ANALYSIS SHEET--DEEP WELL STUDY

Well No. Wooll

Depth 162 to 170

No. of Samples 1

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	30 gr.	100%	
2. Filter Paper Wt.	2.45 gr.		
3. Weight after Acid treatment, with F.P.	30.54 gr.		
4. Less Wt. Filter Paper	2.45 gr.		
5. Weight of Insoluble Residue	28.09 gr.	93.63%	
6. Loss (1 minus 5)	1.91 gr.	6.37%	

B. Subsidation:

Cylinder (-1/32) 12.95 2.20 5.70	10.75 gr.	38.15%	
Jar (1/32-1/64) ..2.05.	3.65	12.99%	
Drain	13.69	48.86%	
Original (Total)	28.09	100.00%	

C. Screen Analysis 10.77

Size	Gram	%
+2-1	.53	4.96
1-1/2	.24	2.25
1/2-1/4	.40	3.75
1/4-1/8	.93	8.70
1/8-1/16	1.98	18.54
1/16-1/32	6.61	61.80
	10.69	100.00

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.26 gr. Size-Grade 1/16-1/32 mm. Date Aug 18, 1934

Heavy Minerals .09 gr. 2.8 %

Light Minerals 3.17 gr. 97.2 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr.) ±2.93 sp. gr.
~~Bromoform~~)

~~Principal Minerals~~ Accessory Minerals: identified

~~Principal Minerals~~

Primary 96.33%

	absol. %
Quartz	82.0
Clay	13.9
Zircon	.2
Tourmaline	.2
Rutile	.0
Garnet	.0
Staurolite	.0
Anatase	.0
Hornblende	

Secondary 3.77%

Pyrite	2.3
Feldspar	1.3
Limonite	.1
Barite	.0

100.0%

~~Primary~~ heavy

	No. grains	Rel. %
Pyrite	298	80.3
*Zircon Zoned	123	7.6
*Zircon Unzoned	37	2.3
Limonite	76	4.7
**Tourmaline Brown	37	2.3
**Tourmaline green	14	.9
**Tourmaline Blue	9	.6
Hornblende	6	.4
Rutile	5	.3
Garnet	4	.2
Pistacite	2	.1
Staurolite	2	.1
Barite	2	.1

~~Secondary~~ Light 1616 100.0%

***Quartz	705	84.3
Clay	120	14.3
Feldspar	12	1.4
	837	100.0%

Classification grouping

Well Log Description: Shy A 8.9%; slightly calcareous; light gry in color; S/S; 23.5%; ang. to frag; some sand. F very angular

Pyrite fairly abundant

4. mechanical analysis is of aggregates of clay with some chert.

5. Quartz foundonly in s/t. size.

6. Chert is chiefly in elongate, rod-like fragments; evidently a replacement of some organic material.

DEEP WELL STUDY

Well No. W— 0011

Depth 620 to 630

No. samples used 1

Analyst T. & G.

Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	35 gm.	100.0%	2. Wt. of F. P. 2.30
3. Wt. after solution, with filter paper	7.97 gm.		
4. Less wt. F. P. (2)	2.30 gm.		
5. Wt. Insol. Residue (3 minus 4)	5.67 gm.	16.3	%
6. Wt. lost by solution (1 minus 5)	29.33 gm.	83.7	%
7. To balance (5 plus 6)	35.00 gm.	100.0	%

B. Subsidation:

1. Original Wt.	5.67 gm.	100.0%	
2. Cylinder (+1/32)	4.13 gm.	72.9	%
3. Jar (1/32—1/64)	1.00 gm.	16.6	%
4. Drain	5.67 gm.	9.5	%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) +1/32 mm.

Analyst Rouser

Date Aug 3, 1934

Wt. of sample 2.68 gm. 100.0%

Heavy Minerals .2 gm. 7.6 %

Light Minerals 2.48 gm. 92.4 %

Shape Analysis:

A ____ %: a ____ %: C ____ %

r ____ %: R ____ %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
1 Pyrite	613	93.6
2 Limonite	36	5.5
3 Barite	6	.9
Total	655	100%

Classification Grouping: Primary Minerals: 76.8 %

	Absol. %
Clay	52.4
Quartz	24.4

Light Concentrate			
4 Clay	426	56.7	
5 Quartz	198	26.4	
6 Chert	127	16.9	
Total	751	100%	

Secondary Minerals: 23.2 %

Pyrite	7.1
Limonite	.4
Barite	.1
Chert	15.6
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Ls, 83.7%; hard; gry; cherty; Chrt, ±5%; gry, oolitic in part; Sh content, ±10%. Some Pyrite,

* Limonite in irregular masses & in flakes, translucent giving appearance of cleavage, but due, probably, to having formed in between & along shale beds;

** Feldspar is secondarily enlarged, fresh on outside, chiefly Microcline.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 610 to 620

1. Sample Weight ..... 30 gr. 100% No. of Samples 1
2. Filter Paper Wt. .... 2.30 gr. Analyst T & G
3. Weight after Acid treatment, with F.P. 16.30 gr. Date 7-23-34
4. Less Wt. Filter Paper ..... 2.30 gr.
5. Weight of Insoluble Residue ..... 14.00 gr. 46.6 %
6. Loss (1 minus 5) .... 16.00 gr. 53.4 %

B. Subsidation:
Cylinder (-1/32) .... 1.64 gr. 11.7 %
Jar (1/32-1/64) .... 2.76 19.7 %
Drain ..... 9.60 68.6 %
Original (Total) .... 14.00 100.0 %

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA Analyst Powser

Sample Weight Used 1.60 gr. Size-Grade Comp mm. Date 8/10/34

Heavy Minerals .02 gr. 3.0 %

Light Minerals 1.53 gr. 97.0 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr.) / ~~Bromoform~~ } 2.93± sp. gr.

~~Principal Minerals~~ Primary — Absol. %

Quartz	54.5
Tourmaline (brwn)	.0
Clay	39.1

Secondary

Limonite	1.5
Feldspar	3.4
Pyrite	1.5
	100.0 %

~~Accessory~~ Minerals: identified

~~Primary~~ Heavy

	No. grains	Rel. %
Pyrite	311	50.6
*Limonite	301	49.1
Tourmaline (brown)	2	.3
	614	100. %

~~Secondary~~ light

Quartz	432	56.1
Clay	311	40.4
**~~Feldspar~~	27	3.5
	770	100.0%

Well Log Description: Shale; 47%; satt, gy, vcy, calcareous; (53% soluble) Qtz frag, small, chiefly f-m grade, a few reach ¼-½ (10-12%)

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 590 to 610

1. Sample Weight ..... 50 gr. 100% No. of Samples 2
2. Filter Paper Wt. .... 2.30 gr. Analyst T & G
3. Weight after Acid treatment, with F.P. 32.52 gr. Date 7-23-34
4. Less Wt. Filter Paper ..... 2.30 gr.
5. Weight of Insoluble Residue ..... 30.22 gr. 60.5%
6. Loss (1 minus 5) .... 19.78 gr. 39.5 %

C. Screen Analysis

Size	Gram	%

B. Subsidation:

Cylinder (-1/32)	17.97 − 2.20 = 15.77 gr.	52.6%
Jar (1/32-1/64)	10.07 − 2.27 = 8.80	29.0%
Drain	5.65	18.4%
Original (Total)	30.22	100.0%

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 3.20 gr. Size-Grade Comp mm. Date 8/24/34

Heavy Minerals .06 gr. 1.5%

Light Minerals 3.15 gr. 98.5%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr.) / ~~Bromoform~~ } 2.93± sp. gr.

~~Principal Minerals~~ Absol. %

Primary 98.82

Clay	50.0
Quartz	48.5
Tourmaline	.1
Zircon	.2
Enstatite	.0
Hornblende	.0

Secondary 1.29%

Barite	.4
Limonite	.4
Pyrite	.2
Casing scale	.2
	100.09%

Classification Ranking

~~Accessory~~ Minerals: Identified, No. gra. Rel %

~~Primary~~ Heavy

Barite		34	29.5
Limonite		26	23.5
Pyrite		15	13.3
Tourmaline	Brown	6	6.3
	Green	3	2.7
Zircon	Zoned	6	5.3
	Unzoned	5	4.4
Hornblende		1	.9
Enstatite		1	.9
Sphalerite		1	.9
Casing scale		15	13.3
		113	100.0%

~~Secondary~~

Clay	212	50.7
Quartz	209	49.3
	421	100.0%

Well Log Description: Shale, 60.5%; grey; calcareous (39.5%) with a few hard cemented frag; calcareous cement;

*. Quartz present in heavies because Pyrite adhering - & because heavy eroplarge, bringing down Quartz + one or two grains of Feldspar + Chr.

** Feldspar all sndar. enlarged; chiefly Microcline, but a small amt of Orthoclase also present.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 560 to 580

No. of Samples 2

Analyst T Y G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 2.00 gr.
3. Weight after Acid treatment, with F.P. 5.43 gr.
4. Less Wt. Filter Paper ..... 2.00 gr.
5. Weight of Insoluble Residue ..... 3.43 gr. 6.8%
6. Loss (1 minus 5) ....46.57 gr. 93.2%

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.30 gr. Size-Grade Comp mm. Date 8/24/34

Heavy Minerals .87 gr. 26.4%

Light Minerals 2.43 gr. 73.6%

Shape Analysis: A 3 %; a 42 %; C 52 %; r 5 %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.937 sp. gr.

~~Principal Minerals~~

Primary 68.5% — Abs% of %

Quartz	54.1
Clay	13.8
Zircon	.4
Tourmaline	.0
Garnet	.2

Secondary 31.5%

Pyrite	21.0
Feldspar	2.9
Glauconite	.5
Limonite	1.5
Chert	4.6
Barite	.6
Casing Scale	.4
	100.0%

Classification from Heavy

~~Accessory Minerals~~ identified

Primary (Heavy)	No. grs.	Rel %
Pyrite	555	79.2
Barite	17	2.4
Limonite	40	5.8
Zircon Zoned	10	1.4
Unzoned	1	.1
Garnet (etched)	4	.6
Tourmaline	1	.1
Casing Scale	11	1.6
*Quartz	62	8.8
	701	100.0%

Secondary (Light)		
Quartz	363	70.3
**Feldspar	20	3.9
Glauconite	4	.8
Chert	32	6.2
Clay	97	18.8
	516	100.0%

Well Log Description: LS, 93%; greyish-pink, coarsely x'line; few frag. chert; snd + s/s; ±5%; Pyrite abundant; size of Snd; 1/4-1/8 - 74%; Sec. max, 1/8-1/16

* the pyrite in this slide is chiefly in spherical pieces, or shows oolitic-like structure, Probably replacing oolites in mother rock.

** Flourite in irregular grains showing considerable etching and solution.

≠ Chert present in small amounts in grade 1/4 - pan, but makes up ±100% of grades from +2 - 1/4; it shows some oolitic structure

≠≠ feldspar present in +2 - 1/4 grades; not noticed in smaller grades.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

A. Acid Treatment (HCl 15 %)

Depth 540 to 560

No. of Samples 2

Analyst J & G

Date 7-23-34

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 2.33 gr.
3. Weight after Acid treatment, with F.P. 22.88 gr.
4. Less Wt. Filter Paper ..... 2.33 gr.
5. Weight of Insoluble Residue ..... 20.55 gr. 41.1 %
6. Loss (1 minus 5) .... 29.45 gr. 58.9 %

B. Subsidation: 21.57, 2.30, 2.60

Cylinder (-1/32)	19.27 gr.	93.8 %	2.27
Jar (1/32-1/64)	.33	1.6 %	
Drain	.95	4.6 %	
Original (Total)	20.55	100.0 %	

C. Screen Analysis 19.10

Size	Gram	%
+2-1	15.81	83.04
1-½	1.92	10.07
½-¼	.51	2.67
¼-⅛	.31	1.65
⅛-1/16	.15	.78
¼ Pan	.34	1.79
Tot.	19.04	100.00

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used .80 gr. Size-Grade ~~¼-1/32~~ mm.

Date 8/24/34

Heavy Minerals .015 gr. 1.9 %

Light Minerals .785 gr. 98.1 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93 ± sp. gr.

~~Principal Minerals~~ Abs ol %

Primary 79.6

Clay	79.0
Zircon	.0
Tourmaline	.0
Hornblende	.0

Secondary 21.0%

Pyrite	1.4
Flourite	.3
Limonite	.2
Magnetite	.0
Barite	.0
Chert	19.1
	100.0%

Classification - Rankine

~~Accessory Minerals~~: Identified

~~Primary~~ Heavy	No. grains	Rel %
*Pyrite	598	74.0
**Flourite	126	15.7
Limonite	51	6.3
Magnetite	12	1.5
Barite	7	.9
Hornblende	9	1.1
Zircon	3	.4
Tourmaline	1	.1
	809	100.0 %
~~Secondary~~ Light		
Clay	250	80.6
≠Chert	60	19.4
	310	100. %

Well Log Description: Ls, 590', hard, gry, ≠Chr; +40', lt gry to white; **Feldspar, a trace; Pyrite +1'.

*Quartz in minute, angular fragments, and in aggregates of x/s;
†, Chert fragments make up ± 100 % of the size grades larger than ½ mm; is drk. gry; is coarsely xline, grades into xline Quartz.

Ls - hrd, gry, Lt to bdr brn frag, & fr sh, blk, carb, Chert,

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Woolly

Depth 520 to 540

No. of Samples 2

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 1.96 gr.
3. Weight after Acid treatment, with F.P. 10.13 gr.
4. Less Wt. Filter Paper ..... 1.96 gr.
5. Weight of Insoluble Residue ..... 8.17 gr. 16.34%
6. Loss (1 minus 5) .... 41.83 gr. 83.66%

B. Subsidation:

Cylinder (-1/32) 9.26 2.30 2.12	6.96 gr.	85.20%
Jar (1/32-1/64) 1.86	.26	3.18%
Drain	.95	11.62%
Original (Total)	8.17	100.00%

C. Screen Analysis

Size	Gram	%
+2-1	5.57	80.3
1-1/2		
1/2-1/4		
1/4-1/8	1.37	19.7
1/8-1/16		
1/16-Pan		
Tot.	6.94	100.0

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 1.39 gr. Size-Grade 1/4-Pan mm. Date Aug 16, 1934

Heavy Minerals .02 gr. 1.5 %

Light Minerals 1.37 gr. 98.5 %

Shape Analysis: A 100 %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr.) ~~Bromoform~~ 2.93± sp. gr.

Principal Minerals

	Primary 81.0%	absol. %
	Clay	50.5
	Quartz	30.4
	Hornblende	.1
	epidote	.0
	tourmaline	.0
	Zircon	.0
	Garnet	.0
	Secondary 19.0	
	Chert	17.6
	barite	.5
	Pyrite	.5
	Limonite	.4
		100.0 %

Classification Grouping

Accessory Minerals: identified

Primary	heavy	No. grains	Rel %
	Barite	169	36.0
	Pyrite	151	32.2
	Limonite	113	24.0
	Hornblende	25	5.3
	Epidote	6	1.3
	Tourmaline	2	.4
	Zircon	3	.6
	Garnet	1	.2
		470	100.0 %

Secondary	Light		
	Clay	435	51.3
	Quartz	261	30.8
	Chert	152	17.9
		848	100.0%

Well Log Description: Ls; 83.6%; grey, hard, a small amt of shale; chert ± 13%; dry, dense; barite abundant

* Confirmatory test run on the flourite - glass was etched in 48hrs after treatment of heavy concentrate with concentrated H_2SO_4.

DEEP WELL STUDY

Well No. W— 0011
Depth 480 to 500
No. samples used 2
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50 gm.	100.0%	2. Wt. of F. P. 1.97
3. Wt. after solution, with filter paper	4.73 gm.		
4. Less wt. F. P. (2)	1.97 gm.		
5. Wt. Insol. Residue (3 minus 4)	2.76 gm.	5.5 %	
6. Wt. lost by solution (1 minus 5)	47.24 gm.	94.5 %	
7. To balance (5 plus 6)	50.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	2.76 gm.	100.0%
2. Cylinder (+1/32)	1.93 gm.	70.0 %
3. Jar (1/32—1/64)	.19 gm.	6.8 %
4. Drain	.64 gm.	23.2 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 8-23-34

Acet. Tetrabr. / ~~Bromoform~~ 2.93 ± Sp. gr. Size–Grade(s) Comp mm.

Wt. of sample 1.82 gm. 100.0%

Heavy Minerals .37 gm. 20.3 %

Light Minerals 1.45 gm. 79.7 %

Shape Analysis:
A ....%: a ....%: C ....%
r ....%: R ....%.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
*Flourite	167	7.1
Pyrite	1609	67.8
Limonite	168	7.1
Barite	122	5.2
Tourmaline	3	.1
Casing, s + dolo	300	12.7
Total	2369	100%

Light Concentrate

Clay	603	91.4
Chert	52	7.8
Quartz	5	.8
Total	660	100%

Classification Grouping:
Primary Minerals: 73.4%

	Absol. %
Clay	72.8
Quartz	.6
Tourmaline	.0

Secondary Minerals: 26.6 %

Pyrite	13.8
Flourite	1.4
Limonite	1.4
Barite	1.1
Chert	6.3
Casing & dolomite	2.6
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

limestone; ± 95%; lt. dk. gray; Pyrite very abundant; chert rare; calcite & ls common; sh - ± 5%

* dolo- + calcite present due to incomplete solution of the mother rock;

** Quartz in fresh xls + xl fragments; Probably lined cavities, as in geodes;

amt of Limestone is estimated, as solution was incomplete.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 440 to 460

No. of Samples 2

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 40 gr. 100%
2. Filter Paper Wt. .... 2.34 gr.
3. Weight after Acid treatment, with F.P. 14.50 gr.
4. Less Wt. Filter Paper ..... 2.34 gr.
5. Weight of Insoluble Residue ..... 12.16 gr. 30.4%
6. Loss (1 minus 5) .... 27.84 gr. 69.6%

B. Subsidation:

Cylinder (-1/32)	gr.	%
Jar (1/32-1/64)		%
Drain		%
Original (Total)		%

C. Screen Analysis 12.16

Size	Gram	%
+1	2.30	18.73
1-1/2	3.77	30.80
1/2-1/4	4.03	32.93
1/4-1/8	1.33	10.88
1/8-1/16	.65	5.30
1/16-Pan	.16	1.36
Tot.	12.24	100.00

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 1.90 gr. Size-Grade 1/4-Pan mm. Date 8/10/34

Heavy Minerals .046 gr. 2.5%

Light Minerals 1.855 gr. 97.5%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / ~~Bromoform~~ 2.93± sp. gr.

~~Principal Minerals~~ absol. % ~~Accessory~~ Minerals: identified

classification

	absol. %	~~Primary~~ Heavy	No. grains	Rel. %
Primary				
Magnetite	.0	Pyrite	221	49.8
Zircon	.0	Limonite	88	19.7
Tourmaline	.0	Barite	11	2.5
Hornblende	.0	Sphalerite	4	.9
Quartz	9.6	Magnetite	4	.9
Glauconite	3.8	Zircon	2	.5
Secondary		Tourmaline	1	.2
Pyrite	1.2	Hornblende	1	.5
Limonite	.5	Polo; casing scale etc	2	.5
Barite	.1		111	25.0
Sphalerite	.0		444	100.0%
(Heavy) - Polo; casing scale, etc.	.6	Secondary light		
(Light) - Polo. & calcite	63.0	*Dolomite+calcite	280	64.6
Chert	21.2	Chert	93	21.6
	100.0%	**Quartz	43	9.9
		Glauconite	17	3.9
			433	100.0%

Well Log Description: ± Limestone ±85%; white, coarsely xline; calcite xls abundant; chert ±15%; white; dense; ~~Quartz xline~~; Pyrite abundant; 2ndary euhedral Qtz xls common;

* Described as "chert," but 51% soluble; all insoluble chert except ± 5-9% which is s/s + shale; Glauconite in rounded grains up to 1/8 mm in diameter.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth H20 to 440

1. Sample Weight ..... 50 gr. 100% No. of Samples 2

2. Filter Paper Wt. .... 2.33 gr. Analyst T & G

3. Weight after Acid treatment, with F.P. 26.85 gr. Date 7-23-34

4. Less Wt. Filter Paper ..... 2.33 gr.

5. Weight of Insoluble Residue ..... 24.52 gr. 49.0%

6. Loss (1 minus 5) .... 25.48 gr. 51.0%

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

C. Screen Analysis

Size	Gram	%
1 & larger	17.35	73.90
1-1/2	3.01	12.78
1/2-1/4	.81	3.45
1/4-1/8	.42	1.79
1/8-1/16	.54	2.30
1/16-Pan	1.36	5.78
Tot.	23.49	100.00

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 2.18 gr. Size-Grade 1/4-pan mm. Date 8/10/34

Heavy Minerals .02 gr. 9.2% Shape Analysis: A ____%; a ____%;

Light Minerals 2.16 gr. 90.8% C ____%; r ____%; R ____%

Acet.Tetrabr.) 2.93 ± sp. gr.
~~Bromoform~~

Classification

~~Principal Minerals~~

Primary	abso %
Quartz	9.2
Tourmaline	.1
Garnet	.0
Zircon	.1
Clay	74.5
Secondary	
Pyrite	4.5
Limonite	.3
Glauconite	7.1
Barite	.0
Casing Scale	.2
	100.0 %

Accessory Minerals: identified

~~Primary~~ heavy

	No. grains	Rel %
Pyrite	1840	92.7
Limonite	64	3.2
Zircon	15	.8
Tourmaline	12	.6
Garnet	9	.5
Barite	2	.1
Casing scale	42	2.1
	1984	100.0%

~~Secondary~~ light

Clay	440	82.0
Glauconite	42	7.8
Quartz	54	10.2
	536	100.0%

Well Log Description: Ls, 5%; grx; shy; Chy; +45%; gry; dense; s/s; 10-2%; Sh; +5%; Pyrite abundant; Glauconite also abundant.

* Quartz is all fresh, angular xls + xl fragments; probably from xl lined cavities etc.

From 3 samples: 410, 410-420, & 420

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 400 to 420

No. of Samples 3

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 2.20 gr.
3. Weight after Acid treatment, with F.P. 40.64 gr.
4. Less Wt. Filter Paper ..... 2.20 gr.
5. Weight of Insoluble Residue ..... 38.44 gr. 77.0 %
6. Loss (1 minus 5) .... 11.56 gr. 23.0 %

B. Subsidation:

Cylinder (-1/32)	____ gr.	____ %
Jar (1/32-1/64)	____	____ %
Drain	____	____ %
Original (Total)	____	____ %

C. Screen Analysis

Size	Gram	%
1 Hanger	27.10	71.00
1-½	7.51	19.70
½-¼	2.29	6.00
¼-⅛	.49	1.28
⅛-1/16	.29	.76
1/16-Pan	.47	1.26
Tot.	38.15	100.00

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 1.21 gr. Size-Grade ¼ Pan mm.

Date 8/10/34

Heavy Minerals .060 gr. 5 %

Light Minerals 1.205 gr. 99.5 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr.) / ~~Bromoform~~ } 2.93 ± sp. gr.

Accessory Minerals: identified

Principal Minerals	absol %
Primary	
Quartz	11.9
Zircon	.0
Secondary	
Chert	51.5
Glauconite	22.7
Pyrite	.4
Limonite	.1
Barite	.0
Gypsum	13.4
	100.0 %

Heavy	No. grains	Rel. %
Pyrite	366	81.1
Limonite	56	12.4
Barite	2	.5
Zircon	2	.5
casing Scale + bit frag.	25	5.5
	451	100.0 %
Secondary light		
Chert	374	51.7
Glauconite	165	22.8
Gypsum	98	13.5
+ Quartz	87	12.0
	724	100.0 %

Class fraction

Well Log Description: Chert + 770/; grey to white with some fine Quartz xls. interspersed; some larger clusters of Qtz xls, similar to geodes; a few frag. calcareous s/s; Pyrite 1%

* Chert makes up nearly 100% of insoluble lights; even down to pan grade. Coarser grades (+2 - 1/4) is not completely desolved; has frag. of limestone. much chr. has replaced fossil frag; even down to 1/16'.
# ls. not completely desolved, so 60% is an estimate. Had been described as a s/s.

From 3 Samples: 395, 390-400, & 400

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Wooll

Depth 380 to 400

No. of Samples 3

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 2.35 gr.
3. Weight after Acid treatment, with F.P. 29.12 gr.
4. Less Wt. Filter Paper ..... 2.35 gr.
5. Weight of Insoluble Residue ..... 26.77 gr. 53.4%
6. Loss (1 minus 5) .... 23.23 gr. 46.6%

B. Subsidation:

Cylinder (-1/32)	20.46 gr.	79.5%	27.46 − 2.00 − 3.40 − 2.03
Jar (1/32-1/64)	1.37	5.3%	
Drain	3.94	15.2%	
Original (Total)	25.77	100.0%	

C. Screen Analysis 20.41

Size	Gram	%
+2-1	16.00	76.20
1-½	1.73	8.25
½-¼	.45	2.20
¼-⅛	.52	2.54
⅛-⅟₁₆	.69	3.36
⅟₁₆-Pan	1.03	7.45
T.I.	20.42	100.00

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 2.60 gr. Size-Grade ~~¼-⅓~~ mm.

Date 8/10/34

Heavy Minerals .02 gr. 1.9 %

Light Minerals 2.55 gr. 98.1 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet. Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Classification grouping

~~Principal Minerals~~ Absol. %

Primary

Quartz	15.8
Glauconite	3.1
Zircon ~~Zoned~~	.1
Zircon Unzoned	.0
Hornblende	.0
Garnet	.0

Secondary

Limonite	.4
Barite	.0
Celestite	.0
Sphalerite	.0
Fluorite	.0
Pyrite	1.3
Chert	79.2
	99.9%

Accessory Minerals: identified

~~Primary~~ Heavy	No. grains	Rel. %
Pyrite	960	70.9
Limonite	299	22.0
Zircon Zoned	31	2.3
Zircon Unzoned	25	1.8
Barite	13	1.0
Hornblende	8	.6
Celestite	10	.7
Garnet	4	.3
Sphalerite	4	.3
Fluorite	1	.1
	1355	100.0 %

~~Secondary~~ Light		
*Chert	480	80.7
Quartz	96	16.1
Glauconite	19	3.2
	595	100.0 %

Well Log Description: Limestone; ±60%; gry; hard; finely xlized; *Chert 35-39% gry to white; dense; very little xline Quartz; some pyrite.

DEEP WELL STUDY

Well No. W— 0011
Depth 360 to 380
No. samples used 2
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50 gm.	100.0%	2. Wt. of F. P. 1.94
3. Wt. after solution, with filter paper	20.77 gm.		
4. Less wt. F. P. (2)	1.94 gm.		
5. Wt. Insol. Residue (3 minus 4)	18.83 gm.	37.61 %	
6. Wt. lost by solution (1 minus 5)	31.17 gm.	62.39 %	
7. To balance (5 plus 6)	50.00 gm.	100.00%	

B. Subsidation:

1. Original Wt.	50.00 gm.	100.0%
2. Cylinder (+1/32)	7.40 gm.	39.22 %
3. Jar (1/32—1/64)	5.27 gm.	27.98 %
4. Drain	6.16 gm.	32.80 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	1.38	19.10
1–½ mm	.72	9.97
½–¼ mm	.60	8.30
¼–⅛ mm	1.38	19.20
⅛–1/16	1.35	18.71
Pan	1.78	24.72
Total	7.21	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 8/26/34

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 ± Sp. gr. Size–Grade(s) ..... mm.

Wt. of sample 1.09 gm. 100.0%

Heavy Minerals 0.01 gm. 1.0 %

Light Minerals 1.08 gm. 99.0 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	461	99.4
Zircon	1	.2
Limonite	2	.4
Total	464	100%

Classification Grouping:

	Absol. %
Primary Minerals: 98.6%	
clay	98.6
Zircon	.0

Light Concentrate			
clay	502	99.6	
glauconite	2	.4	
Total	504	100%	

Secondary Minerals: 1.4 %

Pyrite	1.0
Limonite	.0
glauconite	.4
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

shale ± (90%) grey, calcareous (62.39% soluble); a few frag. of grey, cal. s/s; containing qtz. mineral resembling glauconite; a few frag. white chert;

From 2 samples: Nos. 350-360 & 360

DEEP WELL STUDY

Well No. W— 0011

Depth 350 to 360

No. samples used 2

Analyst T. & G.

Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50 gm.	100.0%	2. Wt. of F. P. 2.34
3. Wt. after solution, with filter paper	24.35 gm.		
4. Less wt. F. P. (2)	2.34 gm.		
5. Wt. Insol. Residue (3 minus 4)	22.01 gm.	44.2 %	
6. Wt. lost by solution (1 minus 5)	27.99 gm.	55.8 %	
7. To balance (5 plus 6)	50.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	22.01 gm.	100.0%
2. Cylinder (+1/32)	12.27 gm.	55.8 %
3. Jar (1/32—1/64)	2.81 gm.	12.7 %
4. Drain	6.93 gm.	31.5 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	7.90	65.30
1–½ mm	1.69	13.94
½–¼ mm	.94	7.75
¼–⅛ mm	.58	4.78
⅛–1/16	.05	.41
Pan	.95	7.82
Total	12.11	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s) ..... mm.

Analyst .....

Date .....

Wt. of sample . . . . gm. 100.0%

Heavy Minerals . . . . gm. %

Light Minerals . . . . gm. %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Total		100%

Classification Grouping: Absol. %

Primary Minerals: ..... %

Secondary Minerals: ..... %

Light Concentrate

Total	100%	Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Production data: Date _____

Static depth to water 165 Measuring point _____

Pumping level 241 at 250 g.p.m.

_____ _____

_____ _____

_____ _____

Specific capacity _____ g.p.m. per ft. drawdown; Temperature 67 °F.

Pump data; Type pump _____ Column Dia. _____ Length _____

Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power _____ Airline _____

Estimated rate of production: _____ g.p.m. for _____ hrs. a day

Use of water _____

WATER ANALYSES (in parts per million)

Date sampled				
Sampled by				
Total solids				
Insoluble matter				
Alkalinity (Meo)				
Alkalinity (Phn)				
pH				
Fe_2O_3+ Mn_2O_3+Al_2O_3				
Alkali as sodium				
Calcium				
Magnesium				
Iron (unfiltered)				
Manganese				
Nitrate				
Fluoride				
Chloride				
Sulfate				
Bicarbonate				
Hardness (ppm)				
Hardness (gpg)				

Remarks _____

Laboratory data: Sample storage location _____

Sample range 10'-2790' No. spls. 784 No. dupls. & cond. 148 7

Spls. prepared by _____ Washed range _____ by _____

Driller's log and cond. _____

Insoluble residues: Prepared by _____ Studied by _____ Strip log _____

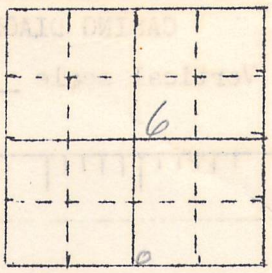
Microscopic study _____ strip log Aux Vaches

Gen. log _____ Correl. by _____

W-0011

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

RECORD OF WELL



Location:

Town: Nevada (N E S W); County Story

SW/c SE sec. 6 T. 83 N., R. 22 W. Nevada Twp.

Well name and number Nevada #3

Owner Town of Nevada Address

Tenant Address

Contractor Thorpe Bro's Well Co. Address Des Moines

Drillers

Drilling dates 1928

Well data:

Elevations: Drilling curb 1006 feet; Land surface feet

Determined by

Topographic position

Total depth: Reported 2791 feet, Measured feet

Drilling method

Hole and casing data 303' of 16", 533' of 12", 622' of 10", 519' of 8", 885' of 6"
(Give amount, size, kind, and depth of all casing; type and position of seals and packers; cementing; how finished--perforated pipe, screen, gravel pack, open hole, etc.)

Original depth to water ft. above below Date

Original elevation of water level ft.; Source of data

Sources of water: Principal 2723-91; Others 1890-1925, 2190-2215, 2240-2250

DEEP WELL STUDY

Well No. W— 0011
Depth 320 to 350
No. samples used 1
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30.00 gm.	100.0%	2. Wt. of F. P. 2.23
3. Wt. after solution, with filter paper	16.62 gm.		
4. Less wt. F. P. (2)	2.23 gm.		
5. Wt. Insol. Residue (3 minus 4)	14.39 gm.	47.9 %	
6. Wt. lost by solution (1 minus 5)	15.61 gm.	52.1 %	
7. To balance (5 plus 6)	30.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	14.39 gm.	100.0%
2. Cylinder (+1/32)	7.94 gm.	55.06 %
3. Jar (1/32—1/64)	3.24 gm.	22.56 %
4. Drain	3.21 gm.	22.38 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	2.17	27.90
1–½ mm	1.09	14.00
½–¼ mm	.65	8.35
¼–⅛ mm	.62	7.97
⅛–1/16	1.01	12.82
Pan	2.25	28.96
Total	7.79	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rouser
Date 8-23-'34

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ⅛ - Pan mm.

Wt. of sample 2.13 gm. 100.0%

Heavy Minerals 0.08 gm. 3.8 %

Light Minerals 2.05 gm. 96.2 %

Shape Analysis:
A ....%: a ....%: C ....%
r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	726	98.7
Zircon [zoned]	7	1.0
Tourmaline (Brown)	1	.1
Hornblende	1	.1
Garnet	1	.1
Total	736	100%

Classification Grouping:
Primary Minerals: 84.1 %

Absol. %	
Clay	84.1
Zircon	.0
Tourmaline	.0
Garnet	.0
Hornblende	.0

Light Concentrate			
Clay	560	87.5	Secondary Minerals: 15.9 %
Chert	75	11.7	
Gypsum	5	.8	
Total	640	100%	Total 100%

Absol. %	
Chert	11.3
Gypsum	.8
Pyrite	3.8

Revised Lithologic Description (from descriptive log and laboratory data).

Shale; gray, laminated; S/S, 35-40%, hard, gray, calcareous; Chert frag. common (prob. from above) a few grains of calcite; Pyrite common (sample 5-29 Sol.)

* Dolo brought down with pyrite, which has intergrown with it, and protects it, in part, from solution

From 2 samples: Nos. 310-320 & 320

DEEP WELL STUDY

Well No. W— 0011

Depth 310 to 320

No. samples used 2

Analyst T. & G.

Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	55.00 gm.	100.0%	2. Wt. of F. P. 4.74
3. Wt. after solution, with filter paper	31.60 gm.		
4. Less wt. F. P. (2)	4.74 gm.		
5. Wt. Insol. Residue (3 minus 4)	26.86 gm.	48.5 %	
6. Wt. lost by solution (1 minus 5)	28.14 gm.	51.5 %	
7. To balance (5 plus 6)	55.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	26.86 gm.	100.0%	
2. Cylinder (+1/32)	15.13 gm.	55.6 %	
3. Jar (1/32—1/64)	4.94 gm.	19.1 %	
4. Drain	6.79 gm.	25.3 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	5.64	37.80
1–½ mm	1.23	8.28
½–¼ mm	1.53	10.68
¼–⅛ mm	1.92	12.82
⅛–1/16	2.09	14.00
Pan	2.43	16.42
Total	14.84	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ ± 2.93 Sp. gr. Size–Grade(s) ½-1/32 mm.

Analyst Rowsey

Date Aug 22, 1934

Wt. of sample 2.41 gm. 100.0%

Heavy Minerals .02 gm. .8 %

Light Minerals 2.39 gm. 99.2 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	857	78.0
Limonite	65	5.9
Zircon Zoned	20	1.9
Zircon unzoned	4	.4
Tourmaline green	2	.2
Tourmaline Brown	3	.3
Barite	3	.3
Hornblende	5	.5
Garnet	1	.1
* Dolomite casing scale	128	11.7
	8	.7
Total	1090	100%

Classification Grouping:

Primary Minerals: 98.3 %

	Absol. %
Clay	94.1
Quartz	4.2
Zircon	.0
Tourmaline	.0
Garnet	.0
Hornblende	.0

Light Concentrate		
Clay	561	94.8
Quartz	25	4.2
Chert	6	1.0
Total	592	100%

Secondary Minerals: 1.7 %

Pyrite	.6
Limonite	.0
Barite	1.0
Chert	.1
Dolomite	
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

shale; gy.; very calcareous (5-10% sol.); 10-15% wh. chert; a few frags. of Ls. (from above); Pyrite abundant.

* Quartz secondarily enlarged angular grains, many euhedral xls; some Qtz adhering to Chert fragments; Larger grades not examined under petrographic; hence Shape analysis applies only to 1/4-pan.

Taken from two samples Nos 3104 305-310

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W 00 11

Depth 305 to 310

No. of Samples 2

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 55 gr. 100%
2. Filter Paper Wt. .... 1.93 gr.
3. Weight after Acid treatment, with F.P. 20.47 gr.
4. Less Wt. Filter Paper ..... 1.93 gr.
5. Weight of Insoluble Residue ..... 18.54 gr. 33.74%
6. Loss (1 minus 5) .... 36.46 gr. 66.26%

B. Subsidation:

Cylinder (-1/32) .... 11.64 gr. 62.7%

Jar (1/32-1/64) .... .68 3.7%

Drain 6.22 33.6%

Original (Total) 1854 100.0%

C. Screen Analysis 11.68

Size	Gram	%
+2-1	.14	1.23
1-1/2	.82	7.22
1/2-1/4	4.08	35.90
1/4-1/8	2.73	24.05
1/8-1/16	2.36	20.80
1/16-Pan	1.22	10.80
Tot.	11.33	100.00

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.00 gr. Size-Grade 1/4-Pan mm. Date 8/10/34

Heavy Minerals .15 gr. 4.3 %

Light Minerals 3.35 gr. 95.7 %

Shape Analysis: A 72 %; a 16 %; C 12 %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93+ sp. gr.

Classification grouping

~~Principal Minerals~~

	Abs'l %
Primary	
Zircon zoned	.1
Zircon unzoned	.1
Tourmaline brown	.1
Tourmaline blue	.0
Tourmaline green	.0
Garnet pink	.0
Hornblende	.1
Quartz	63.0
Secondary	
Pyrite	3.2
Limonite	.5
Barite	.0
Anhydrite	.0
Casing scale	.1
Chert	24.4
Feldspar	8.4
	100.0

~~Accessory Minerals~~: identified

~~Primary~~ Heavy	No. grains	Rel. %
Pyrite	575	75.2
Limonite	89	11.6
Zircon zoned	15	2.0
Zircon unzoned	17	2.2
Tourmaline Brown	17	2.2
Tourmaline Blue	2	.3
Tourmaline Green	6	.8
Garnet + pink	2	.3
Hornblende	9	1.2
Barite	3	.4
anhydrite	2	.3
casing scale	1	.1
~~Secondary~~ Light	26	3.4
	764	100.0
X Quartz	560	65.8
Chert	217	25.5
Feldspar	74	8.7
	851	100.0%

Well Log Description: Limestone 66.3 %; ary, very hard; SS; 30.0 %; SIZE; 1/2-1/4 - 35.9 %; sec. max; 24.0 %; S/S, 10.8 %; Pyrite abundant;

*Quartz in heavies brought down by the large amt of Pyrite.

**Practically 100% of the Quartz in the lights is secondary, grading from xline Qtz frag, to Chert; little or no evidence of rounding

†described as a siltstone.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 280 to 300

No. of Samples 1

Analyst T & Q

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 40 gr. 100%
2. Filter Paper Wt. .... 2.28 gr.
3. Weight after Acid treatment, with F.P. 7.43 gr.
4. Less Wt. Filter Paper ..... 2.28 gr.
5. Weight of Insoluble Residue ..... 5.15 gr. 12.9%
6. Loss (1 minus 5) .... 34.85 gr. 87.1%

B. Subsidation:

Cylinder (-1/32)	4.34 gr.	84.3%	6.33, 1.99, 2.12
Jar (1/32-1/64)	.17	3.3%	1.95
Drain	.64	12.4%	
Original (Total)	5.15	100.0%	

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Rowsey

Sample Weight Used 3.29 gr. Size-Grade +1/32 mm. Date Aug 17, 1934

Heavy Minerals .66 gr. 20.0 %

Light Minerals 2.63 gr. 80.0 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ ± 2.93 sp. gr.

Classification grouping

~~Principal Minerals~~

Primary 22.2%	Abs. %
Clay	21.0
Tourmaline	.1
Garnet	.1
Zircon	.8
Hornblende	.1
Staurolite	
Secondary 77.8%	
Quartz	57.5
Chert	9.6
Pyrite	14.6
Limonite	1.4
Barite	.7
	100.0%

Accessory Minerals: identified

~~Primary~~ heavy

	No. gr.	Rel %
Pyrite	375	73.5
Limonite	37	7.2
Zircon	21	4.1
Tourmaline	3	.6
Staurolite	2	.4
Garnet	3	.6
Hornblende	2	.4
Barite	14	2.7
*Quartz	54	10.5
	511	100.0%

Secondary light

**Quartz	415	61.7
Clay	176	26.2
Chert	81	12.1
	672	100.0 %

Well Log Description: + LS; 80%; hard, grey; Pyrite abundant; some blk, carbonaceous shale; Chert grading into xline Quartz; ± 9%; some xline calcite;

* Quartz brought down into heavies by excessive amount of pyrite.

** Mechanical analysis meaningless, as +1 mm grade is composed largely of large pyrite xls; cinders + shale frag.' as are all the grades above 1/8 mm; even smaller grades contain ±50% of shale fragments.

DEEP WELL STUDY

Well No. W— 0011

Depth 262 to 280

No. samples used 2

Analyst T. & G.

Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50.00 gm.	100.0%	2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper	35.67 gm.		
4. Less wt. F. P. (2)	2.32 gm.		
5. Wt. Insol. Residue (3 minus 4)	33.35 gm.	66.7 %	
6. Wt. lost by solution (1 minus 5)	16.65 gm.	33.3 %	
7. To balance (5 plus 6)	50.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	34.35 gm.	100.0%	
2. Cylinder (+1/32)	18.05 gm.	52.59 %	
3. Jar (1/32—1/64)	4.65 gm.	13.54 %	
4. Drain	11.65 gm.	33.87 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	3.09	17.10
1–½ mm	.79	4.37
½–¼ mm	1.68	9.31
¼–⅛ mm	3.27	18.20
⅛–1/16	4.52	25.10
Pan	4.68	25.92
Total	18.03	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser

Date Aug 22

Acet. Tetrabr. / ~~Bromoform~~ ±2.93 Sp. gr. Size–Grade(s) ⅛–1/32 mm.

Wt. of sample 3.29 gm. 100.0%

Heavy Minerals 1.05 gm. 1.5 %

Light Minerals 3.24 gm. 98.5 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1251	84.0
Zircon Zoned	43	2.9
Unzoned	26	1.7
Limonite	64	4.3
Garnet	28	1.9
Tourmaline Green	7	.5
Blue	1	.1
Brown	8	.5
Barite	1	.1
Rutile	3	.3
Hornblende	2	.1
*Quartz	54	3.6
Total	1491	100%

Light Concentrate			
Quartz	336	48.4	
Clay	329	47.4	
Feldspar	29	4.2	
Total	694	100%	

Classification Grouping:

	Absol. %
Primary Minerals: 98.7 %	
Quartz	47.8
Clay	46.7
Zircon	.1
Garnet	.0
Tourmaline	.0
Rutile	.0
Feldspar	4.1
Hornblende	.0
Secondary Minerals: 1.3 %	
Pyrite	1.2
Limonite	.1
Barite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale, Black, carbonaceous, calcareous (33% sol.) intermixed with gray, calcareous Sh; SS (in 265-280) + 25%; SS, 10-20%; Pyrite abundant; Cinders used. **

DEEP WELL STUDY

Well No. W— 0011
Depth 258 to 262
No. samples used 1
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	25.00 gm.	100.0%	2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper	17.44 gm.		
4. Less wt. F. P. (2)	2.32 gm.		
5. Wt. Insol. Residue (3 minus 4)	15.12 gm.	60.6 %	
6. Wt. lost by solution (1 minus 5)	9.88 gm.	39.4 %	
7. To balance (5 plus 6)	25.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	15.12 gm.	100.0%	
2. Cylinder (+1/32)	10.78 gm.	71.4 %	
3. Jar (1/32—1/64)	1.85 gm.	12.2 %	
4. Drain	2.49 gm.	16.4 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	2.33	22.00
1–½ mm	1.43	13.62
½–¼ mm	1.42	13.47
¼–⅛ mm	2.62	24.80
⅛–1/16	1.64	15.51
Pan	1.12	10.60
Total	10.56	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ } 2.93± Sp. gr. Size–Grade(s) ¼–1/30 mm.

Analyst Rowser
Date Aug 20, 1934

Wt. of sample . . . . 3.27 gm. 100.0%

Heavy Minerals . . . . .08 gm. 2.4 %

Light Minerals . . . . 3.19 gm. 97.6 %

Shape Analysis:
A 8 %: a 41 %: C 51 %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	753	91.1
Zircon [zoned	14	1.7
Zircon [unzoned	13	1.6
Tourmaline [brown	5	.6
Tourmaline [green	2	.2
Tourmaline [blue	1	.1
Hornblende	5	.6
Garnet	8	1.0
Quartz	23	2.7
anhydrite		
Total	826	100%

Light Concentrate		
Quartz	465	68.5
clay	210	30.9
Feldspar	4	.6
Total	679	100%

Classification Grouping:

Primary Minerals: 97.2%	Absol. %
clay	30.1
Quartz	67.0
Zircon	.1
tourmaline	.0
Garnet	.0
Hornblende	.0

Secondary Minerals: 2.8 %	
Pyrite	2.2
anhydrite	.0
Feldspar	.6
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

shale; ±72% black, carbonaceous; 33% soluble
ss, ±16%; fine snd; (¼–1/6) shape– C 51%; a–41%; A 8%
s/s, ±7%; Pyrite common; ss is gny, calcareous

≠ Pyrite count not indicative of true amount of Pyrite in slide, as +1 grade is largely pyrite, and considerable amt in other grades;

* Mechanical analysis is of aggregates of large Pyrite x/s, not representative of the sediment size grades,

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W6011

Depth 240 to 258

No. of Samples 1

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 30 gr. 100%
2. Filter Paper Wt. .... 2.44 gr.
3. Weight after Acid treatment, with F.P. 29.10 gr.
4. Less Wt. Filter Paper ..... 2.44 gr.
5. Weight of Insoluble Residue ..... 26.66 gr. 88.7%
6. Loss (1 minus 5) .... 3.34 gr. 11.3%

B. Subsidation: 24.15, 2.28, 4.12

Cylinder (-1/32)	21.87 gr.	82.1%
Jar (1/32-1/64) 2.27	1.85	6.9%
Drain	2.94	11.0%
Original (Total)	26.66	100.0%

C. Screen Analysis 21.67

Size	Gram	%
+2-1	3.35	15.6
1-1/2	1.07	5.0
1/2-1/4	3.59	16.7
1/4-1/8	4.00	18.6
1/8-1/16	5.82	27.3
1/16 Pan	3.62	16.8
Tot.	21.45	100.0

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.22 gr. Size-Grade 1/8-Pan mm. Date Aug. 20-1934

Heavy Minerals .03 gr. .9 %

Light Minerals 3.24 gr. 99.1 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93± sp. gr.

Classification Grouping

Principal Minerals	Absol. %
Primary 98.3%	
Quartz	64.8
Clay	33.4
Zircon	.1
Tourmaline	.0
Garnet	.0
Rutile	.0
Secondary 1.7%	
Pyrite	.8
Feldspar	.9
	100.0%

Accessory Minerals: identified

~~Primary~~ heavy	No. grains	Rel. %
≠ Pyrite	631	85.7
Zircon Zoned	43	5.9
Zircon Unzoned	25	3.4
Tourmaline Brown	6	.8
Tourmaline Green	4	.5
Tourmaline Blue	1	.1
Anhydrite	10	1.4
Limonite	7	.9
Garnet	7	.9
Rutile	2	.3
Hornblende	1	.1
	737	100.0%
Secondary Light		
Quartz	351	65.4
Clay	181	33.7
Feldspar	5	.9
	537	100.0%

Well Log Description: * Shale; black, carbonaceous; 11% soluble; a small amt of s/s; Pyrite very abundant

* Fluorite represented by but 2 grains in entire slide

** Shale is very carbonaceous, so that about 60% of clay Frag. are black, high in carbon; others brownish to drk. gry.

† Shale; mechanical analysis shows frag. up to 2mm; but examination shows that all larger than silt grades are aggregates of clay part, (frag. of shale); or extraneous material thrown in to aid drilling (cinders etc)

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Wacil

A. Acid Treatment (HCl 15 %)

Depth 220 to 240

1. Sample Weight ..... 50 gr. 100%

No. of Samples 9

2. Filter Paper Wt. .... 4.63 gr.

Analyst T & Q

3. Weight after Acid treatment, with F.P. 49.76 gr.

Date 7-23-34

4. Less Wt. Filter Paper ..... 4.63 gr.

C. Screen Analysis 23.87

Size	Gram	%
+2-1	2.27	9.44
1-½	1.97	8.20
½-¼	4.01	16.68
¼-⅛	4.48	18.66
⅛-1/16	6.09	25.43
1/16-Pan	5.19	21.59
Tot.	24.01	100.00

5. Weight of Insoluble Residue ..... 45.13 gr. 90.04%

6. Loss (1 minus 5) .... 4.87 gr. 9.96%

B. Subsidation: 25.93 2.06 9.88 2.05

Cylinder (-1/32) .... 23.87 gr. 52.6 %

Jar (1/32-1/64) .... 1.83 12.6 %

Drain ..... 13.43 29.8 %

Original (Total) 45.13 100.0%

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 2.65 gr. Size-Grade ~~¼-Pan~~ mm.

Date 8/24/34

Heavy Minerals .03 gr. 1.1 %

Shape Analysis: A ____ %; a ____ %;

Light Minerals 2.62 gr. 98.9 %

C ____ %; r ____ %; R ____ %

Acet.Tetrabr.) ~~Bromoform~~ } 2.93± sp. gr.

Minerals identified

~~Principal Minerals~~

~~Primary 97.8%~~

Primary	Rel. %
Clay	84.5
Quartz	13.8
Magnetite	.0
Zircon	.0
Tourmaline	.0
Hornblende	.0
Secondary 2.2%	
Pyrite	1.0
Limonite	.1
Kaolin	1.1
Flourite	.0
	100.0%

~~Accessory Minerals~~:

Primary Heavy	No. Grains	Rel. %
Pyrite	473	96.2
Limonite	7	1.4
Magnetite	4	.8
Zircon	3	.6
Tourmaline	2	.4
Hornblende	½	.4
*Flourite	1	.2
	492	100.0%

~~Secondary~~ Light		
** Clay Fragments	421	85.4
Quartz	67	13.5
Kaolin	5	1.1
	493	100.0%

Classification grouping F

Well Log Description: Shale, +100%; blk, carbonaceous; soapy; non calcareous; few frag of wh. shale; silt content <1%; considerable Pyrite

1.622
1.633

unknown; isotropic. Red-brown, thin flakes, index between 1.622-1.633

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 185 to 205

1. Sample Weight ..... 30 gr. 100% No. of Samples 1
2. Filter Paper Wt. .... 2.49 gr. Analyst T & G
3. Weight after Acid treatment, with F.P. 28.40 gr. Date 7-23-34
4. Less Wt. Filter Paper ..... 2.49 gr.
5. Weight of Insoluble Residue ..... 25.91 gr. 86.4%
6. Loss (1 minus 5) .... 4.09 gr. 13.6 %

C. Screen Analysis

Size	Gram	%

B. Subsidation:

Cylinder (-1/32)	6.63 2.00 3.47 4.63	gr.	17.9 %
Jar (1/32-1/64)	1.23		4.8 %
Drain	20.05		77.3 %
Original (Total)	25.91		100.0 %

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 3.28 gr. Size-Grade Camp mm. Date 8/10/34

Heavy Minerals 1.30 gr. 36.4 %

Light Minerals 2.28 gr. 63.4 %

Shape Analysis: A 68 %; a 22 %; C 10 %; r ___ %; R ___ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93± sp. gr.

~~Principal Minerals~~

	absol	%
Primary		
Clay	35.5	
Quartz	27.8	
Zircon	.3	
tourmaline	.15	
Magnetite	.7	
Secondary		
Pyrite	30.1	
Limonite	3.3	
Hornblende	.15	
Feldspar	.3	
** Unknown	1.7	
	100.00%	

Classification groupings

~~Accessory Minerals~~:

	No. of grains	Rel. %
~~Primary~~ Heavy		
* Pyrite	215	82.7
Magnetite	5	1.9
** unknown	12	4.6
Zircon	2	.8
Tourmaline	1	.4
Hornblende	1	.4
Limonite	24	9.2
	260	100.0%
~~Secondary~~ light		
Clay frag	301	56.0
Quartz	235	43.6
Feldspar	2	.4
	538	100.0%

Well Log Description: Sh: 77.3%; blk, carbonaceous, some coal; Pyrite abund. Sds: 22.7%; chiefly Qtz, some admixture of Feldspar.

19-8

3,2

*quartz brought down in heavies by pyrite, in nearly 100% of cases, quartz and pyrite intergrown; very small percent of quartz in lights, & it is 1/16 or less;

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 170 to 185

1. Sample Weight ..... 25 gr. 100% No. of Samples 1
2. Filter Paper Wt. .... 2.35 gr. Analyst T & G
3. Weight after Acid treatment, with F.P. 25.39 gr. Date 7-23-34
4. Less Wt. Filter Paper ..... 2.35 gr.
5. Weight of Insoluble Residue ..... 23.04 gr. 92.15%
6. Loss (1 minus 5) .... 1.96 gr. 7.85%

B. Subsidation:
Cylinder (-1/32) .... 12.76 gr. 55.4%
Jar (1/32-1/64) 4.60 19.9%
Drain 5.68 24.7%
Original (Total) 23.04 100.0%

C. Screen Analysis

Size	Gram	%
+2-1	2.48	19.63
1-½	.57	4.54
½-¼	1.40	11.10
¼-⅛	1.18	9.40
⅛-1/16	3.12	24.72
1/16-Pan	3.83	30.61
Tot.	12.58	100.00

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 3.03 gr. Size-Grade ¼-1/32 mm. Date Aug 18

Heavy Minerals .03 gr. .1%

Light Minerals 3.00 gr. 99.9%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr.) / ~~Bromoform~~ } 2.93+ sp. gr.

Accessory Minerals: identified

Classification Grouping

~~Principal Minerals~~	Absol. %
Primary 99.9%	
Clay	99.7
Quartz	.2
Tourmaline	.0
Zircon	.0
Secondary .1%	
Pyrite	.1
Limonite	.0
	100.0%

~~Primary~~ heavy	No. grains	Rel-%
Pyrite	682	84.6
Limonite	72	8.9
*Quartz	32	3.7
Tourmaline	6	.7
Zircon	5	.6
casing scale	12	1.5
	809	100.0%
~~Secondary~~ Light		
clay	250	99.8
Quartz	3	.2
	253	100.0%

Well Log Description: shale; dark gray, carbonaceous, only 7.85% soluble; laminated; considerable pyrite;

* Zircon in minute xls, many are euhedral; elongate; some show twinning; one or two groups are in radiating xls in Quartz grain

** Tourmaline, chiefly in very minute needle-like xls; many euhedral, & many having inclusions of some sort; xls so small that these cannot be made out.

*** Quartz shows blk. inclusions; may be carbonaceous material, as a small amount, (+2%) shows secondary enlargement.

F Sand grade mis-represented in mechanical analysis, since larger grades are made up of sh. fragments; fresh qtz xls. and cinders dumped to aid in drilling.

DEEP WELL STUDY

Well No. W— 0011

Depth 630 to 650

No. samples used 2

Analyst T. & G.

Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	40 gm.	100.0%	2. Wt. of F. P. 2.28
3. Wt. after solution, with filter paper	28.25 gm.		
4. Less wt. F. P. (2)	2.28 gm.		
5. Wt. Insol. Residue (3 minus 4)	25.97 gm.	64.96 %	
6. Wt. lost by solution (1 minus 5)	14.03 gm.	35.04 %	
7. To balance (5 plus 6)	40.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	25.97 gm.	100.0%	
2. Cylinder (+1/32)	12.13 gm.	46.87 %	
3. Jar (1/32—1/64)	6.95 gm.	26.70 %	
4. Drain	6.89 gm.	26.43 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	.20	1.65
1–½ mm	.09	.74
½–¼ mm	.11	.91
¼–⅛ mm	1.10	9.10
⅛–1/16	3.45	28.60
Pan	7.13	59.00
Total	12.08	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/16 - Pan mm.

Analyst Rowsey

Date 8-23-'34

Wt. of sample 3.47 gm. 100.0%

Heavy Minerals 0.01 gm. .3 %

Light Minerals 3.46 gm. 99.7 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
1 Pyrite	1151	75.2
2 Zircon [zoned	34	2.2
2 Zircon [un. zoned	14	.9
3 Tourmaline [Brown	21	1.4
3 Tourmaline [Green	17	1.1
3 Tourmaline [Blue	1	.1
4 Limonite	32	2.1
5 Cas. scale etc	261	17.0
Total	1531	100%

Light Concentrate

6 Clay	461	73.6
7 Quartz	163	26.1
Glauconite	2	.3
Total	626	100%

Classification Grouping:

Primary Minerals: 99.4 %

	Absol. %
clay	73.4
Quartz	26.0
zircon	.0
tourmaline	.0
Pyrite	.0
Limonite	.0

Secondary Minerals: .6 %

Pyrite	.2
Glauconite	.3
Limonite	.0
Casing Scale	.1
Total	100%

Note: analysis is for 630-640 - see attached sheet for 640-650'

Revised Lithologic Description (from descriptive log and laboratory data).

Shale; soft, grey, calcareous (3.5% soluble) with some s/s; Glauconite present; some fine snd (±10%) Garnets plentiful in heavy.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

A. Acid Treatment (HCl 15 %)

Depth 1250 to 1270

No. of Samples 2

Analyst T & G

Date 7-25-34

1. Sample Weight ..... 35 gr. 100%
2. Filter Paper Wt. .... 2.30 gr.
3. Weight after Acid treatment, with F.P. 32.81 gr.
4. Less Wt. Filter Paper ..... 2.30 gr.
5. Weight of Insoluble Residue ..... 30.51 gr. 87.1 %
6. Loss (1 minus 5) .... 4.49 gr. 12.9 %

B. Subsidation:

Cylinder (-1/32)	____ gr.	____ %	
Jar (1/32-1/64)	____	____ %	
Drain	____	____ %	
Original (Total)	____	____ %	

C. Screen Analysis

Size	Gram	%
1+ larger	13.62	44.65
1-1/2	11.02	36.41
1/2-1/4	4.12	13.50
1/4-1/8	1.30	4.28
1/8-1/16	.24	.79
1/16-Pan	.10	.37
	30.40	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 1.60 gr. Size-Grade 1/4-Pan mm. Date 8/27/34

Heavy Minerals .015 gr. 1 %

Light Minerals 1.585 gr. 98.9 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93± sp. gr.

Minerals Identified

~~Principal Minerals~~ (Classification Grouping)

	Abs. %	Heavy
Primary	99%	
Zircon	.0	
Tourmaline	.0	
Garnet	.0	
Hornblende	.0	
Quartz	.7	
Secondary	99.3%	
Pyrite	.1	
Limonite	.8	
Dolomite	.0	
Barite	.0	
Chert	98.3	
Casing Scale	.1	
	100%	

~~Accessory Minerals~~

Primary	No. Grains	Rel. %
Pyrite	149	13.5
Limonite	857	77.8
Cas. Scale	74	6.7
Dolomite	8	.7
Zircon	5	.5
* Tourmaline	2	.2
+ Barite	1	.1
+ Garnet	1	.1
+ Hornblende	4	.4
Secondary	101	Total 100%
& Chert	153	99.3
Quartz	1	.7
	154 Total	100%

Light

Well Log Description: Chert, wh. to gray 85-90%. Dolomite light gray 10-15%.

* chert: cryptoxyln; limonite stained; grains 1/2-1/4 mm in size, appear white to naked eye

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 1210 to 1230

No. of Samples 2

Analyst T & G

Date 7-25-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 1.91 gr.
3. Weight after Acid treatment, with F.P. 28.58 gr.
4. Less Wt. Filter Paper ..... 1.91 gr.
5. Weight of Insoluble Residue ..... 26.67 gr. 53.4%
6. Loss (1 minus 5) .... 23.33 gr. 46.6%

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis 26.50

Size	Gram	%
1+larger	12.24	46.30
1-1/2	9.89	37.21
1/2-1/4	3.25	12.43
1/4-1/8	.66	2.48
1/8-1/16	.21	.79
1/16-Pan	.21	.79
Tot.	26.46	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.122 gr. Size-Grade 1/2-Pan mm. Date 8/27/34

Heavy Minerals .11 gr. 5 %

Light Minerals 2.11 gr. 99.5 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr.) 2.93± sp. gr.
~~Bromoform~~)

~~Principal Minerals~~ ~~Absol %~~ ~~Heavy~~

Primary ___ %

Secondary 100.0%

Pyrite	.3
Limonite	.1
Anhydrite	.0
Chert	98.4
Quartz	1.2
Casing Scale	.0
	100%

Classification Grouping

~~Accessory Minerals~~:

~~Primary~~ No. Grains Rel. %

Pyrite-	607	66.5
Limonite-	205	22.4
Cas. Scale-	41	4.5
Anhydrite-	61	6.6
	914	Total 100%

Light Secondary

* Chert-	161	98.8
Quartz-	2	1.2
	163	Total 100%

Well Log Description: Chert: white to gray 60%. Dolomite 40%; buff, granular. Few grains anhydrite.

* Gypsum: Aggregates; gives appearance of cryptoxylinity but extinctions are simultaneous. Irregular outline; limonite stained.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W 6011

Depth 1200 to 1210

No. of Samples 1

Analyst T & G

Date 7-25-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	20 gr.	100%	
2. Filter Paper Wt.	1.99 gr.		
3. Weight after Acid treatment, with F.P.	3.20 gr.		
4. Less Wt. Filter Paper	1.99 gr.		
5. Weight of Insoluble Residue	1.21 gr.	6.1%	
6. Loss (1 minus 5) ...	18.79 gr.	93.9%	

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 1.09 gr. Size-Grade Comp. mm.

Date 8/27/34

Heavy Minerals .04 gr. 3.7%

Light Minerals 1.05 gr. 96.3%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / Bromoform 2.93± sp. gr.

Principal Minerals

	%	Absd %	Heavy
Primary			
Tourmaline -		.0	
Secondary	100.0%		
Pyrite -		.6	
Limonite -		2.4	
Barite -		.5	
Gypsum -		96.3	
Casing Scale -		.2	
		100%	

Accessory Minerals:

Primary	No. Grains	Rel. %
Pyrite -	292	17.0
Limonite -	1109	64.5
Barite -	225	13.1
Tourmaline (brwn) -	1	.1
Cas. Scale -	91	5.3
Secondary	1718	Total 100%
Light *Gypsum -	303	100.0
		Total 100%

Classification Grapings

Well Log Description: Dolomite, hard, buff, granular. Gypsum grains common.

DEEP WELL STUDY

Well No. W— 0011
Depth 1180 to 1200
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 40 gm. 100.0%: 2. Wt. of F. P. 2.23
3. Wt. after solution, with filter paper . . . . . 6.61 gm.
4. Less wt. F. P. (2) . . . 2.23 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 4.38 gm. 10.8 %
6. Wt. lost by solution (1 minus 5) . . . . . 35.62 gm. 89.2 %
7. To balance (5 plus 6) . . 40.00 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . 4.38 gm. 100.0%
2. Cylinder (+1/32) 2.14 gm. 49.0 %
3. Jar (1/32—1/64) .30 gm. 6.8 %
4. Drain . . . . . 1.94 gm. 44.2 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) +1/32 mm.

Analyst Briard
Date 8/27/34

Wt. of sample . . . . 2.03 gm. 100.0%

Heavy Minerals . . . . .18 gm. 8.9 %

Light Minerals . . . . 1.85 gm. 91.1 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	473	50.2
Limonite	225	23.9
Cas. Scale	103	10.9
Barite	130	13.8
Fluorite	11	1.2
Total	942	100%

Light Concentrate		
Dolomite:-	340	33.9
Gypsum:-	51	5.1
Clay:-	611	61.0
Total	1002	100%

Classification Grouping:
Primary Minerals: 55.6 %

	Absol. %
Clay	55.6

Secondary Minerals: 44.4 %

Pyrite	4.5
Limonite	2.1
Barite	1.2
Fluorite	.1
Dolomite	30.4
Gypsum	4.6
Cas. Scale	1.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; buff, granular, silty. Pyrite present.

DEEP WELL STUDY

Well No. W— 0011

Depth 1140 to 1160

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 35.00 gm. 100.0%: 2. Wt. of F. P. 2.05
3. Wt. after solution, with filter paper . . . . . 5.05 gm.
4. Less wt. F. P. (2) . . . 2.05 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 3.00 gm. 8.5 %
6. Wt. lost by solution (1 minus 5) . . . . . 32.00 gm. 91.5 %
7. To balance (5 plus 6) . . 35.00 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) gm. %
3. Jar (1/32—1/64) gm. %
4. Drain . . . . . gm. %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } Sp. gr. Size–Grade(s) mm.

Analyst Briard

Date 8/20/34

Wt. of sample . . . . gm. 100.0%

Heavy Minerals . . . . gm. %

Light Minerals . . . . gm. %

Shape Analysis:

A. %: a. %: C. %

r %: R %.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. % — Absol. %

Classification Grouping:

Primary Minerals: %

No Heavy Conc.

Total 100%

Light Concentrate

Secondary Minerals: %

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite: hard, silty, gray, granular. Gypsum common.

White chert 2% ±.

DEEP WELL STUDY

Well No. W— 0011

Depth 1120 to 1140

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	40 gm.	100.0%	2. Wt. of F. P. 2.17
3. Wt. after solution, with filter paper	4.22 gm.		
4. Less wt. F. P. (2)	2.17 gm.		
5. Wt. Insol. Residue (3 minus 4)	2.05 gm.	5.2 %	
6. Wt. lost by solution (1 minus 5)	37.95 gm.	94.8 %	
7. To balance (5 plus 6)	40.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	2.05 gm.	100.0%	
2. Cylinder (+1/32)	1.17 gm.	57.1 %	
3. Jar (1/32—1/64)	.15 gm.	7.3 %	
4. Drain	.73 gm.	35.6 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.937 Sp. gr. Size–Grade(s) +1/32 mm.

Analyst Briand

Date 8/27/34

Wt. of sample 1.12 gm. 100.0%

Heavy Minerals .03 gm. 2.7 %

Light Minerals 1.09 gm. 97.3 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	733	70.0
Limonite	120	11.5
Cas. Scale	180	17.3
Barite	1	.1
Tourmaline (green)	2	.2
Zircon	6	.6
Garnet (etched)	1	.1
Garnet (unetched)	2	.2
Total	1045	100%

Light Concentrate		
Clay	579	90.5
Quartz	61	9.5
Total	640	100%

Classification Grouping:

Primary Minerals: 97.3%

	Absol. %
Tourmaline	.0
Zircon	.0
Garnet	.0
Clay	88.0
Quartz	9.3

Secondary Minerals: 2.7 %

Pyrite	1.9
Limonite	.3
Barite	.0
Casing Scale	.5
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite, hard, gray, granular; silty

* Presence of fluorine confirmed by etching
Fluorite in large part consists of aggregates of xyls
many triangular, all intergrown. A few cubes.

DEEP WELL STUDY

Well No. W— 0011
Depth 1100 to 1120
No. samples used 2
Analyst T. & G.
Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	40 gm.	100.0%	2. Wt. of F. P.	2.30
3. Wt. after solution, with filter paper	15.55 gm.			
4. Less wt. F. P. (2)	2.30 gm.			
5. Wt. Insol. Residue (3 minus 4)	13.25 gm.	33.15 %	1.08 %	
6. Wt. lost by solution (1 minus 5)	26.75 gm.	66.85 %	98.92 %	
7. To balance (5 plus 6)	40.00 gm.	100.00 %		

B. Subsidation:

1. Original Wt.	13.25 gm.	100.0%
2. Cylinder (+1/32)	11.16 gm.	84.22 %
3. Jar (1/32—1/64)	.87 gm.	6.57 %
4. Drain	1.22 gm.	9.21 %

C. Screen Analysis 11.10

SIZE	GRAMS	%
2 plus		
2–1 mm	4.97	45.20
1–½ mm	1.60	14.51
½–¼ mm	1.47	13.39
¼–⅛ mm	.78	7.09
⅛–1/16	.42	3.81
Pan	1.76	16.00
Total	11.00	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/4-1/32 mm.

Analyst Briand
Date 8/27/34

Wt. of sample 2.99 gm. 100.0%

Heavy Minerals 0.2 gm. .7 %

Light Minerals 2.97 gm. 99.3 %

Shape Analysis:

A ____ %: a ____ %: C ____ %

r ____ %: R ____ %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	63	8.9
Limonite	182	25.6
Cas. Scale	59	8.3
Anhydrite	38	5.4
Barite	15	2.1
* Fluorite	328	46.2
Garnet	1	.1
Dolomite	24	3.4
Total	710	100%

Classification Grouping:

	Absol. %
Primary Minerals: 0. %	
Garnet	.0
Secondary Minerals: 100.0 %	
Pyrite	.1
Limonite	.2
Anhydrite	.0
Barite	.0
Fluorite	.3
Dolomite (HCl)	99.3
Casing Scale	.1
Total	100%

Light Concentrate

Dolomite "100%"

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite, hard, gray to pink, granular. Anhydrite present; some pyrite.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

A. Acid Treatment (HCl 15 %)

Depth 1090 to 1100

No. of Samples 1

Analyst T & G

Date 7-24-34

1. Sample Weight ..... 25 gr. 100%
2. Filter Paper Wt. .... 2.30 gr.
3. Weight after Acid treatment, with F.P. 12.15 gr.
4. Less Wt. Filter Paper ..... 2.30 gr.
5. Weight of Insoluble Residue ..... 9.85 gr. 39.4%
6. Loss (1 minus 5) .... 15.15 gr. 60.6%

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis 9.60

Size	Gram	%
2-1	.82	8.85
1-1/2	3.19	34.08
1/2-1/4	2.25	24.03
1/4-1/8	.90	9.60
1/8-1/16	.80	8.54
1/16-Pan	1.40	14.90
Tot.	9.37	100.00

MINERALOGICAL DATA

Analyst Briand

Sample Weight Used 2.15 gr. Size-Grade 1/4-Pan mm.

Date 8/27/34

Heavy Minerals .09 gr. 4.4 %

Light Minerals 2.06 gr. 95.6 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / Bromoform 2.93± sp. gr.

~~Principal Minerals~~

Classification Groupings

	Absol %
Primary	
Hornblende--	.0
Secondary 100%	
Anhydrite (HL)	52.8
Fluorite---	.0
pyrite---	.1
Limonite---	.1
Gypsum---	46.6
Casing Scale---	.4
	100%

~~Accessory Minerals~~:

	Heavy	Primary	No. Grains	Rel %
		Anhydrite-	528	85.7
		Fluorite--	7	1.1
		Hornblende-	1	.2
		pyrite---	10	1.6
		Casing Scale-	51	8.3
		Limonite--	19	3.1
	Light	Secondary	616	Total 100.0%
		Gypsum	477	48.8
		Anhydrite	501	51.2
			978	Total 100.0%

Well Log Description: Limestone, grayish pink, granular

Anhydrite & gypsum about 40%

* Gypsum - some fibrous; mostly cryptoxyln mosaic struct.; limonite stained.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 1080 to 1090

No. of Samples 1

Analyst T & G

Date 7-24-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	30 gr.	100%	
2. Filter Paper Wt.	2.30 gr.		
3. Weight after Acid treatment, with F.P.	19.60 gr.		
4. Less Wt. Filter Paper	2.30 gr.		
5. Weight of Insoluble Residue	17.30 gr.	57.6%	
6. Loss (1 minus 5)	12.70 gr.	42.4%	

B. Subsidation:

Cylinder (-1/32)	3.18 gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis

Size	Gram	%
1+Harper	2.77	16.51
1-1/2	3.04	18.64
1/2-1/4	3.64	21.56
1/4-1/8	1.77	10.67
1/8-1/16	1.21	7.60
1/16-Pan	4.15	25.02
Tot.	16.58	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.51 gr. Size-Grade 1/4-Pan mm. Date 8/27/34

Heavy Minerals .41 gr. 16.3%

Light Minerals 2.10 gr. 83.7%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / Bromoform 2.93 ± sp. gr.

Accessory Minerals:

Primary	No. Grains	Rel. %
Anhydrite-	859	99.2
Fluorite-	2	.2
Limonite-	4	.5
Cas. scale-	1	.1

866 Total 100%

Classification Groupings

Principal Minerals

Primary — Absol %

Secondary 100%

Anhydrite-(Hyd)	84.4
Fluorite-	.0
Limonite-	.1
Gypsum-	15.5
	100%

Light Secondary

* Anhydrite-	691
* Gypsum-	157

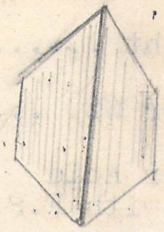
848 Total 100.0%

Anhydrite	81.5
Gypsum	18.5

Well Log Description: Gypsum & anhydrite 55-60%.

Limestone 40-45%

θ Arsenopyrite : white, hexagonal outline striations.



* Gypsum : xylz ; also cryptoxyln stained with limonite; also fibrous

† Magnetite : 1 Grain; aggregate of xyls showing octahedron faces. A short blue color reflected light. No other grains found in heavy unmounted portion of separates

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 1070 to 1080

No. of Samples 1

Analyst T & G

Date 7-24-34

A. Acid Treatment (HCl 15%)

1. Sample Weight ..... 30 gr. 100%
2. Filter Paper Wt. .... 1.96 gr.
3. Weight after Acid treatment, with F.P. 16.54 gr.
4. Less Wt. Filter Paper ..... 1.96 gr.
5. Weight of Insoluble Residue ..... 14.58 gr. 48.5%
6. Loss (1 minus 5) .... 15.42 gr. 51.5%

B. Subsidation:

Cylinder (-1/32)	gr.	%
Jar (1/32-1/64)		%
Drain		%
Original (Total)		%

C. Screen Analysis 14.48

Size	Gram	%
14 larger	8.17	57.15
1-1/2	2.26	15.72
1/2-1/4	1.26	8.85
1/4-1/8	.64	4.47
1/8-1/16	.54	3.77
1/16-Pan	1.42	10.04
Tot.	14.29	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.53 gr. Size-Grade 1/4-Pan mm. Date 8/27/34

Heavy Minerals .0027 gr. .3%

Light Minerals 2.5225 gr. 99.7%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / Bromoform 2.93 ± sp. gr.

Classification Grouping

Principal Minerals	Absol %
Primary	
Magnetite	.0
Secondary 100%	
Pyrite	.0
Arsenopyrite	.0
Limonite	.1
Anhydrite (Hyl)	63.8
Fluorite	.0
Gypsum	35.8
Dolomite	.3
	100%

Accessory Minerals:

Heavy Primary	No. Grains	Rel %
pyrite	99	3.6
Arsenopyrite	11	.4
Limonite	783	28.5
Cas. Scale	106	3.9
± Magnetite(?)	1	.0
Anhydrite	1738	63.4
Fluorite	5	.2
	2743	Total 100%

Light Secondary		
Anhydrite	774	63.9
* Gypsum	433	35.8
Dolomite	3	.3
	1210	Total 100%

Well Log Description: Gypsum & anhydrite; gypsum - soft, wh. Granular Ls. about 50% Calc. content 51.5%

DEEP WELL STUDY

Well No. W— 0011

Depth 1050 to 1070

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	40 gm.	100.0%	2. Wt. of F. P. 1.94
3. Wt. after solution, with filter paper	8.94 gm.		
4. Less wt. F. P. (2)	1.94 gm.		
5. Wt. Insol. Residue (3 minus 4)	7.00 gm.	17.5 %	
6. Wt. lost by solution (1 minus 5)	33.00 gm.	82.5 %	
7. To balance (5 plus 6)	40.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	7.00 gm.	100.0%	
2. Cylinder (+1/32)	4.40 gm.	63.0 %	
3. Jar (1/32—1/64)	.29 gm.	4.2 %	
4. Drain	2.30 gm.	32.8 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) +1/32 mm.

Analyst Briand

Date 8/28/34

Wt. of sample 2.96 gm. 100.0% Shape Analysis:

Heavy Minerals .015 gm. .5 % A ..... %: a ..... %: C ..... %

Light Minerals 2.945 gm. 99.5 % r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	347	63.4
Limonite	131	24.2
Cas. Scale	50	9.2
Barite	1	.2
Zircon	1	.2
Anhydrite	12	2.2
Garnet Etched	1	.2
Fluorite	2	.4
Total	545	100%

Light Concentrate		
Clay	357	90.8
Gypsum	36	9.2
Total	393	100%

Classification Grouping:

	Absol. %
Primary Minerals: 90.3 %	
Zircon	90.3
Clay	.0
Secondary Minerals: 9.7 %	
Pyrite	.3
Limonite	.1
Cas. Scale	.1
Barite	.0
Anhydrite	.0
Fluorite	9.2
Gypsum	.0
Anhydrite	
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone; hard, dolomitic, white to gray to "pink"; granular.

Sh: s-1070; hard, green, noncalc. Gypsum common.

DEEP WELL STUDY

Well No. W— 0011

Depth 1020 to 1040

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 40 gm. 100.0%: 2. Wt. of F. P. 2.15
3. Wt. after solution, with filter paper . . . . . 3.95 gm.
4. Less wt. F. P. (2) . . . 2.15 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 1.80 gm. 4.5 %
6. Wt. lost by solution (1 minus 5) . . . . . 38.20 gm. 95.5 %
7. To balance (5 plus 6) . . 40.00 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . 1.80 gm. 100.0%
2. Cylinder (+1/32) .60 gm. 33.4 %
3. Jar (1/32—1/64) .19 gm. 10.6 %
4. Drain . . . . . 1.01 gm. 56.0 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromo~~form } 2.93± Sp. gr. Size–Grade(s) +1/32 mm.

Analyst Briard

Date 8/29/34

Wt. of sample . . . . .51 gm. 100.0%

Heavy Minerals . . . .02 gm. 3.9 %

Light Minerals . . . .49 gm. 96.1 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	523	68.2
Limonite	66	8.6
Cas. scale	75	9.8
Barite	102	13.3
Zircon	1	.1
Total	767	100%

Classification Grouping:

Primary Minerals: 95.3 %

	Absol. %
Clay	93.8
Quartz	1.5
Zircon	.0

Light Concentrate		
Clay	729	97.5
Quartz	11	1.6
Gypsum	5	.7
Glauconite	2	.2
Total	747	100%

Secondary Minerals: 4.7 %

	Absol. %
Pyrite	2.7
Limonite	.3
Cas. scale	.4
Barite	.5
Gypsum	.7
Glauconite	.1
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone: hard, gray, granular, dolomitic: Some gypsum

DEEP WELL STUDY

Well No. W— 0011

Depth 1000 to ~~2000~~ 1020

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 40 gm. 100.0% : 2. Wt. of F. P. 2.00
3. Wt. after solution, with filter paper . . . . . 3.73 gm.
4. Less wt. F. P. (2) . . . 2.00 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 1.70 gm. 4.3 %
6. Wt. lost by solution (1 minus 5) . . . . . 38.30 gm. 95.7 %
7. To balance (5 plus 6) . . 40.00 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) gm. %
3. Jar (1/32—1/64) gm. %
4. Drain . . . . . gm. %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s) ..... mm.

Analyst Briand

Date 8/29/34

Wt. of sample . . . . gm. 100.0%

Heavy Minerals . . . . gm. %

Light Minerals . . . . gm. %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate

No. of Grains

Rel. %

Classification Grouping: Primary Minerals: ..... %

Absol. %

No slide

Total 100%

Light Concentrate

Secondary Minerals: ..... %

Total 100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

* Fluorite: about 50% fluorite & 50% yttrofluorite.
At N = 1.435 — N > 1.435, N = 1.447.
several cubes & an occasional octahedral clear. fragment.

† Barite: one large grain, well etched; contains inclus.; one or two of pyrite.

(−) Bastite: More or less fibrous; Neg clear. elong. birf .015 index 1.60±, two dis. clear. ext. 11 to cleave faster ray.

O − Clinoenstatite: Resembles bastite described above except ext. slow ray to clear. =22°. pozit. clear. elong. Biax. +

* Sample retreated in acid to obtain % sol. & to recover more fluorite; most fluorite taken out by extended acid treatment.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W00 11

A. Acid Treatment (HCl 15 %)

Depth 960 to 980

1. Sample Weight ..... 50 gr. 100%

No. of Samples 2

2. Filter Paper Wt. .... 2.37 gr.

Analyst T + G

3. Weight after Acid treatment, with F.P. 23.99 gr.

Date 7-24-34

*Note: revised data on sol. residue wt. %

4. Less Wt. Filter Paper ..... 2.37 gr.

C. Screen Analysis 21.33

Size	Gram	%
+1	3.34	15.70
1-1/2	8.80	41.45
1/2-1/4	5.60	26.22
1/4-1/8	1.14	5.35
1/8-1/16	.96	4.52
1/16-Pan	1.44	6.76
Tot	21.28	100.00

0.44gr / 1.5% 29.56gr 98.5% 30.0gr 100%

5. Weight of Insoluble Residue ..... 21.62 gr. *43.3 %

6. Loss (1 minus 5) .... 28.38 gr. 56.7 %

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____ %

Jar (1/32-1/64) ..... ____ ____ %

Drain ..... ____ ____ %

Original (Total) .... ____ ____ %

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.48 gr. Size-Grade ____ mm. Date ____

Heavy Minerals .04 gr. 1.6 %

Light Minerals 2.44 gr. 98.4 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93± sp. gr.

Classification Grouping

~~Principal Minerals~~

Primary

Enstatite	.0
Tremolite	.0
Clinoenstatite	.0

Secondary

Pyrite	.2
Limonite	.8
Casing Scale	.1
Fluorite	.1
Barite	.0
Bastite after enstatite	.0
Orthoclase	.3
Dolomite (HCl)	98.5
Anhydrite	.0
	100.0%

~~Accessory Minerals~~:

Heavy Primary — No Grains

Pyrite	190	12.6
Limonite	720	47.8
Cas. Scale	122	8.1
* Fluorite	132	8.8
Dolomite	331	22.0
+ Anhydrite	3	.2
+ Barite	3	.2
+ Tremolite	1	.1
(—) Bastite (?)	2	.1
0 Clinoenstatite	1	.1
	1505	100.0%

Light Secondary

Dolomite	609	99.7
Orthoclase	2	.3
	611	100.0%

Well Log Description: Limestone - 98%, gray, coarsely crystalline; calcite rhombs abundant; Pyrite - a trace (no ats found)

DEEP WELL STUDY

Well No. W— 0011
Depth 940 to 960
No. samples used 2
Analyst T. & G.
Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50 gm.	100.0%	2. Wt. of F. P. 2.02
3. Wt. after solution, with filter paper	4.00 gm.		
4. Less wt. F. P. (2)	2.02 gm.		
5. Wt. Insol. Residue (3 minus 4)	1.98 gm.	3.9	%
6. Wt. lost by solution (1 minus 5)	48.02 gm.	96.1	%
7. To balance (5 plus 6)	50.00 gm.	100.0	%

B. Subsidation:

1. Original Wt.	1.98 gm.	100.0%	
2. Cylinder (+1/32)	.80 gm.	40.4	%
3. Jar (1/32—1/64)	.13 gm.	6.5	%
4. Drain	1.05 gm.	53.1	%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Briand
Date 8/29/34

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) +1/32 mm.

Wt. of sample .75 gm. 100.0%

Heavy Minerals .06 gm. 8.0 %

Light Minerals .69 gm. 92.0 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	309	27.0
Limonite	347	30.4
Cas. Scale	323	28.3
Fluorite	120	10.5
Zircon	1	.1
Dolomite	37	3.2
Barite	3	.3
Garnet (brown)	1	.1
Tourmaline (grn)	1	.1
Total	1142	100%

Light Concentrate		
Clay	881	74.9
Dolomite	257	21.8
Quartz	24	2.0
Chert	5	.4
Glauconite	11	.9
Total	1178	100%

Classification Grouping:

	Absol. %
Primary Minerals: 70.8 %	
Zircon	.0
Garnet	.0
Tourmaline	.0
Clay	69.0
Quartz	1.8
Secondary Minerals: 29.2 %	
Pyrite	2.2
Limonite	2.4
Dolomite	20.3
Chert	.1
Glauconite	.8
Fluorite	2.3
Barite	
Cas. scale	
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone: grayish pink, coarsely crystalline, calcite rhombs abundant. [L.S. is slightly dolom., also slightly argillac.]

* ? Yttrofluorite

Isotropic; colorless to very slightly brown; brownish inclusions; N = 1.447, some grains slightly below, some slightly above. Cleavage absent in most; apparent ptL clear. in a few.
No grains observed in light crop.
Index definitely above 1.435 with conspicuous relief; def. below 1.457

† Enstatite(?) var. Bastite

2 dir. clear.; colorless; clear along ll to fast ray, biref .008±; refring. 1.64±

Sample ran to obtain absolute solubility

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 900 to 920

1. Sample Weight ..... 5.0 gr. 100% No. of Samples 2
2. Filter Paper Wt. .... 2.37 gr. Analyst T & G
3. Weight after Acid treatment, with F.P. 21.23 gr. Date 7-24-34
4. Less Wt. Filter Paper ..... 2.37 gr.
5. Weight of Insoluble Residue ..... 18.86 gr. 37.7%
6. Loss (1 minus 5) .... 31.14 gr. 62.3%

Wt. 0.3994 90 1.3%
26.64 / 30.014 88.7 / 100.0%

B. Subsidation:
Cylinder (-1/32) .... ____ gr. ____%
Jar (1/32-1/64) ..... ____ ____%
Drain ..... ____ ____%
Original (Total) .... ____ ____%

C. Screen Analysis 18.43

Size	Gram	%
2"	3.99	21.68
1-1/2	6.29	34.24
1/2-1/4	4.70	25.60
1/4-1/8	1.70	9.27
1/8-1/16	.96	5.22
Pan	.73	3.99
Tot	18.37	100.00

MINERALOGICAL DATA Analyst Briard

Sample Weight Used 2.50 gr. Size-Grade ____ mm. Date 8/10/34

Heavy Minerals .100 gr. 2.0%

Light Minerals 2.45 gr. 98.0%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr.) Bromoform ~~Bromoform~~ } 2.93+ sp. gr.

~~Principal Minerals~~
~~Primary~~

Secondary
Pyrite .2
Limonite .9
Barite .2
Dolomite 98.0
Casing Scale .2
? .5
100.0%

Classification Grouping

Accessory Minerals:

Heavy Primary	No. Grains	Rel. %
Pyrite	348	11.8
Limonite	1321	45.1
Cas. Scale	264	9.0
* Fluorite?	753	25.7
Barite	2	.1
Dolomite	244	8.3
† Enstatite (?)	1	.0
Light Secondary	2933	100.0%
Dolomite	1153	100.0%

Well Log Description: Limestone 98% grayish white, coarsely xylns, Dolomite rhombs abundant; no quartz or chert present; Pyrite - a trace

* Fluorite: one grain colorless to amber shows cube combined with dodecah. Dodecahed shows as slightly beveled edges
H Tourmaline: one grain irregular distribut. of brwn & colorless parts

† Garnet: Brownish amber with inclus.

Sample rerun to obtain absolute Sol. & Ins.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 880 to 900

No. of Samples 2

Analyst T & G

Date 7-24-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 2.31 gr.
3. Weight after Acid treatment, with F.P. 28.37 gr.
4. Less Wt. Filter Paper ..... 2.31 gr.
5. Weight of Insoluble Residue ..... 26.06 gr. 52.1%
6. Loss (1 minus 5) .... 23.94 gr. 47.9%

Revised data on Sol. rerun

Wt.	%
0.529	1.37%
39.489	98.7%
400	100%

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis 25.50

Size	Gram	%
1 + larger	8.88	34.63
1"-1½	9.92	38.80
½-¼	5.20	20.40
¼-⅛	1.20	4.72
⅛-⅟₆₄	.25	.98
⅟₆₄-Pan	.12	.47
	25.57	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 1.37 gr. Size-Grade ____ mm. Date ____

Heavy Minerals .02 gr. 1.3 %

Light Minerals 1.49 gr. 98.7 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr.) Bromoform) ____ sp. gr.

Classification Grouping

Principal Minerals

Primary	
Zircon	.0
Tourmaline	.0
Garnet	.0
Quartz	1.5
Secondary	
Pyrite	.3
Limonite	.8
Fluorite	.0
Anhydrite	.0
Casing Scale	.2
Dolomite	96.6
Chert	.6
	100.0%

Accessory Minerals:

Heavy

Primary	No. Grains	Rel % by Vol.
Pyrite	158	20.3
Limonite	459	58.8
Casing Scale	150	19.2
* Fluorite	6	.7
Zircon (?)	1	.1
Anhydrite	5	.6
Tourmaline	2	.2
Garnet	1	.1
Total	782	100.0%

Light

Secondary		
Dolomite	329	97.9
Quartz	5	1.5
Chert	3	.6
Total	336	100.0%

Well Log Description:

LS-98%; grayish-pink, coarsely crystalline; hard; calcite rhombs abundant; Quartz sand - ±1%; Pyrite - a trace

(1) Dolomite: some limonite stained; rhombohedrons.

(2) Zircon: Colorless; elongate.

(3) Orthoclase: Colorless (Adularia)

(4) Pyrite: cubes; xyl aggregates.

(5) Limonite: brnn

(6) Fluorite(?) approx at 1.435; distinctly less than 1.466
Colorless; isotropic; cleavage 2 dir. fair.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 2.04 gr.
3. Weight after Acid treatment, with F.P. 6.45 gr.
4. Less Wt. Filter Paper ..... 2.04 gr.
5. Weight of Insoluble Residue ..... 4.41 gr. 8.8%
6. Loss (1 minus 5) .... 45.59 gr. 91.2%

Depth 860 to 880

No. of Samples 2

Analyst T & G

Date 7-24-34

B. Subsidation:

Cylinder (-1/32)	____ gr.	____ %
Jar (1/32-1/64)	____	____ %
Drain	____	____ %
Original (Total)	____	____ %

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA Analyst Briard

Sample Weight Used 3.33 gr. Size-Grade comp mm. Date 8/10/34

Heavy Minerals .41 gr. 12.6 %

Light Minerals 2.94 gr. 87.4 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93± sp. gr.

Classification grouping

~~Principal Minerals~~

Primary	%	Absol. %
Zircon		.0

Secondary	100.0%	
Pyrite		7.2
Limonite		5.3
Fluorite		.1
Dolomite		.2
Orthoclase		87.2
		100.0%

Minerals Identified

~~Accessory Minerals~~:

~~Primary~~ Heavy	No. of Grains	Rel. %
(2) Zircon	1	.1
(4) Pyrite	620	56.8
(5) Limonite	462	42.3
(6) Fluorite	9	.8
	1092	100.0%

~~Secondary~~ Light		
(3) Orthoclase	1	.2
(1) Dolomite	752	99.8
	753	100.0%

Well Log Description: Limestone, hard, gray; coarsely xyln. Dolomite rhombs very abundant

(1) Clay: so thickly coated with limonite that most of it is opaque

(2) Quartz:- A few rounded grains; majority small .03 - .02 mm.

DEEP WELL STUDY

Well No. W— 0011

Depth 820 to 840

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50 gm.	100.0%	2. Wt. of F. P. 2.05
3. Wt. after solution, with filter paper	7.96 gm.		
4. Less wt. F. P. (2)	2.05 gm.		
5. Wt. Insol. Residue (3 minus 4)	5.91 gm.	11.8 %	
6. Wt. lost by solution (1 minus 5)	44.09 gm.	88.2 %	
7. To balance (5 plus 6)	50.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	5.91 gm.	100.0%
2. Cylinder (+1/32)	3.87 gm.	65.5 %
3. Jar (1/32—1/64)	.60 gm.	10.1 %
4. Drain	1.44 gm.	24.4 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ± 1/32 mm.

Analyst L'Briard

Date 8/29/34

Wt. of sample . . . . 2.05 gm. 100.0%

Heavy Minerals . . . . 1.31 gm. 63.8 %

Light Minerals . . . . .74 gm. 36.2 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	59	3.3
Limonite	1617	90.5
Cas. scale	111	6.2
Total	1787	100%

Classification Grouping:

Primary Minerals: 36.1 %

	Absol. %
Clay	33.0
Quartz	3.1

Light Concentrate		
(1) Clay	769	91.2
(2) Quartz	71	8.4
Glauconite	3	.4
Total	843	100%

Secondary Minerals: 63.9 %

Pyrite	2.1
Limonite	57.7
Cas. Sc.	4.0
Glauconite	.1
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone: hard, pure, cemented artificially with iron rust.

Casing set at about this depth.

DEEP WELL STUDY

Well No. W— 0011

Depth 800 to 820

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50 gm.	100.0%	2. Wt. of F. P. 2.29
3. Wt. after solution, with filter paper	28.17 gm.		
4. Less wt. F. P. (2)	2.29 gm.		
5. Wt. Insol. Residue (3 minus 4)	25.88 gm.	51.8	%
6. Wt. lost by solution (1 minus 5)	24.12 gm.	48.2	%
7. To balance (5 plus 6)	50.00 gm.	100.0	%

B. Subsidation:

1. Original Wt.	25.88 gm.	100.0%	
2. Cylinder (+1/32)	20.00 gm.	77.3	%
3. Jar (1/32—1/64)	1.51 gm.	5.8	%
4. Drain	4.37 gm.	16.9	%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	8.43	43.0
1–½ mm	5.11	26.2
½–¼ mm	2.56	13.2
¼–⅛ mm	.99	5.0
⅛–1/16	1.02	5.1
Pan	1.47	7.5
Total	19.58	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Briand

Date 8/28/34

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/4 - 1/32 mm.

Wt. of sample .59 gm. 100.0%

Heavy Minerals .56 gm. 95.0 %

Light Minerals .03 gm. 5.0 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	24 33	93.8
Limonite	1 09	4.2
Cas. Scale	36	1.4
~~Dolomite~~	8 4 7	
Zircon	6	.2
Staurolite(?)	1	.0
Tourmaline (grn)	6	.2
Tremolite	3	.1
Garnet	3	.1
Barite	1	.0
Siderite		
Total	2599	100%

Classification Grouping:

Primary Minerals: 5.6 %

	Absol. %
Clay	3.6
Quartz	1.4
Zircon	.2
Staurolite	.0
Tourmaline	.2
Tremolite	.1
Garnet	.1

Light Concentrate

~~Dolomite~~	~~558~~ "	
Quartz	34	72.4
Clay	13	27.6
Total	47	100%

Secondary Minerals: 94.4 %

	Absol. %
Pyrite	89.1
Limonite	4.0
"Cas. Scale"	1.3
Barite	.0
Siderite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; hard, gray, coarsely xyln. Calcite clusters common. A few fragments of gray non calc. sh. Few 2ndy gtz xyls. Pyrite abundant

(1) Hornblende: green, pleoch; ragged edges; clear frag.

(2) Tourmaline: greenish pleoc.

(3) Pyrite: cubes; xyl aggregates; most grains surrounded by film of clay.

(4) Clay: cryptoxyln; limonite stain

(5) Quartz: Av. size 1/32 mm. (silt); grains A 80%; a 15%; C 5%.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 790 to 800

1. Sample Weight ..... 30 gr. 100% No. of Samples 1

2. Filter Paper Wt. .... 2.33 gr. Analyst T & G

3. Weight after Acid treatment, with F.P. 24.88 gr. Date 7-24-34

4. Less Wt. Filter Paper ..... 2.33 gr.

5. Weight of Insoluble Residue ..... 22.55 gr. 75.2%

6. Loss (1 minus 5) .... 7.45 gr. 24.8 %

C. Screen Analysis

Size	Gram	%

B. Subsidation:

Cylinder (-1/32) 7.60 2.21 11.43 .... 5.39 gr. ____%

Jar (1/32-1/64) 2.22 .... 9.21 ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

MINERALOGICAL DATA Analyst Briard

Sample Weight Used 2.30 gr. Size-Grade +1/32 mm. Date 8/10/34

Heavy Minerals .02 gr. .9 %

Light Minerals 2.28 gr. 99.1 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

~~Principal Minerals~~ Minerals identified

Classification Grouping		Absol. %	Accessory Minerals:	No. Grains	Rel. %
	Primary		~~Primary~~ Heavy		
	Hornblende		(1) Hornblende	2	.4
	Tourmaline		(2) Tourmaline (Green)	1	.2
	Clay	91.6	(3) Pyrite	532	99.4
	Quartz	7.5		535	100.0%
	Secondary				
	Pyrite	.9			
		100.0%	~~Secondary~~ Light		
			(4) Clay	696	92.5
			(5) Quartz	56	7.5
				752	100.0%

Well Log Description:

shale: light gray; calcareous - Calc. content 24.8%

(1) Pyrite: Mostly xyl aggregates.

(2) Limonite

(3) Zircon: Colorless; pitted.

(4) Fluorite (?) Isotropic, colorless; N = 1.45 ± (estimate). One grain shows two dir. clear.; cleavage apparently cubic rather than III.

(5) Clay; cryptoxyln. Limonite stained

(6) Quartz; very small (.02 - .03 mm)

(7) Orthoclase: Authigenic (.02 - .03 mm) euhedral 85-90%

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 770 to 790

No. of Samples 2

Analyst T Y G

Date 7-24-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	40 gr.	100%	
2. Filter Paper Wt.	2.18 gr.		
3. Weight after Acid treatment, with F.P.	13.26 gr.		
4. Less Wt. Filter Paper	2.18 gr.		
5. Weight of Insoluble Residue	11.08 gr.	27.6 %	
6. Loss (1 minus 5)	28.92 gr.	72.4 %	

B. Subsidation:

Cylinder (-1/32)	7.68 1.94 5.74 gr.	51.8 %	
Jar (1/32-1/64)	4.38 2.25 2.13	19.1 %	
Drain	3.21	29.1 %	
Original (Total)	11.08	100.0 %	

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.98 gr. Size-Grade +1/32 mm. Date 8/10/34

Heavy Minerals .32 gr. 10.8 %

Light Minerals 2.66 gr. 89.2 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / Bromoform 2.93± sp. gr.

~~Principal Minerals~~	Absol. %
Primary	
Zircon	.0
Clay	78.3
Quartz	5.7
Secondary	
Pyrite	9.6
Limonite	1.2
Feldspar (Or)	5.2
Fluorite	.0
	100.0 %

Minerals identified

~~Accessory Minerals~~:

~~Primary~~ Heavy	No. Grains	Rel. %
(1) Pyrite	707	88.6
(2) Limonite	88	11.1
(3) Zircon	1	.1
(4) Fluorite (?)	2	.2
	798	100.0%

~~Secondary~~ Light		
(5) Clay	864	87.9
(6) Quartz	61	6.3
(7) Feldspar (Ortho.)	57	5.8
	982	100.0%

Classification Grouping

Well Log Description: Limestone, gray, argillaceous 85%, silty 15%

Total calc. content 72.4%

ANALYSIS SHEET--DEEP WELL STUDY Well No. W6011

A. Acid Treatment (HCl 15 %) Depth 760 to 770

1. Sample Weight ..... 140 gr. 100% No. of Samples 1

2. Filter Paper Wt. .... 1.97 gr. Analyst T & G

3. Weight after Acid treatment, with F.P. 11.48 gr. Date 7-24-34

4. Less Wt. Filter Paper ..... 1.97 gr.

5. Weight of Insoluble Residue ..... 9.51 gr. 23.8%

6. Loss (1 minus 5) .... 30.49 gr. 96.2%

C. Screen Analysis

Size	Gram	%

B. Subsidation:

5.50
1.90
4.93
2.25

Cylinder (-1/32) .... 3.60 gr. 37.8%

Jar (1/32-1/64) 2.68 28.3%

Drain 3.23 33.9%

Original (Total) 9.51 100.0%

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 2.52 gr. Size-Grade Comp mm. Date 8/24/34

Heavy Minerals .73 gr. 29.0%

Light Minerals 1.79 gr. 71.0%

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ 2.93± sp. gr.

Accessory Minerals: identified

~~Principal Minerals~~

Primary 72.2%	Abs't %
Quartz	37.3
Clay	35.4
Zircon	.0

Secondary 27.3%	
Pyrite	25.5
Feldspar	1.7
Barite	.1
	100.0 %

~~Primary~~ Heavy	No. grains	Rel %
Pyrite	734	87.8
Zircon	1	.1
Barite	3	.4
Quartz	52	6.2
Clay	46	5.5
	836	100.0%

~~Secondary~~ light		
Quartz	435	50.0
Clay	416	47.6
Feldspar	21	2.4
	872	100.0%

Classification Grouping

Well Log Description: LS; 760'; very hard, gry; impure; silty; few wh. frag. of Ls. from above; Pyrite abundant; Ss, 15%; Sh, 9%.

* Percentage of Ls estimated, as solubility tests were incomplete, and a large number of Ls fragments were left.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Wooth

Depth 740 to 760

No. of Samples 2

Analyst T & G.

Date 7-24-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 50 gr. 100%
2. Filter Paper Wt. .... 2.25 gr.
3. Weight after Acid treatment, with F.P. 23.08 gr.
4. Less Wt. Filter Paper ..... 2.25 gr.
5. Weight of Insoluble Residue ..... 20.83 gr. 41.6 %
6. Loss (1 minus 5) .... 29.17 gr. 58.4 %

B. Subsidation:

Cylinder (-1/32) 20.07 − 1.88	18.14 gr.	87.20%
Jar (1/32-1/64) 3.30 − 2.27	1.03	4.86%
Drain	1.66	7.94%
Original (Total)	20.83	100.00%

C. Screen Analysis 18.11

Size	Gram	%
+2-1	8.23	45.97
1-½	5.79	32.22
½-¼	2.36	13.02
¼-⅛	.84	4.67
⅛-1/16	.27	1.56
1/16-Pan	.46	2.56
Tot.	17.97	100.00

Fragments 1.51 to 2 mm

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 1.57 gr. Size-Grade ¼-Pan mm. Date 8/24/34

Heavy Minerals .09 gr. 5.7 %

Light Minerals 1.48 gr. 94.3 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr.) Bromoform } 2.83± sp. gr.

Principal Minerals

	Absol. %
Primary 46.9%	
Quartz	22.6
Clay	24.3
Tourmaline	.0
Secondary 53.1%	
Pyrite	4.3
Limonite	.3
Barite	.1
sphalerite	.2
Glauconite	1.5
Calcite	46.9
Casing Scale	.2
	100.0%

Classification Ranking

Accessory Minerals: identified

Primary heavy	No. grains	Rel. %
Pyrite	359	73.7
Limonite	27	5.6
Barite	6	1.2
Tourmaline	1	.2
sphalerite	2	.4
Calcite	71	14.6
casingscale	21	43
	487	100.0%

Secondary light		
Calcite	460	48.7
Quartz	225	23.9
Clay	243	25.8
Glauconite	15	1.6
	943	100.0%

Well Log Description: Ls; ±98%; white, pure; hard; some large calcite xls; Quartz ±1.0%; in silt sizes; Pyrite abundant.

DEEP WELL STUDY

Well No. W— 0011

Depth 680 to 700

No. samples used 2

Analyst T. & G.

Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	50 gm.	100.0%	2. Wt. of F. P. 2.15
3. Wt. after solution, with filter paper	3.55 gm.		
4. Less wt. F. P. (2)	2.15 gm.		
5. Wt. Insol. Residue (3 minus 4)	1.40 gm.	2.8 %	
6. Wt. lost by solution (1 minus 5)	48.60 gm.	97.2 %	
7. To balance (5 plus 6)	50.0 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	1.40 gm.	100.0%
2. Cylinder (+1/32)	.87 gm.	62.1 %
3. Jar (1/32—1/64)	.13 gm.	9.3 %
4. Drain	1.40 gm.	28.6 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } 2.93± Sp. gr. Size–Grade(s) +1/32 mm.

Analyst Powsey

Date August, 1934

Wt. of sample . . . . .77 gm. 100.0% Shape Analysis:

Heavy Minerals . . . . .33 gm. 43.0 % A ..... %: a ..... %: C ..... %

Light Minerals . . . . .44 gm. 57.0 % r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1148	93.4
Limonite	24	1.9
Tourmaline	1	.1
Clay	49	3.8
Quartz	7	.6
Sphalerite	1	.1
Barite	1	.1
Total	1281	100%

Classification Grouping:

Primary Minerals: 54.6 %

	Absol. %
clay	46.0
quartz	8.6
tourmaline	.0

Light Concentrate			
clay	456	77.8	
Quartz	86	14.6	
Chert	45	7.6	
Total	587	100%	

Secondary Minerals: 45.4 %

	Absol. %
chert	4.3
Pyrite	40.3
Limonite	.8
Sphalerite	.0
Barite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone, ±100%, white, soft, pyritic, coarsely xline, containing trace of chert; Sh, ±10% Pyrite abundant.

* Limestone not entirely digested - Probably 1/2 to 2/3 soluble, judging from +1/32 grade examined.

DEEP WELL STUDY

Well No. W— 0011
Depth 670 to 680
No. samples used 1
Analyst T. & G.
Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	40 gm.	100.0%	2. Wt. of F. P. 2.30
3. Wt. after solution, with filter paper	16.61 gm.		
4. Less wt. F. P. (2)	2.30 gm.		
5. Wt. Insol. Residue (3 minus 4)	14.31 gm.	35.8	%
6. Wt. lost by solution (1 minus 5)	25.69 gm.	64.2	%
7. To balance (5 plus 6)	40.0 gm.	100.0	%

B. Subsidation:

1. Original Wt.	14.31 gm.	100.0%	
2. Cylinder (+1/32)	12.81 gm.	89.50	%
3. Jar (1/32—1/64)	.36 gm.	2.55	%
4. Drain	1.14 gm.	7.95	%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	6.24	49.70
1–½ mm	3.70	29.91
½–¼ mm	1.30	10.40
¼–⅛ mm	.43	3.45
⅛–1/16	.38	3.25
Pan	.41	3.29
Total	12.46	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Bowser
Date 8/24/34

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ..... mm.

Wt. of sample 2.19 gm. 100.0%

Heavy Minerals .1 gm. 4.5 %

Light Minerals 2.09 gm. 95.5 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
1 Pyrite	182	25.0
2 Limonite	131	18.0
3 Casing scale	300	41.3
4 dolomite	114	15.7
Total	727	100%

Light Concentrate Dolomite 100%; no insol. residue

Classification Grouping: Absol. %
Primary Minerals: ..... %
Secondary Minerals: 100 %
Pyrite — — — 1.1
Limonite — — — .8
dolomite — — — 96.2
Casing Scale — — — 1.9

Total 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone* – light gray, greyish pink, coarsely xline; contains same dolomite; casing scale abundant; a few frag. of blu-grn. shale.

* Quartz carried down into heavies by pyrite;

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 660 to 670

1. Sample Weight ..... 35 gr. 100% No. of Samples 1
2. Filter Paper Wt. .... 2.34 gr. Analyst T & G
3. Weight after Acid treatment, with F.P. 8.74 gr. Date 7-24-34
4. Less Wt. Filter Paper ..... 2.34 gr.
5. Weight of Insoluble Residue ..... 6.40 gr. 18.6 %
6. Loss (1 minus 5) ....28.60 gr. 81.4 %

C. Screen Analysis

Size	Gram	%

B. Subsidation:

Cylinder (-1/32)	5.03 1.92 3.45	3.11 gr.	48.6%
Jar (1/32-1/64)	2.25	1.20	18.7%
Drain		2.09	32.7%
Original (Total)		6.40	100.0%

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 3.00 gr. Size-Grade +1/32 mm. Date 8/24/34

Heavy Minerals .52 gr. 17.3 %

Light Minerals 2.48 gr. 82.7 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr.) / ~~Bromoform~~ } 2.93± sp. gr.

Classification Grouping

~~Principal Minerals~~ Absol. %

Primary 83.0%

Quartz	14.4
Clay	68.6
Zircon	.0

Secondary 17.0%

Pyrite	14.6
Limonite	1.7
anhydrite	.0
Glauconite	.7
	100.0

~~Accessory~~ Minerals: determination

Primary heavy

	No. grains	Rel %
Pyrite	642	85.3
limonite	60	8.0
+quartz	47	6.3
Zircon	1	.1
anhydrite	2	.3
	752	100.0%

Secondary light

Clay	545	83.0
Quartz	106	16.2
Glauconite	5	.8
	656	100.0%

Well Log Description: Limestone, 81.4%; lt. gry, glty; s/s+sh; 18.6%. S/s content = 18.6% of insolubles; Pyrite abundant;

1- Pyrite in very minute xls:

3; Zircon chiefly euhedral xls of very minute size,

7. Clay shows very minute inclusions, which is probably Pyrite or limonite, bringing it down into heavies.

DEEP WELL STUDY

Well No. W— 0011
Depth 650 to 660
No. samples used 1
Analyst T. & G.
Date 7-24-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30 gm.	100.0%	2. Wt. of F. P. 2.31
3. Wt. after solution, with filter paper	25.71 gm.		
4. Less wt. F. P. (2)	2.31 gm.		
5. Wt. Insol. Residue (3 minus 4)	23.40 gm.	78.0 %	
6. Wt. lost by solution (1 minus 5)	6.60 gm.	22.0 %	
7. To balance (5 plus 6)	30.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	23.40 gm.	100.0%
2. Cylinder (+1/32)	7.44 gm.	31.78 %
3. Jar (1/32—1/64)	7.47 gm.	31.82 %
4. Drain	8.49 gm.	36.40 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm	.11	1.47
½–¼ mm		
¼–⅛ mm	.20	2.66
⅛–1/16	3.10	41.27
Pan	4.09	54.60
Total	7.50	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rouser
Date Aug 2-3, '34

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/16–1/32 mm.

Wt. of sample 2.00 gm. 100.0%

Heavy Minerals .01 gm. .5 %

Light Minerals 1.99 gm. 99.5 %

Shape Analysis:
A ....%: a ....%: C ....%
r ....%: R ....%.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
1 Pyrite	755	62.0
2 Limonite	70	5.8
3 Zircon (Zoned)	9	.7
4 Tourmaline (Brown)	3	.3
5 Tremolite	2	.2
6 Barite	2	.2
7 Clay	376	30.8
Total	1217	100%

Classification Grouping:

Primary Minerals: 99.7 %	Absol. %
Clay	99.7
Zircon	.0
Tourmaline	.0
Tremolite	.0

Light Concentrate
clay 100 90

Secondary Minerals: 3 %

Pyrite	.3
Limonite	.0
Barite	.0

Total 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

shale; ±100% hard, gray, slaty; 0% soluble; very few heavy minerals of any kind present.

1. Pyrite in very minute aggregates of xls

2: Zircon chiefly euhedral x/s.

7 Quartz in minute fragments, coated with clay minerals.

* Tourmaline; schorlite; greenish blk pleoc.

† Garnet; slightly etched, light amber.

‡ Hornblende; 3 pleoch. in green, 1 pleoch in brown.

§ Chert; limonite stained; occasional oolitic(?) struct.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 2310 to 2320

1. Sample Weight ..... 20.00 gr. 100% No. of Samples 1

2. Filter Paper Wt. .... 1.91 gr. Analyst T & G.

3. Weight after Acid treatment, with F.P. 14.20 gr. Date 7/25/34

4. Less Wt. Filter Paper ..... 1.91 gr.

5. Weight of Insoluble Residue ..... 12.29 gr. 61.5 %

6. Loss (1 minus 5) .... 7.71 gr. 38.5 %

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____ %

Jar (1/32-1/64) ..... ____ ____ %

Drain ..... ____ ____ %

Original (Total) .... ____ ____ %

C. Screen Analysis

Size	Gram	%
1-½	.48	4.09
½-¼	5.42	46.14
¼-⅛	5.21	45.65
⅛-⅙	.60	5.12
⅙-Pan	.00	
Tot.	11.71	100.00

MINERALOGICAL DATA Analyst Briard

Sample Weight Used 3.52 gr. Size-Grade ¼-⅛ mm. Date 8/30/34

Heavy Minerals .10 gr. 2.8 %

Light Minerals 3.42 gr. 97.2 %

Shape Analysis: A ____ %; a ____ %; C 25 %; r 70 %; R 5 %

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Classification Gronpsy

~~Principal Minerals~~ Minerals Identified

Primary 12.5%	Absol. %
Quartz	12.5
Epidote	.0
Secondary 87.5%	
Pyrite	2.0
Limonite	.5
Anhydrite	.0
Dolomite	84.0
Chert	.7
Cas. Sc.	.3

~~Accessory Minerals:~~

~~Primary~~ Heavy

	No. of Grains	Rel. %
Pyrite	267	73.9
Limonite	59	16.3
Cas. Sc.	34	9.4
Anhydrite	1	.3
Epidote	1	.3
	362	100.0 %

~~Secondary~~ Light

Dolomite	657	86.4
Quartz	98	12.9
Chert	5	.7
	760	100.0 %

Well Log Description: Sandstone: ½-¼ mm., frosted; curvilinear to subround. (Shape analysis of light composite as above.) Dolomite 40% with granular. Chert 3-4% with

* Dolo. content not shown by sol. portion of sample, as all did not dissolve.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W001

Depth 2300 to 2310

No. of Samples 1

Analyst T. & G.

Date 7/25/34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	18.59 gr.	100%
2. Filter Paper Wt.	2.29 gr.	
3. Weight after Acid treatment, with F.P.	6.92 gr.	
4. Less Wt. Filter Paper	2.29 gr.	
5. Weight of Insoluble Residue	4.63 gr.	24.9%
6. Loss (1 minus 5)	13.96 gr.	75.1%

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.44 gr. Size-Grade Comp mm. Date 8/6/34

Heavy Minerals .08 gr. 2.3%

Light Minerals 3.36 gr. 97.7%

Shape Analysis: A ____%; a 10 %;

C 60 %; r 30 %; R ____%

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Classification grouping

Principal Minerals — Absol. %

Primary 92.6

Quartz	92.6
Zircon	.0
Tourmaline	.0

Secondary 7.42

Chert	4.0
Feldspar	1.1
Limonite	1.5
Pyrite	.8
	100.0%

Minerals identified

~~Accessory Minerals~~:

	No. of Grains	Rel. %
Primary heavy		
Limonite	108	65.0
Pyrite	56	33.
Zircon (unzoned)	1	1.
Tourmaline, green,	1	1.
	166	100.0%
Secondary light		
Quartz	460	95.
Chert	20	4.
Feldspar	5	1.
	485	100.0%

Well Log Description: *Dolo; ±80%; white; finely granulated; SS, 20%; ¼-⅛, ±74%; sec. max ¼-⅛, ±2%; well frosted; some pyrite

* Quartz well frosted; shows minute inclusions of tourmaline and (probably) biotite.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 17.47 gr. 100%
2. Filter Paper Wt. .... 1.92 gr.
3. Weight after Acid treatment, with F.P. 10.06 gr.
4. Less Wt. Filter Paper ..... 1.92 gr.
5. Weight of Insoluble Residue ..... 8.14 gr. 46.6%
6. Loss (1 minus 5) .... 9.33 gr. 53.4%

Depth 2290 to 2300

No. of Samples 1

Analyst T+G.

Date 7/25/34

B. Subsidation:
Cylinder (-1/32) .... ____ gr. ____%
Jar (1/32-1/64) ..... ____ ____%
Drain ..... ____ ____%
Original (Total) .... ____ ____%

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 3.63 gr. Size-Grade Comp mm. Date Aug 3, 1934

Heavy Minerals .02 gr. .55%

Light Minerals 3.61 gr. 99.45%

Shape Analysis: A ____%; a 10 %; C 50 %; r 40 %; R ____%

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Minerals identified

~~Principal Minerals~~ Gross %

Primary 82.3%

*Quartz	82.2
Tourmaline	.1
Zircon	.0

Secondary 17.7%

Chert	15.7
Chalcedony	1.4
Pyrite	.5
Feldspar	.1
Celestite	.0
	100.0 %

Classification grouping

Accessory Minerals:

~~Primary~~ Heavy

	No. of Grains	Rel. %
Pyrite	125	95.
Tourmaline (brown)	3	3.
Zircon (unzoned)	2	1.5
Celestite (?)	2	1.5
	132	100.0 %

~~Secondary~~ Light

Quartz	469	83.
Chert	89	16.
Chalcedony	8	1.
Feldspar	1	0.
	567	100. %

Well Log Description: SS, 46%; wh; well frosted; size, ¼-⅛-62%; Sec. max, ½-¼; Shows very little 2ndary enlarg; dolo, 50%; Chert, 10-20%; Some Pyrite. heavy mineral crop small.

*Quartz shows numerous, very minute inclusions, in many grains these are arranged parallel, or radiate; too small for identification. Some larger inclusions of tourmaline.

**Chert shows black, isotropic inclusions, probably liquid: also ~~is~~ has grown around nucleus of Qtz or feldspar.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 2280 to 2290

1. Sample Weight ..... 11.31 gr. 100% No. of Samples 1

2. Filter Paper Wt. .... 2.25 gr. Analyst T & G.

3. Weight after Acid treatment, with F.P. 7.80 gr. Date 7/24/34

4. Less Wt. Filter Paper ..... 2.25 gr.

5. Weight of Insoluble Residue ..... 5.55 gr. 49.0%

6. Loss (1 minus 5) .... 5.76 gr. 51.0%

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 3.51 gr. Size-Grade comp. mm. Date 8/3/34

Heavy Minerals .015 gr. .5 %

Light Minerals 3.495 gr. 99.5 %

Shape Analysis: A ____ %; a 7 %; C 74% %; r 19% %; R ____ %

Acet. Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

~~Principal Minerals~~ Minerals identified

Primary 86.2% about %

Quartz ---- 86.7

Secondary 13.3%

Chert ---- 12.3

Feldspar --- .5

Limonite --- .3

Pyrite --- .2

100.0%

Classification Grouping

~~Accessory Minerals~~:

	~~Primary~~ Heavy. No. of Grains	Rel.%
Pyrite ----	7	37.8
Limonite ---	12	63.2
	19	100.0%

~~Secondary~~ Light

*Quartz ---	369	87.5
**Chert ---	52	12.3
Feldspar ---	2	1.5
	423	100.0%

Well Log Description: Dolo, 51%; buff to white, finely granulated; SS; +80%; wh; size-1/2-1/4, 60-70%; 1/4-1/8; sec. max, 20-30%; Chert <1%; Pyrite, a trace

*Garnet is all colorless + etched.

** Hornblende is green, weathered,

*** celestite in euhedral xls + cleavage frags.

T. qtz is chiefly in s/t. size + angular;
Has a few inclusions:

++ Feldspar chiefly ortho. xls of minute size; both microcline + orthoclase; very little plagioclase present.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

A. Acid Treatment (HCl 15 %)

Depth 2240 to 2260

No. of Samples 2

Analyst T + G.

Date 7/24/34

1. Sample Weight ..... 21.11 gr. 100%
2. Filter Paper Wt. .... 2.33 gr.
3. Weight after Acid treatment, with F.P. 5.66 gr.
4. Less Wt. Filter Paper ..... 2.33 gr.
5. Weight of Insoluble Residue ..... 3.33 gr. 15.76%
6. Loss (1 minus 5) .... 17.78 gr. 84.24%

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 2.95 gr. Size-Grade comp mm. Date 8/6/34

Heavy Minerals .10 gr. 3.4 %

Light Minerals 2.85 gr. 96.6 %

Shape Analysis: A ____ %; a 5 %; C 92 %; r 3 %; R ____ %

Acet.Tetrabr.) Bromoform } 2.93± sp. gr.

Minerals identified

Principal Minerals	Absol. %
Primary 73.5%	
Tourmaline {Brown— Green—	.0 .0
zircon— {zoned— unzoned—	.0 .0
Garnet—	.0
Hornblende—	.0
Staurolite—	.0
Quartz	73.5
Secondary 26.5%	23.2
Feldspar—	2.8
pyrite—	.0
Celestite—	.5
limonite—	
	100.0%

Classification grouping

Accessory Minerals:	No. of Grains	Rel. %
Primary Heavy		
Tourmaline [Brown-3 Green-1	1	0.
zircon— [zoned-3 unzoned-1	1	0.
* Garnet—	3	1.
** Hornblende—	446	82.
pyrite—	3	0.
*** celestite—	73	14.
limonite—	1	0.
staurolite—	536	100. %
Secondary Light		
+ Quartz—	582	76.
++ Feldspar—	184	24.
	766	100. %

Well Log Description: Dolomite, 84%; buff to white, finely granulated; s/s ±14%; very angular; 102% snd; ¼-⅛ ± 92% ½-¼, ± 8%; shape;

*Garnets all colorless and show etching.

** Hornblende (green) weathered.

*** Celestite in euhedral xls & cleavage frag.

† Quartz grd shows a very little (<1%) of
2ndary enlarg. also ±5% show inclusions
of tourmaline + biotite.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

A. Acid Treatment (HCl 15 %)

Depth 2220 to 2240

No. of Samples 2

1. Sample Weight ..... 20.66 gr. 100%
2. Filter Paper Wt. .... 2.32 gr.
3. Weight after Acid treatment, with F.P. 6.63 gr.
4. Less Wt. Filter Paper ..... 2.32 gr.
5. Weight of Insoluble Residue ..... 4.31 gr. 20.8 %
6. Loss (1 minus 5) .... 16.35 gr. 79.2 %

Analyst T & G.

Date 7/24/34

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____ %

Jar (1/32-1/64) ..... ____ ____ %

Drain ..... ____ ____ %

Original (Total) .... ____ ____ %

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.62 gr. Size-Grade comp. mm.

Date 8/6/34

Heavy Minerals .08 gr. 2.2 %

Light Minerals 3.54 gr. 97.8 %

Shape Analysis: A ____ %; a ± 35 %;

C ± 55 %; r 10 %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ } 2.93 ± sp. gr.

Minerals identified.

~~Principal Minerals~~

	Absol. %
Primary 73.9%	
quartz	72.0
Garnet	.0
Hornblende	.0
Enstatite	.0
Staurolite	.8
zircon {unzoned	1.8
zircon {zoned	
clay	.1
Tourmaline {brown	.0
Tourmaline {green	
Secondary 26.1%	
chert	3.6
Marcasite	3.0
Feldspars	17.4
limonite	2.1
pyrite	
	100.0 %

~~Accessory Minerals:~~

	No. of Grains	Rel. %
Primary Heavy		
Tourmaline {Brown	3	1.
Tourmaline {Green	1	0.
Pyrite	236	94.
* Garnet	3	1.
** Hornblende	1	0.
*** celestite	2	1.
Zircon {unzoned	1	0.
Zircon {zoned	1	0.
Enstatite	2	1.
Marcasite	3	1.
Staurolite	1	0.
	253	100. %
Secondary Light		
chert	24	4.
limonite	424	18.
+ quartz	10	73.
clay	2	2
++ Feldspar	18	3.
	575	100.0 %

Classification grouping.

Well Log Description: Dolo; 79%; wh; hard; granular; SS 90%; size: 1/4-1/8 80%; sec. max. 1/4-1/8; Shape: C 50-60%; a, 40-30%; r, 10-20%; well frosted; Pyrite + 1%;

① Tourmaline — grain well rounded.

② Garnet — colorless to pinkish brown; deeply etched.

③ Zircon — well abraded; surfaces pitted by abrasion; unzoned.

④ Fluorite — 1 grain.

⑤ Quartz — well abraded; sec. enlgments; incipient faces & triangles & completely restored xtals.; inclusions, tourmaline, zircon, apatite, liquid or gaseous, (with system of two directions, anisotropic, colorless needle-like), few hair-like.

⑥ Feldspars — nuclei, mostly microcline, dust-like; coatings & possibly alteration product; authigenic growths; skeletons of rhombic outlines, adularia, & for albite.

⑦ Chert — clastic, roundish by abrasion.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Wo11

Depth 2200 to 2210

No. of Samples 1

Analyst T + G.

Date 7/24/34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 17.29 gr. 100%
2. Filter Paper Wt. .... 2.28 gr.
3. Weight after Acid treatment, with F.P. 16.76 gr.
4. Less Wt. Filter Paper ..... 2.28 gr.
5. Weight of Insoluble Residue ..... 14.48 gr. 83.75%
6. Loss (1 minus 5) .... 2.81 gr. 16.25%

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

C. Screen Analysis 14.52

Size	Gram	%
1-1/2	1.40	9.70
1/2-1/4	9.80	67.45
1/4-1/8	3.04	21.30
1/8-1/16	.22	1.55
1/16-Pan	.00	
Tot	14.46	100.00

MINERALOGICAL DATA

Analyst Powers

Sample Weight Used 3.225 gr. Size-Grade 1/4-1/16 mm. Date 8/16/34

Heavy Minerals .0025 gr. .23%

Light Minerals 3.2225 gr. 99.77%

Shape Analysis: A ____%; a 9 %; C 75 %; r 15 %; R / %

Acet.Tetrabr.) Bromoform } 2.93 ± sp. gr.

Classification grouping

Principal Minerals

Primary 95.8%

	Absol. %
Tourmaline green	.0
Tourmaline brown	.0
Tourmaline blue	.0
Garnet	.1
Zircon	.0
Quartz	94.2
Chert	1.0

Secondary 4.7

Fluorite	.0
Hematite	.0
Anhydrite	.0
Pyrite	.0
Feldspars	4.5
Casing Scale	.2
	100.0%

Minerals identified Accessory Minerals:

Primary Heavy

	No. of Grains	Rel. %
(1) Tourmaline green	3	.7
(1) Tourmaline brown	4	.9
(1) Tourmaline blue	3	.7
(2) Garnet	29	6.3
(3) Zircon	5	1.1
Hematite	8	1.7
(4) Fluorite	1	.2
Anhydrite	2	.4
Casing scale	399	86.7
Pyrite	6	1.3
	460	100.0%

Secondary light

(5) Quartz	1116	94.5
(6) Feldspars	53	4.5
(7) Chert	12	1.0
	1181	100.0%

Well Log Description: Ss; buff, light; maj. grd. = 1/2 - 1/4 (67%), prin. sub. grd. = 1/4 - 1/8 mm (21%); a = 9%, C = 75%, r = 15%; dolomite, cement + fragments, 16%, fragments may be from above; quartz, prin. min., felds. abundant, fluorite, rare.

(1) Hornblende – occasional grain; 1/16 – 1/32 mm.

(2) Pyrite – cubes, pyritohedra, aggregates of xtals.

(3) Zircon – colorless, ylwh, brwnh.

(4) Garnet(?) – colorless to pale pink; subconchoidal fracture surfaces; unetched, except for one small grain; RI. = 1.74±.

(5) _____? red; isotropic; 1 perfect cleavage; RI. =

(6) Organic(?) isotropic; brwnh.; R.I. = 1.595 – 1.610; dust-like inclusions; possibly organic.

(7) Quartz – well abraded; inclusions tourmaline, hair-like xtals, apatite(?); sec. enlargements.

(8) Feldspars – microcline, orthoclase nuclei; authigenic growths of adularia(?) & Or) albite; nuclei fresh to altered (with dust-like coatings.

(9) Chert – detrital; abraded grains.

ANALYSIS SHEET--DEEP WELL STUDY Well No. 11-0011

A. Acid Treatment (HCl 15 %) Depth 2180 to 2200

1. Sample Weight ..... 20.16 gr. 100% No. of Samples 2
2. Filter Paper Wt. .... 2.48 gr. Analyst T + G
3. Weight after Acid treatment, with F.P. 19.54 gr. Date 7/23/34
4. Less Wt. Filter Paper ..... 2.48 gr.
5. Weight of Insoluble Residue ..... 17.06 gr. 84.2%
6. Loss (1 minus 5) .... 3.10 gr. 15.8%

B. Subsidation:
Cylinder (-1/32) .... ____ gr. ____%
Jar (1/32-1/64) ..... ____ ____%
Drain ..... ____ ____%
Original (Total) .... ____ ____%

C. Screen Analysis 17.09

Size	Gram	%
1-1/2	1.11	6.48
1/2-1/4	9.09	53.14
1/4-1/8	6.53	38.05
1/8-1/16	.40	2.33
1/16-Pan		
Tot.	17.13	100.00

MINERALOGICAL DATA Analyst Powers

Sample Weight Used 3.24 gr. Size-Grade 1/4-1/16 mm. Date 8/8/34

Heavy Minerals .01 gr. 3%

Light Minerals 3.23 gr. 99.7%

Shape Analysis: A ____ %; a 9 %; C 70 %; r 20 %; R 1 %

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Classification grouping

~~Principal Minerals~~ Minerals identified.

Primary 92.2%	Absd. %
Zircon {zoned	.0
Zircon {unzoned	.6
Glauconite	.0
Tourmaline {brown	.8
Tourmaline {green	.0
Garnet	90.0
Quartz	2.2
Common hornblende	
Chert	
Secondary 7.8%	
Pyrite	.3
Anhydrite	.0
Barite	.0
(3) (Red, isotropic)	.0
organic (3) (brown, ")	.0
Feldspars	1.9
Hematite	5.6
	100.0 %

~~Accessory Minerals~~:

~~Primary~~ Heavy	No. of Grains	Rel. %
(1) Hornblende - 2	3	.0
(2) Pyrite	1310	91.2
(3) Zircon {zoned	16	1.1
(3) Zircon {unzoned	44	3.3
Glauconite	17	1.2
Tourmaline {brown	13	.9
Tourmaline {green	2	.0
(4) Garnet (3) (Unnotched)	3	.1
Anhydrite	9	.6
Barite	15	1.0
(5) (Red, isotropic)	4	.3
(6) organic (5) (brown, ")	4	.3
	1439	100.0 %

~~Secondary~~ Light

Glauconite - (2)		
(1) Quartz	751	90.2
(2) Feldspars	16	1.9
(3) Chert	18	2.2
Hematite	47	5.7
	832	100.0 %

Well Log Description: Ss; 84%; buff; maj. grd. = 1/2 - 1/4 (53%), priv. sub. grd. = 1/4 - 1/8 (38.%); a = 9%, C = 70%, r = 20%, R = 1%; qtz. priv. min. sec. enlargements; feldspars, authigenic; pyrite, abundant.

(1) Garnet – colorless to pink; all deeply etched;

(2) Fluorite (?) – isotropic; colorless; RI 1.44±; cleavage, 1 fair, difficult to work out a system.

(3) Pyrite – Fresh; xtals & aggregates;

(4) Casing scale – dark steely luster; irregular, angular fragments.

(5) Quartz – Well abraded; inclusions, zircon, tourmaline, apatite (?); secondary enlargements, incipient xtal faces & L-G & completely restored xtals, dust-like & bubble-like inclusions enclosed on abraded surfaces by sec. growths.

(6) Feldspars – Nuclei abraded, microcline, orthoclase; authigenic growths of adularia (?) & (or) albite (?); dust-like coatings on surfaces of nuclei.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 2160 to 2180

1. Sample Weight ..... 20.52 gr. 100% No. of Samples 2

2. Filter Paper Wt. .... 2.30 gr. Analyst T + G.

3. Weight after Acid treatment, with F.P. 14.10 gr. Date 9/23/34

4. Less Wt. Filter Paper ..... 2.30 gr.

5. Weight of Insoluble Residue ..... 11.80 gr. 57.6 %

6. Loss (1 minus 5) .... 8.20 gr. 42.4 %

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____ %

Jar (1/32-1/64) ..... ____ ____ %

Drain ..... ____ ____ %

Original (Total) .... ____ ____ %

C. Screen Analysis 11.71

Size	Gram	%
1-1/2	.55	4.75
1/2-1/4	6.15	53.26
1/4-1/8	4.70	40.60
1/8-1/16	.16	1.39
1/16-Pan	.00	
Tot.	11.56	100.00

MINERALOGICAL DATA Analyst Powers

Sample Weight Used 3.24 gr. Size-Grade 1/4-1/16 mm. Date 8/8/34

Heavy Minerals .01 gr. .3 %

Light Minerals 3.23 gr. 99.7 %

Shape Analysis: A ____ %; a 9 %; C 70 %; r 20 %; R 1 %

Acet.Tetrabr.) 2.93± sp. gr.
~~Bromoform~~)

Minerals identified.

~~Principal Minerals~~ Primary 93.0%

	Absol. %
Garnet	.0
zircon	.0
Quartz	93.0

Secondary 2.0%

Pyrite	.0
Fluorite(?)	.0
Casing scale	.3
Feldspars	6.7
	100.0%

Classification Grouping

~~Accessory Minerals~~: Primary Heavy

	No. of Grains	Rel. %
(1) Garnet	13	4.5
(2) Fluorite(?)	1	.3
zircon(unzoned)	1	.3
(3) Pyrite	16	5.6
(4) Casing scale	256	89.3
	287	100.0%

~~Secondary~~ Light

(5) Quartz	828	93.2
(6) Feldspars	61	6.8

Well Log Description: Ss.; Wh. buff, 57% maj. grd. = 1/2 - 1/4 mm (53%), prin. sub. grd. = 1/4 - 1/8 mm (40%); a = 9%, C = 20%, r = 20%, R = 1%; sec. enlgments. qtz. prin. min., Felds. abundant. Dol.; Wh.; 42%; granular.

** Quartz shows inclusions of tourmaline + biotite; about 10% show a very small amt. of 2ndary. enlarg.

* Garnet - 7 show etching, one does not; all colorless.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 2140 to 2150

1. Sample Weight ..... 20.02 gr. 100% No. of Samples 2

2. Filter Paper Wt. .... 2.33 gr. Analyst I F G

3. Weight after Acid treatment, with F.P. 7.75 gr. Date 7/23/34

4. Less Wt. Filter Paper ..... 2.33 gr.

5. Weight of Insoluble Residue ..... 5.42 gr. 26.9 %

6. Loss (1 minus 5) .... 14.60 gr. 73.1 %

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____ %

Jar (1/32-1/64) ..... ____ ____ %

Drain ..... ____ ____ %

Original (Total) .... ____ ____ %

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA Analyst Rowser

Sample Weight Used 3.55 gr. Size-Grade comp mm. Date 8/8/34

Heavy Minerals .01 gr. .28 %

Light Minerals 3.54 gr. 99.72 %

Shape Analysis: A ____ %; a 20-30 %;

C 60-70 %; r 10-20 %; R ____ %

Acet.Tetrabr.) / Bromoform } 2.93± sp. gr.

Minerals identified.

~~Principal Minerals~~

~~Primary~~ 95.4% Absol. %

Quartz 90.4

Tourmaline 8

Zircon 0

Garnet 0

Hornblende 0

Clay 0

Secondary 4.6%

Pyrite 0

Feldspars 2.6

Chert 1.8

Limonite 2

100.0 %

Classification Grouping

~~Accessory Minerals~~:

	~~Primary~~ Heavy	No. of Grains	Rel. %
	Tourmaline	6	3.
	Pyrite	7	4.
	Zircon	2	1.
	*Garnet	8	4.
	Hornblende	1	1.
	Clay	15	8.
	Limonite	143	79.
		182	100. %
	Secondary Light		
	Feldspars	12	3.
	Chert	10	2.
	**Quartz	560	95.
		582	100.0 %

Well Log Description: Dolomite, 73%; hrd; wh; sndy; a little chrt; SS; +5%; wh; qtz; maj size ¼-⅛; 50-60%; sec sub; ¼-¼; 30-40%; shape C; 60-70%;

DEEP WELL STUDY

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	21.78 gm.	100.0%	2. Wt. of F. P. 2.35
3. Wt. after solution, with filter paper	17.35 gm.		
4. Less wt. F. P. (2)	2.35 gm.		
5. Wt. Insol. Residue (3 minus 4)	15.00 gm.	69.0 %	
6. Wt. lost by solution (1 minus 5)	6.78 gm.	31.0 %	
7. To balance (5 plus 6)	gm.	%	

B. Subsidation:

1. Original Wt.	gm.	100.0%
2. Cylinder (+1/32)	gm.	%
3. Jar (1/32—1/64)	gm.	%
4. Drain	gm.	%

Well No. W— 0011
Depth 2120 to 2140
No. samples used 2
Analyst T. & G.
Date 7-23-34

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm	.94	6.44
½–¼ mm	5.92	40.48
¼–⅛ mm	7.37	50.15
⅛–1/16	.43	2.93
Pan		
Total	14.66	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ¼-1/10 mm.

Analyst Rowser
Date Aug 7-9, 1934

Wt. of sample 3.36 gm. 100.0%

Heavy Minerals 0.01 gm. .3 %

Light Minerals 3.35 gm. 99.7 %

Shape Analysis:
A 6 %: a 45 %: C 35 %
r 14 %: R %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	50	8.6
Casing scale	471	81.2
Tourmaline	1	.2
Barite	1	.2
Quartz	56	9.6
garnet	1	.2
Total	~~580~~	100%

Classification Grouping:

Primary Minerals: 99.8%	Absol. %
Quartz	97.4
Feldspar	1.9
Tourmaline	.0
garnet	.0
Clay	.5

Light Concentrate			Secondary Minerals: .2 %	
Quartz	561	97.6	Pyrite	.0
Feldspar	11	1.9	Barite	.0
Clay	3	.5	Casing scale,	.2
Total	575	100%	Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Sandstone, ±60%; white; size-¼-⅛-50±%; sec. max; ¼-⅛-40±%; well frosted, shape; a, 40-50%; C, 30-40%; r, 10-20%; many show 2ndary enlargement; dolo ±30%; some incement; rest is white, granular.

Quartz sand shows a very little 2ndary enlargment; some few fragments of Quartzite;

DEEP WELL STUDY

Well No. W— 0011
Depth 2110 to 2120
No. samples used 1
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 17.00 gm. 100.0%: 2. Wt. of F. P. 2.53
3. Wt. after solution, with filter paper . . . . . 16.61 gm.
4. Less wt. F. P. (2) . . . 2.53 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 14.08 gm. 82.8 %
6. Wt. lost by solution (1 minus 5) . . . . . 2.92 gm. 17.2 %
7. To balance (5 plus 6) . . . . gm. %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) gm. %
3. Jar (1/32—1/64) gm. %
4. Drain . . . . . gm. %

C. Screen Analysis 14.20

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm	2.00	14.42
½–¼ mm	9.33	66.50
¼–⅛ mm	2.50	17.80
⅛–1/16	.18	1.28
Pan		
Total	14.01	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date Sept. 4, 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93 ± Sp. gr. Size–Grade(s) ¼-1/16 mm.

Wt. of sample . . . . 2.61 gm. 100.0%

Heavy Minerals . . . . .015 gm. .59 %

Light Minerals . . . . 2.595 gm. 99.41 %

Shape Analysis:
A ____ %: a 33 %: C 41 %
r 26 %: R ____ %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	82	16.2
Tourmaline (Brown)	1	.2
garnet	2	.4
Casing scale	420	83.2
Total	505	100%

Light Concentrate
Quartz — 100%

Classification Grouping:
Primary Minerals: 99.4 %

	Absol. %
Quartz	99.4
Tourmaline	.0
garnet	.0

Secondary Minerals: .6 %

Pyrite	.1
Casing scale	.5
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Sandstone ±80%; size- ½-¼ 66.5%; sec. max; ¼-⅛ 17.8%; Shape- C, 41%; a, 33%; R-26%; shows ndary. enlarg.; Dolo; ±17%; granular; containing Chert; chert, ±1%; oolitic;

8; Feldspar shows very minute authigenic growth; central clastic part shows some alteration.

DEEP WELL STUDY

Well No. W— 0011
Depth 2090 to 2110
No. samples used 2
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	23.90 gm.	100.0%	2. Wt. of F. P. 2.29
3. Wt. after solution, with filter paper	12.55 gm.		
4. Less wt. F. P. (2)	2.29 gm.		
5. Wt. Insol. Residue (3 minus 4)	10.26 gm.	42.9 %	
6. Wt. lost by solution (1 minus 5)	13.64 gm.	57.1 %	
7. To balance (5 plus 6)	23.90 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	gm.	100.0%	
2. Cylinder (+1/32)	gm.	%	
3. Jar (1/32—1/64)	gm.	%	
4. Drain	gm.	%	

C. Screen Analysis 10.22

SIZE	GRAMS	%
2 plus		
2–1 mm	.06	.6
1–½ mm	.56	5.6
½–¼ mm	5.39	53.9
¼–⅛ mm	3.68	36.8
⅛–1/16	.20	2.00
Pan	.11	1.1
Total	10.00	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date Sept 4, 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ¼-Pan mm.

Wt. of sample 3.44 gm. 100.0%

Heavy Minerals .025 gm. .72 %

Light Minerals 3.415 gm. 99.28 %

Shape Analysis:
A ____ %: a 32 %: C 57 %
r 11 %: R ____ %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
1 Pyrite	334	52.0
2 sphalerite	4	.6
3 Tourmaline	1	.2
4 Zircon	1	.2
5 casing scale	303	47.0
Total	643	100%
Light Concentrate		
6 Quartz	550	83.0
7 clay	71	10.7
8 Feldspar	42	6.3
Total	663	100%

Classification Grouping:

	Absol. %
Primary Minerals: 93.0 %	
Quartz	82.4
clay	10.6
Tourmaline	.0
Zircon	.0
Secondary Minerals: 7.0 %	
Feldspar	6.3
Pyrite	.4
sphalerite	.0
casing scale	.3
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite – 57% – both finely granulated; SS; 43%; size – ½-¼ – 53.9%; sec. max; ½-⅛, 36.8%; shape; C, 57%; a, 32%; r, 11%; Chert 1%

* Feldspar chiefly microcline and plagioclase with orthoclase in minority; ratio about 40-40-20; all show authigenic growth around clastic center.

** garnets all show considerable etching.

DEEP WELL STUDY

Well No. W— 0011

Depth 2580 to 2600

No. samples used 2

Analyst T. & G.

Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30.53 gm.	100.0%	2. Wt. of F. P. 1.92
3. Wt. after solution, with filter paper	10.83 gm.		
4. Less wt. F. P. (2)	1.92 gm.		
5. Wt. Insol. Residue (3 minus 4)	8.91 gm.	29.0 %	
6. Wt. lost by solution (1 minus 5)	21.62 gm.	71.0 %	
7. To balance (5 plus 6)	30.53 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	8.91 gm.	100.0%
2. Cylinder (+1/32)	6.92 gm.	77.7 %
3. Jar (1/32—1/64)	1.01 gm.	11.3 %
4. Drain	.98 gm.	11.0 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 Sp. gr. Size–Grade(s) Comp. mm.

Analyst Rowser

Date Sept 5, 1934

Wt. of sample 2.86 gm. 100.0%

Heavy Minerals .04 gm. 1.4 %

Light Minerals 2.82 gm. 98.6 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	814	41.0
**garnet	84	4.3
zircon zoned	21	1.1
zircon unzoned	15	.8
Tourmaline green	11	.6
Tourmaline brown	6	.3
Tourmaline blue	2	.1
staurolite	2	.1
Hornblende	3	.2
Quartz	39	2.0
Feldspar	33	1.7
casing scale	4	.2
glauconite	7	.4
Total	1977	100%

Classification Grouping:

Primary Minerals: 29.4 %

	Absol. %
Quartz	26.8
clay	1.0
Muscovite	1.5
garnet	.1
zircon	.0
Tourmaline	.0
staurolite	.0
Hornblende	.0

Light Concentrate			
*Feldspar	688	69.2	Secondary Minerals: 70.6 %
Quartz	270	27.2	Feldspar 68.2
Muscovite	15	1.5	glauconite 1.1
clay	10	1.0	pyrite .6
glauconite	11	1.1	casing scale .7
Total	994	100%	Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite, ±71% pink, white, granular, s.s, ±9% pink, composed chiefly of feldspar, very little glauconite present, some pyrite.

* Feldspar show very well developed authigenic rims around clastic centers; chiefly Adularia but with 15-20% Microcline + Plag.

DEEP WELL STUDY

Well No. W— 0011
Depth 2560 to 2580
No. samples used 2
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30.00 gm.	100.0%	2. Wt. of F. P. 2.19
3. Wt. after solution, with filter paper	6.05 gm.		
4. Less wt. F. P. (2)	2.19 gm.		
5. Wt. Insol. Residue (3 minus 4)	3.86 gm.	12.0 %	
6. Wt. lost by solution (1 minus 5)	26.14 gm.	88.0 %	
7. To balance (5 plus 6)	30.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	3.86 gm.	100.0%
2. Cylinder (+1/32)	2.85 gm.	74.0 %
3. Jar (1/32—1/64)	.40 gm.	10.6 %
4. Drain	.61 gm.	15.4 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rouser
Date Sept 6, 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) +1/32 mm.

Wt. of sample 2.74 gm. 100.0%

Heavy Minerals 0.15 gm. 5.5 %

Light Minerals 2.59 gm. 94.5 %

Shape Analysis:
A ____ %: a ____ %: C ____ %
r ____ %: R ____ %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	630	59.8
Zircon zoned	12	1.1
Zircon unzoned	6	.6
Tourmaline Brown	6	.6
Tourmaline blue	1	.1
garnet	24	2.3
Hornblende	3	.3
quartz	66	6.3
Feldspar	24	2.3
Casing scale	280	26.6
Total	1054	100%

Light Concentrate

*Adularia	675	59.9
Quartz	294	26.1
clay	152	13.5
glauconite	6	.5
Total	1127	100%

Classification Grouping:

Primary Minerals: 37.9 %	Absol. %
Quartz	25.0
clay	12.7
zircon	.1
tourmaline	.0
garnet	.1
hornblende	.0

Secondary Minerals: 62.1 %	
Feldspar	.1
glauconite	.5
Pyrite	3.4
Adularia	56.6
Casing scale	1.5
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite 85%; grayish buff, finely xline,
s/s, ±2%; composed chiefly of feldspar,
pyrite very common.

DEEP WELL STUDY

Well No. W— 6011

Depth 2500 to 2520

No. samples used 2

Analyst T. & G.

Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 24.48 gm. 100.0% 2. Wt. of F. P. 1.97
3. Wt. after solution, with filter paper . . . . . 4.95 gm.
4. Less wt. F. P. (2) . . . 1.97 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 2.98 gm. 12.3 %
6. Wt. lost by solution (1 minus 5) . . . . . 21.50 gm. 87.7 %
7. To balance (5 plus 6) . . 24.48 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . 2.98 gm. 100.0%
2. Cylinder (+1/32) 1.86 gm. 62.3 %
3. Jar (1/32—1/64) 1.03 gm. 34.6 %
4. Drain . . . . . .09 gm. 3.1 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ± 1/32 mm.

Analyst Briand

Date 8/31/34

Wt. of sample . . . . 1.75 gm. 100.0% Shape Analysis:

Heavy Minerals . . . . .08 gm. 4.5 % A ..... %: a ..... %: C ..... %

Light Minerals . . . . 1.67 gm. 95.5 % r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	384	66.7
Limonite	35	6.1
Cas. scale	110	19.1
Garnet (etched)	39	6.8
Zircon	5	.9
Epidote	1	.2
Dolomite	1	.2
Total	575	100%

Classification Grouping:

Primary Minerals: 15.4 %	Absol. %
Garnet	.3
Zircon	.0
Epidote	.0
Quartz	7.3
Clay	7.8

Light Concentrate		
Feldspar (Orthoc. & Microcl.)	523	84.0
Quartz	47	7.6
Glauconite	1	.2
Clay	51	8.2
Total	622	100%

Secondary Minerals: 84.6 %	Absol. %
Pyrite	3.0
Limonite	.3
"Cas. Scale"	.9
Feldspar (Authigenic)	80.2
Glauconite	.2
Dolomite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite, buff, finely xtln.

S.S. fine.

Feldspar chiefly Adularia (±80%) with plagioclase (15%) & microcline (5%) in minority; clastic centers well outlined, with well developed authigenic growths. There are a few euhedral centers.

** Titanite in short, euhedral x/s; hard to distinguish from zircon, owing to minute size.

DEEP WELL STUDY

Well No. W— 0011
Depth 2460 to 2480
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	25.27 gm.	100.0%	2. Wt. of F. P. 1.96
3. Wt. after solution, with filter paper	8.00 gm.		
4. Less wt. F. P. (2)	1.96 gm.		
5. Wt. Insol. Residue (3 minus 4)	6.04 gm.	23.8 %	
6. Wt. lost by solution (1 minus 5)	19.23 gm.	76.2 %	
7. To balance (5 plus 6)	25.27 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	6.04 gm.	100.0%	
2. Cylinder (+1/32)	5.22 gm.	86.40 %	
3. Jar (1/32—1/64)	.31 gm.	5.14 %	
4. Drain	.51 gm.	8.46 %	

C. Screen Analysis 5.18

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm	.10	1.96
½–¼ mm	.73	14.30
¼–⅛ mm	.91	17.82
⅛–1/16	1.47	28.81
Pan	1.89	37.11
Total	5.10	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rouser
Date Sept 5, 1934

Acet. Tetrabr. / ~~Bromoform~~ ..... Sp. gr. Size–Grade(s) 1/8–1/32 mm.

Wt. of sample 3.35 gm. 100.0%

Heavy Minerals 0.03 gm. .9 %

Light Minerals 3.32 gm. 99.1 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	208	67.5
garnet	26	8.5
zircon zoned	5	1.9
unzoned	2	.6
**Titanite	1	.3
Tremolite	1	.3
staurolite	1	.1
Tourmaline green	2	.9
brown	1	.3
blue	1	.5
Hornblende	4	1.1
quartz	17	5.5
feldspar	1	.3
casing scale	37	12.1
glauconite	2	.9
Total	309.1	100%

Classification Grouping:
Primary Minerals: 38.7 %

	Absol. %
Quartz	34.1
Clay	4.0
Muscovite	.5
garnet	.1
zircon	.0
tourmaline	.0
Titanite	.0
Tremolite	.0
staurolite	.0
Hornblende	.0

Light Concentrate

*Feldspar	448	59.4	Secondary Minerals: 61.3 %
Quartz	259	34.4	Feldspar 58.9
clay	30	4.0	glauconite 1.7
glauconite	13	1.7	Pyrite .6
Muscovite	4	.5	casing scale .1
Total	754	100%	Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite 76%; hard, gray to buff, finely xline;
s/s, ±23%; composed chiefly of feldspar; Sand, ±1%;
Pyrite <1%.

1. Quartz is chiefly in slt. size, (1/16-1/32) although there is ±10% in C to r snd. grains, well frosted, 1/2-1/4 in size.

2. Feldspar is all in 1/16-1/32 grade; some good euhedral x's; all show small authigenic growths.

DEEP WELL STUDY

Well No. W— 0011
Depth 2440 to 2460
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	20.51 gm.	100.0%	2. Wt. of F. P. 1.98
3. Wt. after solution, with filter paper	4.25 gm.		
4. Less wt. F. P. (2)	1.98 gm.		
5. Wt. Insol. Residue (3 minus 4)	2.27 gm.	11.0 %	
6. Wt. lost by solution (1 minus 5)	18.24 gm.	89.0 %	
7. To balance (5 plus 6)	20.51 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	gm.	100.0%
2. Cylinder (+1/32)	gm.	%
3. Jar (1/32—1/64)	gm.	%
4. Drain	gm.	%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) comp mm.

Analyst Rowser ~~Powers~~
Date Sept 4, '34

Wt. of sample 2.19 gm. 100.0%

Heavy Minerals .055 gm. 2.5 %

Light Minerals 2.135 gm. 97.5 %

Shape Analysis:
A ....% : a ....% : C ....%
r ....% : R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	507	47.3
Tourmaline Brown	3	.3
Tourmaline Green	4	.4
Tourmaline Blue	1	.1
Tremolite	10	.9
Zircon (zoned)	11	1.0
garnet	7	.7
Hornblende	1	.1
Sphalerite	1	.1
Quartz	48	4.5
Feldspar	13	1.2
Casing scale	465	43.4
Total	1071	100%

Light Concentrate		
1 Quartz	615	54.0
2 Feldspar	435	38.2
Clay	88	7.8
Total	1138	100%

Classification Grouping:

	Absol. %
Primary Minerals: 60.4 %	
Quartz	52.8
Clay	7.6
Tourmaline	.0
Tremolite	.0
Zircon	.0
garnet	.0
Hornblende	.0
Secondary Minerals: 39.6 %	
Feldspar	37.3
Pyrite	1.2
Sphalerite	.0
barite	.0
casing scale	1.1
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; 890; hard; grayish buff, finely xline; 5/5 ± 99%; made up of Quartz + Feldspar in ratio of 6:4; Snd, 100-70; ½-¼; Ctgs; Pyrite abundant.

This sample seems clearly to be out of place. Very likely mixed up with 2940-2950

DEEP WELL STUDY

Well No. W— W0011

Depth 640 to 650

No. samples used

Analyst

Date

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . gm. 100.0%: 2. Wt. of F. P.
3. Wt. after solution, with filter paper . . . . . gm.
4. Less wt. F. P. (2) . . . gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . gm. %
6. Wt. lost by solution (1 minus 5) . . . . . gm. %
7. To balance (5 plus 6) . . gm. %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) gm. %
3. Jar (1/32—1/64) gm. %
4. Drain . . . . . gm. %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/16–Pan mm.

Analyst Rowsey

Date aug 23, 1934

Wt. of sample . . . . 2.68 gm. 100.0%

Heavy Minerals . . . . .01 gm. .4%

Light Minerals . . . . 2.67 gm. 99.6%

Shape Analysis:

A.....%: a.....%: C.....%

r.....%: R.....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
1 Garnet	255	40.1
2 Pyrite	214	33.6
3 Tourmaline Brown	26	4.1
Green	21	3.3
Blue	2	.3
4 Zircon (zoned	38	6.0
5 Limonite	16	2.5
6 Hornblende	9	1.4
7 anhydrite	4	.6
8 Barite	3	.5
9 Tremalite	3	.5
10 c.s. + atreti)	45	7.1
Total	636	100%

Classification Grouping:

Primary Minerals: 80.5%

	Absol. %
Quartz	80.3
Garnet	.2
Tourmaline	.0
Zircon	.0
Tremalite	.0

Light Concentrate			
11 Quartz	421	80.5	
12 Feldspar	85	16.2	
13 Glauconite	17	3.3	
Total	523	100%	

Secondary Minerals: 19.5%

Feldspar	16.1
Glauconite	3.3
Pyrite	.1
Limonite	.0
Hornblende	.0
anhydrite	.0
Barite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0011
Depth 2420 to 2440
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 24.61 gm. 100.0%: 2. Wt. of F. P. 2.20
3. Wt. after solution, with filter paper . . . . . 4.46 gm.
4. Less wt. F. P. (2) . . . 2.20 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 2.26 gm. 9.3 %
6. Wt. lost by solution (1 minus 5) . . . . . 22.35 gm. 90.7 %
7. To balance (5 plus 6) . . 24.61 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) . . . . . gm. %
3. Jar (1/32—1/64) . . . . . gm. %
4. Drain . . . . . gm. %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Briard
Date 8/31/34

Acet. Tetrabr. / ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) "Comp." mm.

Wt. of sample . . . . 2.23 gm. 100.0%

Heavy Minerals . . . . .01 gm. .4 %

Light Minerals . . . . 2.22 gm. 99.6 %

Shape Analysis:

A ____ %: a 20 %: C 70 %

r 10 %: R ____ %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	402	31.9
Limonite	377	29.8
Cas. Scale	382	30.2
Barite	5	.4
Tourmal. (grn	8	.6
Tourmal. (brn	2	.2
Zircon	22	1.7
Sphalerite	10	.8
Garnet (etched)	38	3.0
Tremolite	15	1.2
Dolomite	3	.2
Total	1264	100%

Light Concentrate		
Quartz	491	66.4
Feldspar (Orth. & Microcl.	205	27.7
Clay	43	5.8
Glauconite	1	.1
Total	740	100%

Classification Grouping:

Primary Minerals: 72.0 %	Absol. %
Tourmaline	.0
Zircon	.0
Garnet	.0
Tremolite	.0
Clay	5.8
Quartz	66.2

Secondary Minerals: 28.0 %	
Pyrite	.1
Limonite	.1
Cas. Scale	.1
Barite	.0
Dolomite	.8
Feldspar (authigenic)	27.6
Glauconite	.1
Sphalerite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite, buff, medium to coarsely xln

Sandstone 5-10%; Mic. Gr. ¼-⅛ mm 60%; P. Sub. ½-¼ mm 25%

Shale, trc; hard, grn

DEEP WELL STUDY

Well No. W— 0011

Depth 2400 to 2420

No. samples used 2

Analyst T. & G.

Date 7-27-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 31.57 gm. 100.0%: 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. Cylinder (+1/32) .....gm.....%
3. Jar (1/32—1/64) .....gm.....%
4. Drain . . . .gm.....%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	.11	.4
1–½ mm	3.21	10.6
½–¼ mm	13.03	41.9
¼–⅛ mm	10.06	32.2
⅛–1/16	3.02	9.7
Pan	1.63	5.2
Total	31.06	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Briard ~~Powers~~

Date 8/31/34

Acet. Tetrabr. ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) 1/4 - 1/16 mm.

Wt. of sample . . . . 3.56 gm. 100.0%

Heavy Minerals . . . . .02 gm. .6 %

Light Minerals . . . . 3.54 gm. 99.4 %

Shape Analysis:

A.....%: a 10 %: C 75 %

r 15 %: R .....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	15	7.4
Limonite	89	44.1
Cas. scale	57	28.2
Garnet (etched)	2	1.0
Sphalerite	14	6.9
Zircon	1	.5
Tourmaline {grn	2	1.0
Tourmaline {brn	2	1.0
Dolo.	4	2.0
Quartz	16	7.9
Total	202	100%

Light Concentrate		
Quartz	413	63.4
Dolomite	221	34.0
Feldspar	17	2.6
Total	651	100%

Classification Grouping:

Primary Minerals: 63.0 %	Absol. %
Garnet	.0
Zircon	.0
Tourmaline	.0
Quartz	63.0

Secondary Minerals: 37.0 %	
Pyrite	.1
Limonite	.3
Cas. scale	.2
Sphalerite	.0
Dolomite	33.8
Feldspar (Authigenic)	2.6
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Sandstone: hard, frosted; Mj. Gr. ½-¼ 60%; P. Sub ¼-⅛ mm 25%; Max. Size 1-½ mm. Dolomite about 4%

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W 0011

Depth 2390 to 2400

No. of Samples 1

Analyst T & G

Date 7/25/34

A. Acid Treatment (HCl 15 %)

80% sand?

1. Sample Weight ..... 20.00 gr. 100%
2. Filter Paper Wt. .... 1.98 gr.
3. Weight after Acid treatment, with F.P. 14.99 gr.
4. Less Wt. Filter Paper ..... 1.98 gr.
5. Weight of Insoluble Residue ..... 13.01 gr. 65.4%
6. Loss (1 minus 5) .... 6.99 gr. 34.6%

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis 12.9 - wt. insol. res. before screening.

Size	Gram	%
1-1/2	.47	3.66
1/2-1/4	6.73	52.44
1/4-1/8	4.60	35.80
1/8-1/16	.84	6.54
1/16-Pan	.20	1.56
Tot.	12.84	100.00

MINERALOGICAL DATA

Analyst Briard

Date 8/31/34

Sample Weight Used 3.44 gr. Size-Grade 1/4-Pan mm.

Heavy Minerals .02 gr. .6 %

Light Minerals 3.42 gr. 99.4 %

Shape Analysis: A ____ %; a 5 %;

C 85 %; r 10 %; R ____ %

Acet.Tetrabr.) 2.93± sp. gr.
~~Bromoform~~

Minerals identified

~~Principal Minerals~~ Absol. %

~~Primary~~ 86.92

Quartz	86.9
Garnet	.0
Zircon	.0
Tourmaline	.0
Tremolite	.0

~~Secondary~~ 13.1%

Pyrite	.2
Limonite	.1
"Cas. Scale"	.3
Dolomite	.0
Feldspar (Authigenic)	12.5
	100.0%

Classification grouping

~~Accessory Minerals:~~

~~Primary~~ Heavy	No. of Grains	Rel. %
Pyrite	201	32.6
Limonite	93	15.1
Cas. Scale	290	47.1
Garnet (etched)	10	1.6
Zircon	9	1.5
Tourmaline {grn	4	.6
Tourmaline {brn	4	.6
Tremolite	2	.3
Dolomite	2	.3
	617	100.0 %

~~Secondary~~ light		
Quartz	506	87.4
Feldspar (orthoclase)	73	12.6
	579	100.0 %

Well Log Description: Sandstone 65%: Gr. 1/4-1/8 mm. 65%, P. Sub. 1/8-1/16 mm. 25%. Dolomite 35%: Gray, xyln, granulated (M).

* Tourmal. grn very well rounded.

(1) Orthoclase: a few grains primary nucleus with authigenic growth.

DEEP WELL STUDY

Well No. W— 0011
Depth 2370 to 2390
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	31.85 gm.	100.0%	2. Wt. of F. P. 1.94
3. Wt. after solution, with filter paper	4.50 gm.		
4. Less wt. F. P. (2)	1.94 gm.		
5. Wt. Insol. Residue (3 minus 4)	2.56 gm.	8.0 %	
6. Wt. lost by solution (1 minus 5)	29.29 gm.	92.0 %	
7. To balance (5 plus 6)	31.85 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	gm.	100.0%	
2. Cylinder (+1/32)	gm.	%	
3. Jar (1/32—1/64)	gm.	%	
4. Drain	gm.	%	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) Comp mm.

Analyst Briard (~~Powers~~)
Date 8/30/34

Wt. of sample 2.39 gm. 100.0%

Heavy Minerals .04 gm. 1.7 %

Light Minerals 2.35 gm. 98.3 %

Shape Analysis:
A ___ %: a ___ %: C 50 %
r 45 %: R 5 %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	663	42.0
Limonite	444	28.1
Cas. scalp	443	28.0
* Tourmaline (grn)	3	.2
Zircon	2	.1
Tremolite	3	.2
Dolomite	1	.1
Quartz	20	1.2
Chert	1	.1
Total	1580	100%

Light Concentrate		
Quartz	416	76.7
Chert	24	4.4
(1) Microcline & orthoc.	35	6.5
Clay	67	12.4
Total	542.	100%

Classification Grouping:

Primary Minerals: 81.8 %	Absol. %
Tourmaline	.0
Zircon	.0
Tremolite	.0
Quartz	75.5
Clay	6.3

Secondary Minerals: 18.2 %	
Pyrite	.7
Limonite	.5
"Cas. scale"	.5
Dolomite	.0
Chert	4.3
Microcline	12.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite: soft, buff, finely granulated.
Quartz sand 4-5%: M Grn ½-¼ mm 45%; P Sub ¼-⅛ mm 35%
Data from light composite

(1) Hornblende : pleoch. colorless to light green

(2) Garnet : Colorless ; one grain very well etched

(3) Tourmaline ; greenish blk — schorlite

(4) Zircon ; Colorless, well rounded ; 3 zoned ; one amber colored

(5) Pyrite : cubes ; xgl aggregates

(6) Limonite

(7) orthoclase : Limonite stained ; grains authigenic ; a few grains with secondary enlargement

(8) Microcline

(9) Quartz ; Limonite stained ; some inclusions

(10) chert ; cryptoxyln ; mosaic struct.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 2358 to 2370

1. Sample Weight ..... 24.72 gr. 100% No. of Samples 2

2. Filter Paper Wt. .... 2.02 gr. Analyst T & G

3. Weight after Acid treatment, with F.P. 4.83 gr. Date 7/25/34

4. Less Wt. Filter Paper ..... 2.02 gr.

5. Weight of Insoluble Residue ..... 2.81 gr. 11.6%

6. Loss (1 minus 5) .... 21.91 gr. 88.4%

C. Screen Analysis

Size	Gram	%

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

MINERALOGICAL DATA Analyst Briard

Sample Weight Used 2.60 gr. Size-Grade comp mm. Date 8/2/34

Heavy Minerals .02 gr. .76%

Light Minerals 2.58 gr. 99.24%

Shape Analysis: A ____%; a 8 %; C 80 %; r 12 %; R ____%

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Minerals identified

~~Principal Minerals~~

	Absol. %
Primary 10.5%	
Hornblende	.0
Garnet	.0
Tourmaline {blue-	.0
Zircon {zoned	.0
Zircon {unzoned	.1
Quartz	10.4
Secondary 89.5%	
Orthoclase	77.4
Microcline	11.1
Chert	.3
Pyrite	.4
Limonite	.3
	100.0%

Classification Grouping

~~Accessory Minerals~~: No. Grains Rel. %

~~Primary~~ Heavy

(1) Hornblende	1	1.
(2) Garnet	2	2.
(3) Tourmaline	6	4.
(4) Zircon {zoned	3	2.
(4) Zircon {unzoned	12	9.
(5) Pyrite	66	49.
(6) Limonite	45	33.
~~Secondary~~ Light	135	100.0%
(7) Orthoclase	584	78.
(8) Microcline	83	11.
(9) Quartz	77	10.
(10) Chert	2	0.
	746	100.0%

Well Log Description: Dolo.; buff; granularzed; sdy.; 11% ; feldspars; (authigenic) abundant; pyrite present;

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 2330 to 2350

No. of Samples 2

Analyst I + G.

Date 7/25/34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	24.22 gr.	100%	
2. Filter Paper Wt.	1.94 gr.		
3. Weight after Acid treatment, with F.P.	4.36 gr.		
4. Less Wt. Filter Paper	1.94 gr.		
5. Weight of Insoluble Residue	2.42 gr.	10.0 %	
6. Loss (1 minus 5)	21.80 gr.	90.0 %	

B. Subsidation:

Cylinder (-1/32)	____ gr.	____ %
Jar (1/32-1/64)	____	____ %
Drain	____	____ %
Original (Total)	____	____ %

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 2.21 gr. Size-Grade Comp mm. Date 8/4/34

Heavy Minerals .022 gr. .9 %

Light Minerals 2.188 gr. 99.1 %

Shape Analysis: A 1 %; a 14 %; C 51 %; r 32 %; R 3 %

Acet.Tetrabr. / ~~Bromoform~~ } 2.93 ± sp. gr.

Minerals identified

~~Principal Minerals~~ Absol. %

Primary 88.5%

Quartz	89.4
Magnetite	.1
Zircon	.0

Secondary 11.5%

Pyrite	.6
Chert	9.6
Feldspar	1.1
Limonite	.2
	100.2%

~~Accessory Minerals:~~ ~~Primary~~ Heavy

	No. of Grains	Rel. %
Pyrite	38	64.
Limonite	15	25.
Magnetite	5	9.
Zircon	1	2.
	59	100.0 %

~~Secondary~~ Light

Quartz	478	89.
Chert	52	10.
Feldspar	6	1.1
	536	100.0 %

Well Log Description: Dolo, Hard, white, finely xlized. SS; well frosted, very little 2ndary enlarg; size; ¼-⅛; TA 7%; Sec. max ½-¼ 2%; heavy crop small, mostly casing scale

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 1290 to 1310

No. of Samples 12

Analyst T & G

Date 7-25-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	35 gr.	100%	
2. Filter Paper Wt.	1.99 gr.		
3. Weight after Acid treatment, with F.P.	32.40 gr.		
4. Less Wt. Filter Paper	1.99 gr.		
5. Weight of Insoluble Residue	30.41 gr.	87.1%	
6. Loss (1 minus 5)	4.59 gr.	12.9%	

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis

Size	Gram	%
1+larger	12.70	42.10
1-1½	12.37	41.21
½-¼	4.26	14.48
¼-⅛	.46	1.54
⅛-1/16	.14	.47
1/16-Pan	.06	.20
Tot	29.99	100.00

MINERALOGICAL DATA

Analyst Briard

Date 8/27/34

Sample Weight Used 3.48 gr. Size-Grade ½-Pan mm.

Heavy Minerals .01 gr. 3 %

Light Minerals 3.47 gr. 99.7 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / Bromoform } 2.93± sp. gr.

Minerals Identified

Accessory Minerals:

Heavy

Primary	No. Grains	Rel %
Pyrite-	71	20.3
Limonite	131	37.8
Gas. Scale-	28	8.0
Anhydrite	113	32.5
Barite--	5	1.4

Principal Minerals

Primary 0.

Secondary 100%	Abs %
Pyrite	.1
Limonite	.1
Anhydrite	.1
Barite	.0
Chert	97.8
Quartz	1.9
	100%

Classification Grouping

Light

Secondary 348	Total	100%
Chert-	199	98.0
Quartz-	4	2.0
	203 Total	100%

Well Log Description: Chert: wh. to grayish 90%±;

Dolomite 10%: wh. granular

* Garnet; etched slightly; colorless

⊖ Andalusite; Rounded; pale greenish gray; non-pleoch.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

A. Acid Treatment (HCl 15 %)

Depth 1270 to 1290

1. Sample Weight ..... 35 gr. 100%
2. Filter Paper Wt. .... 1.91 gr.
3. Weight after Acid treatment, with F.P. 33.68 gr.
4. Less Wt. Filter Paper ..... 1.91 gr.
5. Weight of Insoluble Residue ..... 31.77 gr. 79.25%
6. Loss (1 minus 5) .... 3.23 gr. 20.75%

No. of Samples 2

Analyst I & G

Date 7-25-34

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

C. Screen Analysis

Size	Gram	%
1+larger	11.57	36.75
1-1/2	12.15	38.80
1/2-1/4	5.28	16.43
1/4-1/8	1.75	5.55
1/8-1/16	.38	1.20
1/16-Pan	.40	1.27
Tot.	31.53	100.00

MINERALOGICAL DATA

Analyst Briand

Sample Weight Used 2.52 gr. Size-Grade 1/4-Pan mm.

Date 8/27/34

Heavy Minerals .005 gr. .2 %

Light Minerals 2.515 gr. 99.8 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr.) Bromoform } 2.93 ± sp. gr.

Minerals Identified

Principal Minerals

Primary	Absol %	Heavy Primary	No. Grains	Rel. %
.9%		Pyrite-	229	19.5
Andalusite-	.0	Limonite-	719	61.8
Garnet-	.0	Cas. Scale-	165	14.4
Quartz-	.9	Anhydrite-	29	2.5
		* Garnet-	1	.9
Secondary 99.1%		@ Andalusite-	1	.9
Pyrite-	.0		1144 Total	100.0%
Limonite-	.1	Light Secondary		
Anhydrite-	.0	Chert-	227	99.1
Chert-	99.0	Quartz-	2	.9
	100.0%		229 Total	100.0%

Classification Grouping

Well Log Description: Chert 80%; white to gray. Dolomite 20%; light gray.

DEEP WELL STUDY

Well No. W— 0011

Depth 1810 to 1830

No. samples used 2

Analyst T. & G.

Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15%)

1. Sample weight . . . . . 20.71 gm. 100.0%: 2. Wt. of F. P. 2.25
3. Wt. after solution, with filter paper . . . . . 5.08 gm.
4. Less wt. F. P. (2) . . . 2.25 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 2.83 gm. 13.6 %
6. Wt. lost by solution (1 minus 5) . . . . . 17.88 gm. 86.4 %
7. To balance (5 plus 6) . . 20.71 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) gm. %
3. Jar (1/32—1/64) gm. %
4. Drain . . . . . gm. %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } Sp. gr. Size–Grade(s) mm.

Analyst

Date

Wt. of sample . . . . gm. 100.0%

Heavy Minerals . . . . gm. %

Light Minerals . . . . gm. %

Shape Analysis:

A %: a %: C %

r %: R %.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. % — Absol. %

Classification Grouping:

Primary Minerals: %

Total 100%

Light Concentrate

Secondary Minerals: %

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0011
Depth 1650 to 1670
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 35 gm. 100.0%: 2. Wt. of F. P. 2.03
3. Wt. after solution, with filter paper . . . . . 7.38 gm.
4. Less wt. F. P. (2) . . . 2.03 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 5.35 gm. 15.3 %
6. Wt. lost by solution (1 minus 5) . . . . . 29.65 gm. 84.7 %
7. To balance (5 plus 6) . . 35.00 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . 5.35 gm. 100.0%
2. Cylinder (+1/32) 4.83 gm. 90.2 %
3. Jar (1/32—1/64) .16 gm. 3.0 %
4. Drain . . . . . .36 gm. 6.8 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	1.78	36.9
1–½ mm		
½–¼ mm		
¼–⅛ mm	3.04	63.1
⅛–1/16		
Pan		
Total	4.82	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Stookey
Date 8/6/34

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) ½–⅓ mm.

Wt. of sample . . . . 2.99 gm. 100.0%

Heavy Minerals . . . . .62 gm. 20.8 %

Light Minerals . . . . 2.37 gm. 79.2 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	32	3.8
Casing scale	601	70.5
dolomite	215	25.2
staurolite(?)	1	.1
Epidote	3	.4
Total	852	100%

Light Concentrate		
Quartz	40	8.6
chert	6	1.3
dolomite	216	46.6
clay	201	43.5
Total	463	100%

Classification Grouping:

Primary Minerals: 41.3 %

	Absol. %
Quartz	6.8
clay	34.4
staurolite	.0
epidote	.1

Secondary Minerals: 58.7 %

chert	1.0
Pyrite	.8
dolomite	42.2
Casing scale	14.7
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite ± 100% buff, granulated; medium to coarsely xline; clear dolo. rhombs common; Pyrite present; chert, a few grains.

7. Xtln aggregates + isolated isometric xtls.

6. Colorless

8. Brown, slightly pleochroic grain

9. Frosted + pitted, many minute inclusions

10. Largely orthoclase, many silt-size, sub-hedral to euhedral, few visible nuclei. One microcline nucleus

11. Irregular masses

12. Contains scattered pyrite xtls.

13. Isotropic, translucent to transp~~.~~ in ~~round~~ subspherical masses or irregular aggregates, most grains studded with pyrite. Refringence 1.59±.

ANALYSIS SHEET--DEEP WELL STUDY Well No. XWell

A. Acid Treatment (HCl 15 %) Depth 1630 to 1650

1. Sample Weight ..... 40 gr. 100% No. of Samples 2

2. Filter Paper Wt. .... 193 gr. Analyst T & G

3. Weight after Acid treatment, with F.P. 14.30 gr. Date 7-25-34

4. Less Wt. Filter Paper ..... 1.93 gr.

5. Weight of Insoluble Residue ..... 1237 gr. 30.9 %

6. Loss (1 minus 5) .... 27.63 gr. 69.1 %

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____ %

Jar (1/32-1/64) ..... ____ ____ %

Drain ..... ____ ____ %

Original (Total) .... ____ ____ %

C. Screen Analysis 12.15

Size	Gram	%
+1	.54	4.46
1-½	2.01	16.62
½-¼	4.52	37.30
¼-⅛	3.88	32.12
⅛-1/16	.85	7.02
1/16-Pan	.30	2.48
Tot.	12.10	100.00

MINERALOGICAL DATA Analyst Starkey

Sample Weight Used 3.36 gr. Size-Grade ¼ to pan mm. Date 8/10/34

Heavy Minerals .06 gr. 1.8 %

Light Minerals 3.30 gr. 98.2 %

Shape Analysis: A ____ %; a 1 %; C 75 %; r 20 %; R 4 %

Acet.Tetrabr.) / Bromoform } 2.93 sp. gr.

Minerals identified

Principal Minerals 46=wt.%

Primary 48.7%

Zircon	.1
Garnet	.0
Tremolite	.0
Tourmaline	35.1
Shale	13.5
Quartz	

Secondary 51.3%

Pyrite	1.7
Limenite	.0
Sphalerite	.0
Fluorite	.0
Feldspar	11.8
Chert	4.2
Unknown (?)	33.6
	100.0%

Accessory Minerals:

	Primary Heavy	No. of Grains	Rel. %
1	Pyrite	280	92.8
2	Limenite	6	1.9
3	Zircon (unzoned)	8	2.6
4	Sphalerite	2	.7
5	Fluorite	1	.3
6	Garnet	2	.7
7	Tremolite	2	.7
8	Tourmaline (Drorite)	1	.3
	Total	302	100.0%
	Secondary Light		
9	Quartz	165	13.8
10	Feldspar (authigenic)	144	12.0
11	Chert	51	4.3
12	Shale	429	35.7
13	Unknown	408	34.2
	Total	1197	100.0

Classification grouping

Well Log Description: Dolomite buff granular with prite and chert. ½-¼ 37.30, 1-½ 16.62, ¼-⅛ 32.12, ⅛-1/16 7.02

R 4%, r 20%, C 75%, a 1%.

DEEP WELL STUDY

Well No. W— 0011

Depth 1590 to 1610

No. samples used 2

Analyst T. & G.

Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	20 gm.	100.0%	2. Wt. of F. P. 1.96
3. Wt. after solution, with filter paper	6.44 gm.		
4. Less wt. F. P. (2)	1.96 gm.		
5. Wt. Insol. Residue (3 minus 4)	4.48 gm.	22.4 %	
6. Wt. lost by solution (1 minus 5)	15.52 gm.	77.6 %	
7. To balance (5 plus 6)	20.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	4.48 gm.	100.0%
2. Cylinder (+1/32)	3.46 gm.	77.1 %
3. Jar (1/32—1/64)	.26 gm.	5.8 %
4. Drain	.76 gm.	17.1 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser

Date Aug 28, 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) +1/3 1 mm.

Wt. of sample 1.48 gm. 100.0%

Heavy Minerals .03 gm. 2.0 %

Light Minerals 1.45 gm. 98.0 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1621	79.2
Zircon	5	.2
Tourmaline	1	.1
~~Fluorite~~	1	.1
Barite	3	.1
Clay	87	4.3
Cas. Scale	327	16.0
Total	2045	100%

Classification Grouping: Primary Minerals: 93.3 %

Absol. %	
Clay	87.7
Zircon	.0
Tourmaline	.0
Quartz	5.6

Light Concentrate		
clay	569	89.4
chert	31	4.9
Quartz	36	5.7
Total	636	100%

Secondary Minerals: 6.7 %

Chert	4.8
Pyrite	1.6
Flourite	.0
Barite	.0
Casing Scale	.3
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

dolomite; 70–75% light gray; granular; medium to finely x'lized, having the appearance of fine sandy shale, ± 20–25%; light gray; calcareous; Pyrite

DEEP WELL STUDY

Well No. W— 0011

Depth 1570 to 1790

No. samples used 2

Analyst T. & G.

Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	40 gm.	100.0%	2. Wt. of F. P. 1.95
3. Wt. after solution, with filter paper	5.92 gm.		
4. Less wt. F. P. (2)	1.95 gm.		
5. Wt. Insol. Residue (3 minus 4)	3.97 gm.	9.8 %	
6. Wt. lost by solution (1 minus 5)	36.03 gm.	90.2 %	
7. To balance (5 plus 6)	40.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	3.97 gm.	100.0%
2. Cylinder (+1/32)	1.66 gm.	41.8 %
3. Jar (1/32—1/64)	.70 gm.	17.7 %
4. Drain	1.61 gm.	40.6 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser

Date Aug 28, 1934

Acet. Tetrabr. / Bromoform ±2.93 Sp. gr. Size–Grade(s) +1/32 mm.

Wt. of sample 1.31 gm. 100.0%

Heavy Minerals .07 gm. 5.4 %

Light Minerals 1.24 gm. 94.6 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	63+	70.2
Barite	4	.4
Zircon	4	.4
Tourmaline	2	.2
Flourite	2	.2
Casing scale	206	21.5
Clay	68	7.1
Total	958	100%

Classification Grouping:

Primary Minerals: 73.2 %

	Absol. %
Clay	60.4
Quartz	12.8
Zircon	.0
Tourmaline	.0

Light Concentrate

Clay	451	63.4
Chert	164	23.0
Quartz	97	13.6
Total	712	100%

Secondary Minerals: 26.8 %

Chert	21.8
Pyrite	3.8
Barite	.0
Flourite	.0
Casing scale	1.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; tbag; hard, gray, coarsely xline; a few frag. of soft brown shale; same Pyrite.

* chert and cinders make up 100% of insoluble residue.

DEEP WELL STUDY

Well No. W— 0011
Depth 1530 to 1550
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 40.00 gm. 100.0%: 2. Wt. of F. P. 1.96
3. Wt. after solution, with filter paper . . . . . 10.74 gm.
4. Less wt. F. P. (2) . . . 1.96 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 8.78 gm. 21.9 %
6. Wt. lost by solution (1 minus 5) . . . . . 31.22 gm. 78.1 %
7. To balance (5 plus 6) . . . . gm. %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) . . . . . gm. %
3. Jar (1/32—1/64) . . . . . gm. %
4. Drain . . . . . gm. %

C. Screen Analysis 8.74

SIZE	GRAMS	%
2 plus		
2–1 mm	1.12	12.82
1–½ mm	1.19	13.63
½–¼ mm	1.58	18.20
¼–⅛ mm	2.00	23.00
⅛–1/16	1.82	20.85
Pan	1.02	11.50
Total	8.73	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date Aug 28, '34

Acet. Tetrabr. ~~Bromoform~~ 2.93 ± Sp. gr. Size–Grade(s) ¼-Pan mm.

Wt. of sample . . . . 2.44 gm. 100.0%

Heavy Minerals . . . . .01 gm. .4 %

Light Minerals . . . . 2.43 gm. 99.6 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	843	72.1
Enstatite	4	.3
zircon	2	.2
anhydrite	3	.3
Tourmaline (Brown)	2	.2
Barite	1	.1
Chert	59	5.1
Casing scale	255	21.7
Total	1169	100%

Classification Grouping:

Primary Minerals: ..... %

	Absol. %
Enstatite	.0
zircon	.0
Tourmaline	.0

Light Concentrate * chert 100%

Secondary Minerals: 100.0 %

Chert	99.6
Pyrite	.3
Barite	.0
Casing Scale	.1
Anhydrite	.0
Total	100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite + 78%; light gray to nearly white; coarsely xline; chert + 22%; gray, rather earthy in part; some oölitic; some dense; pyrite abundant.

DEEP WELL STUDY

Well No. W— 0011
Depth 1520 to 1530
No. samples used 1
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	20.00 gm.	100.0%	2. Wt. of F. P. 1.94
3. Wt. after solution, with filter paper	9.17 gm.		
4. Less wt. F. P. (2)	1.94 gm.		
5. Wt. Insol. Residue (3 minus 4)	7.23 gm.	36.1 %	
6. Wt. lost by solution (1 minus 5)	12.77 gm.	63.9 %	
7. To balance (5 plus 6)	20.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	7.23 gm.	100.0%	
2. Cylinder (+1/32)	3.15 gm.	43.9 %	
3. Jar (1/32—1/64)	1.80 gm.	24.5 %	
4. Drain	2.28 gm.	31.6 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date August, 1934

Acet. Tetrabr. ~~Bromoform~~ 2.9.3+ Sp. gr. Size–Grade(s) comp mm.

Wt. of sample 2.96 gm. 100.0%

Heavy Minerals .01 gm. .3 %

Light Minerals 2.95 gm. 99.7 %

Shape Analysis:
A ....%: a ....%: C ....%
r ....%: R ....%.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	650	67.2
Barite	2	.2
Hornblende	3	.3
Tourmaline	1	.1
Zircon	5	.5
Fluorite	2	.2
garnet	2	.2
Chert	72	7.4
Casing scale	231	23.9
Total	968	100%

Classification Grouping:
Primary Minerals: 84.4%

	Absol. %
clay	70.1
Quartz	14.3
Hornblende	.0
Tourmaline	.0
zircon	.0
garnet	.0

Light Concentrate

clay	795	70.4
Quartz	161	14.3
Chert	173	15.3
Total	1129	100%

Secondary Minerals: 15.6 %

chert	15.3
Pyrite	.2
Fluorite	.0
casing scale	.1
Barite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; impure; shaley; gray; insoluble content high; 36%; chert present; Pyrite abundant.

* Chert is soft, in mass; earthy, more or less granular, with an occasional dense piece; much is in elongate fragments, evidently replacing some organism, probably crinoid or cystoid stems.

DEEP WELL STUDY

Well No. W— 0011
Depth 1500 to 1520
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30 gm.	100.0%	2. Wt. of F. P. 2.35
3. Wt. after solution, with filter paper	18.83 gm.		
4. Less wt. F. P. (2)	2.35 gm.		
5. Wt. Insol. Residue (3 minus 4)	16.48 gm.	54.9 %	
6. Wt. lost by solution (1 minus 5)	13.52 gm.	45.1 %	
7. To balance (5 plus 6)	30.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	16.48 gm.	100.0%
2. Cylinder (+1/32)	13.41 gm.	81.4 %
3. Jar (1/32—1/64)	.73 gm.	4.4 %
4. Drain	2.34 gm.	14.2 %

C. Screen Analysis 13.35

SIZE	GRAMS	%
2 plus		
2–1 mm	4.72	35.47
1–½ mm	4.38	32.84
½–¼ mm	2.20	16.52
¼–⅛ mm	1.04	7.73
⅛–1/16	.53	3.98
Pan	.46	3.46
Total	13.33	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowsey
Date Aug 2-A. 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ¼–Pan mm.

Wt. of sample 1.97 gm. 100.0%

Heavy Minerals .15 gm. 7.6 %

Light Minerals 1.82 gm. 92.4 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Classification Grouping:
Primary Minerals: ..... %
Secondary Minerals: 100.0 %

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyite - - 485		77.8
Limonite - 5-0		8.2
casing scale 85		13.7
Sphalevite - 2		.3
Total	622	100%
Light Concentrate * chert - - 476		99.2
glauconite - 4		.8
Total	480	100%

Absol. %	
Chert	91.7
Pyrite	5.8
Limonite	.6
glauconite	.7
Sphalevite	.2
Casing Scale	1.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite, ± 45%, dark to lt. gry., granular, impure; Pyritic Chert, ± 55%, gry., impure, "earthy," imperfectly formed Pyrite common

4, Chert is rather soft, granular; crushing rather easily, & retaining some dolomite in intergrowth;

DEEP WELL STUDY

Well No. W— 0011

Depth 1490 to 1500

No. samples used 1

Analyst T. & G.

Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30 gm.	100.0%	2. Wt. of F. P.	1.96
3. Wt. after solution, with filter paper	20.11 gm.			
4. Less wt. F. P. (2)	1.96 gm.			
5. Wt. Insol. Residue (3 minus 4)	18.15 gm.	60.5 %		
6. Wt. lost by solution (1 minus 5)	11.85 gm.	39.5 %		
7. To balance (5 plus 6)	30.00 gm.	100.0 %		

B. Subsidation:

1. Original Wt.	17.15 gm.	100.0%
2. Cylinder (+1/32)	16.55 gm.	95.9 %
3. Jar (1/32—1/64)	.38 gm.	2.3 %
4. Drain	.22 gm.	1.8 %

C. Screen Analysis 16.51

SIZE	GRAMS	%
2 plus		
2–1 mm	4.23	25.75
1–½ mm	6.07	36.75
½–¼ mm	3.85	23.40
¼–⅛ mm	1.35	8.20
⅛–1/16	.63	3.83
Pan	.34	2.07
Total	16.47	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser

Date Aug 24, 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ¼–Pan mm.

Wt. of sample 2.23 gm. 100.0%

Heavy Minerals .1 gm. 4.5 %

Light Minerals 2.13 gm. 95.5 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
1 Pyrite	462	47.0
2 Limonite	151	15.4
3 Casing Scale	371	37.6
	613	
Total	984	100%

Classification Grouping:

Primary Minerals: ....%

Absol. %

Light Concentrate 4 chert; 100%

Secondary Minerals: 100.0 %

	Absol. %
chert	95.5
Pyrite	2.2
Limonite	.7
Casing scale	1.6
Total	100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; ±40%; gry; impure; granular;
chy; ±60%; gry; imperfectly formed; earthy;

* Larger size grades are nothing but firmly cemented aggregates of shale which have not been broken down,

DEEP WELL STUDY

Well No. W— 0011

Depth 1480 to 1490

No. samples used 1

Analyst T. & G.

Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	25 gm.	100.0%	2. Wt. of F. P. 1.88
3. Wt. after solution, with filter paper	14.37 gm.		
4. Less wt. F. P. (2)	1.88 gm.		
5. Wt. Insol. Residue (3 minus 4)	12.49 gm.	49.8 %	
6. Wt. lost by solution (1 minus 5)	12.51 gm.	50.2 %	
7. To balance (5 plus 6)	25.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	12.39 gm.	100.0%
2. Cylinder (+1/32)	10.08 gm.	81.90 %
3. Jar (1/32—1/64)	.85 gm.	6.15 %
4. Drain	1.46 gm.	11.95 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	.48	4.75
1–½ mm	1.28	12.75
½–¼ mm	2.61	25.92
¼–⅛ mm	2.27	22.73
⅛–1/16	2.00	20.10
Pan	1.37	13.75
Total	10.01	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowsey

Date Aug 29

Acet. Tetrabr. / ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) 1/8-1/32 mm.

Wt. of sample 2.15 gm. 100.0%

Heavy Minerals 0.03 gm. 1.4 %

Light Minerals 2.12 gm. 98.6 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	180	16.9
Sphalerite	2	.2
Zircon	2	.2
Tourmaline	1	.1
Hornblende	1	.1
Barite	2	.2
Clay	65	6.1
Casing scale	809 253	76.2
Total	1062	100%

Classification Grouping:

Primary Minerals: 97.3 %

Absol. %	
Clay	96.4
Zircon	.0
Tourmaline	.0
Hornblende	.0
Quartz	.9

Light Concentrate		
Clay	561	97.7
Chert	8	1.4
Quartz	5	.9
Total	574	100%

Secondary Minerals: 2.7 %

Pyrite	.2
Sphalerite	.0
Barite	.0
Chert	1.4
Cas. scale	1.1
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

*Shale; 50%; gray; calcareous; silty; dolomite say; finely granulated; gray; impure; some pyrite

* Original description lists chert 5% ±.
5% grades (2 - 1/4) made up of clay compacted around a chert nucleus. Gray in color. May have originally had calcareous coating & thus were mistaken for dolomite.

DEEP WELL STUDY

Well No. W— 0011
Depth 1460 to 1480
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	35 gm.	100.0%	2. Wt. of F. P. 2.06
3. Wt. after solution, with filter paper	22.03 gm.		
4. Less wt. F. P. (2)	2.06 gm.		
5. Wt. Insol. Residue (3 minus 4)	19.97 gm.	57.2 %	
6. Wt. lost by solution (1 minus 5)	15.03 gm.	42.8 %	
7. To balance (5 plus 6)	35.00 gm.	%	

B. Subsidation:

1. Original Wt.	19.97 gm.	100.0%	
2. Cylinder (+1/32)	18.02 gm.	90.22 %	
3. Jar (1/32—1/64)	.47 gm.	2.35 %	
4. Drain	1.48 gm.	7.43 %	

C. Screen Analysis 17.95

SIZE	GRAMS	%
2 plus		
2–1 mm	3.48	
1–½ mm	6.83	
½–¼ mm	4.37	
¼–⅛ mm	2.01	
⅛–1/16	.70	
Pan	.67	
Total	18.06	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Briand
Date 8/28/34

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/4-1/32 mm.

Wt. of sample 1.42 gm. 100.0%

Heavy Minerals .02 gm. 1.4 %

Light Minerals 1.40 gm. 98.6 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1294	65.6
Limonite	144	7.3
Cas. Scale	517	26.2
Zircon	7	.4
Tourmaline	8	.4
Hornblende	2	.1
Total	1972 1400	100%

Light Concentrate		
Clay	425	49.2
Chert	440	50.8
Total	865	100%

Classification Grouping:

Primary Minerals: 48.5 %

	Absol. %
Zircon	.0
Tourmaline	.0
Hornblende	.0
Clay	48.5

Secondary Minerals: 51.5 %

Pyrite	.9
Limonite	.1
Chert	50.1
Casing Scale	.4
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; gray, granular, silty. Few fragments green sh.
*[chert & shale 25-30%]

DEEP WELL STUDY

Well No. W— 0011

Depth 1420 to 1440

No. samples used 2

Analyst T. & G.

Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	35 gm.	100.0%	2. Wt. of F. P. 2.20
3. Wt. after solution, with filter paper	18.10 gm.		
4. Less wt. F. P. (2)	2.20 gm.		
5. Wt. Insol. Residue (3 minus 4)	15.90 gm.	45.4 %	
6. Wt. lost by solution (1 minus 5)	19.10 gm.	54.6 %	
7. To balance (5 plus 6)	35.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	15.90 gm.	100.0%
2. Cylinder (+1/32)	12.23 gm.	77.05 %
3. Jar (1/32—1/64)	1.01 gm.	6.32 %
4. Drain	2.66 gm.	16.63 %

C. Screen Analysis 12.20

SIZE	GRAMS	%
2 plus		
2–1 mm	2.80	23.80
1–½ mm	5.12	42.90
½–¼ mm	2.01	16.70
¼–⅛ mm	1.07	8.41
⅛–1/16	.58	4.85
Pan	.40	3.34
Total	11.98	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Briard

Date 8/27/34

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/4-1/32 mm.

Wt. of sample 2.01 gm. 100.0%

Heavy Minerals .2 gm. 9.5 %

Light Minerals 1.81 gm. 90.5 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified;

Heavy Concentrate	No. of Grains	Rel. %
Pyrite		
Limonite	109	10.5
Cas. Scale	187	18.0
Barite	732	70.3
Zircon	7	.7
Diopside (colorless)	3	.3
Tourmaline (green)	1	.1
	1	.1
Total	1040 306	100%

Light Concentrate		
Clay	277	79.4
Chert	40	11.4
Quartz	32	9.2
Total	349	100%

Classification Grouping:

Primary Minerals: 80.2%

	Absol. %
Zircon	.0
Diopside	.0
Tourmaline	.0
Clay	71.9
Quartz	8.3

Secondary Minerals: 19.8 %

Pyrite	1.0
Limonite	1.7
Barite	.1
Chert	10.3
Casing Scale	6.7
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; gray, granular, silty. Few grains subangular medium quartz sand. Chert 2-3%. Pyrite present. Tr. greenish.

DEEP WELL STUDY

Well No. W— 0011
Depth 1400 to 1420
No. samples used 2
Analyst T. & G.
Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 35.00 gm. 100.0%: 2. Wt. of F. P. 2.24
3. Wt. after solution, with filter paper . . . . . 11.90 gm.
4. Less wt. F. P. (2) . . . 2.24 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 9.66 gm. 27.6 %
6. Wt. lost by solution (1 minus 5) . . . . . 25.34 gm. 72.4 %
7. To balance (5 plus 6) . . 35.00 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . 9.66 gm. 100.0%
2. Cylinder (+1/32) 8.51 gm. 88.12 %
3. Jar (1/32—1/64) .24 gm. 2.48 %
4. Drain . . . . . .91 gm. 9.40 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	4.24	50.0
1–½ mm		
½–¼ mm		
¼–⅛ mm	4.24	50.0
⅛–1/16		
Pan		
Total	8.48	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/4-1/16 mm.

Analyst Briaud
Date 8/29/34

Wt. of sample . . . . 3.10 gm. 100.0%

Heavy Minerals . . . . .43 gm. 14.0 %

Light Minerals . . . . 2.67 gm. 86.0 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	11	4.4
Limonite	33	13.4
Cas. Scale	~~197~~	80.0
Barite	5	2.2
	49	
Total	246	100%

Light Concentrate		
Clay	194	69.3
Chert	83	29.6
Quartz	3	1.1
Total	280	100%

Classification Grouping:

	Absol. %
Primary Minerals: 60.6 %	
Clay	59.7
Quartz	.9
Secondary Minerals: 39.4 %	
Pyrite	.6
Limonite	1.9
Barite	.3
Chert	25.4
Casing Scale	11.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite, gray, buff, cherty, pyritic, granular. Chert 20-25%
Few grains angular to subangular medium qtz sand

(1) Quartz. Av. size .03 mm.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Wooll

A. Acid Treatment (HCl 15 %)

Depth 1380 to 1400

No. of Samples 2

Analyst T & G

Date 7-25-34

1. Sample Weight ..... 40 gr. 100%
2. Filter Paper Wt. .... 1.97 gr.
3. Weight after Acid treatment, with F.P. 31.84 gr.
4. Less Wt. Filter Paper ..... 1.97 gr.
5. Weight of Insoluble Residue ..... 29.87 gr. 74.6%
6. Loss (1 minus 5) .... 10.13 gr. 25.4%

B. Subsidation: 1440 2.23 8.75 2.08

Cylinder (-1/32)	12.17 gr.	40.0%
Jar (1/32-1/64)	6.67	22.3%
Drain	11.03	37.7%
Original (Total)	29.87	100.0%

C. Screen Analysis 12.16

Size	Gram	%
+2-1	.75	6.34
1-1/2	.28	2.58
1/2-1/4	.78	6.58
1/4-1/8	1.80	15.20
1/8-1/16	3.69	31.20
1/16-Pan	4.51	38.10
	11.81	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.57 gr. Size-Grade 1/8-1/4 mm. Date 8/27/34

Heavy Minerals .01 gr. .4 %

Light Minerals 2.50 gr. 99.6 %

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Minerals Identified

Accessory Minerals:

~~Principal Minerals~~

	Abs%	Heavy	Primary	No. Grains	Rel %
Primary 99.2%			Pyrite	931	85.8
Zircon {zoned / unzoned	.0		Limonite	67	6.2
Tourmal. {green / colorless	.8		Cas. scale	61	5.6
Garnet	.8		Zircon {zoned / unzoned	1 / 9	.1 / .8
Hornblende	.0		Tourmal. {green / colorless	6 / 1	.6 / .1
Quartz	8.7		Garnet {ethyl / unethyl	1 / 1	.1 / .1
Clay	91.0		Hornblende	6	.6
Secondary .3%				1084	1.1
Pyrite	.3		Total		100.0%
Limonite	.0				
	100%		Light		
			Secondary		
			Clay	506	91.2
			(1) Quartz	49	8.8
				555 Total	100.0%

Classification Grouping

Well Log Description: Shale; grayish green, noncalcareous

A few calcareous frgmts; also chert frgmts

(1) Tourmaline: green to blk; well rounded.

(2) Quartz: av. size .03 mm.

1350-70

DEEP WELL STUDY

Well No. W— 0011

Depth 1350 to 1370

No. samples used 2

Analyst T. & G.

Date 7-25-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	40.00 gm.	100.0%	2. Wt. of F. P. 1.84
3. Wt. after solution, with filter paper	34.26 gm.		
4. Less wt. F. P. (2)	1.84 gm.		
5. Wt. Insol. Residue (3 minus 4)	32.42 gm.	81.1 %	
6. Wt. lost by solution (1 minus 5)	7.58 gm.	18.9 %	
7. To balance (5 plus 6)	40.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	32.42 gm.	100.0%
2. Cylinder (+1/32)	14.07 gm.	43.4 %
3. Jar (1/32—1/64)	7.39 gm.	22.6 %
4. Drain	11.04 gm.	34.0 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	2.25	16.45
1–½ mm	.39	2.77
½–¼ mm	2.10	14.95
¼–⅛ mm	2.78	19.81
⅛–1/16	2.90	20.52
Pan	3.59	25.50
Total	14.01	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Briard

Date 8/27/34

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/8-1/32 mm.

Wt. of sample 2.57 gm. 100.0%

Heavy Minerals .01 gm. .4 %

Light Minerals 2.56 gm. 99.6 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite		
Limonite	148	10.0
Casing scale	1107	74.5
Zircon	221	14.9
Garnet	6	.4
(1) Tourmaline	2	.1
	2	.1
Total	1486	100%
Light Concentrate		
Clay	609	89.3
(2) Quartz	73	10.7
Total	682	100%

Classification Grouping:

Primary Minerals: 99.6 %

	Absol. %
Zircon	.0
Garnet	.0
Tourmaline	.0
Clay	89.0
Quartz	10.6

Secondary Minerals: .4 %

Pyrite	.0
Limonite	.3
Casing Scale	.1
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale: light green; noncalcareous. Few chert & limestone fragments.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 1330 to 1350

No. of Samples 2

Analyst I & G

Date 7-25-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	40 gr.	100%
2. Filter Paper Wt.	1.94 gr.	
3. Weight after Acid treatment, with F.P.	35.17 gr.	
4. Less Wt. Filter Paper	1.94 gr.	
5. Weight of Insoluble Residue	33.23 gr.	83.2%
6. Loss (1 minus 5)	6.77 gr.	16.8%

B. Subsidation:

Cylinder (-1/32)	14.46 − 1.88	12.58 gr.	37.76%
Jar (1/32-1/64)	12.22 − 2.26	9.96	30.05%
Drain		10.69	32.19%
Original (Total)		33.23	100.00%

C. Screen Analysis 12.37

Size	Gram	%
+2-1	.45	3.64
1-1/2	.08	.64
1/2-1/4	.09	.72
1/4-1/8	223	18.00
1/8-1/16	4.32	34.90
1/16-Pan	5.20	42.10
Tot.	12.37	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.75 gr. Size-Grade 1/8-1/32 mm. Date 8/27/34

Heavy Minerals .01 gr. .4%

Light Minerals 2.74 gr. 99.6%

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / ~~Bromoform~~ } 2.93± sp. gr.

Minerals Identified

~~Principal Minerals~~ Abs'l %

~~Primary~~ 98.3%

Quartz — — — 1.1

Clay — — — — 97.2

~~Secondary~~ 1.7%

Pyrite — — — .0

Arsenopyrite — .0

Limonite — — — .1

Chert — — — — 1.3

Casing Scale, etc — .3

100%

~~Accessory Minerals:~~

Heavy

Primary	No. Grains	Rel %
Pyrite	41	3.7
Arsenopyrite	3	.3
Limonite	213	19.0
Cas. Scale etc.	861	76.8
Zircon	2	.2

Light

Secondary	1120 Total	100%
Clay	543	97.5
Quartz	6	1.1
Chert	8	1.4
	557 Total	100%

Classification Grouping

Well Log Description: Shale; reddish gray to greenish gray; noncalcareous. Few chert fragments

ANALYSIS SHEET--DEEP WELL STUDY

Well No. WO 011

A. Acid Treatment (HCl 15 %)

Depth 1310 to 1330

No. of Samples 2

Analyst T & G

Date 7-25-34

1. Sample Weight ..... 35 gr. 100%
2. Filter Paper Wt. .... 2.17 gr.
3. Weight after Acid treatment, with F.P. 9.88 gr.
4. Less Wt. Filter Paper ..... 2.17 gr.
5. Weight of Insoluble Residue ..... 7.71 gr. 22.03%
6. Loss (1 minus 5) .... 27.29 gr. 77.97%

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis 7.50

Size	Gram	%
+2-1	1.33	17.90
1-½	2.62	35.40
½-¼	1.95	26.12
¼-⅛	.97	13.04
⅛-1/16	.35	4.72
1/16-Pan	.21	2.82
Tot.	7.43	100.00

MINERALOGICAL DATA

Analyst Briard

Sample Weight Used 2.14 gr. Size-Grade ½-Pan mm. Date 8/27/34

Heavy Minerals .03 gr. 1.4 %

Light Minerals 2.11 gr. 98.6 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / Bromoform } 2.93± sp. gr.

Classification Grouping

Principal Minerals		Absolute	Heavy	Primary	No. Grains	Rel. %
Primary	1.7%			Pyrite	132	10.3
Quartz		1.7		Limonite	653	51.1
Tourmaline		.0		Casing Scale	178	13.9
Hornblende		.0		Dolomite	237	18.6
Zircon		.0	(1)	Tourmaline	43	3.4
Garnet		.0		Fluorite	30	2.3
Secondary	98.3%			Hornblende	1	.1
Pyrite		.1	(2)	Zircon	1	.1
Limonite		.7		Garnet	3	.2
Dolomite (HCl)		91.3	Light	Secondary	Total 1298	100.0%
Fluorite		.0		Dolomite	619	92.2
Chert		5.7		Chert	39	5.8
Glauconite		.3		Quartz	11	1.7
Casing Scale		.2		Glauconite	2	.3
		100.0%		Total	671	100.0%

Well Log Description: Dolomite: 70-75%; buff to light gray; granular. Chert: chiefly white.

DEEP WELL STUDY

Well No. W— 0011
Depth 2070 to 2090
No. samples used 2
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	20.34 gm.	100.0%	2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper	7.65 gm.		
4. Less wt. F. P. (2)	2.32 gm.		
5. Wt. Insol. Residue (3 minus 4)	5.33 gm.	26.0 %	
6. Wt. lost by solution (1 minus 5)	15.01 gm.	74.0 %	
7. To balance (5 plus 6)	20.34 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	gm.	100.0%	
2. Cylinder (+1/32)	gm.	%	
3. Jar (1/32—1/64)	gm.	%	
4. Drain	gm.	%	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93+ Sp. gr. Size–Grade(s) comp mm.

Analyst Rowser
Date 8-24-34

Wt. of sample 3.60 gm. 100.0%

Heavy Minerals 0.14 gm. 3.9 %

Light Minerals 3.46 gm. 96.1 %

Shape Analysis:
A ____ %: a 22 %: C 46 %
r 32 %: R ____ %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	1793	97.5
Zircon zoned	6	.3
Zircon unzn.	4	.2
Limonite	20	1.1
Tourmaline	1	.1
Garnet	2	.1
Sphalerite	1	.1
Staurolite	1	.1
Casing scale	9	.5
Total	1837	100%

Light Concentrate

Quartz	603	65.4
Chert	295	32.0
Clay	21	2.3
Glauconite	3	.3
Total	922	100%

Classification Grouping:
Primary Minerals: 65.0 %

	Absol. %
Quartz	62.8
Clay	2.2
Zircon	.0
Tourmaline	.0
Garnet	.0
Staurolite	.0

Secondary Minerals: 35.0 %

	Absol. %
Chert	30.8
Pyrite	3.8
Limonite	.1
Sphalerite	.0
Glauconite	.3
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; ±75%; buff, finely granular; hard; containing ±18% Qtz. snd; chiefly ¼-½; sec. max. ¼-⅛; C. ±5%; Chert, ± 8%; grey to wh; dense. Pyrite abundant.

1. quartz: 1 grain rutilated(?) full of needle-like dark inclusions oriented ∥ to symmetry. 5% of grains show beginnings of secondary enlargement, few grains show x+l faces.

2. garnet: colorless, etched, showing angular indentations suggesting cleavage

3. Zircon: colorless

5. Tourmaline: pleochroic, brown, sub-round grain

7. Pyrite: cubes, in part modified with octahedrons, + aggregates, striated

8. Chert: grains formed around ~~nucleus~~ sub-round quartz grain as nucleus; yellowish to brownish in color

6. Chert: rounded grains, no nuclei

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 2050 to 2070

1. Sample Weight ..... 20.89 gr. 100% No. of Samples 2
2. Filter Paper Wt. .... 2.33 gr. Analyst T+G.
3. Weight after Acid treatment, with F.P. 7.27 gr. Date 7/23/34
4. Less Wt. Filter Paper ..... 2.33 gr.
5. Weight of Insoluble Residue ..... 4.94 gr. 23.6%
6. Loss (1 minus 5) .... 15.95 gr. 76.4%

C. Screen Analysis

Size	Gram	%

B. Subsidation:
Cylinder (-1/32) .... ____ gr. ____%
Jar (1/32-1/64) ..... ____ ____%
Drain ..... ____ ____%
Original (Total) .... ____ ____%

MINERALOGICAL DATA Analyst Stookey

Sample Weight Used 3.56 gr. Size-Grade ¼-½ mm. Date 8/6/34

Heavy Minerals .07 gr. 1.9 %

Light Minerals 3.49 gr. 98.1 %

Shape Analysis: A 0 %; a 10 %; C 80 %; r 8 %; R 2 %

Acet.Tetrabr.) / ~~Bromoform~~ } 2.907 sp. gr.

Principal Minerals — Absol. %

Primary 93.12%
- Garnet 0
- Zircon 0
- Augite 0
- Tourmaline 0
- Quartz 93.1

Secondary 6.9
- Chert 5.1
- Pyrite 1.8

100.0%

Classification grouping

Minerals identified

Accessory Minerals:

	No. of Grains	Rel. %
~~Primary~~ Heavy		
2. garnet	3	1.
3. zircon	1	0.
4. augite	1	0.
5. tourmaline	1	0.
7. pyrite	250	98.
	256	100.0%
~~Secondary~~ light		
1. Quartz	200	95.
8. chert	11	5.
	211	100.0%

Well Log Description: Dolomite, buff, granular, upper 10' shows ± chert, deposited around nuclei of qutz grains, and chert in rounded grains. Few frags green shale. Lower 10' shows little chert, + 15-20% quartz sand, + pyrite. Acc. Min. A 0%, a 10%, C 80%, r 8%, R 2%.

DEEP WELL STUDY

Well No. W— 0011

Depth 2010 to 2030

No. samples used 2

Analyst T. & G.

Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 20.07 gm. 100.0%: 2. Wt. of F. P. 2.30
3. Wt. after solution, with filter paper . . . . . 5.40 gm.
4. Less wt. F. P. (2) . . . 2.30 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 3.10 gm. 15.4 %
6. Wt. lost by solution (1 minus 5) . . . . . 16.97 gm. 84.6 %
7. To balance (5 plus 6) . . 20.07 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) gm. %
3. Jar (1/32—1/64) gm. %
4. Drain . . . . . gm. %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } Sp. gr. Size–Grade(s) Comp mm.

Analyst

Date

Wt. of sample . . . . 2.91 gm. 100.0% Shape Analysis:

Heavy Minerals . . . . .04 gm. 1.4 % A %: a %: C %

Light Minerals . . . . 2.87 gm. 98.6 % r %: R %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	Abd	
Tourmaline	2	
Barite	1	
Sphalerite	2	
Garnet	1	
Casing Scale	206	
Total	633	100%

Classification Grouping: Absol. %

Primary Minerals: %

Light Concentrate

Secondary Minerals: %

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

1. Isometric xtln. aggreg.

3. Common

4. cleavage frags,

6. Colorless, few grains etched

8. 2 grains with rutile (?) needles

9. Many grains show concentric structure.

10. Nuclei of some grains microcline, albite (?) + orthoclase, rounded grains with secondary growth, others apparently authigenic orthoclase. Subhedral frags without nuclei.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W-011

A. Acid Treatment (HCl 15 %) Depth 1990 to 2010

1. Sample Weight ..... 20.43 gr. 100% No. of Samples 2

2. Filter Paper Wt. .... 1.92 gr. Analyst T + Gr

3. Weight after Acid treatment, with F.P. 5.55 gr. Date 7/23/34

4. Less Wt. Filter Paper ..... 1.92 gr.

5. Weight of Insoluble Residue ..... 3.63 gr. 17.7 %

6. Loss (1 minus 5) .... 16.80 gr. 82.3 %

C. Screen Analysis

Size	Gram	%

B. Subsidation:

Cylinder (-1/32) .... -.- gr. ___ %

Jar (1/32-1/64) ..... ___ ___ %

Drain ..... ___ ___ %

Original (Total) .... ___ ___ %

MINERALOGICAL DATA Analyst Stookey

Sample Weight Used 3.31 gr. Size-Grade 1/2 - 1/4 mm. Date 8/5/34

Heavy Minerals .08 gr. 2.4 %

Light Minerals 3.23 gr. 97.6 %

Shape Analysis: A 2 %; a 3 %;

C 65 %; r 25 %; R 5 %

Acet.Tetrabr.) / Bromoform } 2.93± sp. gr.

(Minerals identified)

Principal Minerals

	Absol. %
Primary 66.6%	
Hornblende	.0
Tourmaline (brn)	.0
Garnet	.0
Quartz	58.0
Clay	8.6
Secondary 33.4%	
Pyrite	1.4
Limonite	.9
Sphalerite	.0
Barite	.0
Feldspar (authi).	10.8
Chert	20.3
	100.0%

Accessory Minerals:

	No. of Grains	Rel. %
Primary Heavy		
1. Pyrite	243	57.0
2. Limonite	165	38
3. Hornblende	6	1.
4. Sphalerite	3	1.
5. Tourmaline (brn)	3	1.
6. Garnet	4	1.
7. Barite	2	1.
Secondary Light	426	100.0%
8. Quartz	162	59.
9. Chert	57	21.
10. Feldspar (authigenic)	30	11.
11. Clay	24	9.
	273 1/2 %	100.0%

Classification grouping

Well Log Description: Dolo. buff, granular, cherty. a 3%, C 65%, r 25%; R 5%. Maj. Gr. 1/2 - 1/4, 60%, 1/8 - 1/4 20%, 1/8 - 1/16, 20%

*chert: is both primary and secondary; about 2/3 is in rounded grains, while rest is secondary

DEEP WELL STUDY

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30.57 gm.	100.0%	2. Wt. of F. P.	2.37
3. Wt. after solution, with filter paper	8.88 gm.			
4. Less wt. F. P. (2)	2.37 gm.			
5. Wt. Insol. Residue (3 minus 4)	6.51 gm.	21.3 %		
6. Wt. lost by solution (1 minus 5)	24.06 gm.	78.7 %		
7. To balance (5 plus 6)	gm.	%		

B. Subsidation:

1. Original Wt.	gm.	100.0%
2. Cylinder (+1/32)	gm.	%
3. Jar (1/32—1/64)	gm.	%
4. Drain	gm.	%

Well No. W— 0011

Depth 1950 to 1970

No. samples used 2

Analyst T. & G.

Date 7-23-34

C. Screen Analysis 6.25

SIZE	GRAMS	%
2 plus		
2–1 mm	.64	11.20
1–½ mm	1.29	20.31
½–¼ mm	2.23	34.00
¼–⅛ mm	1.40	22.17
⅛–1/16	.42	6.64
Pan	.36	5.68
Total	6.34	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ¼-Pan mm.

Analyst Rowser

Date aug 29, 1934

Wt. of sample 2.12 gm. 100.0%

Heavy Minerals .14 gm. 6.6 %

Light Minerals 1.98 gm. 93.4 %

Shape Analysis: A ____ %: a 9 %: C 72 %

r 17 %: R 2 %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	379	25.4
Zircon	3	.2
Tourmaline	1	.1
Hornblende	1	.1
Sphalerite	1	.1
Pistacite	2	.1
garnet	1	.1
Barite	1080	73.8
cas. Scale		.1
Total	1464	100%

Classification Grouping:

Primary Minerals: 74.8 %	Absol. %
Quartz	41.0
Clay	28.9
Chert (329 grains)	4.9
Zircon	.0
Tourmaline	.0
Hornblende	.0
Pistacite	.0
garnet	.0

Light Concentrate	No. of Grains	Rel. %
Quartz	272	43.8
clay	193	31.0
*Chert	150	24.2
Feldspar	6	1.0
Total	621	100%

Secondary Minerals: 25.2 %

	Absol. %
Chert	19.7
Feldspar	.9
sphalerite	.0
Barite	.0
Pyrite	1.7
Closing Scale	4.9
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite ± 78%; gray, to buff, granular, cherty; Chert ± 10%; wh; colitic in part; Sh; ± 8%; green; Some well frosted sand.

1. Isometric x'tln masses

2.

3. cleavage frags & crystals(?), not worn.

4. Pleochroism bl-grn to yel-grn. Pargasite(?)

6. Grains ~~$\frac{1}{4}$~~ - $\frac{1}{8}$

7. Irregular masses

8. Authigenic, ~~few~~ grains have rounded nuclei. The grains are $\frac{1}{16}$ to pon, ~~few larger~~ $\frac{1}{8} - \frac{1}{16}$

ANALYSIS SHEET--DEEP WELL STUDY Well No. WO011

A. Acid Treatment (HCl 15 %) Depth 1920 to 1950

1. Sample Weight ..... 20.00 gr. 100% No. of Samples 1

2. Filter Paper Wt. .... 2.38 gr. Analyst T+G

3. Weight after Acid treatment, with F.P. 10.88 gr. Date 7/23/34

4. Less Wt. Filter Paper ..... 2.38 gr.

5. Weight of Insoluble Residue ..... 8.50 gr. 42.4%

6. Loss (1 minus 5) .... 11.50 gr. 57.6%

B. Subsidation:

Cylinder (-1/32) .... ____ gr. ____%

Jar (1/32-1/64) ..... ____ ____%

Drain ..... ____ ____%

Original (Total) .... ____ ____%

C. Screen Analysis 8.49

Size	Gram	%
+2-1	.67	8.02
1-½	2.47	29.86
½-¼	3.27	38.29
¼-⅛	1.16	13.90
⅛-Pan	.32	3.83
	.51	6.10
Tot.	8.35	100.00

MINERALOGICAL DATA Analyst Stookey

Sample Weight Used 1.81 gr. Size-Grade ¼-pan mm. Date 8/10/34

Heavy Minerals .01 gr. .6 %

Light Minerals 1.80 gr. 99.4 %

Shape Analysis: A 2 %; a 10 %; C 80 %; r 7 %; R 1 %

Acet.Tetrabr.) / Bromoform } 2.93 ± sp. gr.

Principal Minerals

	Absol. %
Primary 14.5%	
Tremolite	.0
Hornblende	.0
Zircon	.0
Quartz	14.5
Secondary 85.5%	
Feldspar	73.6
Chert	11.3
Limonite	.3
Pyrite	.3
	100.0%

Accessory Minerals:

	Minerals identified	No. of grains	Rel. %
Primary Heavy			
1	Pyrite	127	50.1
2	Limonite	120	47.5
3	Tremolite	4	1.6
4	Hornblende	1	.4
5	Zircon (unzoned)	1	.4
Secondary Light	Total	253	100.0%
6	Quartz	82	14.6
7	Chert	64	11.4
8	Feldspar	413	74.0
	Total	559	100.0%

Well Log Description: Limestone, dolomitic, hard, granular, white, cherty, quartz sand A 2%, a 10% C 80%, r 7%, R 1%. 38.29 % ½-½, 29.86 % 1-½, 13.90 ¼-⅛. Few frags green shale

1. Ktln aggregates, isometric

2. ± oblong rounded grains ⊙. Pleochroic

3. Small rounded grains

4. May be in part from rusted casing

5.

6. Not magnetic

7.

8. Grains frosted & pitted. Few short rutile(?) needles

9. Probably corings

10. Small irreg. masses

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

Screen

A. ~~Acid Treatment~~ (HCl _____%)

1. Sample Weight ..... 30.99 gr. 100%
2. Filter Paper Wt. .... _____ gr.
3. Weight after Acid treatment, with F.P. _____ gr.
4. Less Wt. Filter Paper ..... _____ gr.
5. Weight of Insoluble Residue ..... _____ gr. _____%
6. Loss (1 minus 5) .... _____ gr. _____%

Depth 1890 to 1905

No. of Samples 2

Analyst T. + G.

Date 7/27/34

B. Subsidation:
Cylinder (-1/32) .... _____ gr. _____%
Jar (1/32-1/64) ..... _____ _____%
Drain ..... _____ _____%
Original (Total) .... _____ _____%

C. Screen Analysis

Size	Gram	%
1+	2.71	8.89
1-1½	2.56	8.39
½-¼	14.76	48.63
¼-⅛	8.43	27.71
⅛-1/16	1.84	6.02
1/16-Pan	.11	.36
Tot	30.41	100.00

MINERALOGICAL DATA Analyst Stookey

Sample Weight Used 3.18 gr. Size-Grade ½-¼ mm. Date 8/10/34

Heavy Minerals .035 gr. 1.0 %

Light Minerals 3.145 gr. 99.0 %

Shape Analysis: A _____%; a _____%; C 75 %; r 20 %; R 5 %

Acet.Tetrabr.) / Bromoform } 2.93 + sp. gr.

Classification Group(?)

Principal Minerals — Abs. %

Primary 99.0%

Tourmaline	.0
Zircon	.0
Garnet	.0
Ilmenite	.0
Quartz	91.2
	7.8

Secondary 1.0%

Pyrite	1.0
Limonite	.0
Leucoxene	.0
Calcite	
	100.0 %

Minerals identified — Accessory Minerals:

	Primary Heavy	No. of Grains	Rel. %
1	Pyrite	125	85.
2	(brn) Tourmaline	6	4.
3	Zircon (unzoned)	4	3.
4	Limonite	5	3.
5	Garnet	1	1.
6	Ilmenite(?)	4	3.
7	Leucoxene	1	1.
	Secondary Light	146	100.0%
8	Quartz	420	92.
9	Clay	36	8.
10	Calcite		
		456	100.0 %

Well Log Description: Sandstone, quartz frosted + pitted grains.

R 5%, r 20%, C 75%.

1. Isometric root-like ± irregular thin masses and isolated crystal
2. Includes pyrite masses imbedded in a small amt. of shale
3. ...
4. Common
5. Yellow-brown, transparent, under high above balsam, conch. frac., show little abrasion
6. Frosted, pitted, numerous inclusions
7. Fragments of aggregated clay particles with minute pyrite inclusions
8. Subhedral & anhedral orthoclase, 2 or 3 grains with nuclei of orthoclase

Nos. 3 & 7 added for absol %
" 1 & 2 " " " " "

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Woon

A. Acid Treatment (HCl 15 %)

Depth 1878 to 1890

No. of Samples

Analyst T+G

Date 7/23/34

1. Sample Weight	26.04 gr.	100%	
2. Filter Paper Wt.	2.52 gr.		
3. Weight after Acid treatment, with F.P.	25.54 gr.		
4. Less Wt. Filter Paper	2.52 gr.		
5. Weight of Insoluble Residue	23.02 gr.	88.5%	
6. Loss (1 minus 5)	3.02 gr.	11.5%	

B. Subsidation:

Cylinder (-1/32)	15.33 gr.	66.4%	17.38, 2.05, 4.84, 2.20
Jar (1/32-1/64)	2.64	11.8%	
Drain	5.05	21.8%	
Original (Total)	23.02	100.0%	

C. Screen Analysis 15.39

Size	Gram	%
+2-1	1.13	7.36
1-½	3.50	21.90
½-¼	4.38	27.45
¼-⅛	1.98	12.89
⅛-1/16	1.71	12.66
¼-Pan	2.64	17.74
T.T.	15.34	100.00

MINERALOGICAL DATA

Analyst Hookey

Sample Weight Used 2.09 gr. Size-Grade ¼ to pan mm. Date 8/10/34

Heavy Minerals .06 gr. 2.8 %

Light Minerals 2.03 gr. 97.2 %

Shape Analysis: A %; a 3 %; C 70 %; r 25 %; R 2 %

Acet.Tetrabr.) Bromoform } 2.93 sp. gr.

Principal Minerals 46 sol.%

Primary 96.89%

Quartz	3.2
Hornblende	.0
Garnet (?)	.0
Shale (Heavy + light)	93.6

Secondary 3.27%

Pyrite + pyrite with shale	2.7
Feldspar	.5

Accessory Minerals:

Minerals identified	No. of Grains	Rel. %
Primary Heavy		
1. Pyrite	112	86.6
2. Pyrite with shale	15	11.6
3. Shale with pyrite	2	1.8
4. Hornblende	1	.0
5. Brown garnet(?)	1	.0
Secondary Light	Total 291	100.0%
6. Quartz	31	3.3
7. Shale	905	96.2
8 Feldspar (auth.)	5	.5

Classification grouping

100.0%

Well Log Description: Shale, green ~~(no) Cuttings~~ Total 941 + calc 100.0%

upper 2', hard, splintery, ~~fissile~~ below. Lower 10' has 15% quartz sand, ~~the~~ great majority ¼-⅛ mm. Pyritic. 1-½ 21.90% (largely shale), ½-¼ 27.45%, ¼-⅛ 12.89%, ⅛-1/16 12.66, ¼-pan 17.74%. a 3%, (mostly ¼-⅛) C 70%, r 25%, R 2%.

9+10- the clay frag. make up the larger size grades; while Quartz frag. are all very small (<½)

DEEP WELL STUDY

Well No. W— 0011
Depth 1860 to 1878
No. samples used 2
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	25.45 gm.	100.0%	2. Wt. of F. P. 2.29
3. Wt. after solution, with filter paper	13.64 gm.		
4. Less wt. F. P. (2)	2.29 gm.		
5. Wt. Insol. Residue (3 minus 4)	11.35 gm.	44.6 %	
6. Wt. lost by solution (1 minus 5)	14.10 gm.	55.4 %	
7. To balance (5 plus 6)	25.45 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	11.35 gm.	100.0%
2. Cylinder (+1/32)	10.13 gm.	89.34 %
3. Jar (1/32—1/64)	.32 gm.	2.82 %
4. Drain	.90 gm.	7.84 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	.91	9.05
1–½ mm	3.55	35.40
½–¼ mm	3.27	32.60
¼–⅛ mm	1.12	11.15
⅛–1/16	.50	4.97
Pan	.70	6.83
Total	10.05	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowsey
Date 8-27-34

Acet. Tetrabr. / ~~Bromoform~~ } ± 2.93 Sp. gr. Size–Grade(s) ¼-1/32 mm.

Wt. of sample 2.25 gm. 100.0%

Heavy Minerals .04 gm. 1.8 %

Light Minerals 2.21 gm. 98.2 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
1 Pyrite	1174	82.5
2 Zircon [zoned	25	1.8
2 Zircon [unzoned	7	.5
3 Tourmaline [brown	3	.2
3 Tourmaline [blue	2	.1
3 Tourmaline [green	6	.4
4 Garnet	5	.4
5 Staurolite(?)	1	.1
6 Casing scale	160	11.3
7 Quartz	25	1.8
8 Clay	13	.9
Total	1421	100%
Light Concentrate		
9 Clay	700	64.5
10 Quartz	371	34.1
11 Chert	15	1.4
Total	1086	100%

Classification Grouping:

	Absol. %
Primary Minerals: 96.8 %	
Clay	63.3
Quartz	33.5
Zircon	.0
Tourmaline	.0
Garnet	.0
Staurolite	.0
Secondary Minerals: 3.2 %	
Pyrite	1.6
Chert	1.4
Casing Scale	1.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale; 45-50%; green, fissile; hard;
LS; 45-50%; hard, gray, with a little yellow chert;
Pyrite abundant (chiefly in the shale)

DEEP WELL STUDY

Well No. W— 0011
Depth 1850 to 1860
No. samples used 1
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	10 gm.	100.0%	2. Wt. of F. P. 2.53
3. Wt. after solution, with filter paper	5.49 gm.		
4. Less wt. F. P. (2)	2.53 gm.		
5. Wt. Insol. Residue (3 minus 4)	2.96 gm.	29.6 %	
6. Wt. lost by solution (1 minus 5)	7.04 gm.	70.4 %	
7. To balance (5 plus 6)	10.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	2.96 gm.	100.0%
2. Cylinder (+1/32)	1.57 gm.	63.0 %
3. Jar (1/32—1/64)	.26 gm.	4.2 %
4. Drain	1.13 gm.	32.8 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Bowser
Date 8/27/34

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) + 1/32 mm.

Wt. of sample 1.45 gm. 100.0%

Heavy Minerals 0.8 gm. 5.5 %

Light Minerals 1.37 gm. 94.5 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1505	92.0
Tremolite	3	.2
Zircon	3	.2
green Tourmaline	1	.1
Common hornblende	1	.1
Casing Scale	121	7.4
Total	1634	100%

Light Concentrate		
clay	460	96.8
Quartz	15	3.2
Total	475	100%

Classification Grouping:
Primary Minerals: 94.5 %

	Absol. %
clay	91.5
quartz	3.0
Tremolite	.0
Tourmaline	.0
Hornblende	.0
Zircon	.0

Secondary Minerals: 5.5 %

Pyrite	5.1
Casing Scale	.4
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone ±70%; gray; somewhat silty; shale, ±30%; green, thinly laminated; Pyrite common.

DEEP WELL STUDY

Well No. W— 0011
Depth 1845 to 1850
No. samples used 1
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	15.00 gm.	100.0%	2. Wt. of F. P. 2.47
3. Wt. after solution, with filter paper	15.64 gm.		
4. Less wt. F. P. (2)	2.47 gm.		
5. Wt. Insol. Residue (3 minus 4)	13.17 gm.	87.8 %	
6. Wt. lost by solution (1 minus 5)	1.83 gm.	12.2 %	
7. To balance (5 plus 6)	15.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	13.17 gm.	100.0%
2. Cylinder (+1/32)	9.77 gm.	74.22%
3. Jar (1/32—1/64)	1.84 gm.	13.95%
4. Drain	1.56 gm.	11.83%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	.29	2.98
1–½ mm	.58	5.97
½–¼ mm	1.45	14.90
¼–⅛ mm	1.92	19.73
⅛–1/16	2.51	25.78
Pan	2.96	30.64
Total	9.71	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date Aug 27, 1934

Acet. Tetrabr. / ~~Bromoform~~ } +2.93 Sp. gr. Size–Grade(s) ¼–1/32 mm.

Wt. of sample 1.81 gm. 100.0%

Heavy Minerals .03 gm. 1.7 %

Light Minerals 1.78 gm. 98.3 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	2731	88.2
Barite	8	.3
Zircon (zoned)	3	.1
clay	232	7.5
Hornblende	1	.0
Casing Scale	121	3.9
Total	3096	100%

Light Concentrate
clay 100%

Classification Grouping:

	Absol. %
Primary Minerals: 98.4%	
clay	98.4
Zircon	.0
Hornblende	.0

Secondary Minerals: 1.6 %

Pyrite	1.5
barite	.0
Casing scale	.1
Total	100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale ± loamy, green, "gummy", slightly calcareous; a very few traces of dolomite, probably from above; Pyrite abundant.

DEEP WELL STUDY

Well No. W— 0011
Depth 1830 to 1845
No. samples used 2
Analyst T. & G.
Date 7-23-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	20.00 gm.	100.0%	2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper	5.59 gm.		
4. Less wt. F. P. (2)	2.32 gm.		
5. Wt. Insol. Residue (3 minus 4)	3.27 gm.	83.7 %	
6. Wt. lost by solution (1 minus 5)	16.73 gm.	16.3 %	
7. To balance (5 plus 6)	20.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	3.27 gm.	100.0%
2. Cylinder (+1/32)	2.28 gm.	69.6 %
3. Jar (1/32—1/64)	.24 gm.	7.4 %
4. Drain	.75 gm.	23.0 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date August 4, 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) +1/32 mm.

Wt. of sample 2.12 gm. 100.0%

Heavy Minerals 0.15 gm. 7.0 %

Light Minerals 1.97 gm. 93.0 %

Shape Analysis:
A ____ %: a ____ %: C ____ %
r ____ %: R ____ %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	541	84.3
Limonite	46	7.2
Zircon	2	.3
Garnet	1	.1
Tourmaline blue	1	.1
Tourmaline green	1	.1
Casing scale	51	7.9
Total	643	100%
Light Concentrate		
Clay	541	74.8
Quartz	126	17.4
Chert	56	7.8
Total	723	100%

Classification Grouping:

Primary Minerals: 85.8%	Absol. %
Clay	69.5
Quartz	16.2
Zircon	.1
Garnet	.0
Tourmaline	.0

Secondary Minerals: 14.2 %

Chert	7.3
Pyrite	5.9
Limonite	.5
Casing Scale	.5
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone ±84%; hard; gray; containing shell fragments, a few frag. of brown ls.; Sh; 10-15%; Slty, 1 or 2%, a little chert; Pyrite abundant.

ANALYSIS SHEET--DEEP WELL STUDY Well No. W0011

A. Acid Treatment (HCl 15 %) Depth 1670 to 1690

1. Sample Weight ..... 35 gr. 100% No. of Samples 2

2. Filter Paper Wt. .... 2.04 gr. Analyst T & G

3. Weight after Acid treatment, with F.P. 5.85 gr. Date 7-25-34

4. Less Wt. Filter Paper ..... 2.04 gr.

5. Weight of Insoluble Residue ..... 3.81 gr. 10.9 %

6. Loss (1 minus 5) .... 31.19 gr. 89.1 %

B. Subsidation:

Cylinder (-1/32) .... 3.52 gr. ____ %

Jar (1/32-1/64) ..... ____ ____ %

Drain ..... ____ ____ %

Original (Total) .... ____ ____ %

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA Analyst Stookey

Sample Weight Used 3.52 gr. Size-Grade comp mm. Date 8/6/34

Heavy Minerals .16 gr. 4.5 %

Light Minerals 3.41 gr. 95.5 %

Shape Analysis: A 1 %; a 5 %; C 30 %; r 60 %; R 4 %

Acet.Tetrabr. / Bromoform } 2.93 ± sp. gr.

Principal Minerals

Primary 67.4% Absol. %

Zircon 3

Quartz ... 67.1

Secondary 32.6%

Fluorite(?) 3

Pyrite ... 3.9

Feldspar ... 10.6

Chert ... 17.8

Total 100.0%

Accessory Minerals:

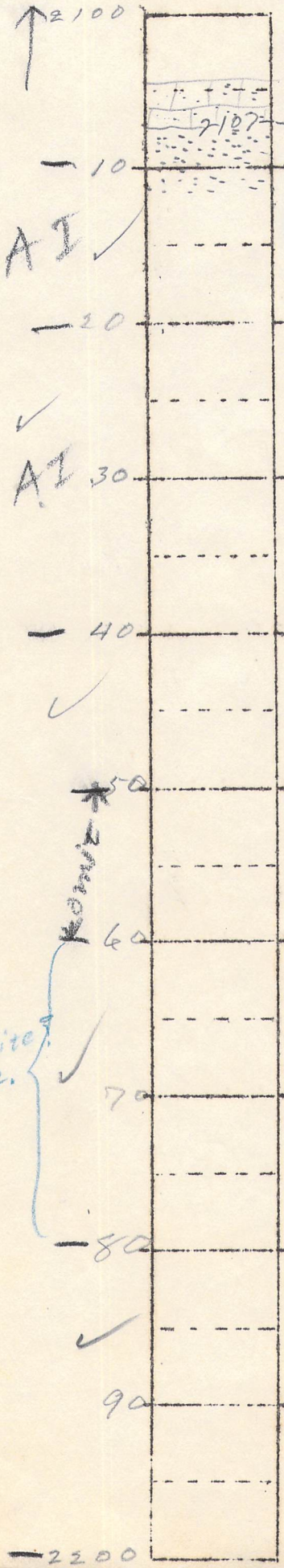
Minerals identified	No. of Grains	Rel. %
Primary Heavy		
1. Pyrite	301	98.
2. Zircon (unzoned)	2	1.
3. Fluorite (?)	2	1.
	305	100.0%
Secondary Light		
4. Quartz	270	70.
5. Chert	70	19.
6. Feldspar (Authi.)	42	11.
	382	100.0%

Well Log Description: Dolomite, buff, med. to coarse xtln., xtln aggr. pyrite. A 1%, a 5%, C 30%, r 60%, R 4%. Maj. grd $\frac{1}{8}$-$\frac{1}{16}$, 75%, $\frac{1}{16}$-$\frac{1}{32}$ 25%.

W 0011

Name of Well Nevada Iowa Sheet No. 22

Depth Range 2100-2300 Scale: 1 inch=10 feet.



Dolomite - finely granulated, 50-55% sand - fine, subangular to curvilinear, in part euhedral - 45-50%. 2% ± of oolitic chert.

about 55-60% angular
sandstone - fine to medium, ~~subangular~~ to curvilinear, in a large part euhedral. Dolomite, granular - 45% ±, bearing chert oolites. Chert oolites = 2-3% of sample.

sandstone - fine to medium, subangular to curvilinear, in part frosted, in part euhedral. - about 70%, cemented by CaCO, in part. dolomite - 20% ±. Some cherty oolite.

sandstone - as above - 50-55%.
dolomite - white, granular - 45-50%
A little cherty oolite.

Dolomite, hard, white, granular → in part, sandy.
= 60-65%. Sand - fine to medium, subangular to curvilinear. 35-40%.

sandstone + dolomite - about 50-50.
Characters essentially same as above.

sandstone + dolomite - about 50-50.
sand - chiefly fine, subangular.
Dolomite - white, granulated.

sandstone - chiefly fine, subangular, quartz. Dolomite - white, granular, about 10%.

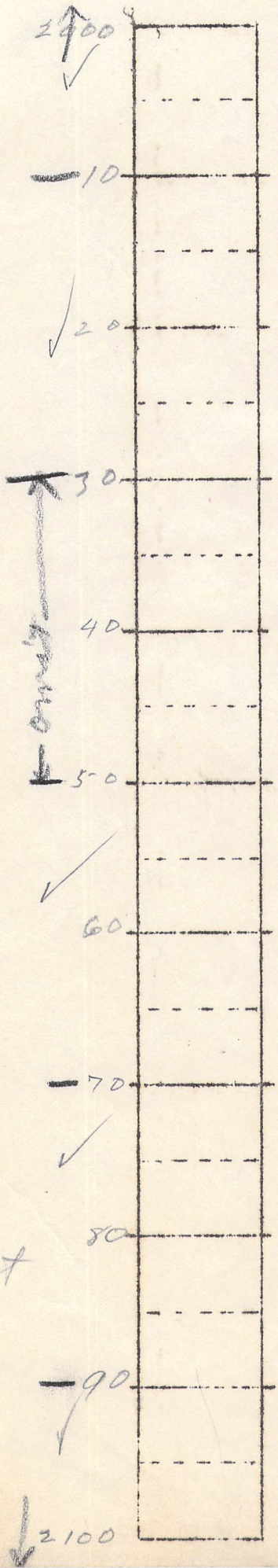
sandstone - chiefly fine, subangular, Granulated dolomite = 10% ±.

sandstone - frosted, medium, subangular to subround - chiefly curvilinear. Max. grade = 1mm. ± subround. Dolomite = 1-2%.

W 0011

Name of Well Nevada, Iowa Sheet No. 21

Depth Range 2000'-2100 Scale: 1 inch=10 feet.



Dolomite - light buff, hard, granular, chert less than 1%. Chert oolites rare. Few green shale fragments. Some pyrite.

Dolomite - buff to white, granular, chert - about 1%. sand, medium, frosted, curvilinear to subround. A few calcite crystals. Few of green shale.

Dolomite, hard, white, granular. About 2% chert. A few striated calcite crystals. Striations seem to be caused by shearing. Pyrite common. Few quartz grains

Dolomite - white, granulated. medium quartz sand - 15-90 ±; some rounded + frosted. Some euhedral. Some pyrite. A few grains of calcite. Few pieces green shale

Dolomite, buff to white, finely granulated, sand as above - 10%±. Chert oolites rare. Pyrite present. Few pieces green shale.

Dolomite - buff, granular, cherty. chert = 3-5%, in part oolitic. Quartz sand - in part euhedral, in part rounded less 1%. Some green shale.

Dolomite - granulated, buff. sand - 15-20% medium euhedral to subround. Pyrite present. Few chert fragments.

Dolomite - finely granulated, buff. 10-15% fine quartz sand, angular to curvilinear. chiefly angular, euhedral. pyrite present.

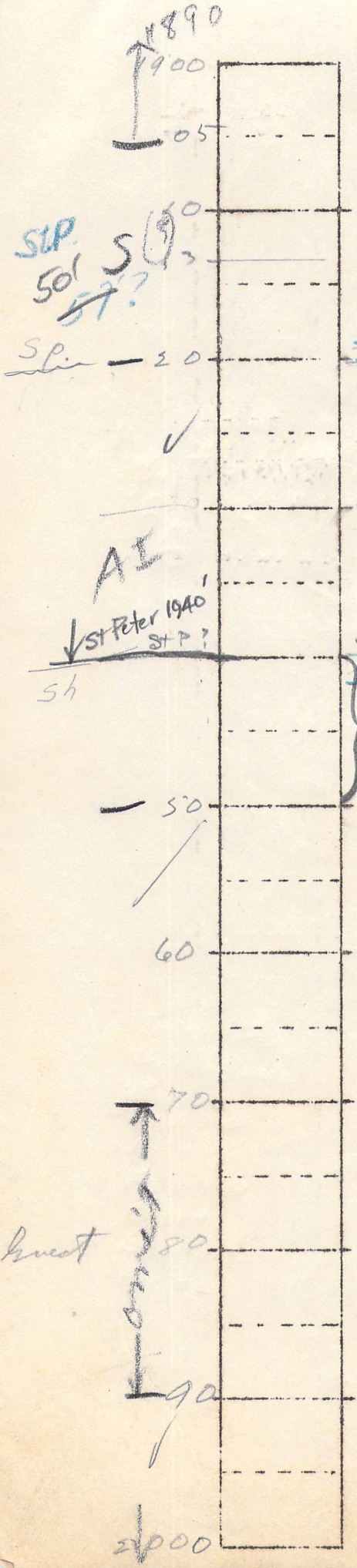
Dolomite - finely granulated, buff. sand, quartz, as above - 20-25%. One chert oolite seen.

Dolomite - same as above. sand - 30-40%, as above. chert - less than 1%. Chert oolites rare.

W 0011

Name of Well Nevada, Iowa Sheet No. 20

Depth Range 1900'-2000' Scale: 1 inch=10 feet.



sandstone - same as above. Shale - 10 ±90 green, splintery, probably from above. Pyrite present.

sandstone - curvilinear to subround, frosted quartz, major grade ½-¼ mm, 20-25 ±90 hard, splintery, green shale. sand - 40-50 ±90 as above. Green shale, probably from above - 30-40 ±90.

sand - frosted, curvilinear to subround, major grade ½-¼ mm., uniform. About 1 ±90 of green shale.

Dolomitic limestone - hard, granular, white, cherty. Chert = 10-15 ±90. Quartz sand as above = about 10 ±90. Few fragments of green shale

Dolomite - gray-buff, granular, cherty. Chert = 3 ±90. About 1 ±90 of medium, frosted quartz sand. Green shale 2-3 ±90. (This material stained by rust.)

Dolomite - hard, gray-buff, granular. 10-15 ±90 - hard, white, chert. Few sand grains as above. Few green shale pieces. Few grains ferruginous chert.

Dolomite - gray, granular, cherty. Chert oolites = 1 ±90 of sample. These oolites are as large as 1mm. Chert = 2-3 ±90. Less 1 ±90 quartz sand. ± green shale

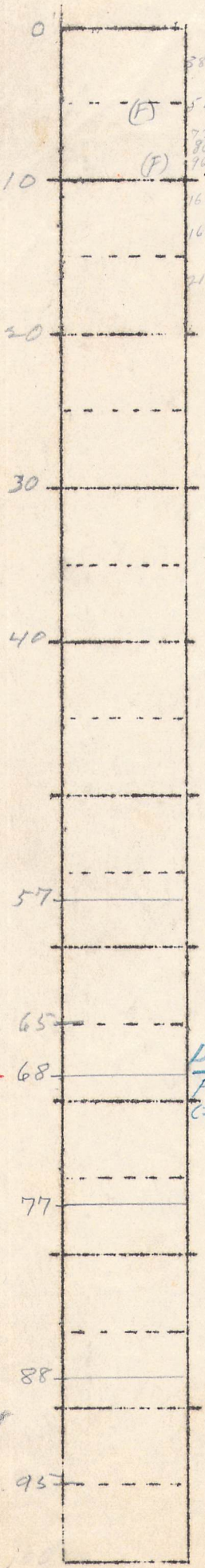
Dolomite - buff, granular, cherty. Chert = 25 ±90, in part oolitic. Few grains quartz sand. ± green shale

Dolomite - granular, cherty, buff. Chert = about 4 ±90. Frosted, medium quartz sand - about 1 ±90. (from above). Few cherty oolites. Little green shale.

Curb 1005'

Name of Well Nevada City, Ion Sheet No. 1

Depth Range 0' - 100' Scale: 1 inch=10 feet.



silt - gray, calcareous, sandy with admixture of quartz, limestone, and igneous pebbles up to 8mm. in diam.

silt - gray, calcareous, sandy as above, pebbles of quartz, limestone, shale, chert, etc. admixed.

silt - gray, compact, only slightly calcareous, sandy, but fewer pebbles than above, leached more than above.

silt - buff colored, sandy, more calcareous and less compact than above, contains a few pebbles of erratic material.

silt - very calcareous, sandy, pebbly, sand & pebbles = 25-30%, - admixture of quartz, limestone, igneous material.

gravel - major grade = 4-8 mm. Max. grade = 16 mm.; angular to subround. Admixture of quartz, light & dark igneous rock, limestone, etc. probably interglacial.

clay - stiff gumbo, non-calcareous, with gravel admixture from above - 15 - 25%.

Drift

Penn. (312')

clay or shale - purplish, soapy, non-calcareous, with a few glacial pebbles from above. 15-20% gumbo same as above

clay or shale - purple with some intermixed gray of same character. This material is soapy and non-calcareous. Few pebbles from above.

clay - gray to almost black, non-calcareous carbonaceous. Contains a few limestone & other foreign pebbles, probably from above.

shale - black, carbonaceous, "pimply slate", containing sphaleritic & calcitic concretions. Gives H_2S gas in acid - from sphalerite.

Mineral study: Rowser = 88 - 270'
Briard = 270 - 1480'
Storey = 1480 - 2440'
Powers = 2440 - 2790'

PLEISTOCENE

PENNS.

AI or Sub Carb

W-0011

		Fluorite	Apatite	Chitin	Barite	Anhydrite	Pyrite	Sphalerite	Zircon [Zoned]	Zircon [Unzoned]	Tourmaline [green]	Tourmaline [brown]	Tourmaline [blue]	Garnet	Leucoxene	Anatase	Titanite	Rutile	Ilmenite + Mag	Limonite + Hema.	Glauconite	Hornblende	Tremolite	Mica	Chlorite	Epidote	Staurolite	Celestite		Anhydrite	Chert	Clay aggregates	Feldspar	Glauconite	Gypsum	Muscovite	Quartz
New Richmond	Sandstone [2110-2210]	X ??		X	X	X	A		R	R	R	R	X	R							X	X									X		R				F
Oneota	Dolomite [2220-2390]				X	X	F		X	R	X	R		X					X	A								X			C	G	C				F
Jordan	Sandstone [2390-2420]						A	R	R		R			R						A													R				F
St. Lawrence & Lodi	Dolomite [2420-2440]						A	X	R	X	R	X	X	C		X						X		X	X							R	A	R		X	A
	Limestone shaly [2600-2680]						F	X	R	X	R	X		X						C		X									very C	A	R		R	C
Franconia	Shale very calcareous 2680-2730						A		R	X	R	R	X	R	X						X	X	X		X						A	C	C		R	C
	Sandstone 2730-2760			C			C		C	C	R	R	X	C	X		X			C	R										R	C	C			A
	Sandstone + Shale 2760-2790						very A		R	X	R	R	X	R							X										A	R	R			A

Cambrian

Ordovician								Silurian						
Shakopee	St. Peter	Glenwood	Platteville	Galena			Maquoketa							
Dolomite (1920-2110)	Sandstone (1890-1905)	Shale (1845-1883)	Limestone (1750-1845)	Dolomite (1630-1750)	Dolomite (1520-1610)	Dolomite (1420-1520)	Shale (1330-1440)	Dolomite (1310-1330)	Chert Rock (10-40% dolomite) 1210-1318	Dolomite 1120-1210	Dolomite 1100-1120	Gypsum, Anhydrite & limestone 1070-1100	Limestone 1020-1070	
				X	X			R		X	A	X	X	Fluorite
														Apatite
														Chitin
X					X	R			X	C	R		C	Barite
									C		C	F		Anhydrite
F	F	F	F	F	F	F	A	C	A	A	C	R	F	Pyrite
X						X								Sphalerite
X		X			X	X	X		X	X			X	Zircon (zoned)
X	R	X		R			X							Zircon (unzoned)
X		X	X	X	X	X	X	R	X	X				Tourmaline-green
X	R	X	X											Tourmaline-brown
		X	X											Tourmaline-blue
	R	X			X		X	X	X	X	X		X	Garnet
														Leucoxene
														Anatase
														Titanite
														Rutile
	R													Ilmenite & Mag.
	R			R		C	A	A	A	C	C	R		Limonite & Hema.
														Glauconite
		X		X		X	X		X					Hornblende
		X		X										Tremolite
														Mica
														Chlorite
														Epidote
														Staurolite
											Not counted	A		Anhydrite
C		R	C	C	C	A	R	A	F					Chert
C	C	F	A	C	F	A	F			A			F	Clay aggregates
C			C	C										Feldspar
								R					X	Glauconite
										A		A	R	Gypsum
														Muscovite
A	F	R	A	A	C	R	C	C	R	C			x	Quartz

W-0011

W-0011 Nevada, Iowa T.D. 2790' Story Co.

		Fluorite	Apatite	Chitin	Barite	Anhydrite	Pyrite	Sphalerite	Zircon (zoned)	Zircon (unzoned)	Tourmaline-green	Tourmaline-brown	Tourmaline-blue	Garnet	Leucoxene	Anatase	Titanite	Rutile	Ilmenite/Mag.	Limonite/Hematite	Glauconite	Hornblende	Tremolite	Mica	Chlorite	Epidote	Staurolite	Siderite	Celestite	Anhydrite	Chert	Clay aggregates	Feldspar	Glauconite	Gypsum	Muscovite	Quartz
Pyrite																																						
Pennsylvanian	Shale 88-127				X	X	A			X		X								C		X				X	X	C		X		F	X		X		A
	Silty Shale 150-170				X		A		R	R	X	R	X	X		X		X				R				X	X					A	X		X		F
	Shale-black 170-240						F			X		X								X	C		X									F					A
	Shale-silty & calcareous 262-280				X	X	F		R	R	X	X	X	R				X		R			X									A	R				A
2227	Limestone shaly 280-320				X	X	F		R	R	X	X	X	X									X				X				C	A	R				C
	Limestone shaly 320-380						F+		X			X		X									X								C	F		X	X		
927	Ls. very cherty 380-460	X			R		F	X	X	X		X		X									X						X		F	C		C	X		C
1430-1530	Ls. 480-540	C			C		F			X		X		X						C		R									A	A					C
Mississippian Osage	Ls 560-580				R		F		R	X		X		X						C											C	C	R	X			F
Kinderhook	Shale. calc. 590-610				A		C	X	C	R	R	C										X										A					A
	Shale & limestone 610-660				X		F		R	X		R		X						C			X								C	F	X				A
Devonian	Limestone 650-840				X	X	F			X		X		X						C		X	X			X	X				X	F		X			C
	Limestone 860-890	X				X	A			X		X		X						A									carbonates				X				X
	Limestone 900-980	C			X	X				X		X		X									X								X	A	X	X			C

DEEP WELL STUDY

Well No. W— W-0011

Depth 88 to 95⁻

No. samples used 1

Analyst T & G

Date 7/23/34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 1.5⁻ %)

1. Sample weight	25⁻ gm.	100.0%	2. Wt. of F. P. 2.33
3. Wt. after solution, with filter paper	24.93 gm.		
4. Less wt. F. P. (2)	2.33 gm.		
5. Wt. Insol. Residue (3 minus 4)	22.60 gm.	90.4 %	
6. Wt. lost by solution (1 minus 5)	2.40 gm.	9.6 %	
7. To balance (5 plus 6)	25.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	22.66 gm.	100.0%	
2. Cylinder (+1/32) 17.88 + 2.28	15.59 gm.	69.0 %	
3. Jar (1/32—1/64) 5.32 − 2.28	3.04 gm.	13.4 %	
4. Drain	4.03 gm.	17.6 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2+1 mm	3.03	20.22
1–½ mm	1.78	11.90
½–¼ mm	3.25⁻	21.78
¼–⅛ mm	2.63	17.60
⅛–1/16	2.21	14.80
Pan	2.05⁻	13.70
Total	14.95⁻	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/8 − 1/32 mm.

Analyst Bowser

Date 8/17/34

Wt. of sample 2.40 gm. 100.0%

Heavy Minerals .01 gm. .5⁻ %

Light Minerals 2.39 gm. 99.5⁻ %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	111	26.2
Limonite	234	55.4
Tourmaline {brown	15	3.6
Tourmaline {green	13	3.1
Zircon {zoned	28	6.6
Zircon {unzoned	7	1.7
Hornblende	5	1.2
Staurolite	2	.5
Pistacite	3	.7
Garnet	2	.5
Barite	2	.5
Total	422	100%

Light Concentrate		
Quartz	256	22.6
Clay	831	73.8
Chert	41	3.6
Total	1128	100%

Classification Grouping:

Primary Minerals: 96.0 %	Absol. %
Clay	73.6
Quartz	22.4
Tourmaline	.0
Zircon	.0
Staurolite	.0
Pistacite	.0
Hornblende	.0

Secondary Minerals: 4.0 %	
Chert	3.6
Pyrite	.1
Limonite	.3
Barite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Sh: ± 90%; gry. to blk; calc. slightly; slty., small amount; chert, 10%

Nevada City well
Save. between 8th & 9th.

H. W. Worstell Engr.
City Mgr.

24" to 275' cemented in
20" to 670' " "
12" to 2000'± " " with 16" liners 1850-1930 ± Glenn
1330 to 1430' Mag.

to drill to 3000'±

Drill Crk Elev. about level with Sta. + 3 feet above L.S.

MATERIAL SENT TO HINMAN FOR QUANTITATIVE ANALYSIS

Nevada W-0011 T.D. 2790'

Intervals

500 - 510
960 - 970
1100 - 1120
1560 - 1580

+ Unknown – chiefly isotropic, with $n = \pm 1.622$; in which section, opaque brown to colorless; gray to grayish brown in reflected light; some are anisotropic, biaxial, $+2V = \pm 45°$ – birot = ±.002; all show one good cleavage; all cleavage frag. give centered bxa figures; probably secondary.

++ all garnets beautifully etched

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Screen

A. ~~Acid Treatment~~ (HCl _____ %)

Depth 2730 to 2735

1. Sample Weight ..... 20.00 gr. 100%

No. of Samples 1

2. Filter Paper Wt. .... _____ gr.

Analyst T+G

3. Weight after Acid treatment, with F.P. _____ gr.

Date 7/27/34

4. Less Wt. Filter Paper ..... _____ gr.

C. Screen Analysis

Size	Gram	%
1	.70	3.4
1/2	1.32	6.5
1/4	3.52	17.5
1/8	6.25	31.0
1/16	7.78	38.5
1/32	.62	3.1
	20.19	100.0

5. Weight of Insoluble Residue ..... _____ gr. _____ %

6. Loss (1 minus 5) .... _____ gr. _____ %

B. Subsidation:

Cylinder (-1/32) .... _____ gr. _____ %

Jar (1/32-1/64) ..... _____ _____ %

Drain ..... _____ _____ %

Original (Total) .... _____ _____ %

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.76 gr. Size-Grade _____ mm.

Date 8/31/34

Heavy Minerals .06 gr. 1.6 %

Light Minerals 3.70 gr. 98.4 %

Shape Analysis: A 4 %; a 51 %;

C 36 %; r 9 %; R _____ %

Acet.Tetrabr.) / ~~Bromoform~~ } 2.93± sp. gr.

Minerals identified

~~Principal Minerals~~

	Absol. %
Primary 60.4%	
Quartz	60.3
Zircon	.1
Tourmaline	.0
Garnet	.0
Secondary 39.6%	
dolomite	8.3
unknown	.4
Feldspar	9.4
glauconite	21.1
Barite	.0
Pyrite	.0
casing scale	.4
	100.0%

~~Accessory Minerals~~:

	No. of Grains	Rel. %
Primary Heavy		
dolomite	656	40.6
* unknown	436	27.1
Zircon [zoned	62	3.8
Zircon [unzoned	28	1.7
Tourmaline [Brown	9	.6
Tourmaline [green	12	.7
Tourmaline [Blue	6	.4
Pyrite	7	.4
** glauconite	29	1.8
garnet	19	1.2
Barite	2	.1
casing scale	348	21.6
	1614	100.0%
Secondary light		
quartz	375	61.2
glauconite	132	21.5
Feldspar	59	9.6
dolomite	47	7.7
	613	100.0%

Well Log Description: Sandstone, white; size - max. 1/16-1/4, 38.5%; sec. max 1/4-1/8, 31%; about 1/3 well frosted; at 5½', 0.36% glauconite ±20%; a few frag. of grayish-green shale.

(1) Zircon – unzoned grains predominate; few brownish, others colorless; most brownish by abrasion &(or) solution.

(2) Garnet – colorless; deeply etched.

(3) Anatase – Tablets & aggregates; suggestion of alteration to leucoxene.

(4) Pyrite – Xtals & aggregates; most grains fresh; some appear altered to hem or limonite.

(5) Isotropic (?) – Brownish; dust-like particles included; R.I. 1.595–1.61; possibly siliceous (opalline(?)).

(6) Hematite – anisotropic on edges & thin grains; possibly altered from pyrite; some limonitic grains from casing scale(?).

(7) quartz – Detrital; inclusions, tourmaline, zircon, apatite(?) etc.; surfaces roundish, with crescent-like pits filled with FeO or organic substance; secondary enlargements, from incipient faces & ½s to restored Xtals.

(8) Glauconite – few grains in heavy concentrate.

(9) Feldspars – Nuclei, banded plagioclase & microcline; authigenic growths & Xtals of albite & adularia(?); relatively fresh.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Screen

A. ~~Acid Treatment~~ (HCl _____ %)

Depth 2735 to 2745

No. of Samples 2

1. Sample Weight ..... 20.06 gr. 100%

2. Filter Paper Wt. .... _____ gr.

Analyst T & G

3. Weight after Acid treatment, with F.P. _____ gr.

Date 7/27/34

4. Less Wt. Filter Paper ..... _____ gr.

5. Weight of Insoluble Residue ..... _____ gr. _____ %

6. Loss (1 minus 5) .... _____ gr. _____ %

C. Screen Analysis

Size	Gram	%
1+	.47	2.39
1-1/2	1.48	7.52
1/2-1/4	1.46	7.44
1/4-1/8	11.64	59.30
1/8-1/16	4.04	20.51
1/16-Pan	.56	2.84
	19.65	100.00

B. Subsidation:

Cylinder (-1/32) .... _____ gr. _____ %

Jar (1/32-1/64) ..... _____ _____ %

Drain ..... _____ _____ %

Original (Total) .... _____ _____ %

MINERALOGICAL DATA

Analyst Powers

Sample Weight Used 3.43 gr. Size-Grade comp. mm.

Date 8/2/34

Heavy Minerals .05 gr. 1.5 %

Light Minerals 3.38 gr. 98.5 %

Shape Analysis: A _____ %; a 8 %;

C 50 %; r 40 %; R 2 %

Acet.Tetrabr.) 2.93± sp. gr.
~~Bromoform~~)

Minerals identified.

~~Principal Minerals~~ ~~Accessory Minerals~~:

	Absol. %
Primary 74.1 %	
Tourmaline {blue	.0
Tourmaline {brown	.1
Tourmaline {green	.0
Zircon {zoned	.2
Zircon {unzoned	.4
Rutile	.0
Garnet	.2
Glauconite	12.2
Quartz	33.5
Secondary 25.7 %	
Anatase	.0
Feldspars	25.3
Hematite	.1
Pyrite	.2
Isotropic (5)	.1
	99.8 %

Primary Heavy	No. of Grains	Rel. %
Tourmaline - blue	9	2.
Tourmaline - brown	36	9.
Tourmaline - green	7	2.
(1) Zircon - zoned	50	13.
Zircon - unzoned	108	27.
(2) Garnet	41	11.
Glauconite	(2)	
(3) Anatase	9	2.
(4) Pyrite	59	15.
Rutile	7	2.
(5) Isotropic (1)	37	10.
(6) Hematite	25	7.
	387	100.0 %
Secondary Light		
(7) quartz	796	54.
(8) Glauconite	298	20.
(9) Feldspars	378	26.
	1472	100.0 %

Classification grouping

Well Log Description: Ss; gry, pinkish to grnh; maj. grd. = 1/2 - 1/4 (60%±); prin. sub. grd. = 1/8 - 1/16 mm (20%±); a = 8%; C = 50%, r = 40%, R = 2%; glz., prin. mineral, glau. abundant. Sh; gry, grnh; compact; thinly lam.; prob. from above.

* Feldspar nearly all microcline; relatively large clastic centers. Some shows marked alteration.

DEEP WELL STUDY

Well No. W— 0011
Depth 2760 to 2780
No. samples used 3
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	31.36 gm.	100.0%	2. Wt. of F. P. 2.23
3. Wt. after solution, with filter paper	30.72 gm.		
4. Less wt. F. P. (2)	2.23 gm.		
5. Wt. Insol. Residue (3 minus 4)	28.49 gm.	90.84 %	
6. Wt. lost by solution (1 minus 5)	2.87 gm.	9.16 %	
7. To balance (5 plus 6)	31.36 gm.	100.00 %	

B. Subsidation:

1. Original Wt.	28.49 gm.	100.0%
2. Cylinder (+1/32)	26.10 gm.	91.60 %
3. Jar (1/32—1/64)	.55 gm.	1.93 %
4. Drain	1.84 gm.	6.47 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	1.13	4.30
1–½ mm	1.76	6.70
½–¼ mm	3.38	12.88
¼–⅛ mm	10.47	39.90
⅛–1/16	8.05	30.82
Pan	1.42	5.40
Total	26.21	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } ..... Sp. gr. Size–Grade(s) 1/8-1/16 mm.

Analyst Rowser
Date Aug 30, 1934

Wt. of sample . . . . 3.80 gm. 100.0%

Heavy Minerals . . . . .02 gm. .5 %

Light Minerals . . . . 3.78 gm. 99.5 %

Shape Analysis:
A 5 %: a 90% %: C 5 %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	241	34.2
Tourmaline Brown	20	2.8
Tourmaline Blue	6	.9
Tourmaline Green	3	.4
zircon (zoned)	8	1.1
garnet	3	.4
casing scale	367	52.1
Limonite	51	7.2
glauconite	6	.9
Total	705	100%

Classification Grouping:
Primary Minerals: 87.5 %

	Absol. %
Quartz	77.4
clay	10.1
Tourmaline	.0
zircon	.0
garnet	.0

Light Concentrate			
Quartz	489	77.8	
Feldspar (Microcline)	44	7.0	
clay	64	10.2	
glauconite	31	5.0	
Total	628	100%	

Secondary Minerals: 12.5 %

glauconite	5.0
feldspar	7.0
Pyrite	.2
Limonite	.0
casing scale.	.3
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Sandstone, ~~fine~~ 100%; quartz, clear; size ¼-⅛, 39.9%; See mat, ½-1/16; shape - a 90%, C 5%, A 5%
some grains of calcareous material 1%; glauconite common; some greenish grey shale, (02%)

*Glauconite count really smaller than actual glauconite content, as shale has some still incorporated in it in very minute grains

DEEP WELL STUDY

Well No. W— 0011
Depth 2780 to 2790
No. samples used 1
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	23.89 gm.	100.0%	2. Wt. of F. P.	2.25
3. Wt. after solution, with filter paper	23.95 gm.			
4. Less wt. F. P. (2)	2.25 gm.			
5. Wt. Insol. Residue (3 minus 4)	21.70 gm.	90.8 %		
6. Wt. lost by solution (1 minus 5)	2.19 gm.	9.2 %		
7. To balance (5 plus 6)	23.89 gm.	100.0 %		

B. Subsidation:

1. Original Wt.	21.70 gm.	100.0%
2. Cylinder (+1/32)	18.11 gm.	83.65 %
3. Jar (1/32—1/64)	.81 gm.	3.73 %
4. Drain	2.78 gm.	12.62 %

C. Screen Analysis 18.14

SIZE	GRAMS	%
2 plus		
2–1 mm	4.92	27.63
1–½ mm	4.07	22.48
½–¼ mm	2.80	15.80
¼–⅛ mm	2.87	16.10
⅛–1/16	2.06	11.29
Pan	1.20	6.70
Total	17.92	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } ..... Sp. gr. Size–Grade(s) ..... mm.

Analyst .....
Date .....

Wt. of sample 3.11 gm. 100.0%

Heavy Minerals 0.02 gm. .6 %

Light Minerals 3.09 gm. 99.4 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	549	88.2
Zircon zoned	29	4.7
Zircon unzon	19	3.1
Tourmaline Brown	2	.3
Tourmaline Green	9	1.5
Tourmaline Blue	1	.2
Tourmaline Pink	1	.2
garnet	8	1.3
Hornblende	3	.5
Total	621	100%

Classification Grouping:
Primary Minerals: 89.7 %

	Absol. %
clay	78.5
Quartz	11.1
Zircon	.1
Tourmaline	
garnet	
Hornblende	

Light Concentrate

Clay	880	79.0
Quartz	124	11.2
*Glauconite	77	6.9
Feldspar	32	2.9
Total	1113	100%

Secondary Minerals: 10.3 %

	Absol. %
Glauconite	6.9
Feldspar	2.9
Pyrite	.5
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale, 85-70 ; gray; calcareous; sand; + 13 %; fine, average ¼ - ⅛ ; clear; Glauconite 20 3 %; a little Feldspar;

* Siderite (?) in yellow rhombs & aggregates, nearly opaque, except along thin edges; appear to have a large amount of included material, making color a Lemon to rust yellow.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 115 to 127

No. of Samples 1

Analyst T & G

Date 7-23-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight	25 gr.	100%
2. Filter Paper Wt.	2.48 gr.	
3. Weight after Acid treatment, with F.P.	21.00 gr.	
4. Less Wt. Filter Paper	2.48 gr.	
5. Weight of Insoluble Residue	18.52 gr.	74.2 %
6. Loss (1 minus 5)	6.48 gr.	25.8 %

B. Subsidation:

Cylinder (-1/32)	5.33 / 2.25 / 2.98 — 3.08 gr.	16.6 %
Jar (1/32-1/64)	2.08 — .90	4.9 %
Drain	14.54	78.5 %
Original (Total)	18.52	100.0 %

C. Screen Analysis

Size	Gram	%

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 3.01 gr. Size-Grade Comp mm. Date 8/24/34

Heavy Minerals 2.59 gr. 86.0 %

Light Minerals .42 gr. 14.0 %

Acet.Tetrabr.) Bromoform } 2.93± sp. gr.

Shape Analysis: A ____ %; a ____ %; C ____ %; r ____ %; R ____ %

[redacted] Minerals: identified

Classification Grouping

Principal Minerals	absol. %
Primary 19.5%	
Quartz	6.2
Clay minerals	7.6
Haematite	5.6
Zircon	.1
Hornblende	.0
Tourmaline	.0
Secondary 80.5%	
Limonite	53.5
Siderite	20.2
Feldspar	.1
Gypsum	.1
Casing Scale	6.6
	100.0%

Heavy	No. grains	Pct.
Primary		
Limonite	364	62.0
* siderite (?)	136	23.2
Haematite	36	5.9
Zircon (unzoned)	4	.7
Hornblende	2	.3
Tourmaline	1	.2
casing scale	45	7.7
	587	100.0%
Secondary — light		
Clay minerals	241	54.4
Quartz	196	44.2
Feldspar	4	.9
Gypsum	2	.5
	443	100.0%

Well Log Description: Sh; 78.5%; very fine, soapy; Purple to buff; mottled; calcareous; containing nodules of hard, cal material.

Ls, 21.5%;

* Pyrite is in long, needle-like xls; with blk. sh. inclusions,

sph. + calcite

sh; blk, carb, pump, slt. + H2S/gas from sphal.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. Wa 11

A. Acid Treatment (HCl 15 %)

Depth 95 to 105

No. of Samples 1

1. Sample Weight ..... 30 gr. 100%
2. Filter Paper Wt. .... 2.54 gr.
3. Weight after Acid treatment, with F.P. 25.80 gr.
4. Less Wt. Filter Paper ..... 2.54 gr.
5. Weight of Insoluble Residue ..... 23.26 gr. 77.6%
6. Loss (1 minus 5) .... 6.74 gr. 22.4%

Analyst J & G

Date 7-23-34

B. Subsidation:

Cylinder (-1/32) 17.80 − 1.96 = 15.84 gr. 68.2%

Jar (1/32-1/64) 5.10 − 1.93 = 3.17 13.6%

Drain 4.25 18.2%

Original (Total) 23.26 100.0%

C. Screen Analysis 15.84

Size	Gram	%
+2-1	4.70	29.80
1-1/2	2.50	15.86
1/2-1/4	1.86	11.80
1/4-1/8	2.23	14.12
1/8-1/4	2.20	13.96
1/4-Pan	2.28	14.46
Tot.	15.77	100.00

MINERALOGICAL DATA

Analyst Rowser

Sample Weight Used 1.99 gr. Size-Grade 1/4-Pan mm.

Date 8/24/34

Heavy Minerals .07 gr. 3.5%

Light Minerals 1.92 gr. 96.5%

Shape Analysis: A 12 %; a 72 %; C 16 %; r ____ %; R ____ %

Acet.Tetrabr.) Bromoform } 2.93+ sp. gr.

Accessory Minerals: identified

Principal Minerals

	Absol %
Primary 96.6%	
Clay	88.4
Quartz	8.1
Zircon	.1
Garnet	.0
Tourmaline	.0
Secondary 3.4%	
Pyrite	3.3
anhydrite	.0
Limonite	.1
Casing Scale	.0
	100.0%

Classification

Heavy Primary

	No. grains	Rel. %
*Pyrite	1119	95.9
Zircon	16	1.5
Tourmaline	1	.1
Garnet	2	.2
anhydrite	1	.1
Limonite	20	1.8
c. scale	4	.4
	1163	100.0%

Light Secondary

Clay	460	91.6
Quartz	42	8.4
	502	100.0 %

Well Log Description: Sh; 77.6%; blk, calcareous; "pimply" slate; nodules of sphalerite & calcite; a small amt of fine sts sd, 1/4-1/8; chiefly Pyrite bound.

* Feldspar shows well developed fringes of authigenic growth on larger grains; but on smaller ones is very narrow growth.

DEEP WELL STUDY

Well No. W— 0011
Depth 2720 to 2730
No. samples used 1
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	12.04 gm.	100.0%	2. Wt. of F. P.	2.22
3. Wt. after solution, with filter paper	10.95 gm.			
4. Less wt. F. P. (2)	2.22 gm.			
5. Wt. Insol. Residue (3 minus 4)	8.73 gm.	72.6 %		
6. Wt. lost by solution (1 minus 5)	3.31 gm.	27.4 %		
7. To balance (5 plus 6)	12.04 gm.	100.0 %		

B. Subsidation:

1. Original Wt.	8.73 gm.	100.0%
2. Cylinder (+1/32)	7.30 gm.	83.5 %
3. Jar (1/32—1/64)	.47 gm.	5.5 %
4. Drain	.96 gm.	11.0 %

C. Screen Analysis 7.28

SIZE	GRAMS	%
2 plus		
2–1 mm	1.05	14.4
1–½ mm	1.01	13.9
½–¼ mm	1.30	17.9
¼–⅛ mm	1.60	22.1
⅛–1/16	1.60	22.1
Pan	.70	9.6
Total	7.26	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date Aug 31, 1934

Acet. Tetrabr. / ~~Bromoform~~ ± 2.93 Sp. gr. Size–Grade(s) ¼–Pan mm.

Wt. of sample 3.08 gm. 100.0%

Heavy Minerals 0.01 gm. .3 %

Light Minerals 3.07 gm. 99.7 %

Shape Analysis:
A 2 %: a 40 %: C 52 %
r 1 %: R ____ %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Zircon zoned	98	6.9
Zircon unzoned	11	.8
Tourmaline green	18	1.3
Tourmaline brown	17	1.2
Tourmaline Blue	4	.4
Tourmaline Red	4	.3
Pyrite	70	5.0
Limonite	69	4.9
Garnet	57	4.0
Tremolite	4	.3
Staurolite	2	.1
Hornblende	15	1.1
Casing scale	104	7.3
Total	1419	100%

Light Concentrate

Quartz	196	29.7
Clay	196	29.7
Feldspar	92	13.9
Muscovite	3	.5
Glauconite	173	26.2
Total	660	100%

Classification Grouping:

	Absol. %
Primary Minerals: 59.7 %	
Quartz	29.6
Clay	29.6
Muscovite	.5
Zircon	.0
Tourmaline	.0
Garnet	.0
Tremolite	.0
Staurolite	.0
Hornblende	.0
Secondary Minerals: 40.3 %	
Feldspar	13.9
Glauconite	26.2
Pyrite	.0
Limonite	.0
Casing scale	.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale; 40–50% greenish gray; limestone, 20%; gravish gray; glauconite 15–25%; up to ½ mm in size; SS; 10–20%; ½–¼ max; ½–¼ sec, max; C ± 52%; a ± 40%; A ± 2%; Little Pyrite.

** Feldspar in more or less angular cleavage fragments, with very thin fringes of authigenic growth; some of larger grains show considerable alteration of clastic center.

Mechanical analysis is of sh. frag, & does not give a true analysis of size of grains.

* Quartz chiefly in minute frag; but a few grains up to ½ mm, are present: Larger grains are C tor. – well frosted.

DEEP WELL STUDY

Well No. W— 0011
Depth 2700 to 2710
No. samples used 1
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 17.05 gm. 100.0%: 2. Wt. of F. P. 2.20
3. Wt. after solution, with filter paper . . . . . 12.02 gm.
4. Less wt. F. P. (2) . . . 2.20 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 9.82 gm. 57.0 %
6. Wt. lost by solution (1 minus 5) . . . . . 7.23 gm. 43.0 %
7. To balance (5 plus 6) . . 17.05 gm. 100.0 %

B. Subsidation:

1. Original Wt. . . . . 9.82 gm. 100.0%
2. Cylinder (+1/32) 7.81 gm. 79.53 %
3. Jar (1/32—1/64) .45 gm. 4.58 %
4. Drain . . . . . 1.56 gm. 15.89 %

C. Screen Analysis 7.77

SIZE	GRAMS	%
2 plus		
2–1 mm	.80	10.35
1–½ mm	1.66	21.54
½–¼ mm	1.70	22.00
¼–⅛ mm	1.22	15.83
⅛–1/16	1.11	14.37
Pan	1.23	15.91
Total	7.72	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ } ±2.93 Sp. gr. Size–Grade(s) ¼-⅛32 mm.

Analyst Rowser
Date Sept. 1

Wt. of sample . . . . 2.64 gm. 100.0% Shape Analysis:

Heavy Minerals . . . . .01 gm. .4 % A.....%: a.....%: C.....%

Light Minerals . . . . 2.63 gm. 99.6 % r.....%: R.....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	320	40.7
Limonite	79	10.0
Zircon (Zoned)	6	.8
Glauconite	6	.8
Tourmaline (green)	6	.8
garnet	6	.8
spinel	1	.1
Barite	1	.1
Quartz	4	.5
cas. scale	356	45.4
Total	785	100%

Classification Grouping: Primary Minerals: 71.7 %

Absol. %	
64.0	Clay
6.8	Quartz
.9	Muscovite
.0	Zircon
.0	Tourmaline
.0	garnet
.0	spinel

Light Concentrate		
clay	359	64.3
*Quartz	38	6.8
**Feldspar	74	13.3
glauconite	82	14.7
Muscovite	5	.9
Total	558	100%

Secondary Minerals: 28.3 %

Feldspar	13.3
glauconite	14.6
Pyrite	.2
Limonite	.0
Barite	.0
casing scale	.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale; 50–55%; greenish gray; Limestone 40–45%; white; granular; glauconite abundant; Pyrite Common; Feldspar very common.

* Feldspar is in minute fragments; most authigenic growths; chiefly orth + microcline; very little plag.

** Muscovite shows considerable alteration.

DEEP WELL STUDY

Well No. W— 0011
Depth 2680 to 2700
No. samples used 2
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	26.16 gm.	100.0%	2. Wt. of F. P. 2.00
3. Wt. after solution, with filter paper	14.90 gm.		
4. Less wt. F. P. (2)	2.00 gm.		
5. Wt. Insol. Residue (3 minus 4)	12.90 gm.	49.0 %	
6. Wt. lost by solution (1 minus 5)	13.26 gm.	51.0 %	
7. To balance (5 plus 6)	26.16 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	12.90 gm.	100.0%
2. Cylinder (+1/32)	8.60 gm.	66.63 %
3. Jar (1/32—1/64)	1.33 gm.	10.31 %
4. Drain	2.97 gm.	23.06 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	1.20	14.22
1–½ mm	1.30	15.81
½–¼ mm	1.17	13.90
¼–⅛ mm	1.41	16.72
⅛–1/16	1.52	18.02
Pan	1.71	21.33
Total	8.41	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date Sept 1, 1934

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 Sp. gr. Size–Grade(s) 1/10 – 1/30 mm.

Wt. of sample 1.67 gm. 100.0%

Heavy Minerals 0.01 gm. .6 %

Light Minerals 1.66 gm. 99.4 %

Shape Analysis:
A ____ %: a ____ %: C ____ %
r ____ %: R ____ %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	210	12.4
Limonite	100	5.9
Tourmaline brown	5	.3
Tourmaline green	10	.6
Tourmaline blue	3	.2
Zircon zoned	36	2.2
Zircon unzoned	19	1.1
garnet	49	2.9
hornblende	4	.2
spinel	2	.1
tremolite	1	.1
anatase	3	.2
glauvolite	1	.1
glauconite	6	.4
casing scale	1239	73.1
Total	1693	100%

Light Concentrate

clay	293	44.0
*Feldspar	265	39.7
Quartz	68	10.2
†glauconite	27	4.1
**Muscovite	13	2.0
Total	666	100%

Classification Grouping:

Primary Minerals: 55.9 %	Absol. %
clay	43.7
Quartz	10.2
Muscovite	2.0
Tourmaline	.0
zircon	.0
garnet	.0
Hornblende	.0
spinel	.0
tremolite	.0
anatase	.0

Secondary Minerals: 44.1 %	Absol. %
Feldspar	39.4
glauconite	4.1
Pyrite	.4
Limonite	.1
casing scale	.1
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Shale; gray, very calcareous; 5% soluble; contains considerable Feldspar, in sl. grades; a little fine sand; a few traces of brown tuffaceous Ls.

Feldspar is practically all authigenic

DEEP WELL STUDY

Well No. W— 0011
Depth 2660 to 2680
No. samples used 2
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	24.30 gm.	100.0%	2. Wt. of F. P. 2.03
3. Wt. after solution, with filter paper	17.56 gm.		
4. Less wt. F. P. (2)	2.03 gm.		
5. Wt. Insol. Residue (3 minus 4)	15.53 gm.	64.0 %	
6. Wt. lost by solution (1 minus 5)	8.77 gm.	36.0 %	
7. To balance (5 plus 6)	24.30 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	15.53 gm.	100.0%	
2. Cylinder (+1/32)	11.10 gm.	71.5 %	
3. Jar (1/32—1/64)	1.54 gm.	9.9 %	
4. Drain	2.89 gm.	18.6 %	

C. Screen Analysis 11.04

SIZE	GRAMS	%
2 plus		
2–1 mm	1.61	14.81
1–½ mm	2.01	19.42
½–¼ mm	1.72	15.82
¼–⅛ mm	1.23	11.31
⅛–1/16	1.54	14.18
Pan	2.77	24.46
Total	10.88	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date Aug. 31, 1934

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) 1/16–1/32 mm.

Wt. of sample 2.30 gm. 100.0%

Heavy Minerals 0.02 gm. .9 %

Light Minerals 2.28 gm. 99.1 %

Shape Analysis:
A ....%: a ....%: C ....%
r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	646	66.5
Zircon zoned	21	2.2
unzoned	3	.3
Tourmaline blue	2	.2
green	10	1.3
Biolite	54	.1
Limonite		8.7
Casing scale	201	20.7
Total	968	100%

Light Concentrate			
Feldspar	816	54.0	
Clay	613	40.4	
Muscovite	11	.7	4.4
Quartz	66	4.4	
dolomite	8	.5	
Total	1514	100%	

Classification Grouping:

Primary Minerals: 45.1 %	Absol. %
clay	40.0
Muscovite	.7
Quartz	4.4
Zircon	.0
Tourmaline	.0
biolite	.0

Secondary Minerals: 54.9 %	
Feldspar	53.5
dolomite	.5
pyrite	.6
Limonite	.1
casing scale	.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone, dolomitic, granular, containing 1129 gr. of clear st. grains, slt. ~~fresh~~ carbonaceous, slt. chiefly Feldspar, a little glauconite.

** digestion of ls. in acid not completed; considerable amt. of dolo. in 2-½ grades:

* Feldspar all show authigenic growths.

DEEP WELL STUDY

Well No. W— 0011

Depth 2640 to 2660

No. samples used 2

Analyst T. & G.

Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	30.07 gm.	100.0%	2. Wt. of F. P. 2.17
3. Wt. after solution, with filter paper	16.17 gm.		
4. Less wt. F. P. (2)	2.17 gm.		
5. Wt. Insol. Residue (3 minus 4)	14.00 gm.	46.5 %	
6. Wt. lost by solution (1 minus 5)	16.07 gm.	53.5 %	
7. To balance (5 plus 6)	gm.	%	

B. Subsidation:

1. Original Wt.	14.00 gm.	100.0%	
2. Cylinder (+1/32)	10.90 gm.	78.0 %	
3. Jar (1/32—1/64)	1.41 gm.	10.0 %	
4. Drain	1.69 gm.	12.0 %	

C. Screen Analysis 10.74

SIZE	GRAMS	%
2 plus		
2–1 mm	.26	2.48
1–½ mm	1.05	9.75
½–¼ mm	2.71	25.92
¼–⅛ mm	1.76	16.90
⅛–1/16	1.92	18.22
Pan	2.81	26.73
Total	10.51	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ½–1/32 mm.

Analyst Rowser

Date Aug 31, 1934

Wt. of sample 2.52 gm. 100.0%

Heavy Minerals .01 gm. .4 %

Light Minerals 2.51 gm. 99.6 %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	242	26.6
Zircon [zoned	32	3.5
Unzoned	16	1.8
Limonite	131	14.4
Tourmaline [brown	9	1.0
green	18	1.1
blue	5	.6
garnet	66	7.3
Tremolite	1	.1
Hornblende	2	.2
Barite	16	1.1
Quartz	66	7.3
casing scale	325	36.0
Total	909	100%

Light Concentrate			
Feldspar	431	52.7	
Quartz	231	28.2	
Clay	126	15.4	
Muscavite	12	1.5	
glauconite	18	2.2	
Total	818	100%	

Classification Grouping:

	Absol. %
Primary Minerals: 44.8 %	
Quartz	28.1
clay	15.2
Muscavite	1.5
Zircon	.0
Tourmaline	.0
garnet	.0
Hornblende	.0
Tremolite	.0
Secondary Minerals: 55.2 %	
Feldspar	52.7
glauconite	2.2
Pyrite	.1
Limonite	.1
Barite	.0
casing scale	.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone; ±70%, dolomitic, granular, light gray; argillaceous; silt content ±30%; feldspar chief constituent; 10±% clear Qtz grains; ¼–½; glauconite abundant;

* Feldspar shows relatively large clastic centers with small authogenic growths around edges. chiefly Microcline, but with ± 20% plagioclase

DEEP WELL STUDY

Well No. W— 0011
Depth 2620 to 2640
No. samples used 2
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	21.00 gm.	100.0%	2. Wt. of F. P. 2.16
3. Wt. after solution, with filter paper	15.29 gm.		
4. Less wt. F. P. (2)	2.16 gm.		
5. Wt. Insol. Residue (3 minus 4)	13.13 gm.	62.5 %	
6. Wt. lost by solution (1 minus 5)	7.87 gm.	37.5 %	
7. To balance (5 plus 6)	21.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	13.13 gm.	100.0%
2. Cylinder (+1/32)	8.33 gm.	63.4 %
3. Jar (1/32—1/64)	1.91 gm.	14.6 %
4. Drain	2.89 gm.	22.0 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ } 2.93± Sp. gr. Size–Grade(s) Comp. mm.

Analyst Rowsey
Date Aug 30, 1934

Wt. of sample 3.23 gm. 100.0%

Heavy Minerals .01 gm. .3 %

Light Minerals 3.22 gm. 99.7 %

Shape Analysis:
A ___ %: a 12 %: C 76 %
r 14 %: R ___ %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	306	49.4
Zircon	6	.9
Tourmaline Brown	3	.5
Tourmaline blue	2	.3
Sphalerite	3	.5
Tremolite	4	.6
garnet	3	.5
Ores, scale	294	47.3
Total	621	100%

Light Concentrate		
clay	431	50.7
Quartz	323	38.1
Glauconite	81	9.4
+Feldspar	15	1.8
Total	850	100%

Classification Grouping:

Primary Minerals: 88.5 %	Absol. %
clay	50.5
Quartz	38.0
Zircon	.0
Tourmaline	.0
Tremolite	.0
garnet	.0

Secondary Minerals: 11.5 %	
glauconite	9.4
Feldspar	1.8
Pyrite	.2
sphalerite	.0
casing scale	.1
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone ± 62%; gray; fine & granular, ±10% sand; ¼–⅛; C; shale; ±30%; gray; calcareous; contains small amt of silt; glauconite abundant.

Feldspars are ±70% authigenic with large clastic centers; other 30% show no authi growth.

DEEP WELL STUDY

Well No. W— 0011

Depth 2600 to 2620

No. samples used 2

Analyst T. & G.

Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	20.52 gm.	100.0%	2. Wt. of F. P. 1.98
3. Wt. after solution, with filter paper	10.23 gm.		
4. Less wt. F. P. (2)	1.98 gm.		
5. Wt. Insol. Residue (3 minus 4)	8.25 gm.	40.2 %	
6. Wt. lost by solution (1 minus 5)	12.27 gm.	59.8 %	
7. To balance (5 plus 6)	gm.	%	

B. Subsidation:

1. Original Wt.	8.25 gm.	100.0%
2. Cylinder (+1/32)	6.27 gm.	76.0 %
3. Jar (1/32—1/64)	.95 gm.	11.5 %
4. Drain	1.03 gm.	12.5 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) Comp mm.

Analyst Rowser

Date Aug 31, 1934

Wt. of sample 2.12 gm. 100.0%

Heavy Minerals .05 gm. 2.5 %

Light Minerals 2.07 gm. 97.5 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1019	74.1
Limonite	71	5.2
garnet	13	1.0
zircon [zoned	3	.2
zircon [unzoned	4	.3
Tourmaline (green)	5	.4
Feldspar	57	4.2
casing scale	201	14.6
Total	1373	100%

Classification Grouping:

Primary Minerals: 3.6 %

	Absol. %
Quartz	2.0
Feldspar (±3% of count)	.0
garnet	.0
Zircon	.0
Tourmaline	.0
Muscavite	1.6

Light Concentrate		
Feldspar	539	95.5
Quartz	11	2.0
glauconite	6	.9
Muscavite	9	1.6
Total	565	100%

Secondary Minerals: 96.4 %

Feldspar	93.1
Pyrite	1.9
Glauconite	.9
Limonite	.1
casing scale	.4
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone, ± 60%; gray; dolomitic; granular; sand, ± 20%, clear Quartz, ¼–⅛; glauconite, ± 3%; silt is chiefly Feldspar, a small amt. of glauconite; Pyrite ± 1%

DEEP WELL STUDY

Well No. W— 0011
Depth 1770 to 1790
No. samples used 2
Analyst T. & G.
Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	35.00 gm.	100.0%	2. Wt. of F. P. 2.05
3. Wt. after solution, with filter paper	5.61 gm.		
4. Less wt. F. P. (2)	2.05 gm.		
5. Wt. Insol. Residue (3 minus 4)	3.56 gm.	10.0 %	
6. Wt. lost by solution (1 minus 5)	31.44 gm.	90.0 %	
7. To balance (5 plus 6)	35.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	gm.	100.0%	
2. Cylinder (+1/32)	gm.	%	
3. Jar (1/32—1/64)	gm.	%	
4. Drain	gm.	%	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) comp mm.

Analyst Rowser
Date 8/24/34

Wt. of sample 3.31 gm. 100.0%

Heavy Minerals .13 gm. 4.0 %

Light Minerals 3.18 gm. 96.0 %

Shape Analysis:
A ..... %: a ..... %: C ..... %
r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	2877	67.6
Zircon zoned	51	1.2
Zircon unzoned	42	1.0
Tourmaline Brown	12	.3
Tourmaline green	12	.3
Tourmaline Blue	7	.2
Tremolite	2	.0
Hornblende	3	.1
garnet	6	.1
Barite	3	.1
casing scale	1234	29.1
Total	4249	100%

Light Concentrate

Quartz	512	64.2
clay	217	27.2
Feldspar	32	4.0
Chert	37	4.6
Total	798	100%

Classification Grouping:

Primary Minerals: 87.9 %	Absol. %
Quartz	61.7
clay	26.1
zircon	.1
tourmaline	.0
tremolite	.0
Hornblende	.0
garnet	.0

Secondary Minerals: 12.1 %	
Feldspar	3.8
chert	4.4
Pyrite	2.7
Barite	.0
casing scale	1.2
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

* adularia in beautifully formed euhedral xls; many showing very plainly, the clastic nucleus

DEEP WELL STUDY

Well No. W— 0011

Depth 1750 to 1770

No. samples used 2

Analyst T. & G.

Date 7-26-34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	35 gm.	100.0%	2. Wt. of F. P. 1.94
3. Wt. after solution, with filter paper	4.21 gm.		
4. Less wt. F. P. (2)	1.94 gm.		
5. Wt. Insol. Residue (3 minus 4)	2.27 gm.	6.5 %	
6. Wt. lost by solution (1 minus 5)	32.73 gm.	93.5 %	
7. To balance (5 plus 6)	35.00 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	2.27 gm.	100.0%
2. Cylinder (+1/32)	1.40 gm.	61.8 %
3. Jar (1/32—1/64)	.17 gm.	7.5 %
4. Drain	.70 gm.	30.7 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm		
¼–⅛ mm		
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 ± Sp. gr. Size–Grade(s) +1/32 mm.

Analyst Rowser

Date Aug 27, 1934

Wt. of sample 1.35 gm. 100.0%

Heavy Minerals 0.08 gm. 5.9 %

Light Minerals 1.27 gm. 94.1 %

Shape Analysis:

A ....%: a ....%: C ....%

r ....%: R ....%.

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	46	64.7
Blue tourmaline	1	.1
epidote	1	.1
casing scale	21	30.6
Quartz	31	4.5
Total	69.0	100%

Classification Grouping:

Primary Minerals: 65.2 %

	Absol. %
Quartz	37.6
clay	27.6
Tourmaline	.0
epidote	.0

Light Concentrate

*adularia	157	23.4
Quartz	265	39.6
clay ±	197	29.4
chert	51	7.6
Total	670	100%

Secondary Minerals: 34.8 %

Adularia	22.0
chert	7.2
Pyrite	3.8
casing scale	1.8
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Limestone, ±100%; hard; gray; thin-bedded; some buff dolomite; Pyrite common; feldspar abundant.

*Flourite is in rounded grains + irregular masses; showing wear other than drill.

** Quartz is in minute fragments (silt size); all larger grains in sample are Chert.

DEEP WELL STUDY

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	35 gm.	100.0%	2. Wt. of F. P. 1.92
3. Wt. after solution, with filter paper	8.48 gm.		
4. Less wt. F. P. (2)	1.92 gm.		
5. Wt. Insol. Residue (3 minus 4)	6.56 gm.	18.7 %	
6. Wt. lost by solution (1 minus 5)	28.44 gm.	81.3 %	
7. To balance (5 plus 6)	35.00 gm.	100.0 %	

Well No. W— 0011
Depth 1730 to 1750
No. samples used 2
Analyst T. & G.
Date 7-26-34

B. Subsidation:

1. Original Wt.	6.56 gm.	100.0%
2. Cylinder (+1/32)	5.75 gm.	%
3. Jar (1/32—1/64)	.17 gm.	%
4. Drain	.64 gm.	%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm	3.32	
1–½ mm		
½–¼ mm		
¼–⅛ mm	2.30	
⅛–1/16		
Pan		
Total		100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93± Sp. gr. Size–Grade(s) ¼-Pan mm.

Analyst Rowsey
Date 8-24, '34

Wt. of sample 2.33 gm. 100.0% Shape Analysis:

Heavy Minerals .12 gm. 5.2 % A ..... %: a ..... %: C ..... %

Light Minerals 2.21 gm. 94.8 % r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1044	80.0
Limonite	21	3.0
Zircon	6	.5
Hornblende	6	.5
* Flourite	4	.4
Garnet	3	.2
Barite	2	.1
Tremolite (Blue)	2	.1
Tourmaline (green)	3	.2
Casing scale	2	.1
	195	14.9
Total	1308	100%

Classification Grouping: Primary Minerals: 70.5 %	Absol. %
Quartz	59.0
Clay	7.2
Zircon	.2
Flourite	.0
Garnet	.0
Hornblende	.0
Tourmaline	.0
Feldspar	4.1

Light Concentrate		
** Quartz	501	62.3
Chert	207	25.8
Clay	61	7.6
Feldspar	35	4.3
Total	804	100%

Secondary Minerals: 29.5 %	
Chert	24.5
Pyrite	4.2
Limonite	.8
Tremolite	.0
Barite	.0
Total	100%

Revised Lithologic Description (from descriptive log and laboratory data).

Dolomite; ±80%; hard; buff; crystalline; Chert; ± 6%; white; dense; S/S + sh, ± 10-%; Pyrite common.

1. Perhaps in part from casing scale

2. Irreg. isometric xtln. aggr. and branching rootlet like masses, in part crystal form indeterminate

3. Smooth elongate oval grains,

4. Small rounded grains, in general smaller than the tourmaline

6. Common variety, grn + brn pleochroism

7. Colorless

10. Feldspars mainly subhedral to euhedral, about 25 % show rounded nuclei of orthoclase, 1 grain shows albite nucleus with secondary orthoclase. 1 angular particle of albite without secondary growth.

8. The quartz is silt size.

The coarser grades are carbonates, estimated 60-65 % in the slights.

ANALYSIS SHEET--DEEP WELL STUDY

Well No. W0011

Depth 1710 to 1730

No. of Samples 2

Analyst T & G

Date 7-25-34

A. Acid Treatment (HCl 15 %)

1. Sample Weight ..... 40 gr. 100%
2. Filter Paper Wt. .... 2.15 gr.
3. Weight after Acid treatment, with F.P. 13.77 gr.
4. Less Wt. Filter Paper ..... 2.15 gr.
5. Weight of Insoluble Residue ..... 11.62 gr. 29.2%
6. Loss (1 minus 5) .... 28.38 gr. 70.8 %

B. Subsidation:

Cylinder (-1/32)	____ gr.	____%
Jar (1/32-1/64)	____	____%
Drain	____	____%
Original (Total)	____	____%

C. Screen Analysis 11.41

Size	Gram	%
+2-1	3.66	32.44
1-½	2.44	21.60
½-¼	1.67	14.76
¼-⅛	1.36	12.00
⅛-№	1.30	11.50
№-Pan	.87	7.70
Tot.	11.30	100.00

MINERALOGICAL DATA

Analyst Hartley

Sample Weight Used 3.11 gr. Size-Grade ¼ to pan mm. Date 8/10/34

Heavy Minerals .03 gr. 1.0 %

Light Minerals 3.08 gr. 99.0 %

Shape Analysis: A ____%; a ____%; C ____%; r ____%; R ____%

Acet.Tetrabr. / Bromoform 2.93 sp. gr.

Principal Minerals

	Absol. %
Primary 70.0%	
Tourmaline	0.0
Zircon	0.0
Tremolite	0.0
Hornblende	0.0
Garnet	0.0
Quartz	70.0
Secondary 30.0%	
Limonite	.2
Pyrite	.8
Chert	6.1
Feldspar	22.9
	100.0%

Classification grouping

Accessory Minerals: Minerals identified

		No. of Grains	Rel. %
Primary Heavy			
1	Limonite	68	18.4
2	Pyrite	283	76.7
3	Tourmaline (grn)	9	2.4
4	Zircon (unzoned)	6	1.6
5	Tremolite	1	.3
6	Hornblende	1	.3
7	Garnet	1	.3
	Total	369	100.0%
Secondary Light			
8	Quartz	642	70.6
9	Chert	56	6.2
10	Feldspar (Auth)	212	23.2
	Total	910	100.0%

Well Log Description: Dolomite gray to buff, hard, pyritic, cherty. Insol. res. of silt-size quartz, feldspar chert & heavy minerals as above.

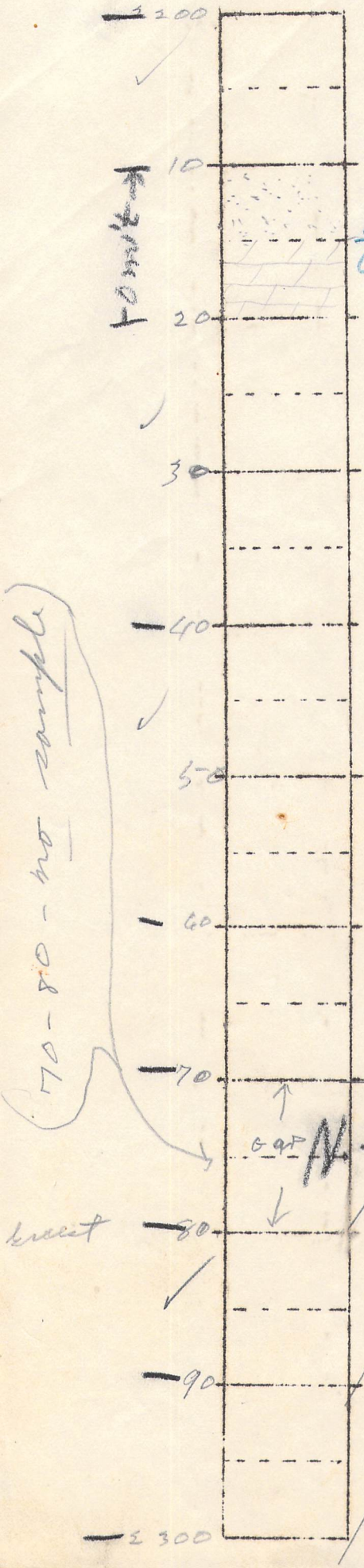
6. 25% of feldspars have rounded nuclei.

Heavy concentrate shows 50% to dolomite, light about 75%.

W 0011

Name of Well Nevada Iowa Sheet No. 23

Depth Range 2200 - 2300 Scale: 1 inch=10 feet.



sandstone - major grade: ½ - ¼ mm. Max. grade = about 1.2 mm., curvilinear to subround. Cement probably dolomite. Dolomite = 190 ±.

N. Rich. Dolomite - hard, white - 50-55%.
Om. (180') sand - as above - 45-50%.
pyrite present.

Dolomite, hard, white, granular. 5-8% medium, curvilinear sand. Pyrite - common. Few green shale pieces.

Dolomite - hard, white, medium crystalline. sand as above - 10% ±. Pyrite common. Few pieces of green shale.

Dolomite - as above - 60%. Soft, white sandy dolomite - 35%. quartz sand, as above. 5%. Few pieces green shale.

Dolomite, finely granulated, buff to white. Fine quartz sand, subangular = 3-4%. pyrite common.

Dolomite - buff - white, finely granulated. Sand as above. 3-5%. Pyrite common.

Dolomite - as above 50-55%. Fine to medium subangular to curvilinear 45-50%. sand frosted. Pyrite present.

? sandstone or sdy dolo. medium, curvilinear to subround, frosted. 70-75%. chert = about 3-4%. Dolomite = 20% ±

53% Sol.

170
100
180
455