4-21-21E

Roselle RC-39

August 29, 1950

Deep Rock Oil Corporation
Atlas Life Building
Tulsa, Oklahoma

Attention: Mr. T. F. Laury

Gentlemen:

Enclosed herewith is the report of the analysis made on the 2½" Rotary core taken from the Roselle Lease, Well No. RC-39, Anderson County, Kansas, and submitted to our laboratory on August 20, 1950.

Very truly yours,

OIL FIELD RESEARCH LABORATORIES

Carl L. Pate

CLP:bb
c.c. to Mr. Neil Henderson
Mr. Jack McQueeney

HERF ROCK OIL CORPORATION

CORE ANALYSIS REPORT

ROSELLE LEASE WELL NO. RC-32

ANDERSON COUNTY, KANSAS

OIL FIELD RESEARCH LABORATORIES

CHANUTE, KANSAS

AUGUST 29, 1950

Oil Field Research Laboratories

GENERAL INFORMATION & SUMMARY

Company Deep Rock Oil Corporation Lease Roselle Well No. BC-39

Location 330' from South Line & 990' from East Line, SW¼ NW¼

Section 4 Twp. 21 Rge. 21 County Anderson State Kansas

Name of Sand	Squirrel
Top of Core	616.83
Bottom of Core	653.96
Top of Sand	625.55
Bottom of Sand	652.38
Total Feet of Permeable Sand	19.82

Distribution of Permeable Sand:

Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 5	8.33	8.33
5 - 10	3.44	11.77
10 - 20	3.75	15.52
20 - 40	3.35	18.87
40 & above	0.95	19.82

Average Permeability, Millidarcys	11.96
Average Percent Porosity	18.55
Average Percent Oil Saturation	54.12
Average Percent Water Saturation	31.34
Average Oil Content, Bbls./A. Ft.	787.
Total Oil Content, Bbls./Acre	12,322.
Average Percent Oil Recovery by Laboratory Flooding Tests	30.53
Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.	465.
Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre	6,093.
Total Calculated Oil Recovery, Bbls./Acre	3,850.
Packer Setting, Feet	625.50
Viscosity, Centipoises @	
A. P. I. Gravity, degrees @ 60 °F	

The above averages are for that part of the sand section extending from the packer setting to the bottom of the core.

Water was used as a circulating fluid in the coring of the sand in this well. There were two losses in the bottom part of the cored section that were not shown in the core as we received it in the laboratory and, as a result, the shot recommendation was based on the core as received.

FORMATION CORED

The detailed log of the formation cored is as follows:

Depth Interval, Feet	Description
616.83 - 617.00	Gray shale.
617.00 - 617.50	Gray shale containing a vertical fracture.
617.50 - 618.60	Gray shale.
618.60 - 619.30	Hard brown fine grained micaceous shaley sandstone.
619.30 - 620.75	Laminated sandstone and shale containing a vertical fracture.
620.75 - 620.95	Laminated sandstone and shale.
620.95 - 621.15	Brown fine grained laminated micaceous shaley sandstone.
621.15 - 621.55	Laminated sandy shale.
621.55 - 621.90	Brown fine grained laminated micaceous shaley sandstone.
621.90 - 622.15	Laminated sandy shale.
622.15 - 622.75	Brown fine grained laminated micaceous shaley sandstone.
622.75 - 625.32	Gray shale.
625.32 - 625.55	Laminated shaley sandstone.
625.55 - 626.05	Brown fine grained micaceous sandstone.
626.05 - 626.24	Laminated sandy shale.
626.24 - 627.80	Brown fine grained slightly laminated micaceous shaley sandstone.
627.80 - 628.20	Laminated sandy shale.
628.20 - 628.75	Brown fine grained finely laminated micaceous shaley sandstone.

628.75 - 630.58 - Gray shale.

630.58 - 632.30 - Brown fine grained micaceous sandstone.

632.30 - 632.72 - Gray sandy shale.

632.72 - 633.00 - Brown fine grained laminated micaceous shaley sandstone.

633.00 - 633.50 - Brown fine grained slightly laminated micaceous shaley sandstone.

633.50 - 633.95 - Alternate layers of shale and sandstone.

633.95 - 634.50 - Brown fine grained micaceous sandstone.

634.50 - 634.85 - Alternate layers of shale and sandstone.

634.85 - 635.40 - Brown fine grained micaceous sandstone.

635.40 - 635.65 - Brown fine grained slightly laminated micaceous shaley sandstone.

635.65 - 636.30 - Brown fine grained micaceous sandstone.

636.30 - 636.46 - Laminated sandy shale.

636.46 - 637.40 - Brown fine grained micaceous sandstone.

637.40 - 638.05 - Brown fine grained slightly laminated micaceous shaley sandstone.

638.05 - 638.30 - Laminated sandy shale.

638.30 - 639.18 - Brown fine grained laminated micaceous shaley sandstone.

639.18 - 639.60 - Laminated sandy shale.

639.60 - 640.15 - Brown fine grained micaceous sandstone.

640.15 - 640.30 - Gray shale.

640.30 - 641.35 - Brown fine grained micaceous sandstone.

641.35 - 641.50 - Laminated shaley sandstone.

641.50 - 641.70 - Laminated sandy shale.

641.70 - 642.15 - Finely laminated shaley sandstone.

642.15 - 642.30 - Laminated sandy shale.

642.30 - 643.00 - Gray shale.

643.00 - 643.60 - Brown fine grained micaceous sandstone.

643.60 - 643.77 - Laminated sandy shale.

643.77 - 643.95 - Finely laminated shaley sandstone.

643.95 - 644.50 - Dark brown fine grained micaceous sandstone.

644.50 - 645.05 - Laminated sandy shale.

645.05 - 645.60 - Brown fine grained laminated micaceous shaley sandstone.

645.60 - 645.75 - Laminated sandy shale.

645.75 - 645.89 - Brown fine grained micaceous sandstone.

645.89 - 646.00 - Gray shale.

646.00 - 646.50 - Brown fine grained finely laminated micaceous shaley sandstone.

646.50 - 646.82 - Gray shale.

646.82 - 647.00 - Finely laminated shaley sandstone.

647.00 - 647.25 - Brown fine grained micaceous sandstone.

647.25 - 647.50 - Finely laminated shaley sandstone.

647.50 - 647.88 - Laminated sandstone and shale.

647.88 - 648.90 - Loss.

648.90 - 649.00 - Laminated sandstone and shale.

649.00 - 649.60 - Dark brown fine grained micaceous sandstone.

649.60 - 649.70 - Laminated sandstone and shale.

649.70 - 649.80 - Brown fine grained micaceous shaley sandstone.

649.80 - 649.90 - Laminated sandstone and shale.

649.90 - 650.60 - Dark brown fine grained micaceous sandstone.

650.60 - 651.20 - Loss.

651.20 - 651.70 - Dark brown fine grained micaceous sandstone.

651.70 - 651.90 - Laminated sandy shale.

651.90 - 652.38 - Dark brown fine grained micaceous sandstone.

652.38 - 653.63 - Gray shale.

653.63 - 653.96 - Discarded at well.

Coring was started at a depth of 616.83 feet in gray shale and completed at 653.96 feet, probably in shale. The bottom 0.33 feet of core was discarded at well. This core shows a total of 18.20 feet of sandstone. The cored section is badly broken by layers of shale and laminated sandstone and shale. For the most part, the clean sand is made up of fine grained micaceous to shaley sandstone.

PERMEABILITY

For the sake of distribution, the core was divided into three sections. The weighted average permeability of the upper, middle and lower sections are 2.28, 9.06 and 30.95 millidarcys respectively; while that of the pay sand, or that part of the cored section extending from the packer setting to the bottom of the sand, is 11.96. (See Table II). By observing the data given on the coregraph, it is noticeable that the sand has a very irregular permeability profile.

PERCENT SATURATION & OIL CONTENT

The pay sand in this core shows a very good weighted average percent oil saturation, namely, 54.12. The weighted average percent oil saturation of the upper, middle and lower sections are 43.24, 53.10 and 63.17 respectively. The weighted average percent water saturation of the upper, middle and lower sections are 53.00, 32.20 and 23.80 respectively; while that of the pay sand is 31.34 (See Table IV). This gives an overall weighted average total fluid saturation of 85.46 percent.

In an effort to get some idea of the degree of flushing of the sand during coring, all of the saturation samples were analyzed for chloride content. The results of these tests are given in Tables VII and VIII. Apparently salt water was used as a circulating fluid as the chloride content of the samples do not give the results that would be expected

if fresh water was used.

The weighted average oil content of the upper, middle and lower sections are 530, 771 and 932 barrels per acre foot respectively; while that of the pay sand is 787 barrels. The total oil content, as shown by this core, is 13,223 barrels per acre of which 12,322 barrels are in the pay sand section (See Table IV).

LABORATORY FLOODING TESTS

The sand in this core responded very well to laboratory flooding tests, as a total recovery of 6,093 barrels per acre was obtained from 13.11 feet of sand. The weighted average percent oil saturation was reduced from 57.08 to 26.55, or represents an average recovery of 30.53 percent. The weighted average effective permeability of the samples is 1.41 millidarcys, while the average initial fluid production pressure is 14.2 pounds per square inch (See Table VI).

By observing the data given in Table V, you will note that of the 27 samples tested, 20 produced water and oil. This indicates that most of the sand represented by these samples is floodable. The results also show that the sand has a wide variation in effective permeability.

CONCLUSION

From a study of the above data, we believe that an efficient water flood within the vicinity of this well will recover approximately 3,850 barrels of oil per acre. In calculating this recovery, no allowance was made for oil lost during coring. From the data given above and on the coregraph, it is evident that the sand within the vicinity of this well is pressured up, or that the well was drilled in semi-virgin territory. By using the primary production factor we ordinarily use in this area,

the calculated recovery is lower than that calculated directly from the core analysis data. The reason why the calculated recovery is considerable lower than the flood pot recovery is the fact that there is a wide variation in permeability.

The principle drawback of this core is the fact that the sand is badly broken and has a wide variation in permeability.

Oil Field Research Laboratories

SHOT RECOMMENDATION

Company Deep Rock Oil Corporation Lease Rozelle Well No. RC-39

Depth Interval, Feet	Feet of Sand	Size of Shell Inches	Qts./Ft.	Total Quarts
630.5 - 650.5	20.0	3.5	2.0	40.0

Recommended Packer Setting 625.5 Feet

Oil Field Research Laboratories

RESULTS OF PERMEABILITY TESTS

TABLE I

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
1	619.33	Imp.	0.30	0.30	0.00
2	620.67	Imp.	0.35	0.65	0.00
3	621.25	Imp.	0.40	1.05	0.00
4	621.75	3.8	0.35	1.40	1.33
5	622.07	Imp.	0.25	1.65	0.00
6	622.70	1.4	0.60	2.25	0.84
7	625.45	Imp.	0.23	2.48	0.00
4A	625.67	2.2	0.50	2.98	1.10
8	626.12	Imp.	0.19	3.17	0.00
9	626.35	2.2	0.46	3.63	1.01
10	626.97	13.	0.40	4.03	5.20
11	627.23	13.	0.70	4.73	9.10
12	627.90	Imp.	0.20	4.93	0.00
13	628.13	Imp.	0.20	5.13	0.00
7A	628.37	0.66	0.55	5.68	0.36
14	630.62	14.	0.52	6.20	7.28
15	631.33	24.	0.35	6.55	8.40
16	631.53	23.	0.45	7.00	10.35
17	632.20	24.	0.40	7.40	9.60
18	632.48	Imp.	0.40	7.80	0.00
19	632.88	1.6	0.78	8.58	1.25
20	633.58	6.3	0.10	8.68	0.63
21	633.88	8.7	0.25	8.93	2.18
11A	634.10	7.5	0.55	9.48	4.13
22	634.55	1.6	0.10	9.58	0.16
23	634.78	12.	0.15	9.73	1.80
12A	635.00	2.8	0.55	10.28	1.54
24	635.50	24.	0.15	10.43	3.60
25	635.63	8.5	0.10	10.53	0.85
13A	635.90	7.7	0.65	11.18	5.01
26	636.37	3.6	0.16	11.34	0.58
27	636.55	6.4	0.54	11.88	3.46
28	637.30	16.	0.40	12.28	6.40
15A	637.60	6.3	0.65	12.93	4.10
29	638.13	0.86	0.25	13.18	0.22
30	638.43	1.8	0.40	13.58	0.72
31	639.12	2.5	0.48	14.06	1.20
32	639.50	Imp.	0.42	14.48	0.00
17A	639.72	12.	0.55	15.03	6.60
33	640.47	22.	0.60	15.63	13.20

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RESULTS OF PERMEABILITY TESTS

TABLE I

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Sample No.	Depth, Feet	Permeability Millidarcys	Feet of Core		Permeability Capacity Ft. x Md.
			Ft.	Cum. Ft.	
34	641.20	15.	0.45	16.08	6.75
35	641.43	2.7	0.15	16.23	0.41
19A	641.82	0.81	0.45	16.68	0.36
36	642.20	Imp.	0.15	16.83	0.00
20A	643.15	5.1	0.60	17.43	3.06
37	643.68	1.1	0.17	17.60	0.18
38	643.90	3.9	0.18	17.78	0.70
21A	644.10	34.	0.55	18.33	18.70
39	644.82	1.8	0.55	18.88	0.99
22A	645.20	1.1	0.55	19.43	0.61
40	645.75	1.2	0.15	19.58	0.18
41	645.84	3.3	0.14	19.72	0.46
23A	646.12	4.9	0.50	20.22	2.45
42	646.93	4.0	0.18	20.40	7.20
24A	647.12	1.3	0.50	20.90	0.65
43	647.70	2.7	0.38	21.28	1.03
44	648.95	14.	0.10	21.38	1.40
45	649.55	53.	0.60	21.98	31.80
46	649.96	43.	0.35	22.33	15.05
47	650.50	32.	0.35	22.68	11.20
26A	651.40	27.	0.50	23.18	13.50
48	651.80	0.91	0.20	23.38	0.18
49	652.32	14.	0.48	23.86	6.72

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SUMMARY OF PERMEABILITY TESTS

TABLE II

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity, Ft. x Md.
618.60 - 622.75	0.95	2.28	2.17
625.55 - 647.50	16.86	9.06	152.73
649.00 - 652.38	2.58	30.95	79.85
625.50 - 652.38	19.44	11.96	232.58

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
1	618.75	14.1	33.9	63.3	97.2	371	0.70	0.70	260
2	620.85	13.7	33.4	59.6	93.0	354	0.20	0.90	71
F-2	621.05	14.8	35.0	-	-	402	0.20	1.10	80
3	622.26	17.5	60.2	38.8	99.0	817	0.60	1.70	490
4	625.67	19.2	55.9	30.4	86.3	833	0.50	2.20	417
5	626.52	18.3	47.0	34.2	81.2	667	0.86	3.06	573
6	627.43	18.2	59.2	27.4	86.6	835	0.70	3.76	585
7	628.37	14.3	41.1	47.3	88.4	456	0.55	4.31	251
8	630.85	20.0	57.5	25.0	82.5	894	0.72	5.03	643
9	631.72	19.9	59.1	26.3	85.4	913	1.00	6.03	913
10	633.12	17.4	58.2	31.0	89.2	786	0.78	6.81	614
11	634.10	19.1	59.7	23.1	82.8	886	0.55	7.36	488
12	635.00	16.9	57.6	24.4	82.0	755	0.55	7.91	415
13	635.90	19.9	57.7	26.5	84.2	891	0.65	8.56	579
14	636.72	18.6	57.8	28.6	86.4	835	0.94	9.50	785
15	637.60	18.8	53.0	32.8	85.8	773	0.65	10.15	502
16	638.62	19.0	51.0	37.6	88.6	753	0.88	11.03	663
17	639.72	21.3	57.4	22.6	80.0	948	0.55	11.58	521

Oil Field Research Laboratories

RESULTS OF SATURATION TESTS

TABLE III

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Sat. No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls./A. Ft.	Feet of Core		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum. Ft.	
18	640.70	20.5	54.7	26.7	81.4	870	1.05	12.63	913
19	641.82	15.3	26.7	58.2	84.9	317	0.45	13.08	144
20	643.15	20.3	57.2	36.4	93.6	901	0.60	13.68	541
21	644.10	18.7	61.1	23.0	84.1	886	0.55	14.23	488
22	645.20	15.9	39.6	48.3	87.9	489	0.55	14.78	269
23	646.12	16.0	42.0	51.8	93.8	521	0.50	15.28	261
24	647.12	17.7	56.4	36.6	93.0	774	0.25	15.53	193
F-24	647.37	15.0	31.1	-	-	362	0.25	15.78	91
25	649.12	20.4	64.8	22.4	87.2	1,027	0.60	16.38	616
26	651.40	17.5	62.4	23.2	85.6	847	0.50	16.88	424
27	652.00	18.8	61.9	26.3	88.2	902	0.48	17.36	433
						Total - - - -	- - - -	- - - -	13,223

Oil Field Research Laboratories

RESULTS OF LABORATORY FLOODING TESTS

TABLE V

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc*	Effective Permeability, Millidarcys **	Initial Fluid Production Pressure Lbs./Sq. In.
			Percent	Bbls./A. Ft.	Percent	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.			
1	619.07	15.0	34.5	401	0.0	0	34.5	64.1	401	0	Imp.	50+
2	621.06	14.8	35.0	402	0.0	0	35.0	61.9	402	0	Imp.	50+
3	622.53	16.6	58.7	756	6.0	77	52.7	44.5	679	0.25	0.024	50
4	625.92	19.8	56.0	860	23.4	359	32.6	56.8	501	1	0.108	25
5	626.75	20.0	54.4	844	31.2	484	23.2	73.2	360	35	1.05	10
6	627.67	18.0	56.1	783	25.8	360	30.3	64.3	423	3	0.120	25
7	628.62	14.9	42.4	490	0.0	0	42.4	50.7	490	0	Imp.	50+
8	631.13	20.1	55.0	857	31.4	489	23.6	72.3	368	55	1.75	10
9	631.95	19.7	57.9	885	31.1	475	26.8	70.0	410	64	2.09	10
10	633.25	17.8	59.6	930	32.8	512	26.8	70.7	418	14	0.396	15
11	634.35	19.6	56.4	858	30.8	469	25.6	70.6	389	29	0.854	15
12	635.25	17.2	56.7	757	20.7	276	36.0	62.7	481	1	0.106	30
13	636.15	19.3	57.0	854	31.8	476	25.2	72.0	378	19	0.508	15
14	637.00	18.8	56.4	823	27.7	404	28.7	69.5	419	47	1.42	10
15	637.90	18.1	54.3	762	26.3	369	28.0	69.6	393	10	0.397	15
16	638.90	19.2	52.2	778	26.7	398	25.5	70.2	380	4	0.203	25
17	640.00	21.0	57.5	937	32.7	533	24.8	72.3	404	94	2.82	10
18	640.95	20.4	54.0	855	29.8	472	24.2	71.1	383	55	1.66	10
19	642.05	15.7	25.2	319	0.0	0	25.2	69.3	319	0	Imp.	50+
20	643.45	19.8	58.3	894	35.3	541	23.0	75.9	353	36	0.999	15
21	644.35	19.0	62.2	917	36.3	535	25.9	71.6	382	158	4.98	10
22	645.46	15.4	37.1	443	0.0	0	37.1	57.8	443	0	Imp.	50+
23	646.37	16.5	40.8	536	0.0	0	40.8	51.8	536	0	Imp.	50+
24	647.37	15.0	31.1	362	0.0	0	31.1	66.5	362	0	Imp.	50+
25	649.35	20.4	64.0	1,015	40.4	639	23.6	72.8	374	223	5.43	5
26	651.60	19.0	59.3	874	34.2	504	25.1	66.4	370	68	1.70	10
27	652.17	18.9	64.8	950	35.4	519	29.4	67.7	431	32	0.713	5

Notes: cc - cubic centimeter
*Volume of water recovered at the time of maximum oil recovery.
**Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE VI

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Depth, Interval, Feet	625.55 - 644.50	649.00 - 652.38	625.55 - 652.38
Feet of Core Analyzed	11.53	1.58	13.11
Average Percent Porosity	19.27	19.49	19.29
Average Percent Original Oil Saturation	96.30	62.72	97.08
Average Percent Oil Recovery	29.65	36.90	30.53
Average Percent Residual Oil Saturation	26.65	25.82	26.59
Average Percent Residual Water Saturation	70.00	68.73	69.85
Average Percent Total Residual Fluid Saturation	96.65	94.55	96.40
Average Original Oil Content, Bbls./A. Ft.	851.	950.	863.
Average Oil Recovery, Bbls./A. Ft.	452.	560.	465.
Average Residual Oil Content, Bbls./A. Ft.	399.	390.	398.
Total Original Oil Content, Bbls./Acre	9,814.	1,500.	11,314.
Total Oil Recovery, Bbls./Acre	5,209.	884.	6,093.
Total Residual Oil Content, Bbls./Acre	4,605.	616.	5,221.
Average Effective Permeability, Millidarcys	1.21	2.82	1.41
Average Initial Fluid Production Pressure, p.s.i.	15.6	6.7	14.2

NOTE: Only those samples which recovered oil were used in calculating the above averages.

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RESULTS OF WATER DIFFERENTATION TESTS

TABLE VII

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Sample No.	Depth, Feet	Chloride Content of Brine in Sand ppm	Percent Water Saturation Connate	Drilling & Foreign	Total
1	618.75	16,400			
2	620.85	16,200			
3	622.26	17,400			
4	625.67	19,700			
5	626.52	18,500			
6	627.43	20,300			
7	628.37	20,600			
8	630.85	23,300			
9	631.72	23,300			
10	633.12	21,800			
11	634.10	21,600			
12	635.00	21,800			
13	635.90	18,600			
14	636.72	21,800			
15	637.60	18,600			
16	638.62	20,800			
17	639.72	17,000			
18	640.70	16,900			
19	641.82	13,600			
20	643.15	14,800			
21	644.10	23,300			
22	645.20	18,900			
23	646.12	17,100			
24	647.12	20,600			
25	649.12	26,100			
26	651.40	21,300			
27	652.00	19,700			

Note: ppm - parts per million

Oil Field Research Laboratories

SUMMARY OF WATER DIFFERENTATION TESTS

TABLE VIII

Company Deep Rock Oil Corporation Lease Roselle Well No. RC-39

Depth Interval, Feet	Chloride Content of Brine in Sand, ppm	Average Percent Connate Water	Average Percent Drilling & Foreign Water
618.60 - 622.75	16,793		
625.55 - 647.50	19,826		
649.00 - 652.38	22,639		
625.50 - 652.38	20,114		

Note: ppm - parts per million