RESULTS OF JULY 26, 1989
CORRECTIVE ACTION MODIFICATIONS

PETROTOMICS COMPANY

SHIRLEY BASIN, WYOMING

OCTOBER, 1989

TABLE OF CONTENTS

1.0 INTRODUCTION AND RECOMMENDATIONS

1.1 INTRODUCTION

This report presents the results of the corrective action program modifications required under License Amendment No. 28, Condition 47D. The results from the August 1989 drilling of three additional Upper Wind River wells are discussed first. The addition of well 54SC as a collection well and the addition of the Stage II evaporation pond is also presented. The proposed covering of the remainder of the tailings and proposed additional evaporation ponds are also discussed.

1.2 SUMMARY AND RECOMMENDATIONS

The new Upper Wind River wells 55SC, 56SC and 57SC will produce less than 0.1 gpm continuously due to their small permeabilities and thin saturated thicknesses. The yields of these wells make them not feasible to be pumped as collection wells. The initial water quality results indicate that seepage has affected the water quality of the Upper Wind River sand at each of the new well locations. Additional samples need to be taken before a detailed water quality evaluation is made because good samples are difficult to obtain from such poor producing wells soon after drilling. The observed Upper Wind River sand saturated thicknesses are significantly less than previously estimated for the downgradient area. An updated water-level elevation map shows that a significant portion of the Upper Wind River sand between

these wells and the tailings is unsaturated. The unsaturated zone prevents Upper Wind River water from moving through the area.

Three additional wells are proposed to be drilled in the downgradient area, south of wells 55SC, 56SC and 57SC as shown on Exhibit 2 1. These three wells would be completed to be functional as monitoring locations as well as seepage collection points. The wells will be used as collection wells if their yields are adequate. Collection from these wells will decrease the area of saturation in the downgradient area of the Upper sand, and remove significant quantities of hazardous constituents.

Well 54SC has been converted to a collection well and is producing approximately four gpm. This production should connect the two zero saturation areas to the north of well 54SC.

The Stage II evaporation pond is currently being constructed. It is anticipated that this pond will be available for collection water in November 1989. The covering of this area also reduces the volume of infiltration to the tailings.

It is anticipated that the remaining clay cover will be placed during the 1990 construction season, which will essentially prevent infiltration to the tailings. Additional evaporation ponds may also be constructed in 1990, if needed.

2.0 UPPER WIND RIVER WELLS, AUGUST 1989

Three Upper Wind River wells, 55SC, 56SC and 57SC, were drilled in August, 1989, in the downgradient area as proposed in Petrotomics' letter dated July 26, 1989. Exhibit 2-1 shows these locations. Attachment A presents the construction details, pump testing and water quality results for these three new wells. The elevation of the base of the Upper Wind River sand at the three sites were very close to the elevations presented on Drawing 3-3 of Hydro-Engineering (1986), except the base elevation was approximately ten feet higher at well 57SC.

2.1 WATER LEVEL AND WELL YIELD

Water level elevations for the three new wells are presented in Exhibit 2-1 and Table 2-1 of Attachment A. These water-level elevations are 22, 17 and 15 feet less than the estimated water-level contours presented in Exhibit 3-1 of Hydro-Engineering (1989). Wells 55SC and 56SC contain 1.7 and 5.2 feet of water above the base of the Upper Wind River sand. The water level in well 57SC is below the base of the Upper Wind River sand.

Exhibit 2-1 shows that a large area exists north of the tailings in which the Upper Wind River sand is not saturated. The limits of this area have been estimated based on analysis of locations at which the water level is equal to the elevation of the base of the Upper sand.

The three new wells do not contain adequate water to enable them to be pumped with a submersible pump. Wells 55SC and 57SC were bailed to test their yields while well 56SC was pumped at 0.06 gpm with a bladder pump. The maximum sustained yield from each of these wells is significantly less than 0.1 gpm. These three wells will not produce an adequate sustained yield, and therefore the Upper Wind River sand is not a significant aquifer in the area of these three wells.

2.2 WATER QUALITY

The concentrations of some constituents in the very small amount of water in the Upper Wind River sand near wells 55SC, 56SC and 57SC indicate that tailings seepage has affected the water quality. The very small amount of water in these wells makes it difficult to obtain a representative sample shortly after drilling due to the small yields. At least one additional set of samples is needed prior to a detailed evaluation of the water quality. This analysis will be presented in Petrotomics' annual report in June of 1990. The flow in the Upper Wind River sand in this area is toward Pathfinder's pit to the north. Section 4.0 of Attachment A presents the water quality results from the first set of samples.

2.3 PROPOSED ADDITIONAL WELLS

The saturated thickness of the Upper Wind River sand to the north of wells 55SC, 56SC and 57SC toward Pathfinder's pit is likely to be very thin, similar to that observed in these wells.

Any well completed in this area will likely not be pumpable. We propose the addition of three wells in troughs in the base of the Upper sand in the downgradient area but south of wells 55SC, 56SC, 57SC. Exhibit 2-1 shows the location of these three proposed wells. If the three wells are pumpable they will be added as collection wells. Pumping of these wells in this area will decrease the area of saturation in the downgradient area of the Upper sand and remove significant quantities of hazardous constituents.

3.0 COLLECTION WELL 54SC

Evaluation of 54SC as to its ability to maintain a sustained yield was completed in August, 1989. Results indicated that a reasonable sustained yield of between three and five gpm could be expected. A permanent power line was installed to this well and continuous collection commenced on September 28, 1989. The current yield from well 54SC is approximately four gpm, which is discharged into the evaporation pond.

4.0 STAGE II EVAPORATION POND

Construction of the Stage II evaporation pond, covering about 17 acres, was commenced on August 24, 1989. As of October 26, 1989, clay lining placement was about 55 percent complete.

Exhibit 2-1 shows the location of the Stage II pond. It is anticipated that this pond will be complete and available for use in November, 1989.

5.0 PROPOSED ADDITIONAL PONDS

The remainder of the tailings surface is being shaped to the reclamation contour. It is anticipated that the shaping of the tailings will be complete in the Spring of 1990, and that the clay cover over the remainder of the tailings will be placed in the 1990 construction season. The shaping and clay covering of the tailings is a very important part of the corrective action because the average infiltration rate was estimated to be 66 gpm prior to the installation of Stage II. The clay covering of the tailings should essentially eliminate the recharge to the tailings.

Additional evaporation ponds will be added in 1990 if additional evaporation area is needed. These ponds would be similar to the Stage I and II evaporation ponds.

6.0 REFERENCES

Hydro-Engineering, 1986, Updated Ground-Water Hydrology of Petrotomics' Tailings Area, Consulting Report for Petrotomics Company.

Hydro-Engineering, 1989, Review of Corrective Action in the Upper Wind River Aquifer at Petrotomics' Tailings Area, Consulting Report for Petrotomics Company.

ATTACHMENT A

UPPER WIND RIVER WELLS
DRILLING AND EVALUATION
FALL 1989

FOR:
PETROTOMICS COMPANY

BY:
HYDRO-ENGINEERING

OCTOBER 1989

MIKE PALM
HYDROLOGIST

GEORGE L. HOFFMAN, P.E.
HYDROLOGIST

TABLE OF CONTENTS

1.0 INTRODUCTION

Hydro-Engineering (Hydro) supervised the well installation and conducted the testing and sampling of the three new northern Upper Wind River Aquifer Wells, 55SC, 56SC and 57SC. This report presents discussion of the lithologies, well completions and results of the testing of each well.

2.0 WELL CONSTRUCTION AND WATER LEVELS

HYDRO supervised the drilling and installation by T.L. Crimm Drilling of Casper of the new wells. A 5 5/8 inch pilot hole was first drilled for each hole. The holes were then reamed to a specified depth using a 9 7/8 inch drill bit. Factory 5 inch diameter, .032 inch slotted PVC well casing was installed in each well with plain PVC pipe on top. A centralizer was placed at the top of each perforated interval. A sand pack using 10-12 silica sand was placed around the perforations and up to a level above the top of perforations. A bentonite seal was then placed on top of the sand pack. The remaining well annulus was filled up with drill cuttings.

Table 2-1 presents the basic well data for new northern upper wells. Tables 2-2, 2-3, 2-4 present the lithologic and drilling time logs for wells 55SC, 56SC and 57SC respectively.

The lithologic log for well 55SC indicates that the base of the Upper Wind River sand was thought to be detected at a depth of approximately 228 feet. This depth was chosen from known local stratigraphic data and also from observation of the drill cuttings. A definitive clay layer between the Upper Wind River sand and the Main Wind River sand was not apparent in the drill cuttings. Therefore the base of the Upper Wind River sand was determined using a predicted depth along with a visual evaluation of a drill cuttings sample interval in the predicted depth range which contained the highest percentage of clays.

The base of the Upper Wind River sand in well 56SC was observed from the drill cuttings at a depth of 220 feet. A blue gray shale was found immediately below the sand allowing for a much more accurate determination of the base of the Upper sand in well 56SC.

The base of the Upper sand was also accurately determined in well 57SC due to the distinct change to blue gray shale at the 207 feet depth just slightly above the 210 feet predicted depth. The elevations of the base of the Upper sand at these three spots are close to the structure map value for wells 55SC and 56SC but approximately ten feet higher than the contoured value at well 57SC. Table 2-1 also presents the water level elevations in these new wells. The water levels in this area are 15 to 22 feet lower than expected which results in very small amounts of water available.

TABLE 2-1 BASIC WELL DATA FOR THE NORTHERN UPPER WIND RIVER WELLS

WELL NAME	MP (ft)	MP ELEV. (ft-msl)	DIAM. (in)	TOTAL DEPTH (ft-mp)	PERF. INTERVAL (ft-lsd)	ELEV. *BASE UPPER (ft-msl)	TO OF SAND (ft-mp)	DEPTH TO WATER (ft-msl)	W.L. ELEV. (ft-lsd)	SEAL INTERVAL
55SC	2.0	7168.3	5	232.3	210.3-230.3	6936.8	229.78	6938.52	192.5-195	
56SC	2.0	7168.2	5	222.1	190.1-220.1	6944.7	218.29	6949.91	183-186	
57SC	1.8	7159.5	5	213.5	191.7-211.7	6950.7	209.82	6949.68	187-190	

NOTE: *Base of sand picked from geophysical log.

ABLE 2-2 LITHOLOGIC AND DRILLING LOG FOR WELL 55SC

DEPTH FT-LSD	DESCRIPTION
0-10	BROWN AND GRAY CLAY, FILL TO 26'
10-15	YELLOW AND BROWN COARSE - VERY COARSE SAND, OX., VERY LITTLE CLAY
15-20	YELLOW OXIDIZED VERY COARSE SAND SOME 1/2" PEBBLES, CLEAN SAND
20-25	YELLOW AND BROWN SANDY CLAY
25-35	BROWN AND BLUE GRAY CLAY
35-40	BLUE GRAY AND BROWN CLAY WITH 10% VERY COARSE SAND
40-45	BLUE GRAY CLAY
45-55	BLUE GRAY CLAY WITH SOME CHUNKS OF GREEN AND REDDISH CLAYS
55-94	BLUE GRAY SHALE AND CLAY WITH VERY LITTLE VERY COARSE SAND (MAYBE FROM ABOVE)
94	THIN HARD CALCITE LAYER
94-100	DARK BLUE GRAY SHALE AND CLAY, SOME 45% VERY COARSE SAND
100-138	DARK GRAY AND BLUE GRAY SHALE
138-139	HARD SPOT CHATTERS
138-140	DARK GRAY AND BLUE GRAY SHALE
140-158	DARK GRAY SHALE WITH SOME REDDISH SHALE CHUNKS (30%)
158-160	HARD LAYER, SCREECHING, CHATTERING, DARK GRAY SHALE RETURN
160-165	DARK GRAY SHALE
165-190	DARK GRAY SHALE AND DARK BROWN CARBONACEOUS SHALE (32%) SMALL THIN HD LENS TO 188'
190-205	DARK GRAY SHALE AND SOME CLAY
205-215	DARK GRAY SHALE AND VERY COARSE SAND (25%)
215-230	GRAY VERY COARSE SAND AND DARK GRAY SHALE (22%)
228	SAME WITH SLIGHTLY GREATER AMOUNT OF SHALE
228-260	GRAY COARSE - VERY COARSE SAND [illegible] 25% SHALE

DRILL TIME LOG FOR PETROTOMICS WELL 55SC
AUGUST 25, 1989

TIME	DESCRIPTION
800	RIG UP
	DIGGING MUD PIT
840	START DRILL PILOT
900	LOST CIRCULATION
915	BIT CLOGGED
930	START DRILLING AGAIN
1036	PILOT DOWN 150'
1145	PILOT DOWN 260'
1150	START REAMING - REAM TO 228'
1246	DOWN 60' REAM - HAD TO STOP AND CHARGE OUT CLOGGED BIT NOZZLES
1355	DOWN 100' (NOW ABOUT 10 MIN/20')
1500	DOWN 210'
1530	REAMING DONE - MADE BIT TRIP - LOT 3' REAMED TO 230' AND TRIP OUT AFTER THINNING
1600	HOLE TD AT 228' - START CASING - SCREWED AND GLUED
1620	CASING IN, CUT OFF 10'

DEVELOP. TIME LOG

TIME	DESCRIPTION
1624	START WASHING HOLE THROUGH CASING
1646	START SAND, SAND TO 195' BENT TO 192.5'
1800	START AIR
1825	STOP FOR DAY 22 GPM
8/24/89	
715	START DEV., VERY DIRTY, WASHING
915	RIG OFF 21 GPM, QUIT CARRYING SAND BUT STILL CLOUDY

Est. GPM:
Water Quality:
Temp.: 18.0
Cond.: 2000
pH: 7.27
WATER TRUCK pH=8.38
C=1200

TABLE 2-3 LITHOLOGIC AND DRILLING LOG FOR WELL 56SC

DEPTH FT-LSD	DESCRIPTION
0-5	BROWN SANDY CLAY
5-10	REDDISH BROWN COARSE - VERY COARSE ANGULAR SAND
10-20	YELLOWISH TAN MEDIUM-VERY COARSE CLAYEY SAND (20% CLAY)
20-25	YELLOW TAN FINE-MEDIUM SAND
25-34	TAN AND RUST COLORED CLAY, OXIDIZED
34-45	GRAY SHALE AND CLAY
45-53	GRAY AND REDDISH BROWN SHALE AND CLAY
55-65	GRAY SHALE AND CLAY
65-75	GRAY AND REDDISH BROWN SHALE AND CLAY
75-85	GRAY AND DARK BLUE GRAY SHALE
85-97	DARK BROWN TO BLACK CARBONACEOUS SHALE W/<10% GRAY SHALE
97-105	BLUE GRAY SHALE
105-110	DARK BROWN, DARK GRAY CARBONACEOUS SHALE
110-120	DARK BLUE GRAY SHALE
120-125	DARK BLUE GRAY SHALE AND 20% CARBONACEOUS SHALE
125-155	BLUE GRAY SHALE
155-160	DARK GRAY VERY VERY FINE SHALEY SAND
160-165	DARK GRAY COARSE SAND AND GRAY SHALE SAND, PROBABLY 162'-165', CHATTERED SOME WHEN DRILLED
165-175	DARK BLUE GRAY SHALE
175-180	DARK GLUE GRAY VERY VERY FINE SANDY SHALE
180-185	BLUE GRAY SHALE
185-190	BLUE GRAY VERY VERY FINE SANDY SHALE
190-200	BLUE GRAY COARSE - VERY COARSE ROUNDED SAND W/10-20% BLUE GRAY SHALE
200-220	GRAY COARSE - VERY COARSE SAND, NO SHALE (HARD LAYER AT 204'-206')
220-225	BLUE GRAY SHALE, POSSIBLY TAGGED SHALE END OF PREVIOUS ROD. REAM TO 222.

DRILL TIME LOG FOR PETROTOMICS WELL 56SC
AUGUST 24, 1989

TIME	DESCRIPTION
930	RIG UP
945	START DRILLING
1030	PILOT DOWN 120'
1100	PILOT DOWN 225' TD
1110	START REAMING
1136	REAMING DOWN 60'
1410	REAMING AND BIT TRIP DONE - TRIP OUT HAD LOST 3' OF HOLE
1420	START CASING
1440	CASING IN/START WASHING
1500	START SAND
1520	SAND IN TO 186' BENT. TO 183'
1530	START DEV.

DEVELOP. TIME LOG

TIME	DESCRIPTION
1530	START DEV.
1700	STOP DEV.
	NO FINES BUT MURKY WATER IN WELL

Est. GPM:
Water Quality:
Temp.: 19.0
Cond.: 2000
pH: 7.35

TABLE 2-4 LITHOLOGIC AND DRILLING LOG FOR WELL 57SC

LITHOLOGIC LOG FOR: PETROTOMICS WELL 57SC

AUGUST 25, 1989

DEPTH FT-LSD	DESCRIPTION
0-5	BROWN VERY COARSE SANDY CLAY
5-15	YELLOWISH TAN VERY COARSE CLAYEY SAND WITH SOME 1/4-1/2" ROCK CHIPS
15-30	YELLOWISH TAN CLAY (aH ABOVE OXIDIZED)
20-25	YELLOW TAN FINE-MEDIUM SAND
30-45	GRAY SHALE AND CLAY WITH SOME TAN CLAY
45-65	BLUE GRAY SHALE
65-80	BLUE GRAY SHALE AND CLAY WITH 20% CARBONACEOUS SHALE AT 78-80'
80-90	DARK BROWN CARBONACEOUS SHALE
90-95	GRAY SHALE 30% DARK BROWN CARBONACEOUS SHALE
95-115	BLUE GRAY SHALE WITH SOME YELLOW PEBBLES
115-120	GRAY VERY COARSE SAND WITH 40% BLUE GRAY SHALE
120-140	DARK GRAY SHALE
140-160	GRAY CLAYEY SHALE
160-170	BLUE GRAY SHALE WITH SOME CARBONACEOUS SHALE, SOME VERY FINE (20%) SAND AT 165'
170-194	SAME WITH SOME FINE SAND AT 193'
194-207	GRAY COARSE TO VERY COARSE SAND
207-212	BLUE GRAY SHALE

DRILL TIME LOG FOR PETROTOMICS WELL 57SC
AUGUST 25, 1989

TIME	DESCRIPTION
715	RIG UP
730	START DRILLING
845	PILOT TD AT 212'
855	START REAMING
1130	MAKE BIT TRIP
1225	START CASING
1240	CASING IN/START WASHING
1310	START SAND
1330	SAND IN TO 190', BENT TO 187'
1340	START DEV.

DEVELOP. TIME LOG

TIME	DESCRIPTION
1340	START DEV.
1500	STOP DEV.

Est. GPM:
Water Quality:
Temp.: 14.8
Cond.: 2200
pH: 7.25

3.0 AQUIFER TESTS

3.1 TRANSMISSIVITY AND PERMEABILITY

Transmissivity and permeability values were determined from the available aquifer test data for each well. Wells 55SC and 57SC were bailed due to these wells having only a few feet of water in them. Water levels were monitored in each well during recovery. Well 56SC had sufficient water in the well to conduct a pumping test at a low discharge rate utilizing an air driven bladder pump.

Table 3-1 presents the aquifer test data for well 55SC. Three and one-half gallons were bailed from well 55SC at an average rate of 0.13 gallons per minutes. Recovering water levels were then monitored for the next 6 1/2 hours. Figure 3-1 presents the plot of the recovery data. The semi-log plot of the residual drawdown versus t/t' (time since pumping started divided by time since pumping stopped) yields a transmissivity of approximately 2 gallons per day per foot. A permeability of 1.15 ft/day is calculated from the transmissivity.

Well 56SC was pumped at approximately 0.06 gallons per minute for two hours resulting in approximately 2.9 feet of drawdown. Table 3-2 presents the aquifer test data for well 56SC. Figure 3-2 presents the semi-log plot of the drawdown data versus time since pumping started. A transmissivity value of 3.5 gallons per day per foot is obtained from the straight line fit of the data. A permeability of 0.13 ft/day can be calculated from the transmissivity value.

Table 3-3 presents the aquifer test data for well 57SC. A total of 1 1/2 gallons of water were bailed from 57SC at an average rate of Ø.19 gallons per minute. The recovering water levels were then monitored throughout the rest of the day. The plot of the recovery data is presented on Figure 3-3. The straight line fit of the recovery data yields a transmissivity of 8 gallons per day per foot. A permeability was not calculated for well 57SC due to the water level in the well being below the base of the Upper Wind River sand.

Transmissivities for wells 55SC and 56SC are probably the most realistic for the Upper Wind River aquifer at this site due mainly to their reaching a stable condition more quickly than well 57SC. The transmissivity for well 56SC is probably too high due to over half of the water being produced coming from well storage. Well 57SC is probably being influenced by drilling and washing fluid still in the formation and its transmissivity value is most likely too high. A more realistic transmissivity for the Upper Wind River sand in this area is probably close to two gallons per day per foot.

3.2 PREDICTED MAXIMUM WELL YIELD

The three new northern Upper Wind River aquifer wells yield very little water. This is evidenced by their very low transmissivity and permeability values. The most realistic view of production from any of these wells at best during short term pumping (only a few hours), would be approximately Ø.1 gallon per minute.

The specific capacity (discharge divided by drawdown) of well 55SC was calculated to be 0.038 gpm/ft. Using this multiplied by the wells maximum available drawdown of 3.5 ft.; well 55SC could at best yield .13 gpm over a short time (a few hours).

Well 56SC has a specific capacity of 0.02 and maximum drawdown of 4.1 feet. Its resulting maximum yield would be 0.08 gpm.

Well 57SC has a specific capacity of 0.176 gpm/ft. and 2.2 ft. of available drawdown resulting in a 0.38 gpm maximum yield. This is probably an unrealistically high value due to the well probably not reaching stability as yet and the maximum available drawdown may be less than what presently is found in the well.

Generally the new northern upper wells are very poor producing wells. A realistic maximum yield for these wells is most likely approximately 0.1 gpm. A maintained long term discharge rate would be most likely substantially less that 0.1 gpm, making it virtually unfeasible to pump any of these wells.

TABLE 3-1 AQUIFER TEST DATA FOR WELL 55SC

DATE	TIME	t/t'	WATER LEVEL (ft-mp)	RESIDUAL DRAWDOWN (ft)
8/28			229.40	
8/28	937.0		229.07	
8/28	1255.0		229.07	Full hose
8/28	1300.0	Pump On		
8/28	1300.5		228.30	
8/28	1301.0		228.45	
8/28	1301.5		228.39	
8/28	1302.0		228.43	Pump Running
8/28	1303.0		228.42	
8/28	1304.0		228.42	
8/28	1305.0		228.42	
8/28	1307.0		228.45	No Discharge
8/28	1310.0	Pump off to bail sample		
		won't pump		
		Bailed 1 1/2 gal. until dry		
		T = 16.2 C = 3830 PH = 6.62		
8/30	816.0		228.90	
		Bailed out two bails		
		Second bail		
		T = 11.2 C = 6750 PH = 4.06		
		Bailed until no more water		
	Last bail	T = 11.2 C = 7290 PH = 4.15		
	PH stable	at 4.06, if let set for ~ 15 min. PH = 4.51		
8/30	1510.0		228.82	condensation
8/30	1514.0	check	228.82	
		T = 12.0 C = 9930 PH = 4.35		
8/30	1608.0	Bailed out		
		T = 11.8 C = 9980 PH = 4.38		
8/31	835.0		229.26	fair reading
8/31	1025.0	Start bailing		
8/31	1030.0	Bailed 1.5 - 2 gal.		
		T = 11.8 C = 10,100 PH = 4.40		
8/31	1052.0	Total bailed 3 1/2 gal. average Q = 0.13 gpm		
		last bail T = 11.8 C = 10,100 PH = 4.42		
		collected sample		
8/31	1054.0	12.2	232.70	3.44
		hard to get good readings due to condensation		
8/31	1100.0	4.2	232.53	3.27
8/31	1115.0	2.2	232.41	3.15
8/31	1335.0	1.2	231.52	2.26
8/31	1542.0	1.1	231.37	2.11
		reading fair		
8/31	1725.0	1.1	230.98	1.72

TABLE 3-2 AQUIFER TEST DATA FOR WELL 56SC

DATE	TIME	TIME SINCE PUMPING STARTED (MINUTES)	WATER LEVEL (ft.-mp)	CORRECTED DRAWDOWN (ft.)
8/28			217.90	
8/28	940.0		217.78	
8/28	1400.0		217.78	
8/28	1512.0	Pump on		
8/28	1512.5		217.08	
8/28	1513.0		216.99	
8/28	1513.5			
8/28	1514.0		217.05	No discharge
8/28	1515.0		217.03	discharge starts
8/28	1516.0		217.16	
8/28	1516.5		217.25	
8/28	1517.0		217.31	
8/28	1518.0		217.45	
8/28	1519.0		217.58	
8/28	1521.0		217.62	
8/28	1523.5		217.87	Q = 0.12 gpm
8/28	1526.0		218.02	
8/28	1528.0		218.12	
8/28	1530.0		218.25	
		hard to get readings/discharge sporadic/(surges)		
8/28	1531.0		218.38	
8/28	1532.0		218.46	
8/28	1533.0			Q = 0.11 gpm
8/28	1536.0		218.84	
8/28	1538.0		218.92	
8/28	1540.0		219.02	
8/28	1542.0		219.12	
8/28	1544.0		219.19	
8/28	1546.0		219.25	
8/28	1549.0		219.57	pump choked out some sed.
8/28	1550.0	pump kicked out		
8/28	1602.0	pump won't restart/will bail for sample		
		bailed ~ 8 gal. T = 17.0 C = 6820 pH = 6.28		
		HCO3 = 346 mg/l		
8/30	1003.0		217.95	
		bailed out 4 gal.		
		last bail T = 11.6 C = 8820 pH = 4.58		
		pH = stable for 30 sec. after 10 min. pH = 4.72		
8/30	1442.0		219.49	

TABLE 3-2 AQUIFER TEST DATA FOR WELL 56SC (cont)

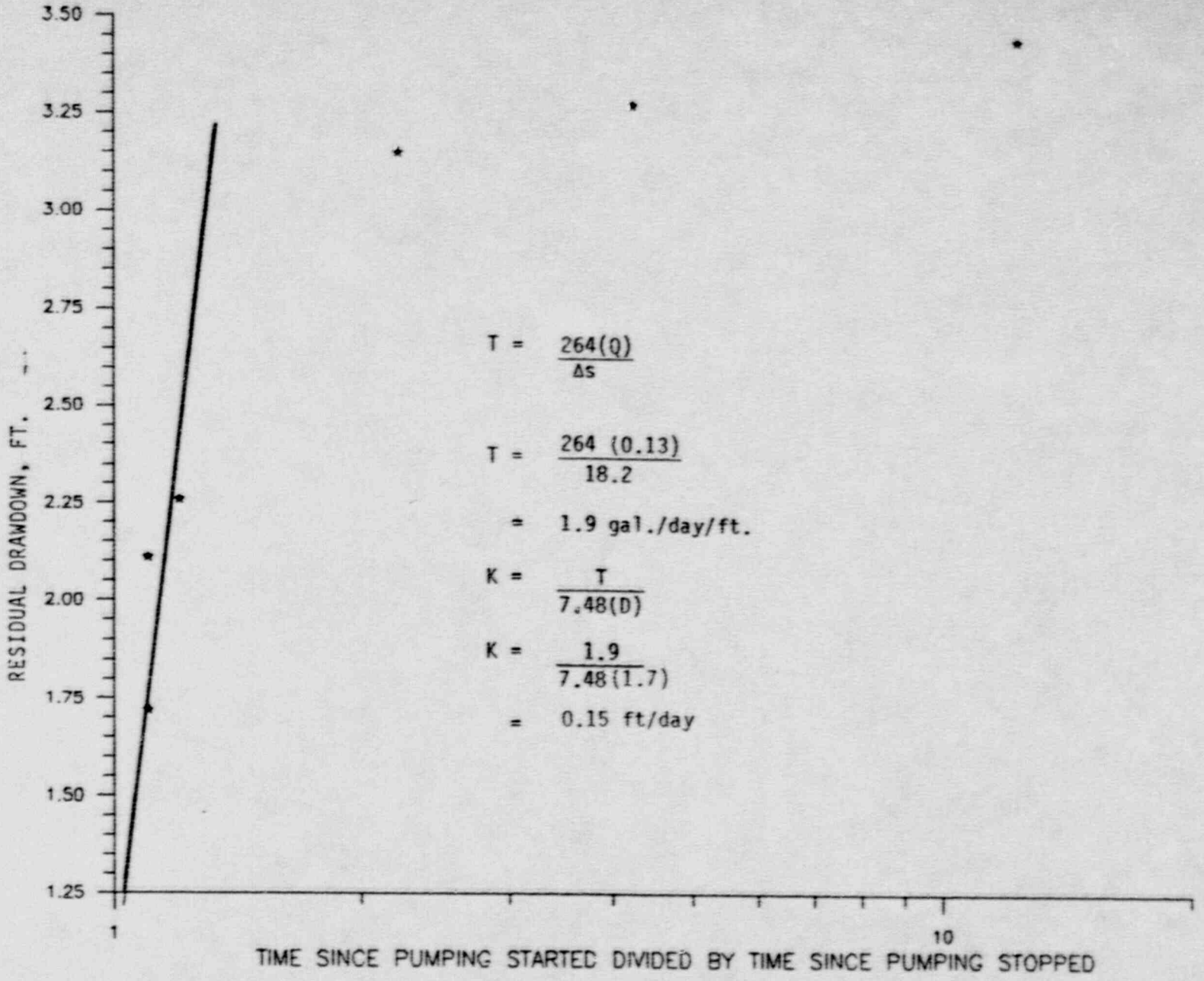
DATE	TIME	TIME SINCE PUMPING STARTED (MINUTES)	WATER LEVEL (ft.-mp)	CORRECTED DRAWDOWN (ft.)	
		bailed out 23.5 gal.			
		T = 11.6 C = 8830 pH = 5.04			
8/30	1630.0	bailed out 2 gal.			
		T = 11.6 C = 10,400 pH = 4.63			
8/31	850.0		218.54		
8/31	1250.0		218.12		
8/31	1255.0	pump on			
8/31	1255.5		218.15		
8/31	1257.0		218.10		
8/31	1259.0		218.03	no discharge	
		switched to nitrogen			
8/31	1308.0	pump on			
8/31	1310.0		218.01		
8/31	1315.0		218.03		
8/31	1402.0				
		checked lines & lube ok			
8/31	1403.0	pump on			
8/31	1405.0	2.0	218.07	.04	
8/31	1407.0	4.0	218.13	.10	
8/31	1408.0	5.0	218.18	.15	
8/31	1409.0	6.0	218.33	.30	
8/31	1410.0	7.0	218.35	.32	
8/31	1412.0	9.0	218.39	.36	
8/31	1414.0	11.0	218.43	.40	
8/31	1415.0	12.0	218.45	.42	
8/31	1420.0	17.0	218.50	.47	
8/31	1421.0	T=24.6 C=8770 pH=4.04			
8/31	1422.0	19.0	218.54	.51	
8/31	1424.0	21.0	218.58	.55	
8/31	1426.0	23.0	218.62	.59	
8/31	1428.0	25.0	218.65	.62	
8/31	1430.0	27.0	218.72	.69	
8/31	1432.0	29.0	218.81	.78	
8/31	1434.0	31.0	218.88	.85 Q = 0.060 gpm	
8/31	1437.0	34.0	219.01	.98	
8/31	1439.0	36.0	219.11	1.08	
8/31	1440.0	T=24.6 C=8970 PH=3.99			
8/31	1444.0	41.0	219.30	1.27	
8/31	1447.0	44.0	219.39	1.36	
8/31	1454.0	51.0	219.61	1.58	

TABLE 3-2 AQUIFER TEST DATA FOR WELL 56SC (cont)

DATE	TIME	TIME SINCE PUMPING STARTED (MINUTES)	WATER LEVEL (ft.-mp)	CORRECTED DRAWDOWN (ft.)
8/31	1500.0	57.0	219.86	1.83
8/31	1504.0	Q = 0.059 gpm		
8/31	1506.0	63.0	220.10	2.07
8/31	1508.0	T = 24.8 C = 8930 pH = 4.02		
8/31	1516.0	73.0	220.45	2.42
		hard to get reading		
8/31	1525.0	82.0	220.54	2.51
		switched to air		
8/31	1602.0	119.0	220.79	2.76
		compressor out of N.		
8/31	1604.0	T = 25.2 C = 8860 pH = 4.02		
8/31	1605.0	sample collected		
8/31	1620.0	137.0	220.89	2.86 Q = 0.050 gpm
8/31	1621.0	pump off		
8/31	1628.0	145.0	220.80	2.77
8/31	1710.0	187.0	220.65	2.62
8/31	1730.0	207.0	220.53	2.50

TABLE 3-3 AQUIFER TEST DATA FOR WELL 57SC

DATE	TIME	t/t'	WATER LEVEL (ft-mp)	RESIDUAL DRAWDOWN (ft)
8/28			206.2	total depth 212.5
8/29	955.0		206.30	
8/30	1048.0		206.21	
	first bail T = 11.6 C = 3320 PH = 6.38			
	2 gal second bail T = 11.6 C = 3290 PH = 7.45			
	bailed ~ 27 gal.			
	last bail T = 11.6 C = 3290 PH = 7.40			
8/30	1420.0		210.32	
	bailed 22.5 gal			
	last bail T = 13.0 C = 3550 PH = 6.30			
8/30	1655.0		211.67	
	bailed out			
	T = 13.0 C = 4'^0 PH = 6.10			
8/31	905.0		211.33	
	start bailing 945			
8/31	953.0 bailed 1.5 gal total (muddy water) average Q = 0.19 gpm			
8/31	1000.0 no more water to bail - bailer won't pick up water on bottom			
	last bail T = 16.2 C = 3450 PH = 6.45			
8/31	1006.0	3.5	212.41	1.08
8/31	1010.0	2.5	212.41	1.08
8/31	1020.0	1.7	212.41	1.08
8/31	1123.0	1.2	212.38	1.05
	readings hard to get			
8/31	1230.0	1.1	212.15	.82
	condensation on walls			
8/31	1350.0	1.1	212.04	.71
8/31	1530.0	1.0	211.95	.62
8/31	1633.0	1.0	211.88	.55
8/31	1700.0	1.0	211.85	.52^Z^Z



$$T = \frac{264(Q)}{\Delta s}$$

$$T = \frac{264\ (0.13)}{18.2}$$

$$= 1.9 \text{ gal./day/ft.}$$

$$K = \frac{T}{7.48(D)}$$

$$K = \frac{1.9}{7.48(1.7)}$$

$$= 0.15 \text{ ft/day}$$

FIGURE 3-1 RECOVERY DATA FOR WELL 55SC

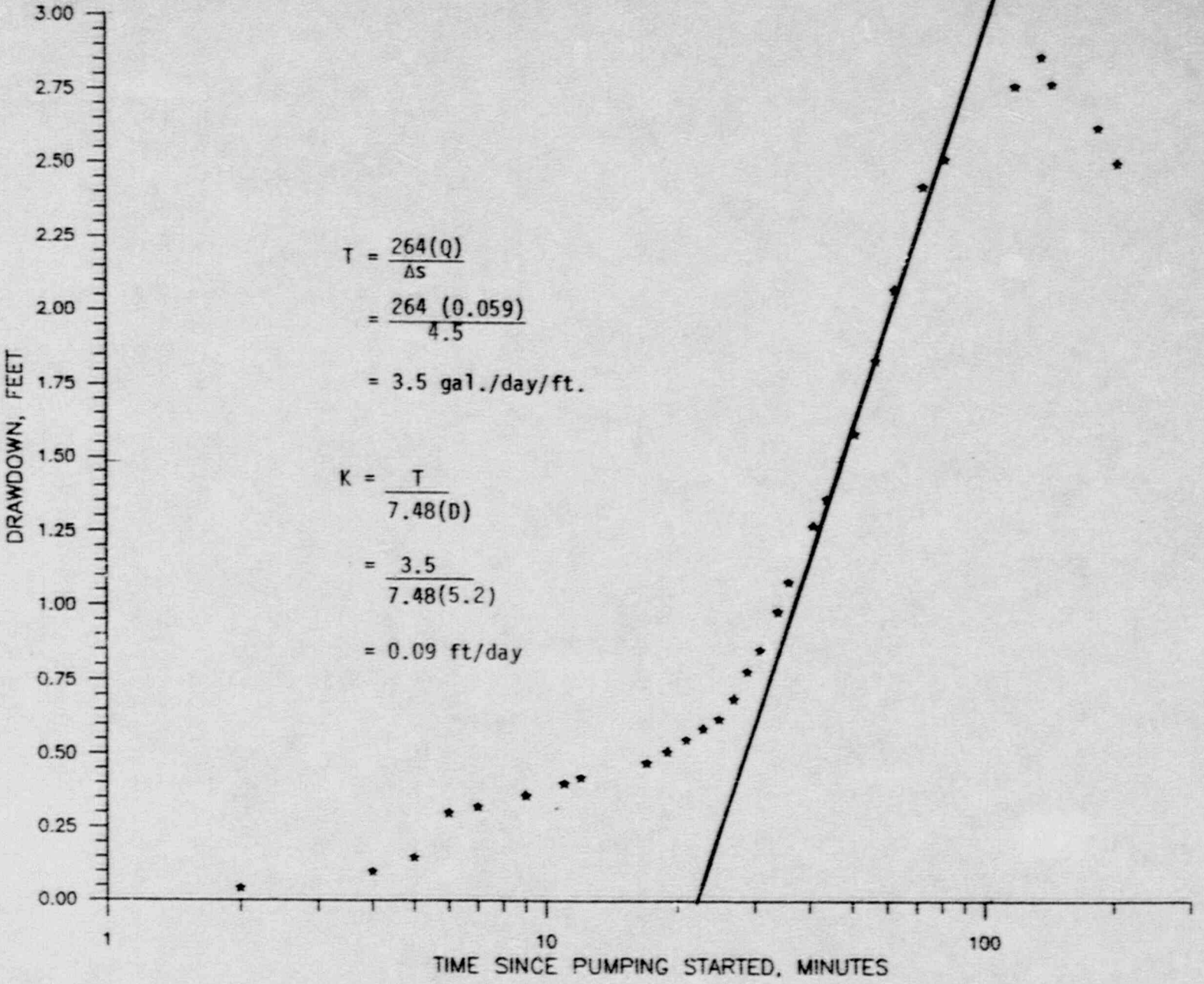
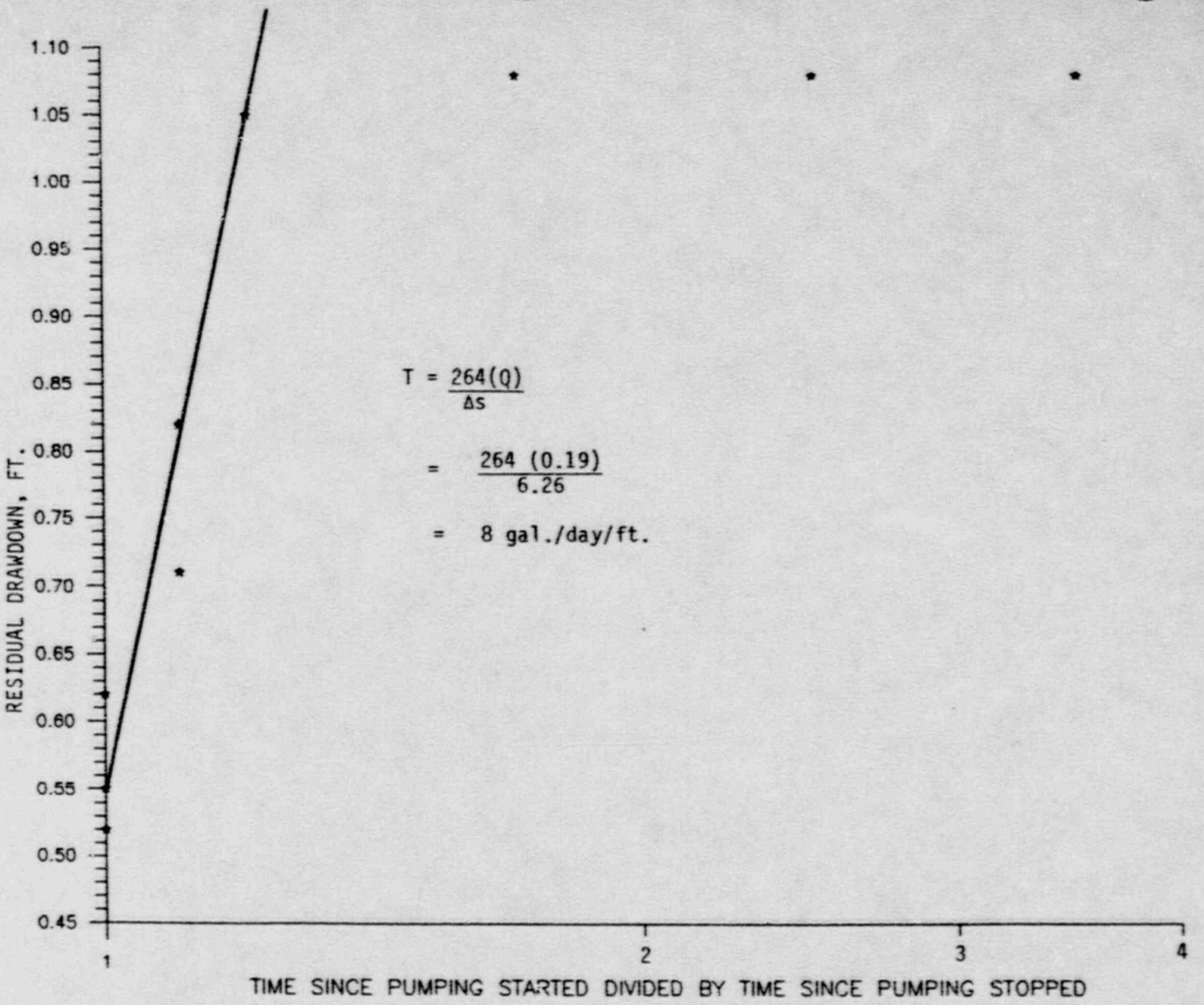


FIGURE 3-2 DRAWDOWN DATA FOR WELL 56SC



$$T = \frac{264(Q)}{\Delta s}$$

$$= \frac{264\ (0.19)}{6.26}$$

$$= 8\ \text{gal./day/ft.}$$

FIGURE 3-3 RECOVERY DATA FOR WELL 57SC

4.0 WATER QUALITY

Table 4-1 presents the water quality data for northern Upper Wind River wells 55SC, 56SC and 57SC as well as the site standard levels for this site.

Several constituents have concentrations similar to the standard levels while parameters such as lead (Pb), cadmium (cd) and nickel (Ni) exhibit elevated levels. These values and low pH of the water may be indicative of tailings water.

Samples from these three wells were difficult to obtain due to the very low yield of the well. These samples were bailed. Poor producing wells generally take longer for their quality to stabilize after drilling. At least one additional set of water quality samples need to be collected prior to a thorough analysis of the water quality.

TABLE 4-1. WATER QUALITY DATA FOR NORTHERN UPPER WIND RIVER WELLS.

WELL	DATE	pH	pHf	TEMP	COND	CONDf	Cl	SO4	TDS	As	Ba
55SC	890831	4.3	4.4	11.8	9200.	10100.	259.	7400.	13684.	0.004	0.47
56SC	890831	4.1	4.0	25.	6640.	8860.	230.	6520.	11869.	0.005	0.47
57SC	890920	4.4	--	--	7070.	--	259.	4640.	7899.	0.007	-0.05
STD		--	--	--	--	--	--	--	--	0.05	1.0

WELL	DATE	Cd	Cr	Pb	Ni	Se	NO3	Ra226	Ra228	Ra226 + Ra228	U
55SC	890831	0.10	0.09	0.39	0.86	0.03	0.44	26.	18.6	45.	0.02
56SC	890831	0.09	0.09	0.35	0.97	0.03	1.3	37.	22.	59.	0.02
57SC	890920	0.07	-0.010	0.55	0.05	0.003	0.48	6.5	13.3	19.8	0.05
STD		0.014	0.05	0.05	0.22	0.010	--	1.8	1.7	5.0	0.16

NOTES:

"-" sign before a value indicates that the value is less than the detection limit. Value shown is lower detection limit.

An "f" subscript on a parameter indicates values were field measured.

All values are in MG/L except as otherwise noted and the following:
TEMP = water temperature, in DEG C.
COND = conductivity, in micromhos/cm @ 25 DEG C.
pH = pH, in standard units.
Ra226 = Radium-226, in pci/l.

LABORATORY EQUIPMENT FAILURE PREVENTED OBTAINING THE TH230 CONCENTRATION IN TIME FOR THIS REPORT.

OVERSIZE DOCUMENT PAGE PULLED

SEE APERTURE CARDS

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARDS 1

APERTURE CARD/HARD COPY AVAILABLE FROM

RECORDS AND REPORTS MANAGEMENT BRANCH