

"Yellowboy" Operating Results

Date - April 22, 1969
Rausch Creek Flow - 11.8 mgd.
Pilot Plant Flow - 30 gpm.
Limestone - None
Hydrated Lime - 10 gms./min.
#74 Polymer - 0.0008 oz./gal.

<u>Chemical Analysis</u>	<u>Raw Water</u>	<u>Effluent</u>	<u>Sludge</u>
pH	4.2	8.6	8.9
Settleable Solids	12.0	0.7	680.
Dissolved Solids	917.0	669.0	1,122.0
Total Solids	2,977.0	752.0	171,722.0
Fixed Solids	1,789.0	631.0	131,724.0
Volatile Solids	188.0	121.0	40,048.0
Total Suspended Solids	2,060.0	83.0	170,650.0
Fixed Suspended Solids	956.0	46.0	129,420.0
Volatile Suspended Solids	1,104.0	37.0	41,230.0
"P" Alkalinity	0.0	5.3	-----
"M" Alkalinity	0.0	23.8	-----
Acidity	54.0	0.0	-----
Hardness	362.0	500.0	-----
Iron, total	64.3	0.13	532.0
Iron, dissolved	2.62	0.12	-----
Manganese	5.25	0.25	-----
Sulfate	330.0	320.0	-----
Aluminum	2.0	0.0	-----

Results are in mg/Liter, except pH and where otherwise stated,
e.g., Settleable Solids ml./l.

"Yellowboy" Operating Results

Date - April 23, 1969
Rausch Creek Flow - 10.7 mgd.
Pilot Plant Flow - 30 gpm.
Limestone - None
Hydrated Lime - 10 gms./min.
#74 Polymer - 0.0008 oz./gal.

<u>Chemical Analysis</u>	<u>Raw Water</u>	<u>Effluent</u>	<u>Sludge</u>
pH	3.2	8.7	9.0
Settleable Solids	2.9	1.1	760.0
Dissolved Solids	554.0	682.0	11,830.0
Total Solids	1,080.0	778.0	119,840.0
Fixed Solids	675.0	628.0	68,204.0
Volatile Solids	405.0	150.0	51,636.0
Total Suspended Solids	526.0	96.0	108,010.0
Fixed Suspended Solids	216.0	47.0	79,110.0
Volatile Suspended Solids	310.0	49.0	28,900.0
"P" Alkalinity	0.0	5.3	-----
"M" Alkalinity	0.0	21.2	-----
Acidity	90.8	0.0	-----
Hardness	440.0	464.0	-----
Iron, Total	24.3	2.6	408.4
Iron, dissolved	5.75	0.0	-----
Manganese	2.70	0.40	-----
Sulfate	330.0	330.0	-----
Aluminum	2.95	0.08	-----

Results are in mg/Litter, except pH and where otherwise stated,
e.g., Settleable Solids ml./l.

"Yellowboy" Operating Results

Date - April 24, 1969
Rausch Creek Flow - 9.6 mgd.
Pilot Plant Flow - 30 gpm.
Limestone - None
Hydrated Lime - 10 gms./min.
#74 Polymer - 0.0008 oz./gal.

<u>Chemical Analysis</u>	<u>Raw Water</u>	<u>Effluent</u>	<u>Sludge</u>
pH	3.2	6.8	8.6
Settleable Solids	6.0	3.5	940.0
Dissolved Solids	407.0	640.0	2,562.0
Total Solids	1,137.0	711.0	139,668.0
Fixed Solids	753.0	599.0	62,548.0
Volatile Solids	384.0	112.0	77,120.0
Total Suspended Solids	730.0	71.0	137,106.0
Fixed Suspended Solids	268.0	34.0	110,380.0
Volatile Suspended Solids	462.0	37.0	26,720.0
"P" Alkalinity	0.0	0.0	-----
"M" Alkalinity	0.0	15.9	-----
Acidity	101.2	0.0	-----
Hardness	402.0	500.0	-----
Iron, total	31.4	6.0	128.5
Iron, dissolved	6.75	0.06	-----
Manganese	1.60	0.0	-----
Sulfate	310.0	340.0	-----
Aluminum	3.10	0.03	-----

Results are in mg/Liter, except pH and where otherwise stated, e.g.,
Settleable Solids ml./l.

FLOW CHARACTERISTICS OF RAUSCH CREEK
(measured at weir)

FLOW		No. of Consecutive Days Exceeded in One Year (1968-69)	Total No. of Days Exceeded in One Year (1968-69)
<u>GPM</u>	<u>MGD</u>		
6,000	8.64	8	37
6,500	9.36	5	33
7,000	10.1	5	27
8,000	11.52	5	20
9,000	12.96	5	14
10,000	14.40	5	11
11,000	15.84	5	8
12,000	17.28	4	6
13,000	18.72	2	4
15,000	21.60	2	4
17,000	24.48	0	2
19,000	27.36	0	1

SAMPLE OF WATER FROM RAUSCH CREEK (MAIN WEIR)

SUBMITTED FOR SPECTROGRAPHIC ANALYSIS

ELEMENTS FOUND:

Aluminum	0.0X	%
Calcium	0.0X	
Copper	0.000X	
Iron	0.0X	
Magnesium	0.000X	
Silicon	0.0X	

ELEMENTS CHECKED BUT NOT FOUND: Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Columbium, Gallium, Germanium, Gold, Molybdenum, Phosphorous, Platinum, Potassium, Strontium, Tellurium, Tungsten, Vanadium, Zirconium, Chromium, Cobalt, Lead, Nickel, Silver, Sodium, Tin, Titanium, Zinc.

KEY TO SEMI-QUANTITATIVE SPECTROGRAPHIC ANALYSIS

Minor = 1.0% to 5.0%

Major = Above 5%

N.F. = Not Found

DEFINITION OF X: 0.X, 0.0X, 0.00X, etc. = Concentration of the elements estimated to the nearest decimal place.

For Example: 0.0X% = 0.01% to 0.09%

Chemical Analysis of Rausch Creek Water

Date - May 20, 1969

Source - Rausch Creek
Weir T-1

Flow	20.0 MGD
pH	3.4
Settleable Solids	0.5 ml/l
Dissolved Solids	346.0
Total Solids	449.0
Fixed Solids	354.0
Volatile Solids	95.0
Suspended Solids	103.0
Fixed Suspended Solids	47.0
Volatile Suspended Solids	56.0
Acidity as H ₂ SO ₄	72.7
Alkalinity	0.0
Hardness	159.0
Iron, total	12.9
Iron, dissolved	6.4
Manganese	4.2
Sulfate	240.0
Aluminum	2.5
C.O.D.	103.0
B.O.D.	2.0

Above results, except pH and where otherwise stated, are expressed in milligrams per Liter.

CHEMICAL ANALYSIS OF PINE CREEK SAMPLES

Sample 1 - Pine Creek, 200 ft. east of Rausch Creek 11/22/68
Time: 2:45 P.M.

Sample 2 - Pine Creek, 200 ft. west of Rausch Creek 11/22/68
Time: 3:00 P.M.

	<u>SAMPLE 1</u>	<u>SAMPLE 2</u>
pH	6.7	3.3
Color	2.	2.
Turbidity	2.	---
Ammonia Nitrogen	0.03	0.3
Nitrate Nitrogen	0.	0.002
Nitrate Nitrogen	9.2	0.2
Chloride	14.0	17.0
Specific Conductance	110.0	720.
Suspended Solids	10.0	386.
Settleable Solids	0.1	1.3
Dissolved Solids	176.	512.
Total Solids	186.	898.
Fixed Solids	78.	561.
Volatile Solids	108.	337.
Fluoride	0.15	0.45
Acidity as H ₂ SO ₄	----	116.
Alkalinity as Ca CO ₃	5.0	-----
Hardness	52.	228.
Iron, Total	0.52	32.0
Manganese	0.2	5.4
Silica (Filtered)	6.0	9.0
Sulfate	50.4	424.
Calcium	13.6	77.5
Magnesium	4.4	22.8
Iron, Dissolved	0.17	0.86
Aluminum	0.05	1.8
Silica, Total	6.0	88.

All results are expressed in parts per million, except pH and where otherwise stated.

Neutralization Study of Rausch Creek Water

Date - May 20, 1969

Test No. 1

Quantity of Water - 2 liters
Initial pH of Water 3.55

<u>Total Vol. of 1% Limestone Slurry Added, ml.</u>	<u>pH</u>	<u>Total Vol. of 1% Lime Slurry Added ml.</u>	<u>pH</u>
1	3.55	0.5	4.90
5	3.60	1.0	5.05
8	3.70	1.5	5.25
11	3.80	2.5	5.90
14	4.00	3.5	7.10
17	4.15	3.8	7.30
20	4.40	4.2	7.60
21	4.60	4.4	7.80
		4.6	7.90
		4.8	8.00

Test No. 2

Quantity of Water - 2 liters
Initial pH 3.3

<u>Total Vol. of 1% Lime Slurry Added, ml.</u>	<u>pH</u>
2.0	3.6
3.0	3.8
4.0	4.3
4.5	4.6
6.5	5.8
8.5	8.4

Neutralization Study of Rausch Creek Water

Date - May 29, 1969

Test No. 1

Quantity of Water - 1 liter
Initial pH of Water 3.10

<u>Total Vol. of 1% Limestone Slurry Added, ml.</u>	<u>pH</u>	<u>Total Vol. of 1% Lime Slurry Added ml.</u>	<u>pH</u>
0	3.10	2.0	5.60
2.0	3.30	4.0	6.00
4.0	3.50	6.0	6.50
6.0	3.75	8.0	8.70
8.0	4.05		
10.0	4.40		
12.0	4.65		

Test No. 2

Quantity of Water - 1 liter
Initial pH of Water 3.10

<u>Total Vol. of 1% Lime Slurry Added ml.</u>	<u>pH</u>
0	3.10
2.0	3.55
4.0	4.30
4.5	4.60
6.5	5.60
7.5	6.00
8.0	6.20
8.5	6.90
9.0	7.90
9.5	8.65

Neutralization Study of Rausch Creek Water

Date - June 6, 1969

Test No. 1

Quantity of Water - 1 liter
Initial pH of Water 3.0

<u>Total Vol. of 1% Limestone Slurry Added, ml.</u>	<u>pH</u>	<u>Total Vol. of 1% Lime Slurry Added ml.</u>	<u>pH</u>
0	3.0	2.0	5.5
2.0	3.3	4.0	6.2
6.0	3.5	5.0	7.2
10.0	3.8	6.0	8.2
14.0	4.2	6.25	8.5
16.0	4.6		

Test No. 2

Quantity of Water - 1 liter
Initial pH of Water 3.1

<u>Total Vol. of 1% Lime Slurry Added ml.</u>	<u>pH</u>
0	3.10
2.0	3.40
4.0	3.85
6.0	4.90
8.0	6.50
9.0	8.10
9.25	8.80

Test No. 3

Quantity of Water - 1 liter
Initial pH of Water 3.1

<u>Total Vol. of 0.02N Sodium Hydroxide Added, ml.</u>	<u>pH</u>
0	3.10
10	3.30
20	3.45
30	3.65
49	4.55
60	4.90
70	6.00
81	7.50
88	8.60

Neutralization Study of Rausch Creek Water

Date - June 17, 1969

Test No. 1

Quantity of Water - 1 liter
Initial pH of Water 3.30

<u>Total Vol. of 1% Limestone Slurry Added, ml.</u>	<u>pH</u>	<u>Total Vol. of 1% Lime Slurry Added ml.</u>	<u>pH</u>
0	3.30	2.0	5.50
2.0	3.50	4.0	6.20
4.0	3.60	5.0	6.90
6.0	3.70	6.0	8.55
10.0	4.00		
14.0	4.65		

Test No. 2

Quantity of Water - 1 liter
Initial pH of Water 3.30

<u>Total Vol. of 1% Lime Slurry Added ml.</u>	<u>pH</u>
0	3.30
2.0	4.00
3.0	4.65
4.0	5.05
5.0	5.95
5.5	6.35
6.0	6.75
6.5	7.75
6.75	8.30
7.0	8.70

Test No. 3

Quantity of Water - 1 liter
Initial pH of Water 3.30

<u>Total Vol. of 1% Pebble Lime Slurry Added, ml.</u>	<u>pH</u>
0	3.30
3.0	4.30
4.0	4.95
6.0	8.60

Neutralization Study of Rausch Creek Water

Test No. 4

Quantity of Water - 1 liter

Initial pH of Water 3.30

Total Vol. of 0.02N
Sodium Hydroxide
Added, ml.

pH

0	3.30
10	3.60
21	3.90
31	4.45
41	4.90
50	5.40
59	6.00
68	6.40
78	7.65
83	8.30
85	8.60

SLUDGE SETTLING ANALYSIS

Date of Analysis ----- APRIL 22, 1969

Neutralization Chemicals - Limestone, Lime and Polymer

<u>Time Min.</u>	<u>Height of Sludge Layer ml.</u>
0	1,000
9	930
11	900
17	820
23	740
34	590
40	540
47	510
49	500
53	490
57	480
101	410
122	390
900	260