Nov 15/80	03:10	19705	106.40		5.78	5.34	
	07:38	19973	106.10		5.48	5.00	
	14:00	20355	106.64		6.02	5.52	
	17:42	20577	106.71		6.09	5.58	
	23:07	20902	106.80		6.18	5.71	
Nov 16/80	04:10	21205	106.14		5.52	5.17	
	09:02	21497	106.36		5.74	5.58	
	13:52	21787	106.33		5.71	5.72	
	19:40	22135	106.00		5.38	5.54	
Nov 17/80	00:07	22402	105.80		5.18	5.42	
	04:07	22642	105.70		5.08	5.36	
	08:53	22928	106.00		5.38	5.67	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 17/80	14:55	23290	106.26		5.64	5.87	
	20:05	23600	106.00		5.38	5.53	
Nov 18/80	01:06	23901	106.20		5.58	5.65	
	06:06	24201	106.22		5.60	5.57	
	10:45	24480	106.61		5.99	5.90	
	15:56	24791	106.66		6.04	5.93	
	21:04	25099	106.30		5.68	5.57	
Nov 19/80	02:07	25402	106.30		5.68	5.60	
	07:10	25705	106.20		5.58	5.46	
	12:51	26046	106.50		5.88	5.69	
	16:58	26293	106.45		5.83	5.60	
	22:06	26601	106.40		5.78	5.54	
Nov 20/80	03:06	26901	106.60		5.98	5.78	
	09:02	27257	106.58		5.96	5.90	
	13:35	27530	106.70		6.08	6.12	
	23:13	28108	106.60		5.98	6.18	
Nov 21/80	04:17	28412	106.50		5.88	6.09	
	09:03	28698	106.55		5.93	6.09	
	13:40	28975	106.65		6.03	6.14	
	19:50	29345	106.65		6.03	6.01	
Nov 22/80	00:14	29609	106.60		5.98	5.85	
	05:15	29910	106.50		5.88	5.65	
	10:13	30208	107.05		6.43	6.16	
	20:12	30807	106.80		6.18	5.99	
Nov 23/80	01:25	31120	106.90		6.28	6.17	
	06:10	31405	106.80		6.18	6.06	
	12:46	31801	107.20		6.58	6.31	
	18:18	32133	107.16		6.54	6.19	
	21:20	32315	107.20		6.58	6.19	
Nov 24/80	02:20	32615	107.20		6.58	6.18	
	12:50	33245	107.15		6.53	6.24	
							PUMPING FINISHED AT
							13:07 (NOVEMBER 24/80)
							NO RECOVERY ON THIS HOLE.



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
			<input type="checkbox"/> FT <input type="checkbox"/> M				
Nov 1/80	08:52		82.15	<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			1. BEA PROBE (BDRX)
	08:55		70.85				2. BEA PROBE (OB)
Nov 1/80	08:58		81.90				1. WELL SOUNDER (BDRX)
	09:00		70.75				2. WELL SOUNDER (OB)
							<u>TEST START 10:45</u>
	12:33	108	82.58		0.68	0.74	
	13:56	191	82.67		0.77	0.87	
	15:00	255	82.73		0.83	0.97	
	15:55	310	82.87		0.97	1.13	
	16:36	351	82.85		0.95	1.12	
	17:07	382	82.85		0.95	1.12	
	17:50	425	82.86		0.96	1.16	
	18:47	482	82.86		0.96	1.20	
	21:56	671	83.30		1.40	1.69	
	22:13	688	83.03		1.13	1.42	
	23:35	770	83.06		1.16	1.47	
Nov 2/80	00:42	837	83.08		1.18	1.49	
	01:39	894	83.13		1.23	1.54	
	03:02	977	83.15		1.25	1.55	
	05:25	1120	83.22		1.32	1.61	
	06:50	1205	83.22		1.32	1.60	
	09:21	1356	83.24		1.34	1.57	
	10:51	1446	83.31		1.41	1.62	
	12:30	1545	83.40		1.50	1.68	
	13:20	1595	83.48		1.58	1.74	
	16:10	1765	83.68		1.78	1.86	
	17:55	1870	83.80		1.90	1.92	
	19:17	1952	83.83		1.93	1.92	
	21:52	2107	83.88		1.98	1.91	
Nov 3/80	00:20	2255	84.03		2.13	2.01	
	02:57	2412	84.10		2.20	2.03	
	08:22	2737	84.26		2.36	2.10	
	11:24	2919	84.33		2.43	2.14	
	18:12	3327	84.62		2.72	2.41	



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER		RATE <input type="checkbox"/> USGPM <input type="checkbox"/> GPM <input type="checkbox"/> LPS	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
			<input type="checkbox"/> FT	<input type="checkbox"/> M				
Nov 3/80	21:18	3513	84.55			2.65	2.36	
Nov 4/80	00:36	3711	84.61			2.71	2.47	
	12:40	4435	84.75			2.85	2.80	
	18:07	4762	84.76			2.86	2.86	
	22:54	5049	84.66			2.76	2.76	
Nov 5/80	03:23	5318	84.72			2.82	2.81	
	07:22	5557	84.76			2.86	2.84	
	13:55	5950	84.86			2.96	2.91	
	17:54	6189	85.06			3.16	3.08	
	22:47	6482	85.06			3.16	3.05	
Nov 6/80	03:52	6787	85.07			3.17	3.06	
	08:20	7055	85.12			3.22	3.11	
	20:37	7792	85.28			3.38	3.30	
Nov 7/80	00:20	8015	85.28			3.38	3.34	
	04:20	8255	85.20			3.30	3.31	
	09:25	8560	85.22			3.32	3.42	
	15:52	8947	85.14			3.24	3.43	
	20:08	9203	85.20			3.30	3.51	
Nov 8/80	01:15	9510	85.27			3.37	3.57	
	06:18	9813	85.21			3.31	3.48	
	11:17	10112	85.31			3.41	3.56	
	16:31	10426	85.36			3.46	3.56	
	21:16	10711	85.48			3.58	3.66	
Nov 9/80	02:18	11013	85.55			3.65	3.66	
	07:27	11322	85.59			3.69	3.64	
	11:51	11586	85.69			3.79	3.67	
	17:35	11930	85.82			3.92	3.73	
	22:31	12226	85.97			4.07	3.84	
Nov 10/80	03:13	12508	86.14			4.24	3.96	
	07:47	12782	86.00			4.10	3.78	
	13:31	13126	86.04			4.14	3.79	
	17:45	13380	86.12			4.22	3.88	
	23:20	13715	86.10			4.20	3.92	
Nov 11/80	04:06	14001	86.22			4.32	4.08	
	09:54	14349	85.98			4.08	3.88	AFTER PUMP SHUTDOWN



DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER		RATE <input type="checkbox"/> USGPM <input type="checkbox"/> ICPM <input type="checkbox"/> LPS	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
			<input type="checkbox"/> FT	<input type="checkbox"/> M				
Nov 11/80	14:15	14610	86.12			4.22	4.22	
	18:10	14845	86.18			4.28	4.09	
Nov 12/80	05:15	15510	86.45			4.55	4.28	
	09:05	15740	86.37			4.47	4.17	
	13:45	16020	86.46			4.56	4.21	
	17:10	16225	86.42			4.52	4.12	
Nov 13/80	01:15	16710	86.42			4.52	4.09	
	06:17	17012	86.53			4.63	4.23	
	10:52	17287	86.51			4.61	4.26	
	16:05	17600	86.41			4.51	4.23	
	21:13	17908	86.38			4.48	4.29	
Nov 14/80	02:18	18213	86.55			4.65	4.53	
	07:18	18513	86.58			4.67	4.56	
	11:57	18792	86.67			4.77	4.50	
	16:47	19082	86.72			4.82	4.46	
	22:15	19410	86.70			4.80	4.39	
Nov 15/80	03:18	19713	86.78			4.88	4.44	
	07:44	19979	86.87			4.97	4.49	
	14:05	20360	86.85			4.95	4.45	
	17:50	20585	86.95			5.05	4.54	
	23:14	20909	87.30			5.40	4.93	
Nov 16/80	04:15	21210	87.02			5.12	4.77	
	09:07	21502	86.73			4.83	4.67	
	13:56	21791	86.69			4.79	4.80	
	19:48	22143	86.57			4.67	4.84	
Nov 17/80	00:12	22407	86.40			4.50	4.74	
	05:13	22708	86.40			4.50	4.79	
	08:54	22929	86.51			4.61	4.90	
	15:02	23297	86.59			4.69	4.92	
	20:12	23607	86.62			4.72	4.87	
Nov 18/80	00:12	23847	86.60			4.70	4.77	
	06:12	24207	86.84			4.94	4.91	
	10:50	24485	86.98			5.08	4.99	
	16:00	24795	86.86			4.96	4.85	
	21:10	25105	86.90			5.00	4.89	







RECORDER

DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER □ FT □ M	RATE	DRAW-DOWN (ft)	CORRECTED DRAW-DOWN	REMARKS
				□ USGPM □ IGPM □ LPS			
Nov 1/80	08:47		76.447				TEST START 10:45
	10:45	0	76.397				STATIC WATER LEVEL
Nov 1/80	14:56	251	76.519		0.122	0.256	
	15:56	311	76.579		0.182	0.348	
	17:56	431	76.679		0.282	0.483	
	20:55	610	76.849		0.452	0.747	
	01:04	859	76.979		0.582	0.890	
Nov 2/80	04:04	1039	77.109		0.712	1.007	
	06:01	1156	77.229		0.832	1.120	
	10:01	1396	77.379		0.982	1.196	
	12:01	1515	77.479		1.082	1.276	
	14:08	1643	77.579		1.182	1.316	
	20:07	2002	77.929		1.532	1.505	
Nov 3/80	03:07	2422	78.199		1.802	1.623	
	08:36	2751	78.429		2.032	1.764	
	16:03	3198	78.550		2.153	1.832	
	21:00	3495	78.690		2.293	2.005	
Nov 4/80	08:55	4210	78.710		2.313	2.206	
	17:44	4739	78.740		2.343	2.332	
Nov 5/80	01:35	5209	78.860		2.463	2.463	
	08:55	5650	78.974		2.577	2.550	
	15:53	6068	79.074		2.677	2.610	
	23:50	6545	79.244		2.847	2.740	
Nov 6/80	09:46	7141	79.370		2.973	2.866	
	19:36	7731	79.460		3.063	2.976	
Nov 7/80	03:25	8200	79.460		3.063	3.063	
	08:47	8522	79.400		3.003	3.083	
	17:10	9025	79.380		2.983	3.186	
Nov 8/80	01:04	9499	79.480		3.083	3.284	
	08:58	9973	79.548		3.151	3.314	
	18:50	10565	79.720		3.323	3.403	
Nov 9/80	05:42	11217	79.880		3.483	3.456	
	13:50	11705	80.040		3.643	3.496	
	22:38	12233	80.240		3.843	3.616	
Nov 10/80	01:21	12396	80.340		3.943	3.683	



RECORDER

DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER <input type="checkbox"/> FT <input type="checkbox"/> M	RATE	DRAW- DOWN (ft)	CORRECTED DRAW- DOWN	REMARKS
				<input type="checkbox"/> USGPM <input type="checkbox"/> IGPM <input type="checkbox"/> LPS			
Nov 10/80	16:01	13276	80.417		4.020	3.696	
	21:10	13585	80.465		4.068	3.774	
Nov 11/80	03:07	13942	80.488		4.091	3.845	
	09:04	14299	80.483		4.086	3.885	
	18:01	14836	80.503		4.106	3.919	
Nov 12/80	02:58	15373	80.683		4.286	4.067	
	09:20	15755	80.753		4.356	4.048	
	17:14	16229	80.833		4.436	4.035	
Nov 13/80	01:08	16703	80.893		4.496	4.068	
	08:50	17165	80.827		4.430	4.055	
	17:44	17699	80.777		4.380	4.112	
Nov 14/80	02:38	18233	80.797		4.400	4.280	
	11:32	18767	80.897		4.500	4.232	
	20:26	19301	81.043		4.646	4.269	
Nov 15/80	03:21	19716	81.168		4.771	4.329	
	09:17	20072	81.238		4.841	4.357	
	18:21	20616	81.268		4.871	4.362	
Nov 16/80	03:25	21160	81.253		4.856	4.503	
	11:28	21643	81.107		4.710	4.576	
	18:31	22066	80.897		4.500	4.655	
Nov 17/80	02:34	22549	80.807		4.410	4.664	
	09:25	22960	80.827		4.430	4.724	
	21:24	23679	80.977		4.58	4.714	
Nov 18/80	09:17	24392	81.177		4.780	4.700	
	21:11	25106	81.307		4.910	4.803	
Nov 19/80	09:04	25819	81.352		4.955	4.821	
	21:00	26535	81.522		5.125	4.887	
Nov 20/80	08:55	27250	81.442		5.045	4.978	
	20:51	27.966	81.302		4.905	5.026	
Nov 21/80	08:46	28.681	81.221		4.824	4.985	
	20:39	29394	81.481		5.084	5.044	
Nov 22/80	08:39	30104	81.651		5.254	5.000	
	20:28	30813	81.691		5.294	5.107	
Nov 23/80	08:17	31522	81.651		5.254	5.107	
	15:48	31983	81.828		5.431	5.096	



APPENDIX 3

CHEMICAL ANALYSES OF GROUNDWATER



**test ltd.**

1650 PANDORA STREET, VANCOUVER, B.C. V5L 1L6 • TELEPHONE 254-7278 • TELEX 04-54210

REPORTED TO BROWN, ERDMAN & ASSOCIATES LTD.  
1409 BEWICKE AVENUE  
NORTH VANCOUVER, B.C.

W/O NO. W-801105-001  
DATE DECEMBER 12, 1980  
P.O.

File No: 8729D

ATTENTION MR. RICHARD VOGWILL  
SAMPLE TYPE WATER  
PREPARATION TOTAL

We have tested the sample of water submitted by you on November 5, 1980 and report as follows:

SAMPLE IDENTIFICATION:

The sample was submitted in a plastic bottle labelled:

Western Mines  
Nov. 1/80  
Pump Test @500 min.

METHOD OF TESTING:

The analyses were carried out in accordance with procedures described in "Laboratory Manual for the Chemical Analysis of Water, Wastewater, Sediments and Biological Materials (2nd Edition)" published by the Government of B.C., Ministry of the Environment, Water Resources Services, 1976.

RESULTS OF TESTING:

(on the following page)

CAN TEST LTD.

Judi M. Mitchell, B.Sc.,  
Chemist

/cs