WATER INVESTIGATIONS BRANCH
BRITISH COLUMBIA WATER RESOURCES SERVICE
DEPARTMENT OF LANDS, FORESTS AND WATER RESOURCES
PARLIAMENT BUILDINGS
VICTORIA, BRITISH COLUMBIA

DESIGN AND TESTING OF THE ALERT BAY

AIRSTRIP TEST-PRODUCTION WELL

File: 0239013

Date: September, 1975

J.C. Foweraker, Head
Groundwater Section
Hydrology Division

DESIGN AND TESTING OF THE ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

1. GENERAL

These notes cover the design and testing of the test-production well drilled for the Village of Alert Bay on Cormorant Island. Previous internal memoranda on file include notes on the geology and no section has been prepared in this report on the geology. Samples of the formations drilled through for the test well have been kept for future reference if further subsurface studies are needed in the future on this island.

This well drilling program was authorized by the Minister following requests for assistance from the Village of Alert Bay. The well drilling contractor was Mr. V. Anderson of Anderson Well Drilling, Courtenay, British Columbia. Drilling commenced on this well on August 8, 1974 and testing was completed early in May, 1975.

The location of the well is shown on the attached key plan (Figure No. 1). The site is located close to the Alert Bay Airstrip. No accurate survey of the well site location or the well site elevation has been carried out. This should be done. For purposes of this report we have therefore had to make a number of assumptions as to the exact location and elevation. We have taken the well location as approximately 2,000 feet from the southwest side of the island and 1,700 feet from the northeast side. The elevation on the top of the 8-inch casing at the well head has been taken as 215 feet above mean sea level. This figure is based on a contoured map of the Alert Bay Airstrip area prepared by the Construction Branch of the Department of Transport (Drawing No. XC598).

It is considered to be outside the scope of this report to outline the various problems we ran into, both during initial well construction and later during the well testing. Only final design and final well tests are discussed here.

The writer acknowledges the major contribution made by all the Groundwater Section staff in the many phases of this program, both in the field and on the subsequent analyses and compilation of the results.

2. WELL DESIGN

The design and final construction details of the well are shown in Figure No. 2. This well has been tested for alignment and straightness. The well is "straight" according to the AWWA Standards, using the 40-foot "dummy" technique. The well was found to be slightly out of "plumb" by a factor of about 20 inches in 200 feet. Below this depth, it was not possible to run a plumbness test.

The well head datum is the top of the 10-inch casing. This casing is approximately 0.4 foot above ground level.

The 10-inch casing is driven to 230 feet below datum. The 8-inch casing was driven a further 137 feet or to a depth of 367 feet below the datum. The 8-inch casing was subsequently withdrawn (for the second time) to 326.5 feet to expose the well screen. During withdrawal (for the second time) the 8-inch casing broke at 68.8 feet. A sleeve was then welded to the upper portion of the 8-inch casing and details of this design modification are shown in Figure No. 2. The sleeve was then slipped over the lower 8-inch casing to line up at the point of rupture, the two broken ends of the 8-inch casing.

The well screen assembly design is based on the size analyses' results of the samples taken from the formation every two feet during drilling. These data are shown in Table No. 1, "Design Table for Screen Slot Size and Length". The driller's log is attached as Table No. 2. The 40.71-foot long well creen assembly includes "riser" pipe lead packer and a "stand" welded to the bail bottom. The screen slot sizes vary from .008 to .020 of an inch. The open area of the screen is set between 324.7 and 357.7 feet below datum. The top of the lead packer is set at 318.55 feet below datum. The following computations in Table No. 3 give the calculated total transmitting capacity of the 8-inch nominal size well screen assembly expressed in U.S. gallons per minute at the recommended entrance velocity of 0.1 foot per second.

Because of the unknown factors associated with a new aquifer and the limitations of the sampling techniques, the screen was "over-designed" to make maximum use of the aquifer penetrated. Surprisingly though, based on computations made on pumping test data, we estimate the well is less than 20% efficient. This leads to speculation that the screen has penetrated only the upper portion of the aquifer.

The well head is completed with a steel plate recorder box which is bolted to the 8-inch casing. The recorder box is kept locked at all times, and Mr. Eric Hamilton of Alert Bay has a key to this box.

3. PUMPING TESTS AND ANALYSES

After an earlier abortive test using a larger line shaft turbine pump, the Contractor, Aqua-Flo Limited of Langley, B.C., subsequently returned to the site and installed a reconditioned 1973 20-hp Myers submersible pump in the well.

In order to establish a pumping rate "Q" for the constant rate test, two "step drawdown" pumping tests were first run on the well. The flow rate (Q) was determined with the use of a Neptune flow meter. The first step drawdown test was run at approximately 52 U.S. gallons per minute for 150 minutes (see Appendix No. 1, page 13. The initial static reading was 204.60 feet and the drawdown reached 10.47 feet approximately (see Figure No. 3). The specific capacity, based on this test, is about 5 gal./min./ft. drawdown.

In recovery (see Appendix No. 1, page 14) the residual drawdown came within 0.11 foot of the initial static after 5 minutes and within 0.06 foot after 80 minutes. Next morning the residual drawdown reading had dropped to 0.11 foot - an indication that tidal or barometric factors may be influencing the non-pumping water level in the aquifer (see Figure No. 4).

The next step drawdown test was run at approximately 103 U.S. gallons per minute for 220 minutes (see Appendix No. 1, pages 15 and 16). The initial static reading was taken at 204.50 feet and the drawdown in the well reached 20.52 feet. The specific capacity, based on this test is about 5 U.S. gpm per foot drawdown. The transmissivity, "T", of the aquifer was calculated at 70,000 U.S. gal./day/ft. width for the second line slope, T_2. This value is under the value obtained in the constant rate test. The recovery readings (see Appendix No. 1, page 17, Figure No. 6) show some fluctuations which in the early stages of recovery may be due to leakage from the pump column.

The main drawdown test was commenced at 1530 hours on April 24, 1975. The pumping rate, Q = 162 U.S. gpm, was a compromise, decided on after reviewing the performance curves for the Contractor's pump, the calculated specific capacity of the well, the need for maintaining

a steady flow for the duration of the test, and the anticipated demand requirements for the Village. A 3-inch orifice and 4-inch pipe were installed at the end of the discharge line. The discharge line removed the water 500 feet from the well site over to a ditch draining towards Alert Bay.

After startup a temporary break in the discharge line prevented an accurate flow being kept for the first 20 minutes of the test. The well readings showed that it took an additional 80 minutes for conditions to "normalize".

A plot of the drawdown data for the constant rate drawdown test at 162 U.S. gpm is shown in Figure No. 7. Our static water level datum is taken at 204.63 feet. The graphical data plot shows a series of peaks and valleys which we interpret (see below) as due in part to barometric fluctuations.

Figure No. 8 is a graphical plot of data from well readings, barometric pressure changes and tidal fluctuations for the May 5-20, 1975 period following the well test. By visual inspection we note a relationship between barometric pressure change and fluctuations in the water level in the well. A table (Appendix No. 3) was compiled and these data are plotted in Figure No. 9 and a straight line relationship is obtained by visual inspection between barometric change in feet of water and water level change in the well for the period following the pumping test.

By least squares fit we obtain the equation $Y = 0.728X + 0.067$, Figure No. 10, for the relationship between change in water level in the well measured in feet and changes in barometric pressure in feet of water. This value, 0.728, is the barometric efficiency factor of the well.

In Appendix No. 1 adjustments have been made to all drawdown readings after 100 minutes in the constant rate test - the time when conditions settled down again after pump fluctuations described above. These results are plotted in Figure No. 11 and show that the drawdown is virtually stabilized after 1,500 minutes of pumping.

The specific capacity, based on these results, is 5.4 U.S. gpm per foot of drawdown. This value has been set more conservatively at 5.0 U.S. gpm per foot of drawdown for this report.

A plot was next made of the recovery readings corrected for barometric changes. The readings are recorded in Appendix No. 1; the data are plotted in Figure No. 12. A replot of this data after corrections for barometric fluctuations is shown in Figure No. 13.

The residual drawdown came within 0.6 foot of the initial static of 204.63 feet after only 5 minutes and complete recovery is estimated, from the corrected recovery readings, to have taken place after 3,240 minutes (54 hours). The small peak at initial recovery on Figure No. 13 is interpreted as being in part due to the leakage of the 200-foot head of water from the pump column back into the well after shutdown. The recovery readings are shown on Figure No. 13 up to May 2, 1975. No readings were taken May 2-5, 1975 when readings again resumed. Data are plotted for the May 5-20, 1975 period in Figure No. 8.

The Coefficient of Transmissivity calculated from Figure No. 13 is over 300,000 U.S. gal./day/ft. width for the T_1 section of the graph and 92,900 U.S. gal./day/ft. width for the T_2 section of the graph.

The surrounding aquifer is therefore interpreted as being very permeable; however, a progressively greater time is required for recovery in what we interpret as less permeable sediments located further away from the well. Unfortunately, there are no observation wells available for the test and, therefore, no values could be computed for the Coefficient of Storage, S.

We can, however, compare two typical S values for the aquifer:

(1) $S = 10^{-4}$ for a confined aquifer

(2) $S = 10^{-1}$ for a water table condition

By inserting these values into the following calculations, we can obtain a value for "s", the drawdown at a point in the aquifer at the at the edge of the island after 100 days of pumping at 150 U.S. gpm.

For $S = 10^{-4}$, T = 70,000 gpd/ft. width, t = 100 days
r (distance to island perimeter from well) = 1,500 feet
s = 2.24 feet drawdown

For S = 0.1, T = 70,000 U.S. gpd/ft.width, t = 100 days
r = 1,500 feet
s = 0.58 foot drawdown

If we change the pumping rate to 100 U.S. gpm,

For $S = 10^{-4}$, T = 70,000 gpd/ft. width, t = 100 days
r = 1,500 feet
s = 1.50 feet drawdown

The above computations show that a difference in 50 U.S. gpm in the pumping rate of the well makes only a marginal difference in the value "s" of the theoretical drawdown induced at the island perimeter.

The static water level in the well is 10 feet approximately above sea level. From the Canadian Tide Tables, Volume 6, published by the Canadian Hydrographic Service, we find that at Alert Bay, mean higher high water is 5.5 feet above mean sea level or 4.5 feet below our well static, or 3 feet below our value for s at the island perimeter after 100 days of pumping at 100 U.S. gpm.

The above estimates are based on assumptions that may be invalid and therefore a "safety factor" of 3 feet is insufficient to guarantee that no salt water intrusion will take place into the aquifer with long-term pumping.

4. ESTIMATE OF AVAILABLE RECHARGE

Another method for assessing the effect of long-term pumping is to calculate the estimated recharge available to the aquifer. For this estimation we have restricted the area available to recharge the aquifer to the glacio-fluvial complex at the east end of the island, about 660 acres (see Figure No. 14). In actual fact, the area could be greater or smaller than that shown. Recharge is limited to precipitation falling on this area; at Alert Bay this amounts to about 52 inches per year.

Calculations of available recharge have been made for the above area by J. Parry (see file no. 0239013, May 20, 1969). Losses to surface runoff, evapotranspiration and evaporation may generally account for about 85% of annual precipitation according to Parry.

Parry estimates infiltration to be 15% of average annual precipitation (7.8 inches) and he estimates this would make available for maximum withdrawal about 270 U.S. gpm. He believes only a small part of this available groundwater could be captured by production wells.

In a recent groundwater study on Mayne Island (February, 1974, file no. 0239013), we estimated annual available recharge to fractured bedrock aquifers from precipitation as only one inch per acre - a conservative estimate. Other estimates on Saanich Peninsula are for 2 inches of precipitation as being available for recharge.

If we accept 2 inches out of 52 inches as being available for recharge, this would allow about 34 U.S. gpm on a year-round basis for the 660-acre area. Between these values of 270 U.S. gpm and 34 U.S. gpm, probably lies the safe annual recharge figure for the eastern part of Cormorant Island from which the Alert Bay Airstrip well draws its water.

5. RECOMMENDATIONS

(1) We recommend that, in view of all the unknown factors and assumptions we have had to make in our pumping test calculations and in our recharge estimates, the well yield should not exceed a pumping rate of 100 U.S. gpm during the first 12 months of operation.

We have estimated the specific capacity of the well at about 5 U.S. gpm per foot of drawdown. As we have about 100 feet of available drawdown in the well, we have a theoretical well capacity in excess of 200-300 U.S. gpm. Therefore, what is required is not a second well into this aquifer, but a careful monitoring program during the first 12 months of operation of the well at a pumping rate of 100 U.S. gpm.

(2) An electric submersible pump should be installed in the well. The pump intake should be set not lower than 300 feet as the top of the lead packer is at 318.5 feet below the well head datum. The pump should have a discharge capacity of 100 U.S. gpm at the well head when operating against a head of about 230 feet of water. (No allowance has been made here for additional head in the distribution system.) This pump should be allowed to operate for several hours. It should not be flashing on and off repeatedly over a short time period.

(3) When the well is put into production, a meter reading in U.S. gpm should be installed at the well head to measure the amount of water pumped and the hours of pumping.

(4) The well must neither be overpumped or backflushed. The well water was checked during testing and found to be sand-free; and if the above precautions are taken, it should remain so.

(5) A check valve should be installed on the discharge side of the pump to prevent backflushing also.

(6) The pump should not be supported on the well casings but on the surrounding concrete pad.

(7) Provision should be made for taking pumping water levels and static water levels in the well. The usual installation is a 3/4-inch standard galvanized pipe strapped to the pump column. This pipe will then permit an electric sounding line to be easily lowered into it without dange of snagging.

(8) No septic tank, drain field or sewer line should be placed within several hundred feet of the well site.

(9) Water quality samples should be taken twice a year for chemical analyses. Water Resources Service will analyse both samples in the first year of operation to ensure quality control during the 12-month monitoring period, provided procedures for collection and transportation of the samples are adhered to. Advance notice of the intended sampling date must be given to the Groundwater Section of the Water Resources Service. Details of procedures for collection and transportation can be obtained from the Groundwater Section. One sample should be collected and sent for analyses in late August; a second should be sent in December or January.

(10) Daily records should be kept of the water levels and production rates during the first year of operation. These records should be sent to the Groundwater Section for analyses so that safe productive capacity of the well can be reassessed after the first 12 months of operation.

(11) The well house should be constructed with a concrete pad; this should be kept free from the well casings and provision should be made so that part of the roof can be removed if a hoist is required to raise or lower the pump in the well.

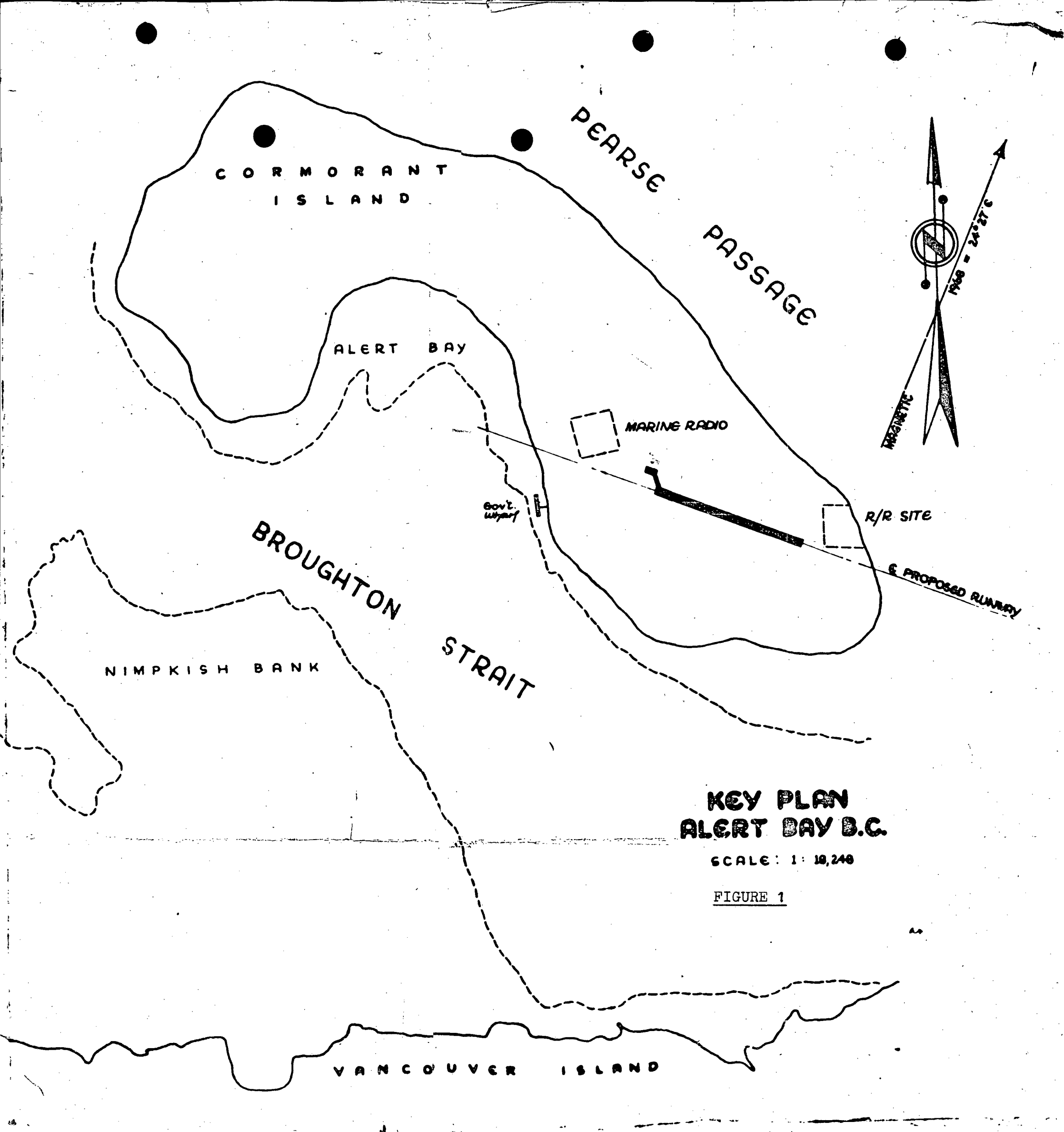
6. WATER QUALITY

The chemical analyses of the water collected from the Alert Bay Airstrip well are attached as Appendix No. 4.

(1) The analyses show the water is clear, clean and potable.

(2) The well water is not contaminated by sea water.

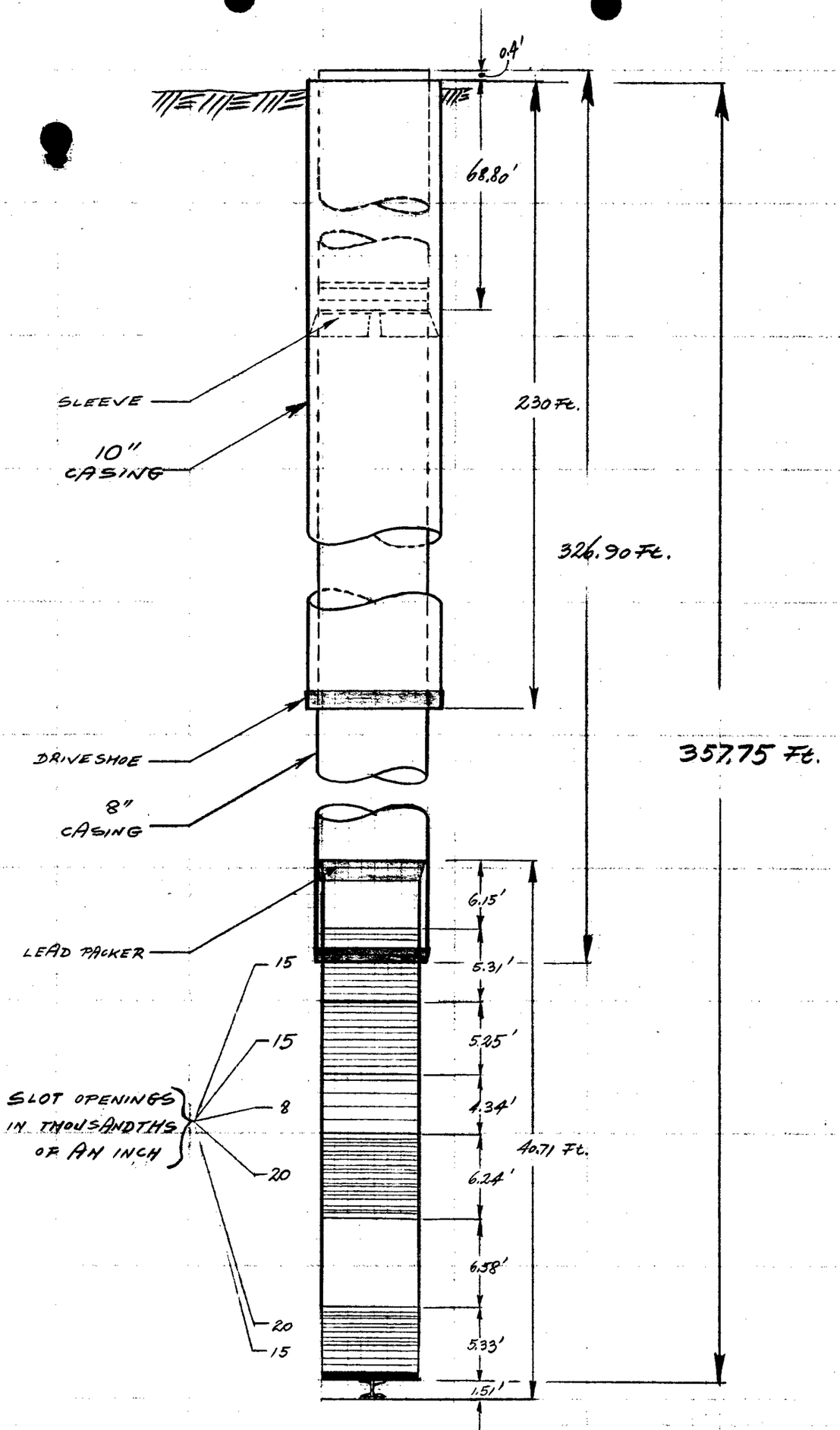
(3) There is very little dissolved iron in the water - actually less than 0.1 ppm towards the end of the constant rate test and therefore no treatment is required for iron.



KEY PLAN
ALERT BAY B.C.

SCALE: 1: 10,240

FIGURE 1



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DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
WATER INVESTIGATIONS BRANCH

TO ACCOMPANY REPORT ON

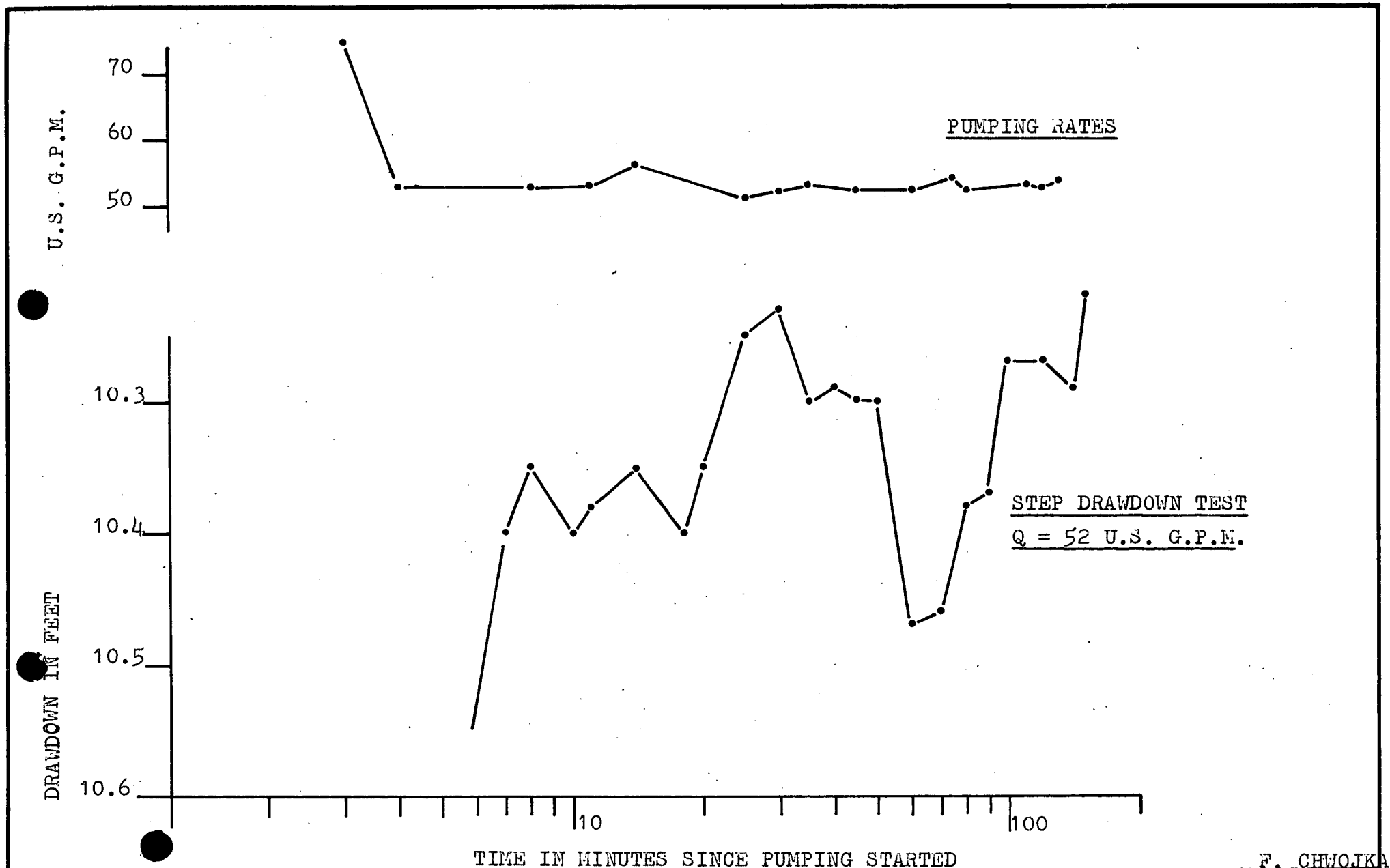
ALERT BAY AIRSTRIP
TEST PRODUCTION WELL

SCALE: VERT. 1 IN. = 10 FEET
HOR. 1 IN. = 1 FOOT

DATE JULY/75

Fred Chwojka ASSISTANT ENGINEER

FILE No. 0239013 DWG. No. FIGURE 2



F. CHWOJKA

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WATER RESOURCES SERVICE
WATER INVESTIGATIONS BRANCH

TO ACCOMPANY REPORT ON
ALERT BAY AIRSTRIP
TEST-PRODUCTION WELL

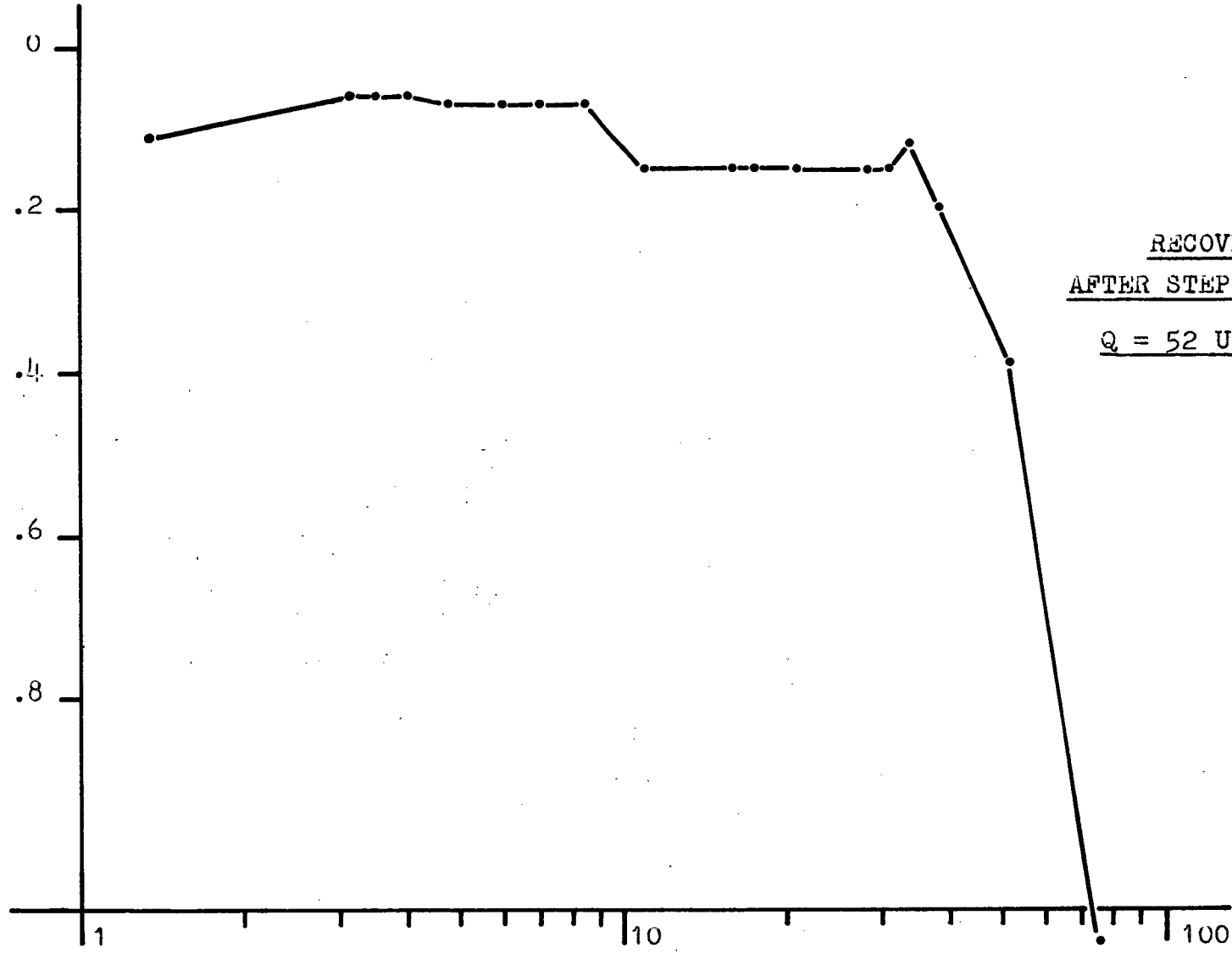
SCALE: VERT. As Shown
HOR. As Shown

DATE
July 1975

J.C. Foweraker ENGINEER

FILE No. 0239013 DWG. No. FIGURE 3

BCIL-3667/A - W.R.B.



RECOVERY READINGS
AFTER STEP DRAWDOWN TEST

Q = 52 U.S. G.P.M.

Fred Chwojka

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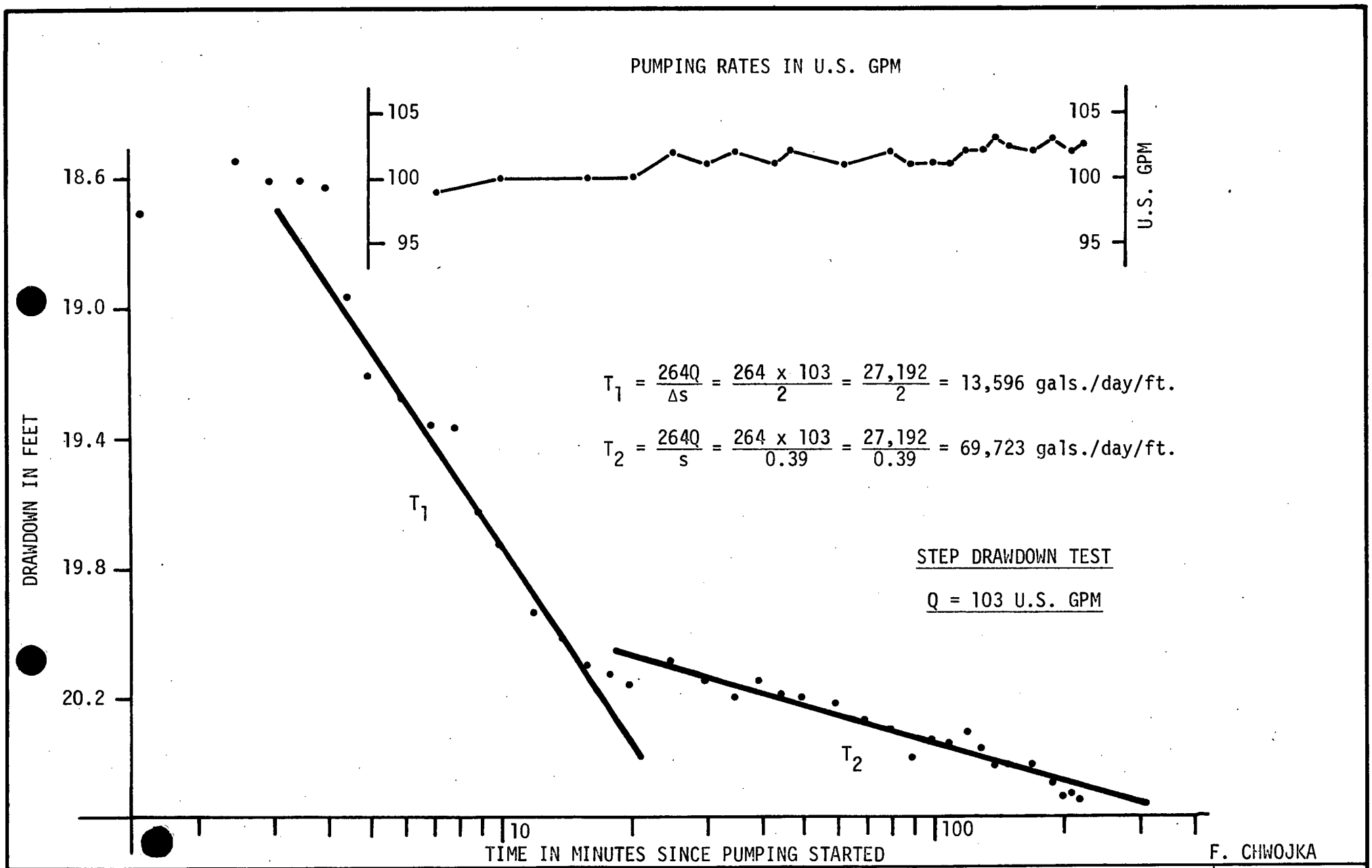
TEST-PRODUCTION WELL

SCALE: VERT. As Shown
HOR. As Shown

DATE
July 1975

J.C. Foweraker
ENGINEER

FILE No. 0239013 DWG. No. FIGURE 4



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TO ACCOMPANY REPORT ON

ALERT BAY AIRSTRIP

TEST-PRODUCTION WELL

SCALE: VERT. AS SHOWN
HOR. AS SHOWN

DATE: JULY 1975

J.C. FOWERAKER — ENGINEER

FILE No. 0239013 DWG. No. FIGURE 5

BCIL-3167/A - W.R.B.

Recovery Readings
After Step Drawdown Test
Q = 103 U.S. G.P.M.

F. Chwojka

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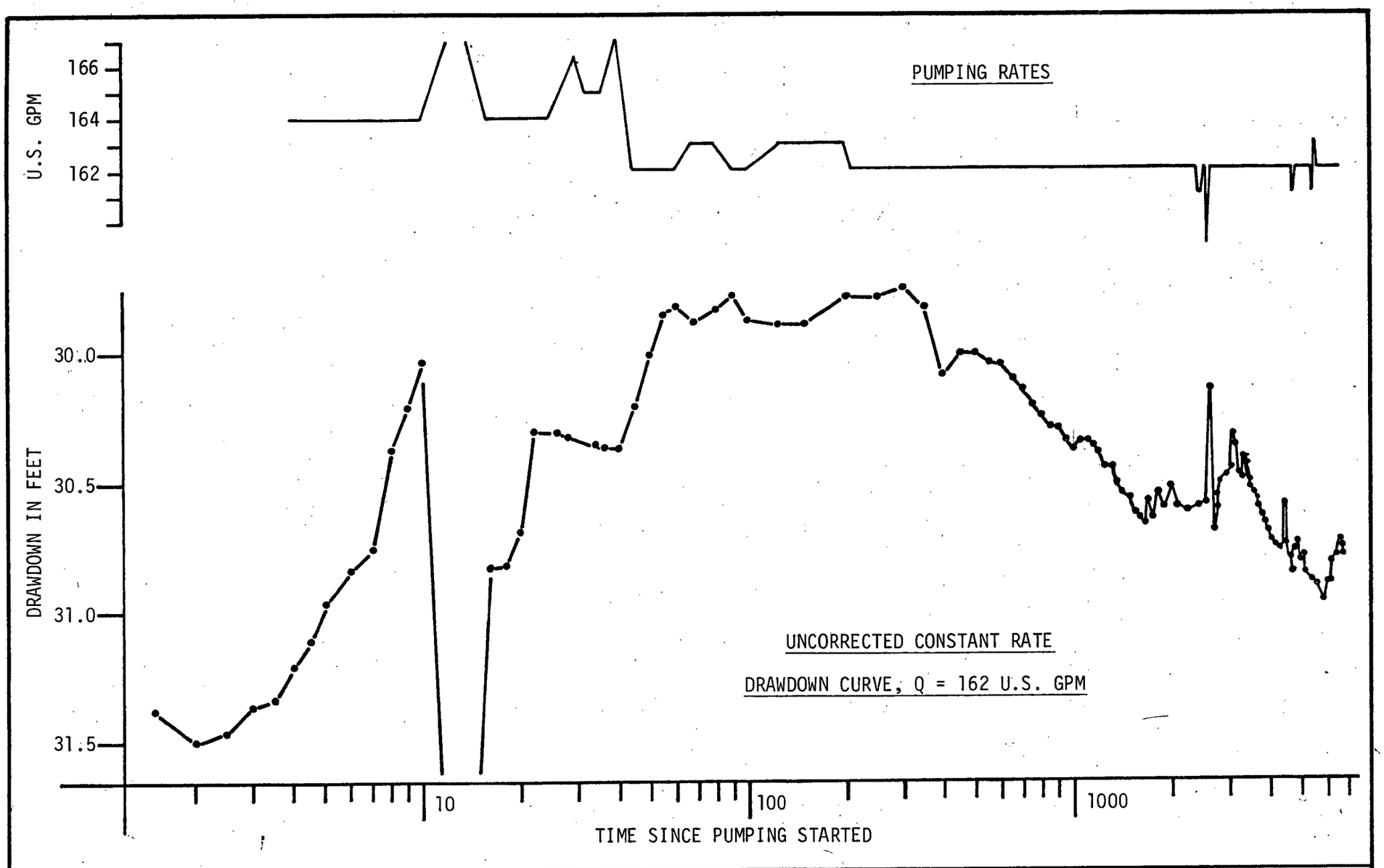
TO ACCOMPANY REPORT ON
ALERT BAY AIRSTRIP
TEST-PRODUCTION WELL

SCALE: VERT. As Shown
HOR. As Shown

DATE
July 1975

J.C. Fowerake ENGINEER

FILE No. 0239013 DWG. No. FIGURE 6



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WATER INVESTIGATIONS BRANCH

TO ACCOMPANY REPORT ON

ALERT BAY AIRSTRIP

TEST-PRODUCTION WELL

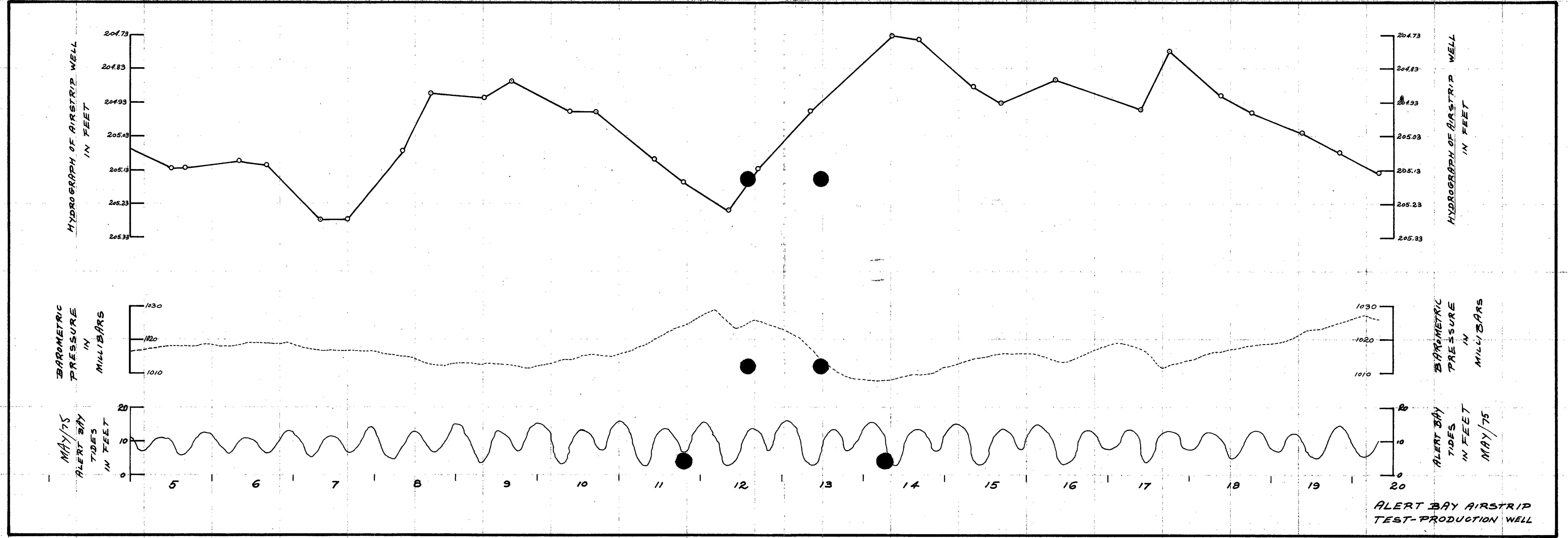
SCALE: VERT. AS SHOWN
HOR. AS SHOWN

DATE
JULY 1975

J.C. FOWERAKER ENGINEER

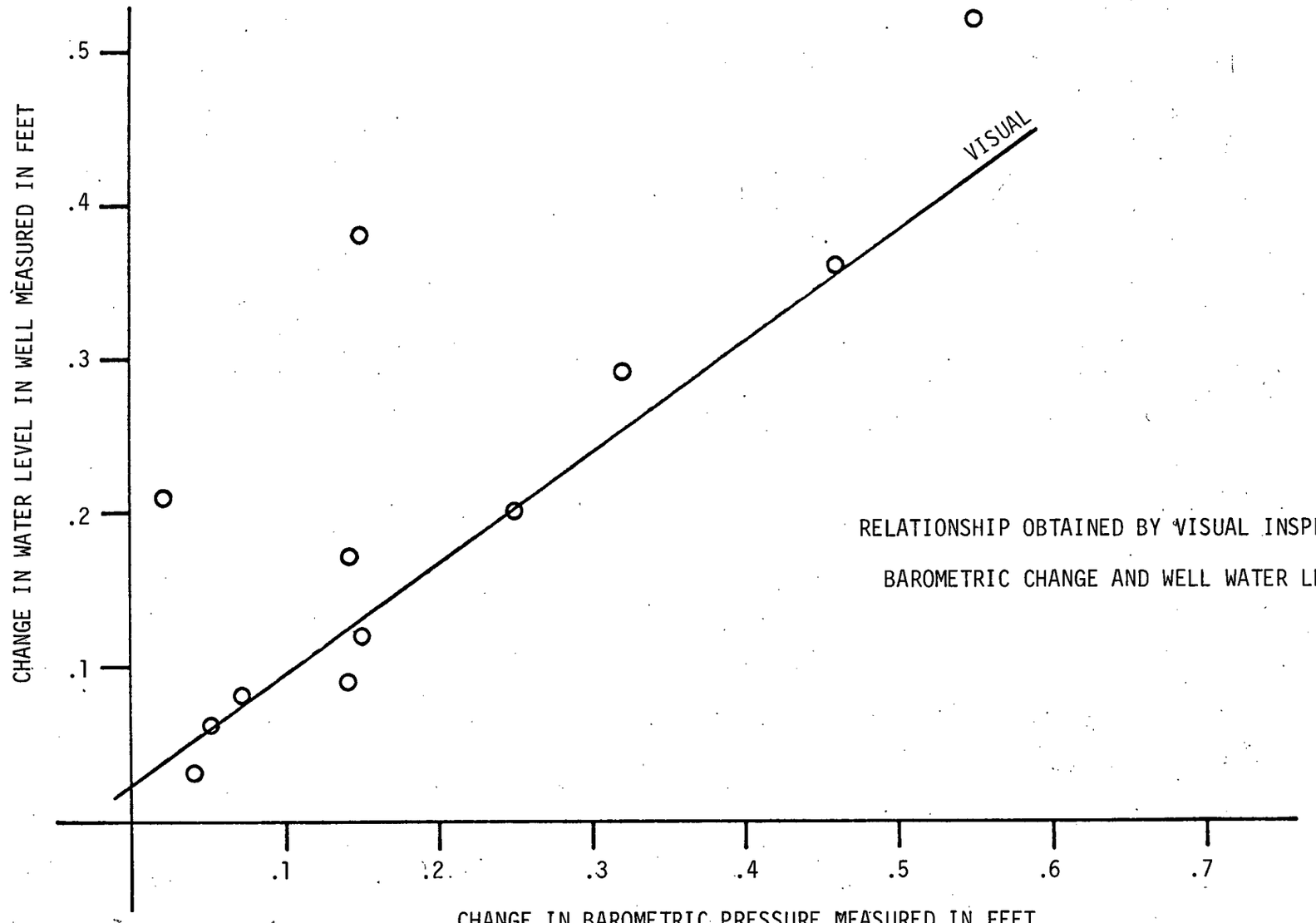
FILE No. 0239013 DWG. No. FIGURE 7

BCIL-3667A - W.R.S.



ALERT BAY AIRSTRIP
TEST-PRODUCTION WELL

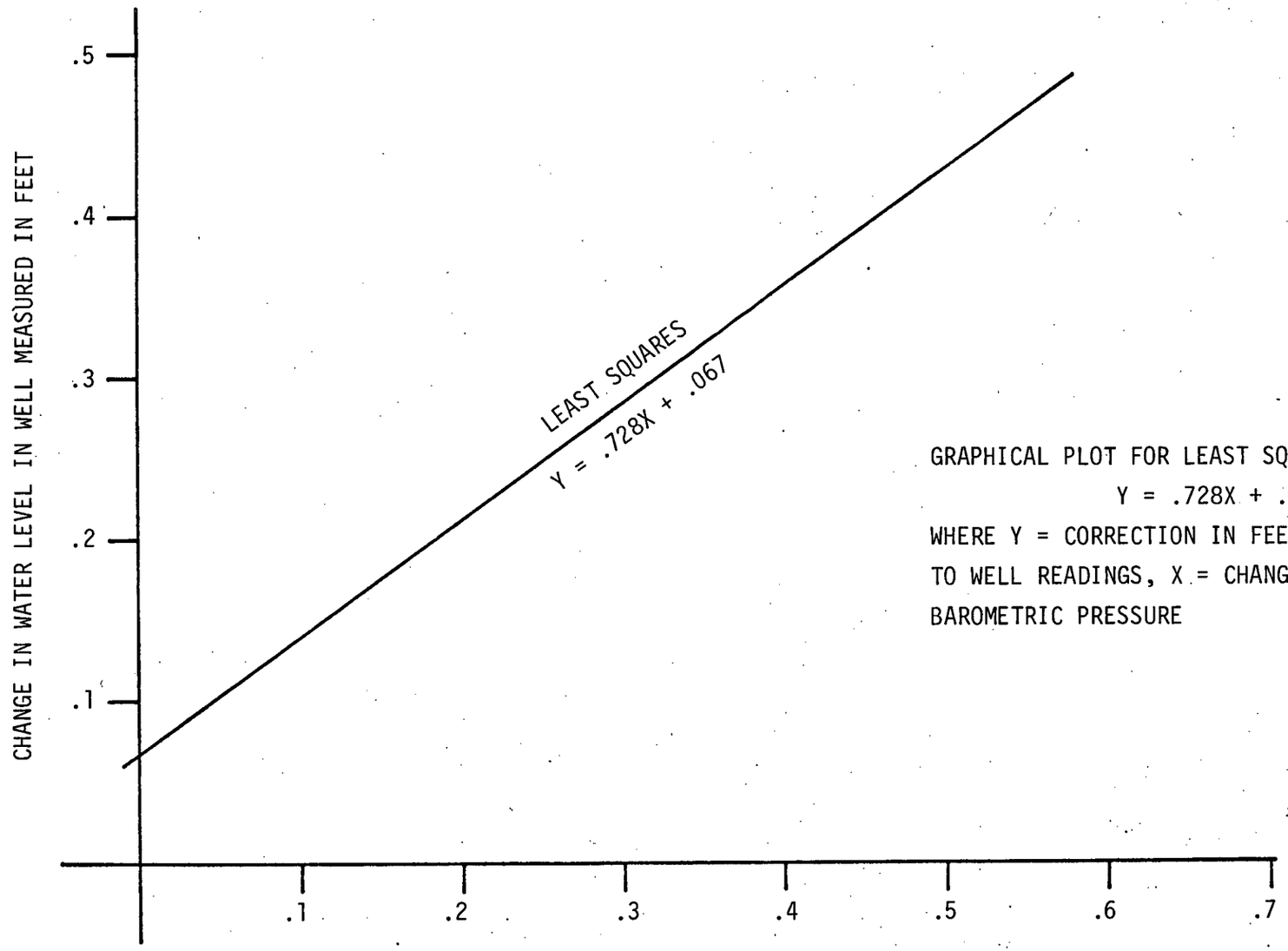
Figure 8



RELATIONSHIP OBTAINED BY VISUAL INSPECTION BETWEEN BAROMETRIC CHANGE AND WELL WATER LEVEL CHANGE

E. TRADEWELL

BRITISH COLUMBIA DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES **WATER RESOURCES SERVICE** WATER INVESTIGATIONS BRANCH	TO ACCOMPANY REPORT ON ALERT BAY AIRSTRIP TEST-PRODUCTION WELL	SCALE: VERT. AS SHOWN HOR. AS SHOWN J.C. FOWERAKER ENGINEER FILE No. 0239013 DWG. No. FIGURE 9	DATE JULY 1975



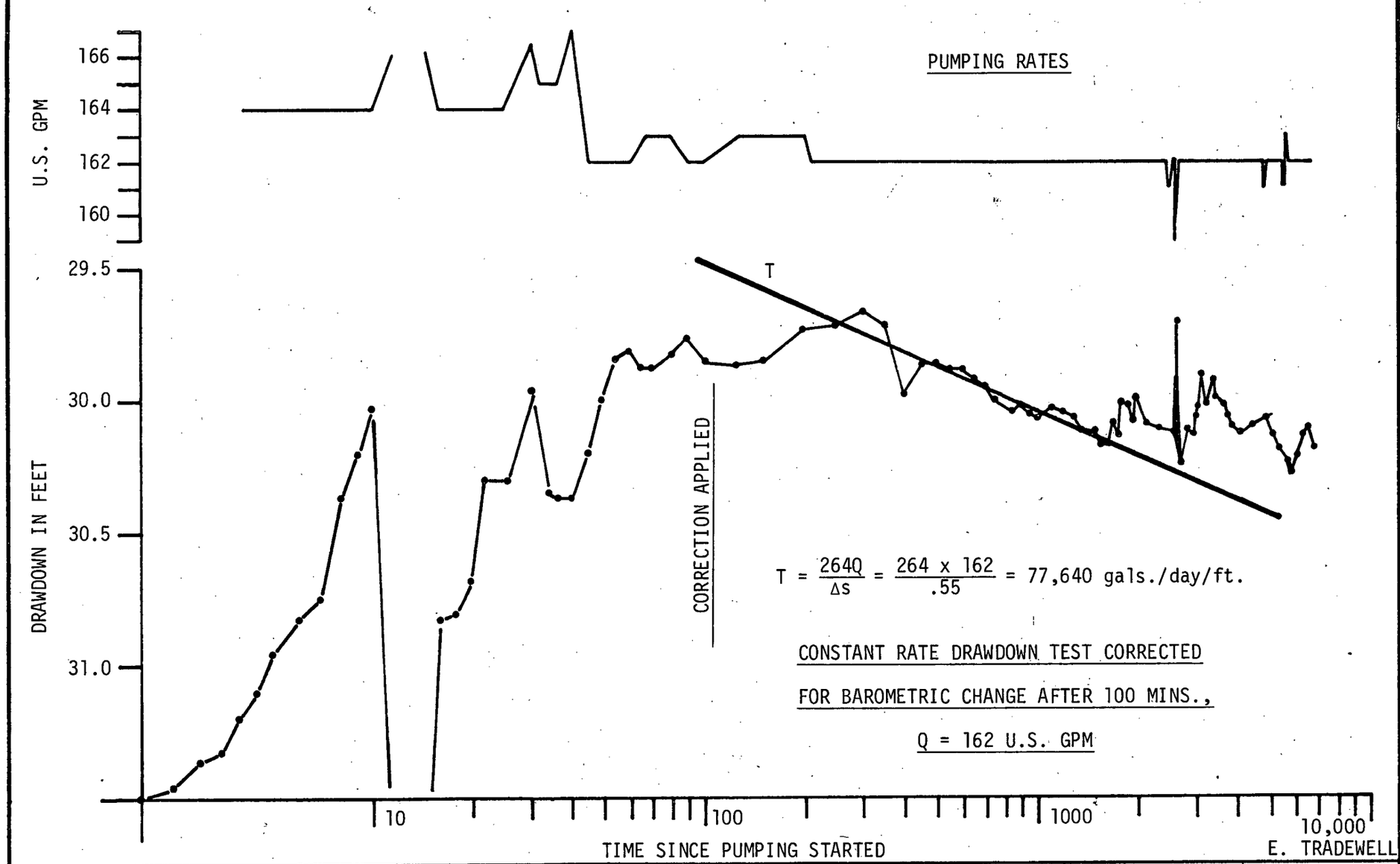
GRAPHICAL PLOT FOR LEAST SQUARE FIT EQUATION

$Y = .728X + .067$

WHERE Y = CORRECTION IN FEET TO BE APPLIED TO WELL READINGS, X = CHANGE RECORDED IN BAROMETRIC PRESSURE

E. TRADEWELL

BRITISH COLUMBIA DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES **WATER RESOURCES SERVICE** WATER INVESTIGATIONS BRANCH	TO ACCOMPANY REPORT ON ALERT BAY AIRSTRIP TEST-PRODUCTION WELL	SCALE: VERT. AS SHOWN HOR. AS SHOWN J.C. FOWERAKER ENGINEER FILE No. 0239013 DWG. No. FIGURE 10	DATE JULY 1975



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WATER RESOURCES SERVICE
WATER INVESTIGATIONS BRANCH

TO ACCOMPANY REPORT ON
ALERT BAY AIRSTRIP

TEST-PRODUCTION WELL

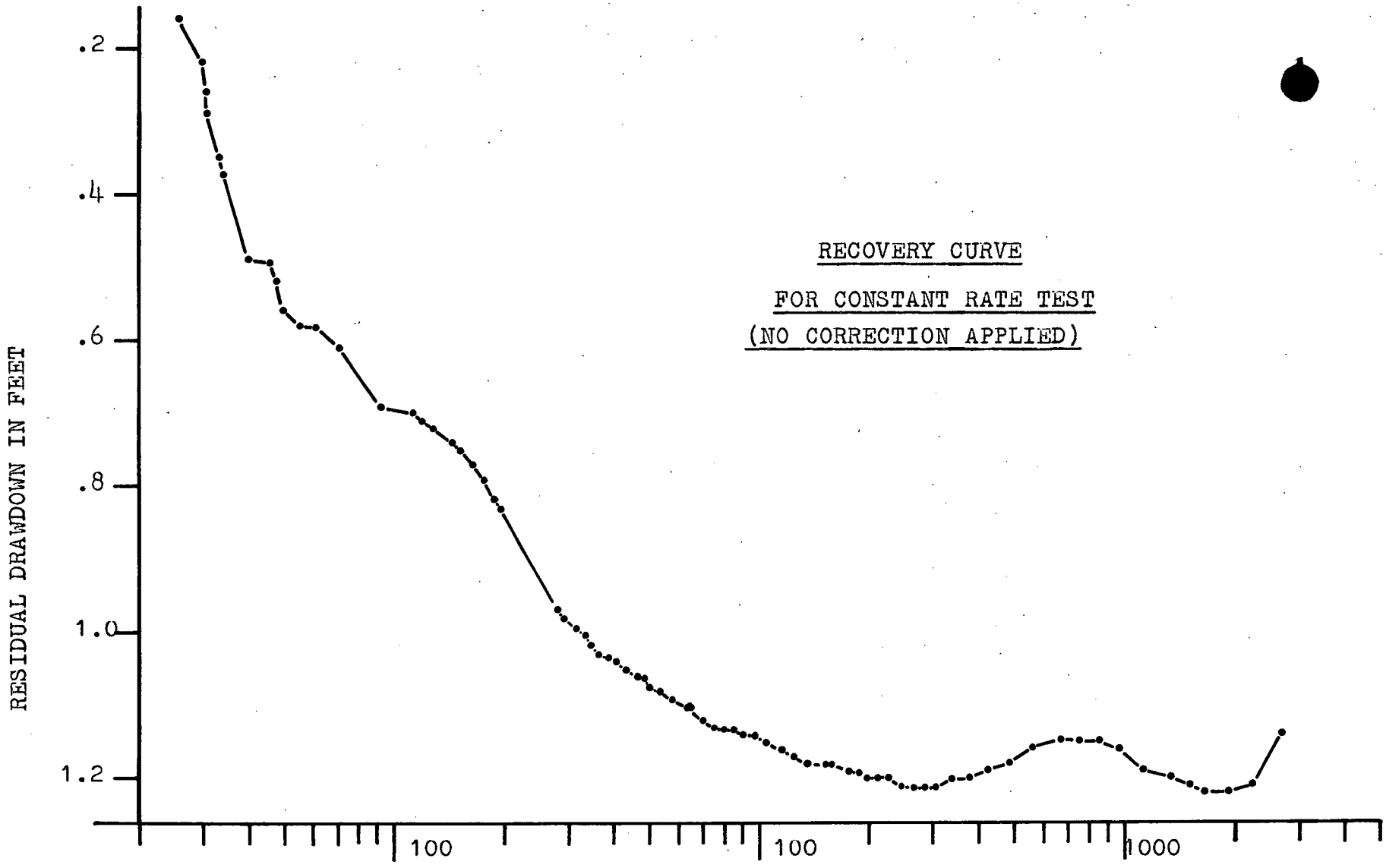
SCALE: VERT. AS SHOWN
HOR. AS SHOWN

DATE
JULY 1975

J.C. FOWERAKER ENGINEER

FILE No. 0239013 DWG. No. FIGURE 11

BCIL-3667A-W.R.B.



RECOVERY CURVE

FOR CONSTANT RATE TEST

(NO CORRECTION APPLIED)

F. Chwojka

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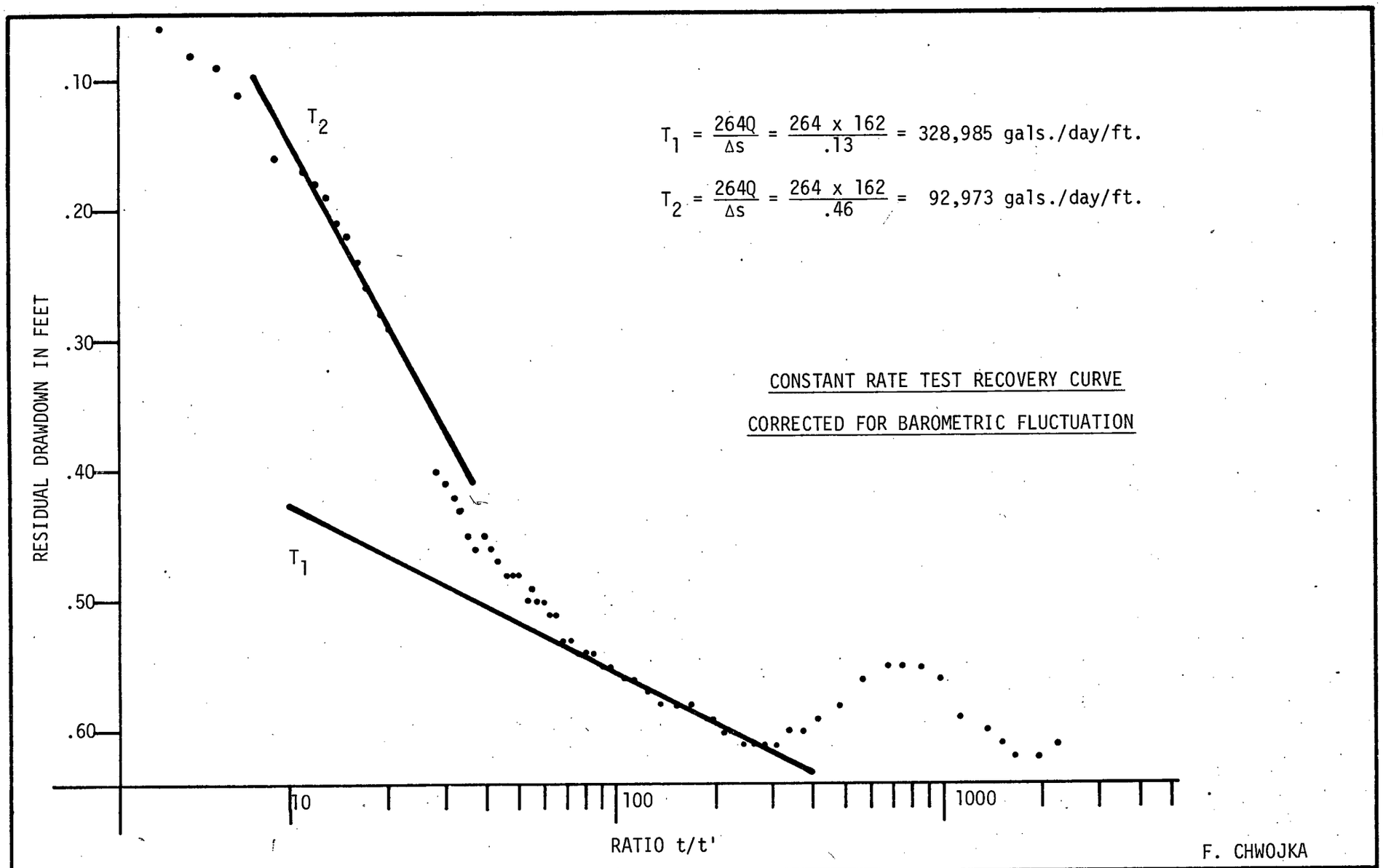

$$T_1 = \frac{264Q}{\Delta s} = \frac{264 \times 162}{.13} = 328{,}985 \text{ gals./day/ft.}$$

$$T_2 = \frac{264Q}{\Delta s} = \frac{264 \times 162}{.46} = 92{,}973 \text{ gals./day/ft.}$$

CONSTANT RATE TEST RECOVERY CURVE

CORRECTED FOR BAROMETRIC FLUCTUATION

F. CHWOJKA

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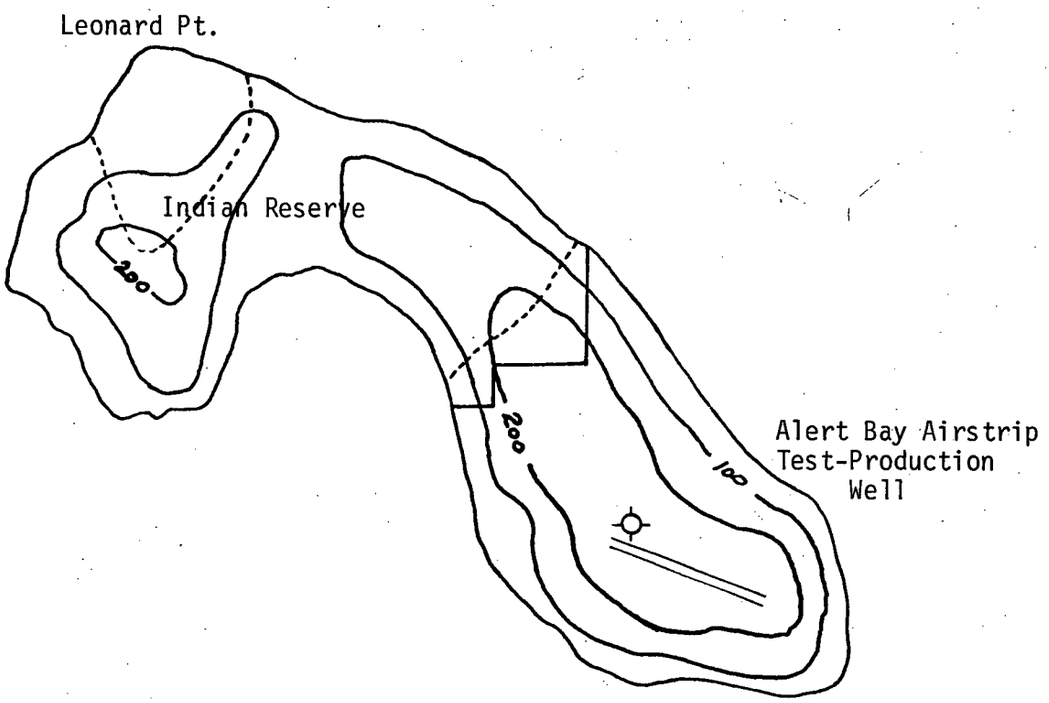

AREA CONSIDERED TO RECHARGE BEACH SANDS AND GRAVELS AT LEONARD POINT

AREA CONSIDERED TO RECHARGE AQUIFER ON EAST END OF CORMORANT ISLAND

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DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
WATER INVESTIGATIONS BRANCH

TO ACCOMPANY REPORT ON
ALERT BAY AIRSTRIP
TEST-PRODUCTION WELL
CORMORANT ISLAND

SCALE: VERT. N.A.
HOR. 1 inch = ½ mile

DATE

J.C. FOWERAKER ENGINEER

FILE No. 0239013 DWG. No. FIGURE 14

SCIL-3588A - W.R.S.

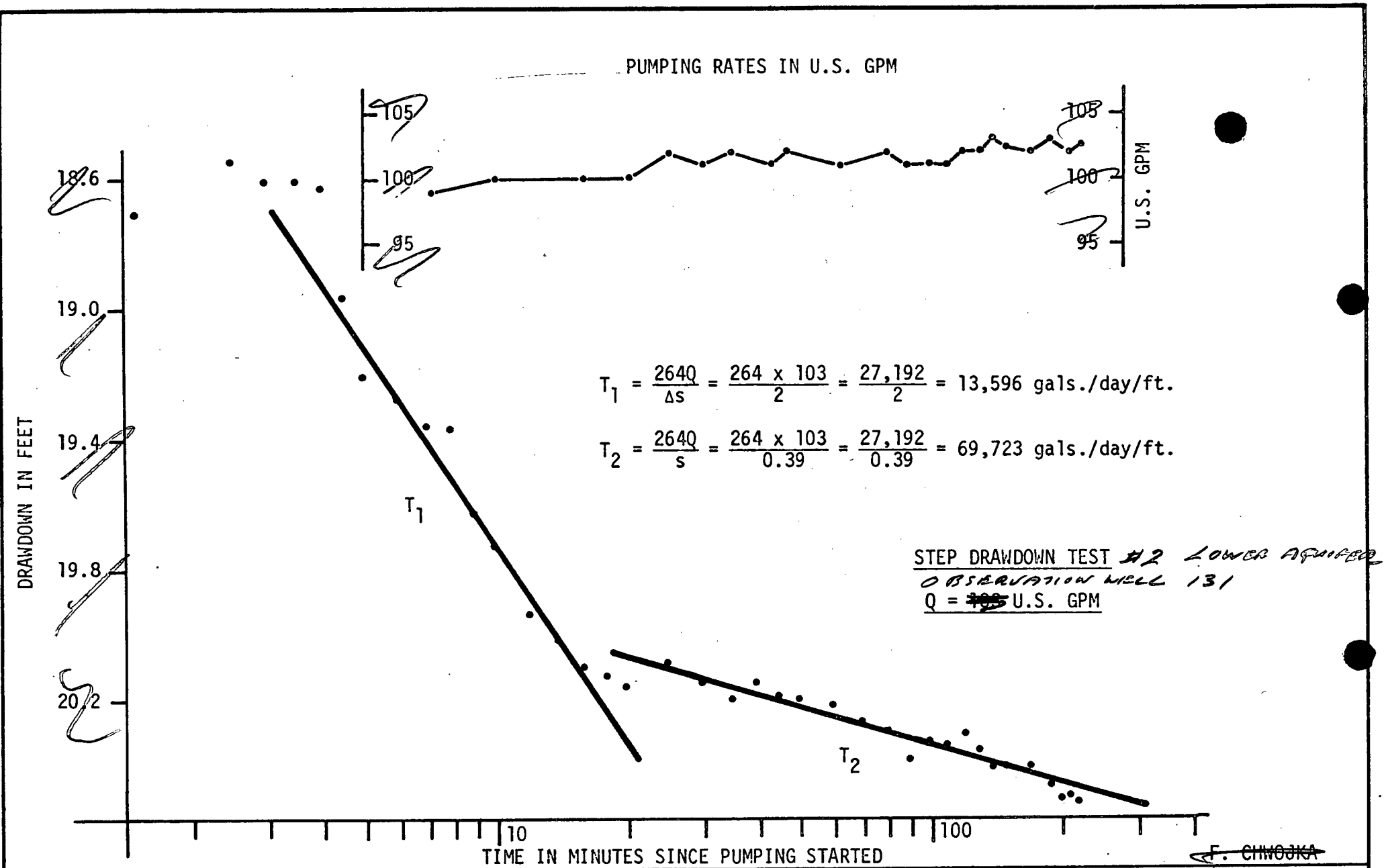
APPENDIX 1A

"STEP DOWN" PUMPING TEST DATA FROM

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 52 U.S. g.p.m. Date April 23, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Discharge from well Flow meter readings U.S. gpm	Remarks
17:30	0	204.60	0	-	Initial static level
17:31	1.0	225.01	20.41		
	1.5	224.14	19.54		
17:32	2.0	221.51	16.91		
17:33	3.0	220.17	15.57	75	Flow too high
					Flow reduced
17:34	4.0	217.61	13.01	53	
17:35	5.0	215.28	10.68		
17:36					
17:37	7.0	215.00	10.40		
17:38	8.0	214.95	10.35	53	
17:40	10.0	215.00	10.40		700 gals. on meter
17:41	11	214.98	10.38	53	800 gals. on meter
17:44	14	214.95	10.35	56	900 gals. on meter
17:46	16	214.79	-		
17:48	18	215.00	10.40		
17:50	20	214.95	10.35		Flow-Meter readings
17:55	25	214.85	10.25	51	1,500 to 1,600 gals. @ 27 min.
18:00	30	214.83	10.23	52	≈ 1,800 gals. Temp. 47°F.
18:05	35	214.90	10.30	53	2,100 gals. @ 36 min.
18:10	40	214.89	10.29		2,400 gals. @ 42 min.
18:15	45	214.90	10.30	52 @ 43 min.	2,500 gals. @ 46 min.
19:90					
18:20	50	214.90	10:30		
18:30	60	215.07	10.47		52 gpm at 60 mins.
18:40	70	215.06	10.46		54 gpm at 75 mins.
18:50	80	214.98	10.38		4,600 gals. pumped at 80 min.
19:00	90	214.97	10.37		
19:10	100	214.87	10.27		53 gpm (5,500 gals pumped)
					53 gpm at 110 mins.
19:30	120	214.82	10.22		52.5 gpm at 120 mins.
					53.5 gpm at 130 mins.
19:50	140	214.89	10.29		(7,200 gals. pumped)
20:00	150	214.82	10.22		Total gallons pumped = 8,243



F. CHWOJKA

BRITISH COLUMBIA
DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
WATER INVESTIGATIONS BRANCH

TO ACCOMPANY REPORT ON
CONTRACT #68
~~ALERT BAY AIRSTRIP~~
GROUNDWATER RESEARCH PROJECT
~~TEST PRODUCTION WELL~~
COWICHAN RIVER RESEARCH BOREHOLE #2

SCALE: VERT. AS SHOWN
HOR. AS SHOWN

DATE Dec ~~JULY~~ 1975

J.C. FOWERAKER ENGINEER

FILE No. 0239013 DWG. No. FIGURE 2.

APPENDIX 1

RECOVERY READINGS IN
ALERT BAY AIRSTRIP TEST-PRODUCTION WELL
AFTER "STEP DRAWDOWN" PUMPING TEST

Date April 23-24, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Remarks
April	23, 1975					
20:00	150	0	0			
20:01	151	1	151	197.69	6.91	
20:02	152	2	75.50	203.50	1.10	
20:03	153	3	51.00	204.21	0.39	
20:04	154	4	38.50	204.39	0.21	
	154.5	4½	34.33	204.48	0.12	
20:05	155	5	31.00	204.45	0.15	
	155.5	5½	28.27	204.45	0.15	
	157.5	7½	21.00	204.45	0.15	
20:09	159	9	17.67	204.45	0.15	
20:10	160	10	16.00	204.45	0.15	
20:15	165	15	11.00	204.45	0.15	
20:20	170	20	8.50	204.53	0.07	
20:25	175	25	7.00	204.53	0.07	
20:30	180	30	6.00	204.53	0.07	
20:40	190	40	4.75	204.53	0.07	
20:50	200	50	4:00	204.54	0.06	
21:00	210	60	3.50	204.54	0.06	
21:10	220	70	3.14	204.54	0.06	
21:20	230	80	2.87	Black line less 0.05 feet		
April	24, 1975					
08:30	900	670	1.34	204.49	0.11	

APPENDIX 1B

"STEP DOWN" PUMPING TEST DATA FROM

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 103 U.S. gpm

Date April 24, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Discharge from well Flow meter readings U.S. gpm	Remarks
08:30	0	204.50	0		Initial static
	½				flow meter reading at
08:31	1	224.11	19.61		start of test 8253 gals.
	1½	223.21	18.71		
08:32	2				
	2½	223.05	18.55		
	3	223.11	18.61		
	3½	223.11	18.61		
08:34	4	223.13	18.63		
	4½	223.47	18.97		
08:35	5	223.71	19.21		
08:36	6	223.79	19.28		
08:37	7	223.86	19.36	99	
08:38	8	223.87	19.37		
08:39	9	224.13	19.63		
08:40	10	224.23	19.73	100	
08:42	12	224.44	19.94		
08:44	14	224.52	20.02		
08:46	16	224.60	20.10	100	
08:48	18	224.63	20.13		
08:50	20	224.66	20.16	100	
08:55	25	224.59	20.09	102	
09:00	30	224.65	20.15	101	
09:05	35	224.70	20.20		102 gpm 11,300 gals
09:10	40	224.65	20.15		12,100 gals. pumped at 38 min.
09:15	45	224.69	20.19		12,500 gals. pumped at 42 min.
					101 gpm at 43 mins.
					102 gpm at 47 min.
					13,100 gals. pumped
09:20	50	224.70	20.20		
09:30	60	224.72	20.22		101 gpm 14,600 gals.
09:40	70	224.77	20.27		pumped at 62 mins.
09:50	80	224.80	20.30		102 gpm 16,420 gals.
10:00	90	224.79	20.29		101 gpm 17,420 gals at 88 min.
10:10	100	224.83	20.33		101 gpm 18,500 gals at 100 min.
10:20	110	224.84	20.34		101 gpm 19,500 gals at 110 mins.

APPENDIX 1B

"STEP DOWN" PUMPING TEST DATA FROM

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 103 U.S. gpm. Date April 24, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Discharge from well Flow meter readings U.S. gpm	Remarks
10:30	120	224.81	20.31		102 gpm 20,700 gals. at 121 min.
10:40	130	224.86	20.36		102 gpm 21,600 gals. at 130 min.
10:50	140	224.92	20.41		103 gpm 22,900 gals. at 143 min.
11:00	150	224.91	20.41		102.5 gpm 23,600 gals. at 150 min.
11:20	170	224.91	20.41		102.5 gpm 25,700 gals.
11:40	190	224.96	20.47		103 gpm 27,800 gals.
11:50	200	225.01	20.51		
12:00	210	225.00	20.50		102 gpm 29,700 gals.
12:10	220	225.02	20.52		102½ gpm

* Remarks (continued)

Water quality sample No. 4 taken at 190 minutes

Total number of gallons pumped

30884 - 8243 = 22,641 gals.

= 103 U.S. gpm.

APPENDIX 1

RECOVERY READINGS IN
ALERT BAY AIRSTRIP TEST-PRODUCTION WELL
AFTER "STEP DRAWDOWN" PUMPING TEST

Pumping rate (Q) ≈ 103 U.S. gpm

Date April 24, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Remarks
12:10	220.0	0	0	204.50	0.00	Static
	220.5	0.5	441.00	204.21	0.29	Above static water level
12:11	221.0	1.0	221.00	198.84	5.66	" " " "
	221.5	1.5	147.67	203.07	1.43	" " " "
12:12	222.0	2.0	111.00	204.04	0.46	" " " "
	222.5	2.5	89.00	204.42	0.08	" " " "
12:13	223.0	3.0	74.33	204.42	0.08	" " " "
	223.5	3.5	63.86	204.48	0.02	" " " "
12:14	224.0	4.0	56.00	204.47	0.03	" " " "
	224.5	4.5	49.89	204.47	0.03	" " " "
12:15	225.0	5.0	45.00	204.49	0.01	" " " "
12:16	226	6.0	37.67	204.49	0.01	" " " "
12:17	227	7.0	32.43	204.49	0.01	" " " "
12:18	228	8.0	28.50	204.49	0.01	" " " "
12:19	229	9.0	25.44	204.51	0.01	Below static water level
12:20	230	10	23.00	204.52	0.02	
12:22	232	12	19.33	204.56	0.06	" " " "
12:24	234	14	16.71	204.56	0.06	" " " "
12:26	236	16	14.75	204.58	0.08	" " " "
12:28	238	18	13.22	204.60	0.10	" " " "
12:30	240	20	12:00	204.63	0.13	
12:35	245	25	9.80	204.61	0.11	" " " "
12:40	250	30	8.33	204.59	0.09	" " " "
12:50	260	40	6.50	204.58	0.08	" " " "
13:00	270	50	5.40	204.58	0.08	" " " "
13:25	295	75	3.93	204.57	0.07	" " " "
13:50	320	100	3.20	204.60	0.10	" " " "
14:15	345	125	2.76	204.60	0.10	" " " "

APPENDIX 1C

"CONSTANT RATE" PUMPING TEST DATA FROM ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 162 U.S. gpm

Date April 24, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Corrected for barometric fluctuations ft.	Height of water in tube on orifice pipe in.	Discharge from well U.S. gpm	Remarks
		204.64					
15:30	0	204.63	0				Static
	0.5	232.22	27.59				
15:31	1	235.11	31.48				
	1.5	236.01	31.38				
15:32	2.0	236.13	31.50				
	2.5	236.09	31.46				
15:33	3.0	235.99	31.36				
	3.5	235.96	31.33				
15:34	4.0	235.83	31.20				
	4.5	235.73	31.10				
15:35	5.0	235.59	30.96				
	6	235.45	30.82				
15:37	7	235.32	30.75				
15:38	8	235.00	30.37				
15:39	9	234.83	30.20				
15:40	10	234.66	30.03				
15:42	12	236.91	32.28				
15:44	14	236.84	32.21				
15:46	16	235.45	30.82				
15:48	18	235.44	30.81				
15:50	20	235.31	30.68		15-1/2	164	
15:52	22	234.93	30.30		15-1/2	164	
15:54	24				15-1/2	164	
15:56	26	234.91	30.28		15-1/2	164	
15:58	28	234.45	30.32		15-5/8	165	
16:00	30				15-5/8	165	
16:02	32				15-7/8	166	
16:04	34	234.98	30.35		15-5/8	165	
16:06	36	234.99	30.36		15-5/8	165	
16:10	40	235.00	30.37		16	167	
16:15	45	234.83	30.20		15	162	
16:20	50	234.63	30.00		15	162	
16:25	55	234.48	29.85		15	162	
16:30	60	234.46	29.82		15-1/8	162	
16:37	67	234.50	29.87		15-1/4	163	
16:40	70	234.50	29.87		15-1/4	163	
16:50	80	234.46	29.83		15-1/4	163	

APPENDIX 1C

"CONSTANT RATE" PUMPING TEST DATA FROM
ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 162 U.S. gpm Date April 24-25, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Corrected for barometric fluctuations ft.	Height of water in tube on orifice pipe in.	Discharge from well U.S. gpm	Remarks
April 24, 1975							
17:00	90	234.40	29.77		15	162	
17:10	100	234.50	29.87	29.85	15	162	
17:35	125	234.52	29.89	29.86	15-1/4	163	Adj. flow
18:00	150	234.52	29.89	29.85	15-1/4	163	Adj. flow
18:50	200	234.42	29.78	29.73	15-1/4	163	Adj. flow
19:00					15-1/8	162	
19:40	250	234.42	29.79	29.72	15-1/8	162	Adj. flow
20:00		234.39	29.76	29.68	15-1/8	162	Adj. flow
20:30	300	234.38	29.75	29.66	15	162	
21:20	350	234.45	29.82	29.72	15	162	
22:10	400	234.45	30.09	29.98	15	162	
23:00	450	234.63	30.00	29.87	15	162	
23:50	500	234.63	30.00	29.86	15	162	
April 25, 1975							
00:40	550	234.67	30.04	29.88	15	162	
01:30	600	234.67	30.04	29.88	15	162	
02:20	650	234.73	30.10	29.92	15	162	
03:10	700	234.77	30.14	29.95	15	162	
04:00	750	234.83	30.20	30.00	15	162	
04:50	800	234.86	30.23	30.21	15	162	
05:40	850	234.91	30.28	30.04	15	162	
06:30	900	234.91	30.28	30.02	15-1/4	162	
07:20	950	234.97	30.34	30.06	15	162	
08:10	1000	235.00	30.37	30.07	15	162	
09:00	1050	234.97	30.34	30.34	15+	162	
09:50	1100	234.97	30.34	30.02	15	162	
10:40	1150	235.00	30.37	30.04	15	162	
11:30	1200	235.02	30.39	30.04	15	162	
12:20	1250	235.06	30.43	30.06	15	162	
13:10	1300	235.07	30.44	30.07	15	162	
14:00	1350	235.13	30.50	30.11	15+	162	
14:50	1400	235.16	30.53	30.12		162	
15:40	1450	235.17	30.54	30.12			
16:30	1500	235.19	30.56	30.12	15+	162	Adjustment made

APPENDIX 1C

"CONSTANT RATE" PUMPING TEST DATA FROM ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 162 U.S. gpm

Date April 25-26, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Corrected for barometric fluctuations ft.	Height of water in tube on orifice pipe in.	Discharge from well U.S. gpm	Remarks
April 25, 1975							
17:20	1550	235.25	30.62	30.17	15	162	
18:10	1600	235.27	30.64	30.18	15	162	
19:00	1650	235.30	30.67	30.17	15	162	
19:50	1700	235.20	30.57	30.08	15	162	
20:25		235.27					
20.40	1750	235.25	30.64	30.14	15	162	
21:30	1800	235.17	30.54	30.01	15	162	
22:20	1850	235.18	30.55	30.01	15	162	
23:10	1900	235.23	30.55	30.03	15	162	
24:00	1950	235.12	30.60	30.08	15	162	
April 26, 1975							
00:50	2000	235.14	30.51	29.99	15	162	
01:40	2050	235.23	30.60	30.08	15	162	
02:30	2100	235.22	30.59	30.07	15	162	
03:20	2150	235.23	30.60	30.08	15	162	
04:10	2200	235.24	30.61	30.09	15	162	
05:00	2250	235.24	30.61	30.10	15	162	
05:50	2300	235.24	30.61	30.11	15	162	
06:40	2350	235.23	30.60	30.10	15	162	
07:30	2400	235.24	30.61	30.12	15	162	
08:20	2450	235.21	30.58	30.10	15	162	
09:10	2500	235.22	30.59	30.11	15-	161	
10:00	2550	235.21	30.58	30.11	15-	161	
10:50	2600	235.22	30.59	30.14	15	162	
11:40	2650	234.77	30.14	29.69	14-1/2	159	
12:30	2700	235.31	30.68	30.25	15+	162	
12:50	2720	235.20	30.57	30.15	15	-	Took measurement after adjustment
13:20	2750	235.24	30.61	30.20	15-3/10	162	
14:10	2800	235.14	30.51	30.11	15	162	
15:00	2850	235.11	30.48	30.10			
15:30		235.10	30.47	30.09			
15:50	2900	235.12	30.49	30.12			
16:40	2950	235.14	30.51	30.13	15-1/8	162	Adj. 1/16 turn

APPENDIX 1C

"CONSTANT RATE" PUMPING TEST DATA FROM
ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 162 U.S. gpm Date April 26-27, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Corrected for barometric fluctuations ft.	Height of water in tube on orifice pipe in.	Discharge from well U.S. gpm	Remarks
April 26, 1975							
17:30	3000	235.10	30.47	30.07	15-1/8	162	
18:20	3050	235.07	30.44	30.03	15-1/8	162	Adj. 1/16 turn
19:10	3100	234.94	30.31	29.89	15+	162	
20:00	3150	234.99	30.36	29.92	15+	162	
20:50	3200	235.10	30.47	30.01	15-1/8	162	
21:40	3250	235.11	30.48	30.01	15+	162	
22:30	3300	235.12	30.49	30.01	15+	162	
23:20	3350	235.03	30.40	29.91	15	162	
April 27, 1975							
00:10	3400	235.12	30.49	29.99	15	162	
02:00	3450	235.13	30.50	29.99	15	162	Time change PDST
02:50	3500	235.15	30.52	30.00	15	162	
03:40	3550	235.13	30.50	29.98	15+	162	
04:30	3600	235.17	30.54	30.02	15	162	
05:20	3650	235.19	30.56	30.03	15	162	
06:10	3700	235.23	30.60	30.07	15+	162	
07:00	3750	235.24	30.61	30.07	15+	162	
07:50	3800	235.26	30.63	30.08	15+	162	
08:40	3850	235.30	30.67	30.11	15+	162	
09:30	3900	235.30	30.67	30.10	15+	162	
10:20	3950	235.32	30.69	30.11			
11:10	4000	235.33	30.70	30.11	15+	162	
12:00	4050	235.36	30.73	30.14	15-1/8	162	
12:50	4100	235.35	30.70	30.10	15-1/8	162	
13:40	4150	235.38	30.75	30.15	15-1/8	162	
14:10	4220	235.34	30.71	30.11	15+		
14:30	4200	235.38	30.75	30.14	15-1/8	162	
15:20	4250	235.39	30.76	30.15	15	162	
16:10	4300	235.39	30.76	30.14	15-1/8	162	
16:30		235.39	30.76	30.14			
17:00	4350	235.38	30.75	30.12	15+	162	
17:50	4400	235.38	30.75	30.11	15+	11	
18:40	4450	235.21	30.58	29.94	15	162	

APPENDIX 1C

"CONSTANT RATE" PUMPING TEST DATA FROM ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 162 U.S. gpm

Date April 27-28, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Corrected for barometric fluctuations ft.	Height of water in tube on orifice pipe in.	Discharge from well U.S. gpm	Remarks
April 27, 1975							
19:30	4500	235.36	30.73	30.08	15	162	
20:20	4550	235.38	30.75	30.09	15	162	
21:10	4600	235.43	30.80	30.14	15-1/8	162	
22:00	4650	235.41	30.78	30.11	15	162	
22:50	4700	235.48	30.85	30.18	15-1/8	162	
23:40	4750	235.43	30.80	30.13	15	162	
April 28, 1975							
00:30	4800	235.40	30.77	30.10	15	162	
01:20	4850	235.36	30.73	30.05	15-	161	
02:10	4900	235.38	30.75	30.07	15	162	
03:00	4950	235.44	30.81	30.13	15+	162	
03:50	5000	235.43	30.80	30.12	15	162	
04:40	5050	235.41	30.78	30.10	15	162	
05:30	5100	235.43	30.80	30.12	15	162	
06:20	5150	235.46	30.93	30.25	15	162	
07:10	5200	235.48	30.85	30.16	15	162	
08:00	5250	235.49	30.86	30.17	15	162	
08:50	5300	235.44	30.81	30.12	15-1/16	162	
09:40	5350	235.49	30.86	30.17	15-1/8	162	
10:30	5400	235.51	30.88	30.19	15-1/8	162	
11:20	5450	235.53	30.90	30.21	15-1/8	162	
12:10	5500	235.55	30.92	30.23	15-3/16	162	
13:00	5550	235.50	30.87	30.19	14-15/16	161	
13:50	5600	235.53	30.90	30.22	15-1/4	163	
14:40	5650	235.53	30.90	30.22	15-1/8	162	
15:30	5700	235.55	30.92	30.24	15-1/8	162	
16:20	5750	235.54	30.91	30.23	15-3/16	163	
16:30	5760	235.55	30.92	30.24	15-3/16	163	
17:10	5800	235.59	30.96	30.28	15-1/8	162	
18:00	5850	235.48	30.85	30.17	15	162	
18:50	5900	235.52	30.89	30.21	15	162	
19:40	5950	235.54	30.91	30.23	15	162	
20:30	6000	235.52	30.89	30.21	15+	162	
21:20	6050	235.52	30.89	30.21	15	162	

APPENDIX 1C

"CONSTANT RATE" PUMPING TEST DATA FROM ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Pumping Rate (Q) ≈ 162 U.S. gpm Date April 28-29, 1975

Time	Time (t) since start of pumping min.	Depth to water in well from top of casing ft.	Drawdown in well ft.	Corrected for barometric fluctuations ft.	Height of water in tube on orifice pipe in.	Discharge from well U.S. gpm	Remarks
April 28, 1975							
22:10	6100	235.52	30.89	30.21	15	162	
23:00	6150	235.38	30.89	30.21	15	162	
23:50	6200	235.44	30.81	30.14	15	162	
April 29, 1975							
00:40	6250	235.43	30.80	30.13	15	162	
01:30	6300	235.43	30.80	30.14	15	162	
02:20	6350	235.42	30.79	30.13	15	162	
03:10	6400	235.41	30.78	30.13	15	162	
04:00	6450	235.41	30.78	30.13	15	162	
04:50	6500	235.35	30.72	30.07	15	162	
05:40	6550	235.36	30.73	30.09	15	162	
06:30	6600	235.36	30.73	30.10	15	162	
07:20	6650	235.37	30.74	30.12	15	162	
08:10	6700	235.39	30.76	30.15	15-	161	
09:00	6750	235.41	30.78	30.18	15	161	

APPENDIX 1C

RECOVERY READINGS IN

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

AFTER "CONSTANT RATE" PUMPING TEST

Date April 29, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Corrected for barometric fluctuations ft.	Remarks
09:00	6750	0	0	235.41	30.78		
	6750.5	0.5	13501				
09:01	6751	1.0	6751	200.57			
	6751.5	1.5	4501	203.18			
09:02	6752	2.0	3376	204.98	0.35		
	6752.5	2.5	2701	205.77	1.14	0.54	
09:03	6753	3.0	2251	205.84	1.21	0.61	
	6753.5	3.5	1929.57	205.85	1.22	0.62	
09:04	6754	4.0	1688.5	205.85	1.22	0.62	
	6754.5	4.5	1501	205,84	1.21	0.61	
09:05	6755	5.0	1351	205.83	1.20	0.60	
09:06	6756	6	1126	205.82	1.19	0.59	
09:07	6757	7	965.29	205.79	1.16	0.56	
09:08	6758	8	844.75	205.78	1.15	0.55	
09:09	6759	9	751	205.78	1.15	0.55	
09:10	6760	10	676	205.78	1.15	0.55	
09:12	6762	12	563.5	205.79	1.16	0.56	
09:14	6764	14	483.14	205.81	1.18	0.58	
09:16	6766	16	422.88	205.82	1.19	0.59	
09:18	6768	18	376.00	205.83	1.20	0.60	
09:20	6770	20	338.5	205.83	1.20	0.60	
09:22	6772	22	307.82	205.84	1.21	0.61	
09:24	6774	24	282.25	205.84	1.21	0.61	
09:26	6776	26	260.62	205.84	1.21	0.61	
09:28	6778	28	242.07	205.84	1.21	0.61	
09:30	6780	30	226.00	205.83	1.20	0.60	
09:32	6782	32	211.94	205.83	1.20	0.60	
09:34	6784	34	199.53	205.83	1.20	0.60	
09:36	6786	36	188.50	205.82	1.19	0.59	
09:38	6788	38	178.63	205.82	1.19	0.59	
09:40	6790	40	169.75	205.81	1.18	0.58	
09:45	6795	45	151.00	205.81	1.18	0.58	
09:50	6800	50	136.00	205.81	1.18	0.58	
09:55	6805	55	123.73	205.80	1.17	0.57	

APPENDIX 1C

RECOVERY READINGS IN

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

AFTER "CONSTANT RATE" PUMPING TEST

Date April 29, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Corrected for barometric fluctuations ft.	Remarks
10:00	6810	60	113.50	205.79	1.16	0.56	
10:05	6815	65	104.85	205.78	1.15	0.56	
10:10	6820	70	97.43	205.77	1.14	0.55	
10:15	6825	75	91.00	205.77	1.14	0.55	
10:20	6830	80	85.38	205.76	1.13	0.54	
10:25	6835	85	80.41	205.76	1.13	0.54	
10:30	6840	90	76.00	205.76	1.13	0.54	
10:35	6845	95	72.05	205.75	1.12	0.53	
10:40	6850	100	68.50	205.75	1.12	0.53	
10:45	6855	105	65.29	205.73	1.10	0.51	
10:50	6860	110	62.36	205.73	1.10	0.51	
10:55	6865	115	59.70	205.72	1.09	0.50	
11:00	6870	120	57.24	205.72	1.09	0.50	
11:05	6875	125	55.00	205.71	1.08	0.49	
11:10	6880	130	52.92	205.71	1.08	0.50	
11:15	6885	135	49.89	205.70	1.07	0.49	
11:20	6890	140	49.21	205.69	1.06	0.48	
11:25	6895	145	47.55	205.69	1.06	0.48	
11:30	6900	150	46.00	205.69	1.06	0.48	Valve added and closed off
11:40	6910	160	43.19	205.68	1.05	0.47	
11:50	6920	170	40.71	205.67	1.04	0.46	
12:00	6930	180	38.50	205.66	1.03	0.45	
12:20	6950	200	34.75	205.65	1.02	0.45	
12:30	6960	210	33.14	205.63	1.00	0.43	
12:40	6970	220	31.68	205.62	0.99	0.42	
12:55	6985	235	29.72	205.61	0.98	0.41	
13:10	7000	250	28.00	205.60	0.97	0.40	
14:00				205.48	.85	0.30	Start Pulling/Pump Pump Out
14:25				205.48	.85	0.30	Installed/Recorder Box

APPENDIX 1C

RECOVERY READINGS IN

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

AFTER "CONSTANT RATE" PUMPING TEST

Date April 29 - May 2, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Corrected for barometric fluctuations ft.	Remarks
April	29, 1975						
15:00	7110	360	19.75	205.46	0.83	0.29	
15:20	7130	380	18.76	205.45	0.82	0.28	
15:55	7165	415	17.27	205.42	0.79	0.26	
16:25	7195	445	16.17	205.40	0.77	0.24	
17:00	7230	480	15.06	205.38	0.75	0.22	
17:30	7260	510	14.24	205.37	0.74	0.21	
18:30	7320	570	12.84	205.35	0.72	0.19	
19:30	7380	630	11.71	205.34	0.71	0.18	
20:00	7410	660	11.23	205.33	0.70	0.17	
22:40	7570	820	9.23	205.32	0.69	0.16	
April	30, 1975						
03:15	7845	1095	7.16	205.24	0.61	0.11	
07:25	8095	1345	6.02	205.21	0.58	0.09	
10:00	8250	1500	5.50	205.21	0.58	0.09	
13:30	8460	1710	4.95	205.19	0.56	0.08	
15:00	8550	1800	4.75	205.15	0.52	0.05	
16:30	8640	1890	4.57	205.12	0.49	0.03	
23:00	9030	2280	3.96	205.12	0.49	0.06	
May 1,	1975						
08:00	9570	2820	3.39	205.00	0.37	0.22	
11:00	9750	3000	3.25	204.97	0.35	0.01	
15:00	9990	3240	3.08	204.92	0.29	+0.01	
17:00	10,110	3360	3.01	204.89	0.26	+0.01	
18:00	10,170	3420	2.97	204.85	0.22	+0.03	
May 2,	1975						
09:00	11,070	4320	2.56	204.79	0.16	0.01	

APPENDIX 1C

RECOVERY READINGS IN

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

AFTER "CONSTANT RATE" PUMPING TEST

Date May 5-11, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Corrected for barometric fluctuations ft.	Remarks
May 5, 1975							
12:00	15,570	8,820	1.77	205.12	0.49	0.11	
16:00	15,810	9,060	1.75	205.12	0.49	0.09	
May 6, 1975							
08:00	16,770	10,020	1.67	205.10	0.47	0.04	
16:00	17,250	10,500	1.64	205.11	0.48	0.05	
May 7, 1975							
08:00	18,210	11,460	1.59	205.27	0.64	0.27	
16:00	18,690	11,940	1.56	205.27	0.64	0.27	
May 8, 1975							
08:00	19,650	12,900	1.52	205.07	0.44	0.12	
16:30	20,160	13,410	1.50	204.90	0.27	0.01	
May 9, 1975							
08:15	21,105	14,355	1.47	204.91	0.28	0.01	
16:20	21,590	14,840	1.45	204.86	0.23	0.00	
May 10, 1975							
09:00	22,590	15,840	1.43	204.95	0.32	0.02	
16:30	23,040	16,290	1.41	204.95	0.32	+0.02	
May 11, 1975							
10:00	24,090	17,340	1.39	205.09	0.46	0.01	
18:30	24,600	17,850	1.38	205.16	0.58	+0.01	

APPENDIX 1C

RECOVERY READINGS IN

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

AFTER "CONSTANT RATE" PUMPING TEST

Date May 12-18, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Corrected for barometric fluctuations ft.	Remarks
May 12, 1975							
08:15	25,425	18,675	1.36	205.24	0.61	0.04	
16:30	25,920	19,170	1.35	205.12	0.49	+0.10	
May 13, 1975							
08:00	26,850	20,100	1.35	204.95	0.32	+0.06	
16:00	27,330	20,580	1.33	204.70	0.07	+0.16	
May 14, 1975							
08:00	28,290	21,540	1.31	204.73	0.10	+0.06	
16:00	28,770	22,020	1.31	204.74	0.11	+0.08	
May 15, 1975							
08:00	29,730	22,980	1.29	204.88	0.25	+0.05	
16:00	30,210	23,460	1.29	204.93	0.30	+0.05	
May 16, 1975							
08:00	31,170	24,420	1.28	204.86	0.23	+0.07	
May 17, 1975							
09:00	32,670	25,920	1.26	204.95	0.32	+0.05	
18:00	33,210	26,460	1.26	204.78	0.15	+0.11	
May 18, 1975							
09:00	34,110	27,360	1.25	204.91	0.28	+0.07	
18:00	34,650	27,900	1.24	204.96	0.33	+0.07	

APPENDIX 1C

RECOVERY READINGS IN

ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

AFTER "CONSTANT RATE" PUMPING TEST

Date May 19-20, 1975

Time	Time (t) since start of pumping min.	Time (t') since pumping stopped min.	Value of t/t'	Depth to water in well from top of casing ft.	Residual drawdown in well ft.	Corrected for barometric fluctuations ft.	Remarks
May 19,	1975						
09:00	35,550	28,800	1.23	205.02	0.39	+0.10	
20:00	36,210	29,460	1.23	205.08	0.45	+0.12	
May 20,	1975						
07.45	36,915	30,165	1.22	205.14	0.51	+0.09	

END OF READINGS BY D. SMITH, ALERT BAY

APPENDIX 2

ALERT BAY SEA LEVEL PRESSURE

IN MILLIBARS, APRIL-MAY, 1975

Date	First Synoptic Hour 0400	Second Synoptic Hour 1000	Third Synoptic Hour 1600	Fourth Synoptic Hour 2200
April 24	996.8	997.8	1001.7	1006.1
25	1009.8	1014.7	1019.2	1023.1
26	1023.1	1021.0	1016.7	1020.0
27	1023.1	1025.3	1027.0	1029.0
28	1029.4	1030.1	1029.7	1029.4
29	1028.1	1026.4	1023.4	1023.2
30	1022.3	1021.6	1020.4	1019.9
May 1	1018.4	1015.8	1013.6	1009.0
2	1006.9	1008.1	1001.9	992.3
3	993.7	997.7	1004.1	1008.8
4	1012.4	1015.2	1014.4	1016.3
5	1016.7	1017.6	1018.1	1018.6
6	1017.9	1019.3	1019.3	1019.6
7	1017.5	1016.7	1016.6	1016.4
8	1015.7	1014.9	1012.5	1012.5
9	1012.8	1012.0	1011.2	1011.6
10	1012.7	1014.0	1015.4	1014.6
11	1016.7	1019.8	1022.7	1025.7
12	1028.1	1023.1	1025.8	1023.7
13	1020.8	1015.3	1010.3	1008.0
14	1007.9	1008.5	1009.3	1010.8
15	1012.9	1014.5	1015.7	1015.7
16	1015.1	1013.6	1014.8	1017.8
17	1018.3	1016.3	1011.8	1013.1
18	1015.2	1016.1	1017.9	1018.2
19	1019.3	1022.2	1023.7	1025.4
20	1026.7	1025.8	1023.0	1022.0

APPENDIX 2

ALERT BAY SEA LEVEL PRESSURE

IN FEET OF WATER, APRIL-MAY, 1975

Date	First Synoptic Hour 0400	Second Synoptic Hour 1000	Third Synoptic Hour 1600	Fourth Synoptic Hour 2200
April 24			0	.11
25	.20	.32	.43	.52
26	.52	.47	.37	.47
27	.52	.58	.62	.67
28	.68	.69	.68	.68
29	.65	.60	.53	.53
30	.50	.49	.46	.44
May 1	.40	.35	.29	.18
2	.13	.16	.005	.23
3	.20	.10	.06	.17
4	.26	.33	.31	.36
5	.37	.38	.40	.41
6	.40	.43	.43	.44
7	.38	.37	.37	.36
8	.35	.32	.26	.26
9	.27	.27	.23	.24
10	.27	.30	.34	.32
11	.37	.45	.51	.59
12	.65	.53	.59	.54
13	.47	.33	.23	.16
14	.15	.17	.19	.23
15	.27	.32	.35	.35
16	.33	.29	.32	.39
17	.41	.36	.25	.28
18	.33	.35	.40	.41
19	.43	.50	.54	.58
20	.61	.59	.52	.50

APPENDIX 3

DATA FROM FIGURE 8 USED TO OBTAIN
BAROMETRIC EFFICIENCY RELATIONSHIP IN THE
ALERT BAY AIRSTRIP TEST-PRODUCTION WELL

Barometric Change millibars	Barometric Pressure Change of Water feet	Change in Water Level in Well feet
	X	Y
0.534	.02	.21
4.467	.15	.38
1.300	.04	.03
4.067	.14	.09
9.500	.32	.29
16.467	.55	.52
7.400	.25	.20
1.600	.05	.06
2.200	.07	.08
4.067	.14	.17
13.867	.46	.36
4.383	.15	.12

APPENDIX 4

RESULTS OF FIELD WATER QUALITY TESTS
TAKEN DURING PUMPING TESTS FROM
ALERT BAY TEST-PRODUCTION WELL

Time since start of pumping min.	Iron (Fe) ppm	Temp. °F	Specific Conductance µ MHOS/cm	Sodium Chloride (NaCl) ppm	Chloride (Cl) ppm	Hardness gpg	pH Reading
Pumping Rate (Q) ≈ 52 U.S. gpm - April 23, 1975							
45				25	15		
99	0.06	43	190	37.5	23		
150		45	177				
Pumping Rate (Q) ≈ 103 U.S. gpm - April 24, 1975							
60		49.5	180				
Pumping Rate (Q) ≈ 162 U.S. gpm - April 24, 1975							
67		50	170	37.5	23		
150	0.3	45	182	37.5		5	8.5
210	0.3	43.5	167	37.5		5	8.5
300	0.3	44	180	37.5		5	8.5
500	0.2	44	182	37.5		7	8.5
Pumping Rate (Q) ≈ 162 U.S. gpm - April 25, 1975							
600		44	180				
700		44	182				
800		44	178				
900		45	180				
1000		45	180				
1050	0.5	50	175	25		5	8.5
1150		50	175				
1250	0.2	51	180	25			
1450		51	180				
1550	0.3	50	179	37.5		5	8.5
1650		49	172				
1750		48	175				
1900	0.3	48	175	37.5		5	8.5

APPENDIX 4

RESULTS OF FIELD WATER QUALITY TESTS
TAKEN DURING PUMPING TESTS FROM
ALERT BAY TEST-PRODUCTION WELL

Time since start of pumping min.	Iron (Fe) ppm	Temp. °F	Specific Conductance µ MHOS/cm	Sodium Chloride (NaCl) ppm	Chloride (Cl) ppm	Hardness gpg	pH Reading
Pumping Rate (Q) ≈ 162 U.S. gpm - April 26, 1975							
2050		50	140				
2100		50	140				
2200		49	180				
2300		50	180				
2400		50	180				
2450	0.4	49	177	25		5	8.5
2600		49	175				
2750	0.2	51	181				
2800		51	180				
3000	0.3	51	178	37.5		5	8.5
3150		50	140				
3200		49	138				
3250		49	170				
3300		50	178				
3350	0.4	48	172	37.5		5	8.5
Pumping Rate (Q) ≈ 162 U.S. gpm - April 27, 1975							
3450		50	140				
3550		50	140				
3650		49	165				
3750		50	180				
4220		50	175				
4350	TR.			35			
4400	0.075	50	173				
4450		48	161	15		5	9.25
4650		48	175				
4700		48	160	15			

APPENDIX 4

RESULTS OF FIELD WATER QUALITY TESTS TAKEN DURING PUMPING TESTS FROM ALERT BAY TEST-PRODUCTION WELL

Time since start of pumping min.	Iron (Fe) ppm	Temp. °F	Specific Conductance µ MHOS/cm	Sodium Chloride (NaCl) ppm	Chloride (Cl) ppm	Hardness gpg	pH Reading
Pumping Rate (Q) ≈ 162 U.S. gpm - April 28, 1975							
4850	Nil	49	140		15		
5050		49	180				
5150		50	180				
5250		49	180				
5350	0.3				15	6	9.15
5550		51	180				
5610	0.05				15		9.16
5760		50	172		15		
5850	0.075	50	170				
6000		50	170				
6050		49	177				
6100		49	175				
6150					15		
6200		49	180				
6300		50	180				
6400		50	160				
6500		49	180				
6600		50	175				
6700		49	180				
6750	0.03				15	6	9.17
OTHER TESTS: Synod Well							
3100	0.3	50	150	37.5		5	7.0
4550	0.075	53	162		15		9.3
5900	0.075				20		

END OF TESTS

DESIGN TABLE FOR SCREEN SLOT SIZE AND LENGTH

Depth Range	Thickness in feet	Effective grain size in thous. of an inch 90° retained	Effective size squared	Possible range of screen slot openings in thous. of an inch — Percentage retained 50%	40%	30%	% of sample not sieved ½ in. or over	Depth in feet	Restricted range of screen slot opening in thous. of an inch	Multiple Slot Scr. Design — Prelim.	Modif. based on Rule 1	Modif. based on Rule 2	Final Screen Design	Optional Design
Well No. 1														
3-11	8	1	1	8	12	19	11.1	11						●
11-18	7	3	9	23	59	103	4.6	18						
18-23	5	3	9	26	39	61	2.3	23						
23-28	5	2	4	11	16	35	1.0	28						
28-34	6	2	4	13	25	59	1.9	34						
34-45	9	2	4	7	10	13	NIL	45						
45-50	5	5	25	82	94	-	6.9	50						
50-52	2	2	4	6	8	11	-	52						
52-57	5	3	9	59	122		3.3	57						●
57-62	5	2	4	10	16	35	5.0	62						
62-67	5	3	9	17	35	89	7.3	67						
67-72	5	5	25	36	48	97	4.6	72						
72-77	5	2	4	13	22	57	5.3	77						
77-87	10	2	4	5	8	13	1.5	87						
87-92	5	2	4	9	12	21	1.6	92						
92-97	5	3	9	44	52	61	NIL	97						
97-102	5	1	1	6	10	16	NIL	102						

DESIGN TABLE FOR SCREEN SLOT SIZE AND LENGTH

Depth	Thickness in feet	Effective grain size in thous. of an inch 90% retained	Effective size squared	Possible range of screen slot openings in thous. of an inch — Percentage retained 50%	40%	30%	% of sample not sieved ½ in. or over	Depth in feet	Restricted range of screen slot opening in thous. of an inch	Multiple Slot Scr. Design — Prelim.	Modif. based on Rule 1	Modif. based on Rule 2	Final Screen Design	Optional Design
102-107	5	1	1	6	8	13	NIL	107						
107-112	5	1	1	6	17	10	NIL	112						
112-117	5	1	1	6	8	12	NIL	117						
117-122	5	1	1	6	9	13	NIL	122						
122-127	5	2	4	11	12	12	NIL	127						
127-132	5	2	4	11	17	24	NIL	132						
132-137	5	2	4	23	37	54	17.8	137						
137-143	6	2	4	20	31	49	NIL	143						
143-148	5	3	9	22	34	49	2.2	148						
148-153	5	4	16	32	64	100	3.7	153						
153-155	2	3	9	22	42	85	-	155						
155-157	2	15	225	78	-	-	48	157						
157-160	3	12	144	43	56	75	9.6	160						
160-164	4	6	36	13	16	22	1.0	164						
164-175	11	2	4	2	2	2	NIL	175						
175-184	9	3	9	17	30	50	5.4	184						
184-190	6	4	16	32	46	78	NIL	190						
190-195	5	8	64	47	65	78	NIL	195						
195-198	3	8	64	31	39	48	1.5	198						

DESIGN TABLE FOR SCREEN SLOT SIZE AND LENGTH

Depth	Thickness in feet	Effective grain size in thous. of an inch 90% retained	Effective size squared	Possible range of screen slot openings in thous. of an inch — Percentage retained 50%	40%	30%	% of sample not sieved ½ in. or over	Depth in feet	Restricted range of screen slot opening in thous. of an inch	Multiple Slot Scr. Design — Prelim.	Modif. based on Rule 1	Modif. based on Rule 2	Final Screen Design	Optional Design
198-200	2	13	169	36	42	47	2.0	200						
200-202	2	9	81	18	22	29	NIL	202						
202-207	5	6	36	11	12	15	NIL	207						
207-212	5	4	16	11	12	15	NIL	212						
212-217	5	-	-	10	14	16	NIL	217						
217-220	3	5	25	11	11	15	NIL	220						
220-222	2	6	36	11	13	14	NIL	222						
222-224	2	6	36	12	13	14	NIL	224						
224-226	2	7	49	10	11	12	NIL	226						
226-228	2	5	25	10	11	12	NIL	228						
228-234	6	3	9	8	9	10	NIL	234						
234-239	5	3	9	8	10	11	1.3	239						
239-244	5	1	1	6	7	8	NIL	244						
244-249	5	1	1	5	6	8	NIL	249						
249-254	5	2	4	6	9	11	NIL	254						
254-259	5	1	1	4	5	6	NIL	259						
259-265	6	1	1	6	10	14	-	265						
265-270	5	1	1	4	6	9	-	270						
270-275	5	1	1	4	5	6	-	275						

DESIGN TABLE FOR SCREEN SLOT SIZE AND LENGTH

Depth	Thickness in feet	Effective grain size in thous. of an inch	Effective size squared	Possible range of screen slot openings in thous. of an inch			% of sample not sieved ½ in. or over	Depth in feet	Restricted range of screen slot opening in thous. of an inch	Multiple Slot Scr. Design			Final Screen Design	Optional Design
				Percentage retained 50%	40%	30%				Prelim.	Modif. based on Rule 1	Modif. based on Rule 2		
275-282	7	3	9	22	32	40	-	282						
282-287	5	3	9	50	74	95	-	287						
287-292	5	3	9	10	12	18	-	292						
292-297	5	2	4	9	14	30	3	297						
297-302	5	3	9	31	49	69	-	302						
302-307	5	3	9	15	18	24	-	307						
307-309	2	3	9	15	18	22	-	309						

DESIGN TABLE FOR SCREEN SLOT SIZE AND LENGTH

Depth	Thickness in feet	Effective grain size in thous. of an inch	Effective size squared	Possible range of screen slot openings in thous. of an inch — Percentage retained 50%	40%	30%	% of sample not sieved ½ in. or over	Depth in feet	Restricted range of screen slot opening in thous. of an inch	Multiple Slot Scr. Design — Prelim.	Modif. based on Rule 1	Modif. based on Rule 2	Final Screen Design	Optional Design
309-320*	11	2	4	10	12	16	-	320*	10	<10	<10	<10		
320-322	2	3	9	17	22	29	-	322	17-22	20	<10	<10		
322-324	2	4	16	14	17	19	-	324	14	14	14(15)	14(15)	324	
324-326	2	6	36	21	29	39	?		21-29					
	2	5	25	18	32	72	37	326	18-32	25	15	15		
326-328	2	9	81	18	21	24	?	328	18-21	20	20	20		
328-330	2	9	81	18	21	27	7	330	18-21	20	20	20	15-slot	
330-332	2	8	64	19	22	26	-	332	19-22	20	20	20		
332-334	2	5	25	14	16	20	-	334	14	14	14	14	334	
334-336	2	4	16	10	11	13	-	336	10	10	10	10	8-slot	
336-338	2	7	49	35	45	74	14	338	45-74	50	10	10	338	
338-340	2	10	100	38	46	64	25	340	46-64	50	50	20		
340-342	2	9	81	18	20	23	8	342	18-20	20	20	20	20-slot	
342-344	2	10	100	20	22	27	4	344	20-22	20	20	20	344	
344-346	2	5	25	13	16	20	-	346	13	10	10	10		
346-349	3	4	16	10	11	14	-	349	<10	10?	10?	10?	BLANK	
349-350	1	12	144	33	39	45	14	350	(40) 39-45	40	10	10		
350-352	2	8	64	16	25	45	23	352	20	20 351	10 20	10 20	351	
352-353	1	11	121	49	56	62	0	353	(50) 56-62	50	20	20	20-slot 353	

DESIGN TABLE FOR SCREEN SLOT SIZE AND LENGTH

Depth	Thickness in feet	Effective grain size in thous. of an inch	Effective size squared	Possible range of screen slot openings in thous. of an inch — Percentage retained 50%	40%	30%	% of sample not sieved ½ in. or over	Depth in feet	Restricted range of screen slot opening in thous. of an inch	Multiple Slot Scr. Design — Prelim.	Modif. based on Rule 1	Modif. based on Rule 2	Final Screen Design	Optional Design
353-354	1	6	36	15	17	20	-	354	15	15	15	15		
354-355	1	8	64	19	22	26	-	355	19-22	20	15	15	15-slot	
355-356	1	5	25	12	15	17	2½	356	12	12	12	12	356	
356-359	3	6	36	15	17	20	-	359	15	15	15	15		

TABLE NO. 2

DRILLER'S LOG

ALERT BAY AIRSTRIP

TEST-PRODUCTION WELL

HOLE DEPTH		DESCRIPTION	REMARKS
From	To		
0"	18"	Loamy topsoil.	The first thing done was to move in some gravel to the drill site to facilitate bringing in the rig. Rig was then brought in and left torn down. The backhoe then planted 13' of 12" casing to a depth of 12' as a surface starter pipe. Directly behind this, 7' of 12" casing was planted to a depth of 6' as a rat hole to facilitate the use of 20' joints if conditions permitted this. The drill rig was then set up and blocked over the hole. At day-end the rig was 75% set up.
18"	3'	Brown clay.	
3'	11'6"	Slightly cemented sand and pebbles and some cobblestone.	
11'6"	12'	Straight sand (medium), some pebbles.	
12'	18'	Sand, gravel and cobblestone (sample taken at 18').	
18'	20'	Sand, gravel and cobblestone.	
20'	23'	Silty sand and gravel (sample taken at 23').	
23'	25'	Silty sand and gravel.	
25'	28'	Slightly cemented silty sand and gravel; not quite as much gravel (sample taken at 28').	
28'	29'	Silty sand and gravel.	
29'	31'	Slightly cemented silty sand and gravel.	
31'	34'	Slightly cemented silty sand and gravel (sample taken at 34').	
34'	37'	Slightly cemented sand and gravel.	

HO	DEPTH		DESCRIPTION	REMARKS
From	To			
37'	45'	Cemented silty sand and fine gravel.		
45'	49'	Very slightly cemented silty sand and gravel.		
49'	50'	Silty sand and sharp gravel (producing some water) (sample taken at 50').		
50'	51'	Slightly saturated silty sand and gravel.		
51'	52'	Non-saturated silty sand; very little gravel (sample taken at 52').		
52'	56'	Silty sand and gravel.		
56'	57'	Silty sand and gravel (sample taken at 57').		
57'	60'	Slightly cemented silty sand and gravel.		
60'	62'	Loose sand and gravel (sample taken at 62').		
62'	63'	Loose sand and gravel.		
63'	68'	Slightly cemented silty sand and gravel (sample taken at 67').		
68'	72'	Slightly cemented silty sand and gravel with some pebbles (sample taken at 72').		
72'	74'	Slightly cemented silty sand and gravel with a few pebbles.		
74'	79'	Silty sand and gravel (slightly cemented) (sample taken at 77').		
79'	87'	Slightly cemented silty sand and gravel (sample taken at 87').		
87'	92'	Slightly cemented silty sand and gravel (sample taken at 92').		
92'	97'	Slightly cemented silty sand and gravel (sample taken at 97').		
97'	102'	Slightly cemented silty sand and gravel (sample taken at 102').		
102'	105'	Slightly cemented silty sand and gravel.		

HOLE DEPTH From	To	DESCRIPTION	REMARKS
105'	107'	Slightly cemented silty sand and gravel (sample taken at 107').	
107'	112'	Slightly cemented silty sand and a little gravel (sample taken at 112').	
112'	117'	Slightly cemented silty sand and a little gravel (sample taken at 117').	
117'	122'	Slightly cemented silty sand with very little gravel (sample taken at 122').	
122'	127'	Slightly cemented silty sand with little gravel (sample taken at 127').	
127'	128'	Silty sand and a lot of gravel; one massive boulder at 128'.	
128'	132'	Sandy silt and gravel (sample taken at 132').	
132'	137'	Silty sand and gravel (sample taken at 137').	
137'	143'	Sandy silt and gravel (sample taken at 143').	
143'	148'	Silty sand and gravel (sample taken at 148').	
148'	150'	Silty sand and a lot of gravel.	
150'	153'	Silty sand and gravel (sample taken at 153').	
153'	154'	Silty sand and gravel.	
154'	155'	Silty sand and gravel.	
155'	155'6"	Coarse sand and gravel with some pebbles; very clean and probably saturated.	
155'6"	156'6"	Coarse sand and gravel with some pebbles and cobbles.	
156'6"	157'	Coarse sand and gravel with some pebbles and cobbles (samples taken at 155' and 157').	
157'	157'6"	Coarse sand and gravel with some pebbles and cobbles.	
157'6"	158'	Coarse sand, gravel, pebbles and cobbles.	

HO[redacted] DEPTH		DESCRIPTION	REMARKS
From	To		
158'	158'6"	Coarse sand, gravel, pebbles and cobbles.	
158'6"	160'	Coarse sand, gravel, pebbles and cobbles. (sample taken at 160').	
160'	160'6"	Light brown cemented silt lense.	Samples taken at 160', 164', 170', 175', 184', 190'.
160'6"	162'	Tight silty sand and gravel (no water).	
162'	163'6"	Silty sand and a little gravel and cobbles.	
163'6"	166'6"	Silty sand and gravel.	
166'6"	168'	Slightly silty sand (medium).	
168'	174'	Sand and silt lenses.	
174'	178'	Sand and silt lenses.	
178'	184'	Silty sand and gravel seams; 20% grey clay seams.	
184'	190'	Silty sand and gravel; 10% grey clay seams.	
190'	195'	Silty sand and gravel; 10% grey clay seams.	Total amount of 10" casing in ground is 230' with a stickup of 2', i.e., 228' below ground datum. Samples taken at 195', 198', 200', 202', 207', 212', 217', 220', 222', 224', 226', and 228'.)
195'	201'	Clean sand and gravel.	
203'	206'	Clean sand and gravel (not as much gravel).	
206'	213'	Clean sand with very little gravel (starting to turn saturated at 213').	
213'	217'	Clean sand with very little gravel.	
217'	224'	Clean sand (medium).	
224'	226'	Clean sand (medium).	
226'	228'	Clean sand and some silt lenses.	
225'	226'	Clean fine sand.	

HO[redacted] DEPTH		DESCRIPTION	REMARKS
From	To		
224'	226'	Clean sand (fairly fine).	
226'	228'	Clean sand (fairly fine).	
228'	230'	Clean sand (fairly fine).	
230'	234'	Compressed fine silt and sand (quite tight) (sample taken at 234'). (Aquifer ended at 230'.)	
234'	239'	Tight, very fine silty sand with a little gravel (sample taken at 239').	
239'	244'	Very tight, fine silty sand with a little coarse sand and fine gravel (sample taken at 244').	
244'	249'	Very tight, fine silty sand with a little coarse sand and fine gravel (sample taken at 249').	
249'	254'	Very tight, fine silty sand with a little coarse sand (sample taken at 254').	
254'	259'	Very tight, fine silty sand with some coarse sand (sample taken at 259').	
259'	265'	Very tight, fine silty sand with some coarse sand (sample taken at 265').	
265'	270'	Very tight, fine silty sand with some coarse sand and a little gravel (sample taken at 270').	
270'	275'	Very tight, fine silty sand with some coarse sand and a little gravel (sample taken at 275').	
275'	282'	Tight sand and gravel with some pebbles (sample taken at 282').	
282'	287'	Tight sand and gravel with some pebbles (sample taken at 287').	

HOLE DEPTH From	To	DESCRIPTION	REMARKS
287'	292'	Tight, silty sand and gravel (sample taken at 292').	
292'	297'	Tight, silty sand and gravel (sample taken at 297').	
297;	302'	Fairly loose, silty sand and gravel (sample taken at 302').	
302'	307'	Loose, silty sand and fine gravel (sample taken at 307').	
307'	308'	Loose, silty sand and gravel (start of aquifer which seems to heave quite a bit).	
308'	309'	Clean fine through coarse sand with some gravel (sample taken at 309').	
309'	310'	Clean fine through coarse sand and gravel.	
310'	310'6"	Silt lense.	I thought this to be the end of the aquifer so the casing was driven to 319' where it turned out to be still in the aquifer.
319'	320'	Clean fine through coarse sand with some gravel (sample taken at 320').	
320'	322'	Clean fine through coarse sand with some gravel (sample taken at 322').	
322'	324'	Clean fine through coarse sand with some gravel (sample taken at 324').	
324'	326'	Coarser sand and gravel; a lot looser and it also made the loaded hole disappear (sample taken at 326').	
324'	326'	Coarse sand, gravel, pebbles and cobble.	
326'	328'	Coarse sand, gravel, pebbles and cobble (sample taken at 328').	
328'	330'	Coarse sand, gravel, pebbles and cobble (sample taken at 330').	

HO[redacted] DEPTH		DESCRIPTION	REMARKS
From	To		
330'	332'	Very tight fine through coarse sand; some very fine gravel (sample taken at 332').	Head of water does not take off when plug is pulled.
332'	334'	Very tight silty fine through coarse sand; some very fine gravel (sample taken at 334').	
334'	336'	Very tight silty fine through coarse sand (sample taken at 336').	
336'	338'	Loose sand, gravel, pebbles and a few cobbles (sample taken at 338').	
338'	340'	Loose sand, gravel, pebbles and cobbles (sample taken at 340').	
340'	342'	Coarse sand; some gravel and pebbles (sample taken at 342').	
342'	344'	Coarse sand; very little gravel and few pebbles (sample taken at 344').	
344'	346'	Coarse sand (sample taken at 346').	
335'	347'	Coarse sand and fine gravel.	Plug could not be removed with bailer so it was drilled down to 347' and a sample was taken at 347'; the hole then heaved 2'.
347'	349'	Tight sand and gravel with a lot of very fine material in it.	347'-350' and 352'-355' not suitable for screening.
349'	350'	Tight sand and gravel with a lot of fine material in it (sample taken at 350').	
350'	352'	Loose sand, gravel, pebbles and cobble (sample taken at 352').	
352'	354'	Coarse sand; quite tight (sample taken at 354').	
354'	355'	Coarse sand; quite tight (sample taken at 355').	

HO[redacted] DEPTH		DESCRIPTION	REMARKS
From	To		
355'	356'	Tight coarse sand with some pebbles and grey clay or silt lenses.	Samples taken at 355', 356', 358', 359'.
356'	357'	Tight coarse sand with some pebbles.	
357'	360'	Bedrock (thought to be granite).	Some question as to nature of bottom hole materials, probably all unconsolidated.
360'	367'		No samples could be taken.

TABLE NO. 3

DATA FOR COMPUTATION OF WELL SCREEN TRANSMITTING CAPACITY

LIN.FT. OF OPEN AREA AT SCREEN	SLOT SIZE (THOUSANDTHS OF AN INCH)	INTAKE AREA PER LIN.FT. OF SCREEN (SQ.IN.)	TOTAL INTAKE AREA OF SCREEN (SQ.IN.)
5	15	39	195
5	15	39	195
4	8	22	88
6	20	51	306
2	20	51	102
3	15	39	117
25	-	241	1,003

Transmitting capacity = square inches of open intake area x 0.31

= 1,003 sq.in. x 0.31

= 310.9 U.S. gallons per minute