ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Oct. 31, 1934 ~~A.M.~~

Time of filing 5:30 P.M.

Name of Well Lovilia Bottom-hole Formation Limestone

Hole drilled today: 9'7" ft. of 6" in.; _____ ft. of _____ in.

Depth at end of day 397'7" ft. in a 6" hole; total footage drilled since yesterday 9'7" ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: _____ ft. 1½ in. 6 1/8" size, from 367'7" ft. to 367'8½" ft. (inside diameter. 6 5/8" outside diam.)

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 29'10.5". 6 1/8" size

Water: At from ft. No. of bailers 49. No. of gallons 441 bailed in 45 min. (aver. 9 gal. per bailer)

Sand Between 363½-377 also possibly ls. + sand below.

Level of water 198½ ft. below surface, lowered to 204.5 ft. (measured 8 minutes after bailing stopped)

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: Qtz sand and ls. bottom at 388 ft.)

Lithology	From	To	Lithology	From	To
Light tan ls. some sand. Drilled hard.	388	389			
Light tan ls. Some sand. Drilled easier.	389	393'4"			
Light tan ls. Some sand. Very large am't of fragmental qtz up to 1/4" diameter. White, clear. Small amt. of blue clay. Some pyrite.	393'4"	397'7"			

Shut-downs: Time 12:30; Cause Bailing tests.

Remarks: Following bailing tests, started to put down pumping pipe. Will place bottom of pipe approximately 350 feet below ground

Gordon A. Hunter
Field Geologist

Oct. 30, 1934

Dr. A.C. Tester,
Geology Dept.,
Iowa City, Ia.

Dear Allan:

The accompanying daily report willcontain a correction on the depth of the 6" casing. This morning I measured the hole, and found a total depth of 366'8", which indicated an error in the total amount of casing, reported to you yesterday as 368'3". McCutcheon came down today, so we checked the tape used, and found it correct. We then found that in their measurements they did not allow for the recess coupling, which will equal 1 inch for each length of pipe, making 18" error. The casing was therefore put down 366'9", which checks my measurement this morning of the hole. I have the sample of this 8" interval, and shall report it on the daily sheet for Saturday the 28th when I submit the casing record. I am expected West back tomorrow.

I measured the water level this morning, and found 174 feet to water, following a bailing of the hole made last evening after my letter of yesterday was sent. Inquires regarding the cause of this brought out the fact that altho they bailed the material from the bottom, they did not attempt to bail the hole dry. The water level yesterday therefore represents the lowering of the water standing in the hole derived from the upper horizon of sand, which we have now cased out. I therefore had them bail until we had reduced the water level to a fairly uniform head, and then stopped.

At 11:20 depth to water - 209½

water raising in 10 minutes.

At 11:40 depth to water - 199

At 1 PM " " " - 199

At 5:15, measuring after drilling, water level 208 ft.

The casing settled during the day as follows:

By 11:20 - - 4 inches
" 2 PM - 2 "
2:45 2 inches
3:30 - 1 inch

At 4:15 the pipe was clamped above the platform and jarred with the wrench on the bit. It settled 1 inch and then

set tight, so that the casing now is 367'7" below the surface.

Sincerely

Please inform me by wire or phone how deep you wish to have me set the pipe for the pumping test unless the following is OK. Will run a bailing test when we have reached good ls. and determine roughly the level to which I can lower the water. Will then put pipe down 40-50 feet below that level, and with a pressure gage holding a constant level to water, determine the capacity of the sand. This will not put the pipe necessarily close to the bottom of the hole.

OK

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Oct. 30

Time of filing 5:30 ~~A.M.~~ P.M.

Name of Well Lovilia Bottom-hole Formation

Hole drilled today: 21'4" ft. of 6" in.; ft. of in.

Depth at end of day 388 ft. in a 6" hole; total footage drilled since yesterday 21'4" ft.

Underreaming: From ft. to ft.; in. size to in. size

From ft. to ft.; in. size to in. size

Casing put in: 0 ft. 10 in. 6 5/8 size, from 366'9" ft. to 367'7" ft.

ft. in. size, from ft. to ft.

Amount of open hole: 20'5" ft. 6" size

Water: At ft. No. of bailers . No. of gallons

Level of water 209½ ft. below surface, lowered to ft.
at 11:20 at 5:15 water at 208 ft.

Kind of water

Log of well for day: (Report each sample) 377 363

(Last sample yesterday: fine sand bottom at 366'8" ft.)

Lithology	From	To
Fine qtz. sand, micaceous, slightly cal.	366'8"	370
Same	370	373'4"
Coarser sand, slightly cal. Some grit grains up to 1/8 ". Some clayey (water) sand. (small am't) and small am't of cemented sand, not cal. Small amount of gray siltst.	373'4"	377
Same type sand. White ls. chips, occurs in bands, drill breaks through easily. No clayey s. or siltst.	377	379
Light tan ls. and qtz sand, latter in minor am't. Drillsharder.	379	381½
Light tan ls. and qtz sand, just beginning to drill easier at last.	381½	382'10"
Qtz sand and ls. chips, drilled easier than above, except for 3" band. Interbedded ls.	382'10"	385
Qtz sand and ls. Drilled harder, but no sharp breaks in drilling.	385	388' -

Shut-downs: Time ; Cause

Remarks: Casing settled 10 inches during drilling.
Report on water level in letter of Oct. 30

Field Geologist

393'4 to 397'7"

Lt tan ls + some ss -

Large amt frag gtz - some upper to ¼" dia -

Blue clay +

MAP No. W-0061

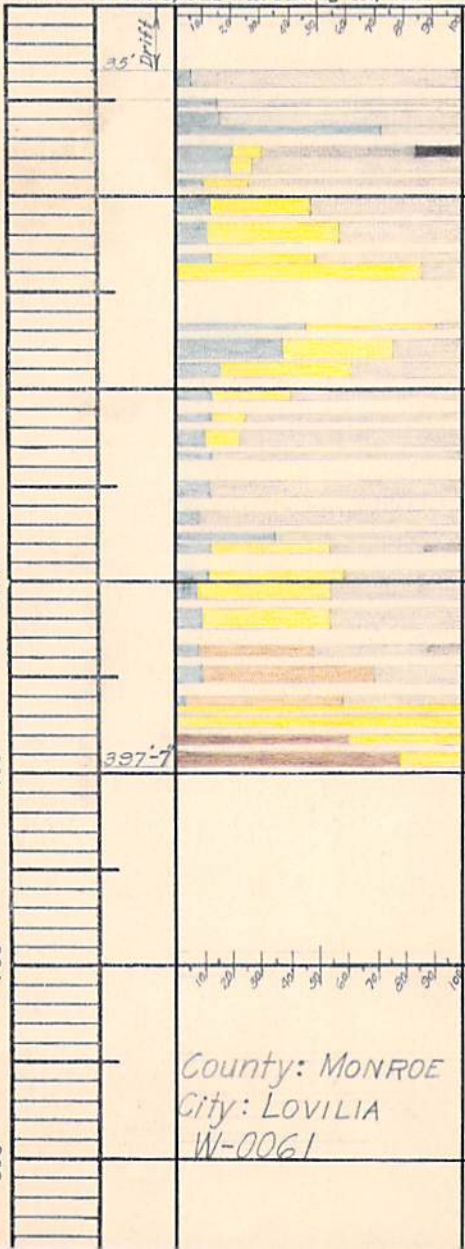
STATE	COMPANY
Iowa	Lovilia
COUNTY	FARM / WELL NO.
MONROE	
T. / R.	CONTRACTOR
	COMMENCED
	COMPLETED
	REMARKS
ALTITUDE	"I.P." study
PRODUCTION	

CASING RECORD

	10"
	8¼"
20"	6⅝"
15½"	5 3/16"
12½"	

SHOT QUARTS BETWEEN

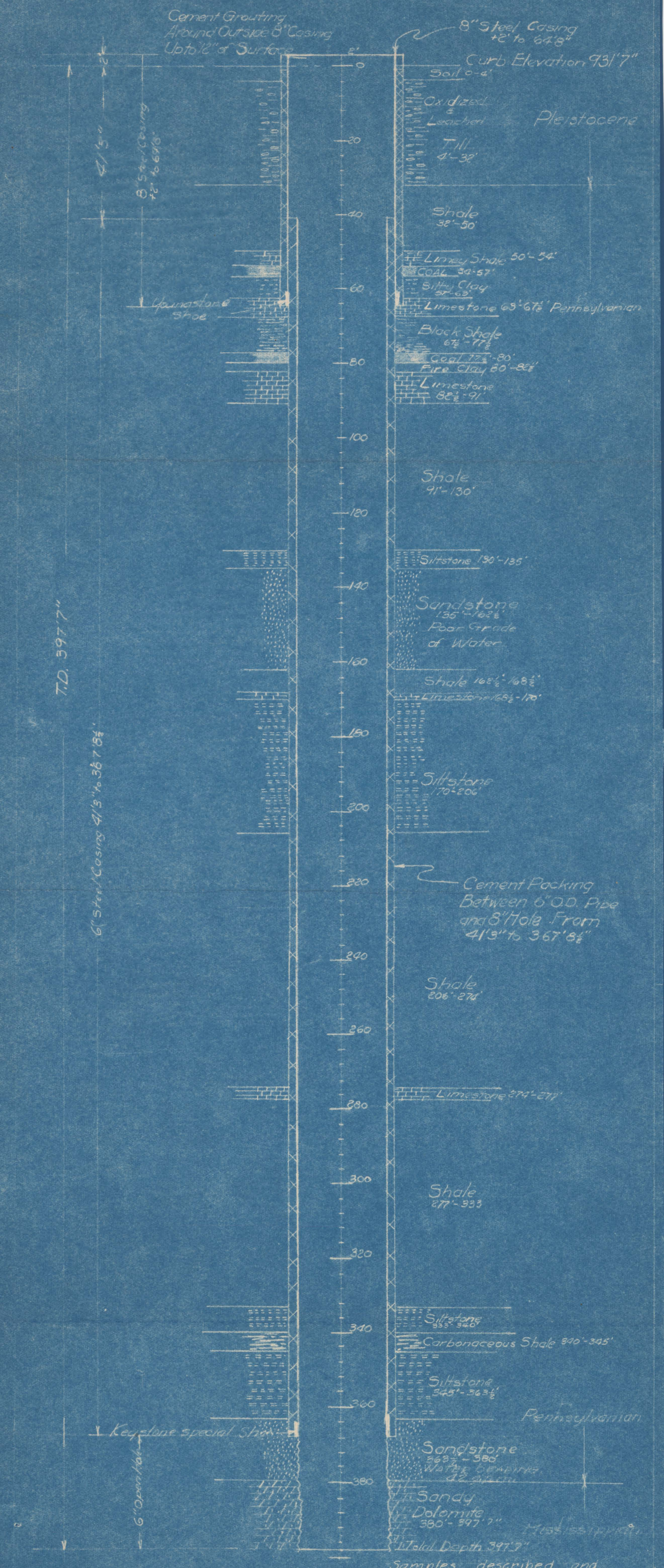
FORM 186—For Sale by Mid-West Printing Co., Tulsa



County: MONROE
City: LOVILIA
W-0061

DIAGRAM OF WELL CONSTRUCTED FOR CITY OF LOVILIA

Completed Nov. 12, 1934



Specifications & Supervision by
A. C. Tester, Assistant State Geologist
Iowa City, Iowa

Samples described and log prepared by
IOWA GEOLOGICAL SURVEY
IOWA CITY

Contractor:
McCUTCHEON WELL CO.
DES MOINES, IOWA

IOWA EMERGENCY RELIEF ADMINISTRATION PROJECT

PUMPING TEST

Satic Level 195 Ft below curb.
Pumping 40 g.p.m., drawdown of 125'
Pumping 42+ g.p.m., drawdown of 137'

		Pyrite	Leucoxene	Limonite	Mica	Barite	Tourmaline	Zircon	Anatase	Garnet	Chlorite	Rutile	Brookite	Sphalerite	Amphibole	Apatite	Epidote	Tibnite	Quartz	Feldspar	Chert	Clay Minerals	Muscovite	Solubility
Shale	35-64	A		A			X	X							X		X		R			F		3%
Limestone	64-67½	F			R	X	R	R											A	R		A		72%
Shale	90-115	F	C		C	X	R	R	X	R	X	X		X	X				A	R		A	A	16%
Shale	115-135	A	A		R		C	R		R	X	X						X	A	X		A	C	11%
Sandstone	135-162½	F	X		R		X	R	R	X	X	X	X	X	X	X		X	F	R		C	X	
Siltstone	162½-170.5'	F	C		R	X	R	R	X	X	X	X		X					F	R	R	C	C	30%
Shale	213½-325'	A	C		X	C	R	R	X	X	X	X		X	X		X		A	R		A	R	10%
Siltstone	353½-363½	A	A		R	X	R	R		R	C	X							A	R	X	A	R	7%
Sandstone	363½-377	F	C				R	R	C	X	C	X		X		X		X	F	X			X	
Dolomite	377-397½'	F	C				C	R	R	X	R	R	R						F	R	R	R	R	67%

Mineral Analysis of Louisa Well

W-6061

F = Flood -- 66-100%
A = Abundant -- 26-65%
C = Common -- 6-25%
R = Rare -- 1-5%
X = Present -- <1%

Des Moines

Mississippian (Perla?)

Monroe Co

Oct. 29th 1934

Dr. A. C. Tester,
Iowa City, Ia.

Dear Allan:

The drillers did not show up this morning, and around noon the second driller and one of the Georgetown men arrived. Pat's step-son was killed Sunday, and they just found it out this morning, so he will not be here until Wednesday, I presume. We cut the cable and removed several hundred feet, and when we went to bail out the hole found the bailer broken, so the afternoon was spent in getting it welded. West did not send his notebook down, so I will have to wait until he arrives before filling out the casing record for Friday PM and Sat. morning. As soon as I get this data will make out the sheets for those days complete. I trust you will excuse the delay.

The casing measures 370' 8", with 29" above the ground making a total of 368' 3" of casing set in the hole. I have the sample of sand taken between 366' and 368'3", and as they bailed out the hole before driving the casing the last 2'3", ~~##/####~~ the sample is uncontaminated, it being bailed out following the final driving.

At 11:30 AM this morning the water level was 147'7", and as close as I could measure was the same this afternoon at 5PM.

Will fill out the forms these past days as soon as possible, incorporating the above data.

Sincerely,

J. A. Thurmer

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Report for Oct. 27

Time of filing _____ A.M. P.M.

Name of Well Lovilia Bottom-hole Formation fine quartz sand

Hole drilled today: ~~8 inches~~ ft. of 6" in.; _____ ft. of _____ in.

Depth at end of day ~~366'8"~~ ft. in a 6" hole; total footage drilled since yesterday 8 inches ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: 239'7" ft. _____ in. 6 5/8 wt, from 127'2" ft. to 366'9" ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 0 ft. _____ size

Water: At _____ ft. No. of bailers _____. No. of gallons _____

Level of water _____ ft. below surface, lowered to _____ ft.

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: med. to fine gr. qtz. sand bottom at 366' ft.)

Lithology	From	To	Lithology	From	To
~~Fine micaceous quartz sand~~, slightly calcareous	366	366'8"			

Shut-downs: Time _____; Cause _____

Remarks: _____

G. A. Waters
Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Supplement report for Oct. 26

Time of filing _____ A.M. P.M.

Name of Well Levilia Bottom-hole Formation Quartz sand

Hole drilled today: 8½ ft. of 8" in.; _____ ft. of _____ in.

Depth at end of day 366 ft. in a 8" hole; total footage drilled since yesterday 8½ ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: 127 ft. 2 in. 6 5/8" size, from 0 ft. to 127'2" ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 238'10" ft. 8" size

Water: At _____ ft. No. of bailers _____. No. of gallons _____

Level of water 123 ft. below surface, lowered to _____ ft.
at 8AM

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: Gray sandy shale bottom at 357½ ft.)

Lithology	From	To	Lithology	From	To
Gray sandy sh, some harder gray shale with a little black carb. impressions.	357½	360			
Gray sandy shale, just at last drilling was harder. Sample shows med to fine grained quartz sand.	360	363½			
Med. to fine grained quartz sand.	363½	366			

Shut-downs: Time _____; Cause _____

Remarks: Drillers dressed bit and widened hole - 7AM - 11AM

gatenter
Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Oct. 26, 1934

Time of filing 2:30 A.M. P.M.

Name of Well Lovilia #1 Bottom-hole Formation quartz sand

Hole drilled today: 8½ ft. of 8" in.; _____ ft. of _____ in.

Depth at end of day 366 ft. in a _____ hole; total footage drilled since yesterday 8½ ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: _____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 301ft 4inches ft. _____ size

Water: At 123 at 8AM ft. No. of bailers _____. No. of gallons _____

Level of water _____ ft. below surface, lowered to _____ ft.

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: ~~3/5~~ Gray sandy shale bottom at 357½ ft.)

Lithology	From	To	Lithology	From	To
Gray sandy sh., some harder gray sh. with a little black carb. impressions.	357½	360			
Gray sandy sh., just at bastdrilling was harder. Sample shows med. to fine gr. quartz sand.	360	363½			
Med. to fine gr. qtz. sand	363½	366			

Shut-downs: Time _____; Cause _____

Remarks: Drillers dressed bit and widened hole- 7AM - 11AM

Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Oct. 25, 1934

Time of filing 5:30 A.M. P.M.

Name of Well Lovilia Bottom-hole Formation _____

Hole drilled today: 37½ ft. of 8" in.; _____ ft. of _____ in.

Depth at end of day 357½ ft. in a _____ hole; total footage drilled since yesterday 37½ ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: _____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 293½ ft. 8" size

Water: At 119½ ft. No. of bailers _____. No. of gallons _____
at 7:30 AM
Level of water _____ ft. below surface, lowered to _____ ft.

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: Gray shale bottom at 320 ft.)

Lithology	From	To
Gray shale	320	325
Soft gray sandy sh., some gray harder sh with small amounts of carbonaceous mat.	325	327½
Same	327½	333'4"
Same	333'4"	336
Soft gray sandy sh., reappearance of dark flaky carbonaceous sh	336	339½
Same, some interlam. ls.	~~339½~~	~~345~~

Lithology	From	To
Gray sandy sh., some darker gray sh., and ~~black flaky carb. sh.~~	345	349
Same	349	353
Gray sandy sh., some ~~darker gray sh.,~~ black carb. flaky ~~sh., and large piece~~ of coal.	353	357½

Shut-downs: Time _____; Cause _____

Remarks: _____

J. A. Hunter
Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Oct. 24, 1934

Time of filing 5:30 A.M. / P.M.

Name of Well Loyilia Bottom-hole Formation Gray lam. sh.

Hole drilled today: 46 ft. of 8" in.; _____ ft. of _____ in.

Depth at end of day 320 ft. in a _____ hole; total footage drilled since yesterday 46 ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: _____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 256 ft. 8" size

Water: At _____ ft. No. of bailers _____. No. of gallons _____

Level of water _____ ft. below surface, lowered to _____ ft.

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: light gray sandy shale. bottom at 274 ft.)

Lithology	From	To
Ls. and interbedded gray shale.	274	275
Gray sandy ls.	275	277
Same	277	279
Gray sandy shale, some darker carb. sh. that breaks into slivers, and chips, flaky.	279	280
Gray sandy sh. and flaky carb. dark sh. Interbedded ls., except for 8" bed ls. at 282	280	285
Soft gray sh., darker carb. sh., and few pieces highly carb. black sh. A little interb'd'd ls.	285	290
Same, except for a few pieces of coal. No change felt in drilling	290	295
Soft gray sandy shale, smaller amt. of dark carb. flaky sh. A few pieces of greenish gray clay.	295	300
Graysandy sh., some dark carb. sh. Some ls.	300	305
Same as above, rarely coal fragment(contam?)		
No change in drilling	305	310
Gray sandy shale, and abundant dark flaky shale in flat chips	310	315
Gray shale, less sandy, very few fragments of darker gray carb. sh.	315	320

Shut-downs: Time _____; Cause _____

Remarks: _____

215-245-30

Field Geologist

ST-1384

DAILY REPORT OF DRILLING PROJECT

Date 10/23/34

Time of filing 5:30 A.M. P.M.

Name of Well Luilia Bottom-hole Formation ______

Hole drilled today: 47 ft. of 8" in.; ______ ft. of ______ in. 274 227 47

Depth at end of day 274 ft. in a 8" hole; total footage drilled since yesterday 47 ft. 274 64 210

Underreaming: From ______ ft. to ______ ft.; ______ in. size to ______ in. size

From ______ ft. to ______ ft.; ______ in. size to ______ in. size

Casing put in: ______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

Amount of open hole: 210 ft. 8" size

Water: At ______ ft. No. of bailers ______. No. of gallons ______

Level of water ______ ft. below surface, lowered to ______ ft.

Kind of water ______

Log of well for day: (Report each sample)

(Last sample yesterday: Med. gray lam. sh. bottom at 227 ft.)

Lithology	From	To	Lithology	From	To
Med. gray lam. sh.	227	230	Dark slate, small coal frag. and light gray clay (underclay)	245	248'3"
Med. gr. sh. a little interbedded ls.	230	232½	Light greenish gray sh.	248'3"	251'6"
Same	232½	237	Same with very thin lam. of coal.	251'6"	255'
Med. gray sh, with a little darker carb. sh.	237	241	Light gray sh.	255	257
Same	241	244'4"	Light gray green sh.	257	262'2"
Dark very carb. sh. some black slate	244'4"	245	Same - some sh. sandy	262'2"	265'6"
			Light gray green sh. - sandy	265'6"	270
			Light gray sdy shale - l.s. in flat chips - Rx becoming increasingly harder, but no abrupt change in	270	274

Shut-downs: Time ______; Cause drilling - Interbedded ls.

Remarks: Please send more sacks

[signature]

Field Geologist

ST-1384

duplicate made Oct. 24 from carbon copy

DAILY REPORT OF DRILLING PROJECT

Date 10/22/34

Time of filing 5:30 A.M. P.M.

Name of Well Lovilia Bottom-hole Formation

Hole drilled today: 23½ ft. of 8" in.; ft. of in.

Depth at end of day 227 ft. in a hole; total footage drilled since yesterday 23½ ft.

Underreaming: From ft. to ft.; in. size to in. size

From ft. to ft.; in. size to in. size

Casing put in: ft. in. size, from ft. to ft.

ft. in. size, from ft. to ft.

Amount of open hole: ft. size

Water: At ft. No. of bailers . No. of gallons

Level of water ft. below surface, lowered to ft.

Kind of water

Log of well for day: (Report each sample)

(Last sample yesterday: sandy shale bottom at 203½ ft.)

Lithology	From	To	Lithology	From	To
Gray sh. and interbedded ls. No single thick bed.	203½	206½	Same	217½	221'3"
			Same	221'3"	224
Medium to dark gray lam. sh. Less ls. Very small amt. of gray sandy shale.	206½	210	Med. gray lam. sh. No dark shale.	224	227
Med. to dark gray lam. sh., some ls.	210	213½			
Med. to dark gray lam. sh. Some hard sh., carbonaceous	213½	217½			

Shut-downs: Time ; Cause

Remarks: Drilled in PM Drillers arrived late from Des Moines where they spent the morning in McC's office.

Field Geologist

ST-1384

203.5
187.1
16

DAILY REPORT
OF
DRILLING PROJECT Date Oct-21

Time of filing 2:30 A.M. P.M.

Name of Well Lucilia #1 Bottom-hole Formation for Oct. 20 Sandy shale

Hole drilled today: 16 ft. of 8" in.; _____ ft. of _____ in.

Depth at end of day 203.5 ft. in a wet hole; total footage drilled since yesterday 16 ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: 5 ft. [redacted] in. 8" size, from _____ ft. to _____ ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 139 1/4" ft. 8" size

Water: At [redacted] ft. No. of bailers _____. No. of gallons _____

203.6
64.2
139.4

Level of water 173 ft. below surface, lowered to _____ ft.

Kind of water see report for Oct 19 Letter

Log of well for day: (Report each sample)

(Last sample yesterday: _____ bottom at _____ ft.)

Lithology	From	To	Lithology	From	To
Gray, laminated sh, and thin beds of sandy gr. sand	187½	192½	Same as above	200	203.5
Hard, calcareous siliceous fine gr. s.s. abundant pyrite	192½	195			
6" hard rock, 1 ft soft					
3½ ft sh. with thin hard beds. Laminated sandy sh. Thin black carbonaceous sh.	195	200			

Shut-downs: Time _____; Cause _____

Remarks: Morning spent in pulling pipe and setting bit -

Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Oct. 16

Time of filing 4:30 A.M. P.M.

Name of Well Lovilia Bottom-hole Formation sandy shale

Hole drilled today: 14 ft. of 8" in.; _____ ft. of _____ in.

Depth at end of day 187½ ft. in a wet hole; total footage drilled since yesterday 14 ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: _____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 128'4" ~~128'4½"~~. 8" size

Water: At 123 ft. No. of bailers 21. No. of gallons 210

Level of water 123 ft. below surface, lowered to bottom of hole required 30 minutes to fill back up to 123 ft.

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: gray sandy shale bottom at 173'6" ft.)

Lithology	From	To	Lithology	From	To
Gray sandy shale, some fine, gray cal. s.s.	173'6"	175'			
Same as above, some of shale is carbonaceous.	175	180			
Same as above, washed samples show fine, platy s.s.	180	183			
Gray sandy shale, laminated, carbonaceous.	183	186			
Same as above	186	187½			

Shut-downs: Time 10:30-2:30; Cause bailing tests.
3:00 bottom of hole.

Remarks: _____

J. A. Hunter
Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date Oct. 15

Time of filing 5:30 A.M. P.M.

Name of Well ~~Lovilia~~ Bottom-hole Formation

Hole drilled today: ~~18'6"~~ ft. of 8" in.; ft. of in.

Depth at end of day 173'6" ft. in a wet hole; total footage drilled since yesterday 18'6" ft.

Underreaming: From ft. to ft.; in. size to in. size

From ft. to ft.; in. size to in. size

Casing put in: ft. 10" in. 8" size, from ft. to ft.

ft. in. size, from ft. to ft.

Amount of open hole: 114'4" ft. 8" size

Water: At 121 ft. No. of bailers . No. of gallons

Level of water 121 ft. below surface, lowered to ft.

Kind of water

Log of well for day: (Report each sample)

(Last sample yesterday: white sand bottom at 155 ft.)

Lithology	From	To	Lithology	From	To
White sand, same as sand above	155	168½			
Gray ~~quartzite~~ Sdy Ls, drills hard	168½	173½			
(just entered sandy shale, gray)					

~~Remarks: Measured water at 10:00 AM 121 ft below the surface, 33½ ft water~~
Measured again at 1:15 PM 121½ feet below surface. 47½ ft. water

This is the water supplying the school wells. The deepest stoppe d ~~at 171 ft., which is about~~ where we hit the hard quartzite. Will drill through the underlying shale, and then test this horizon.

Shut-downs: Time 2PM -4:30PM ; Cause Dressing bit

Remarks:

J. A. Hunter
Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date ~~Oct. 14~~

Time of filing 1 A.M. / P.M.
drilling for Oct. 13

Name of Well Lovilia #1 Bottom-hole Formation _____

Hole drilled today: 45 ft. of 8 in.; _____ ft. of _____ in.

Depth at end of day 155 ft. in a 8" dry hole; total footage drilled since yesterday 45 ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

7, Casing put in: 58 ft. 4 in. 8" size, from 0 ft. to 58'4" ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: 96'8" ft. 8" size

Water: At _____ ft. No. of bailers _____. No. of gallons _____

Level of water 47'6" ft. below surface, lowered to 110 ft. at 9:40AM 200 gal. 10 minutes.

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: dark gray shale bottom at 110 ft.)

Lithology	From	To	Lithology	From	To
Same gray shale, a little interb'd'd l.s.	110	115	Light quartz s.s. possibly a little water on last few feet. Some clay.	135	~~155~~ 140
Same gray shale, practically no l.s.	115	120	SS- pure. light. med. to fine	140	145
Same dark gray shale.	120	125	Same	145	150
Same	125	130	Same	150	155
Largely same dark gray shale, as above, a little interb'd'd ls., and some light gray clayey s.s. 130-135					
Washed Sd. is med. gr. qtz. Sd					

Shut-downs: Time _____; Cause _____

Remarks: ~~Casing run from 7 to 9:40. During this time I chlorinated~~ school wells and tanks.

Field Geologist

ST-1384
dup. from carbon copy
10/24/34

10/13

DAILY REPORT
OF
DRILLING PROJECT Date ~~10/12/34~~

Time of filing ~~5:30~~ A.M. P.M.

Name of Well ~~Lovilia~~ Bottom-hole Formation _____

Hole drilled today: ~~36~~ ft. of ~~8"~~ in.; _____ ft. of _____ in.

Depth at end of day ~~110~~ ft. in a ~~dry~~ hole; total footage drilled since yesterday ~~36~~ ft.

Underreaming: From _____ ft. to _____ ft.; _____ in. size to _____ in. size

From _____ ft. to _____ ft.; _____ in. size to _____ in. size

Casing put in: _____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

_____ ft. _____ in. _____ size, from _____ ft. to _____ ft.

Amount of open hole: ~~110~~ ft. ~~8"~~ size

Water: At In morning ~~71~~ ft. No. of bailers ~~14~~. No. of gallons 140

Level of water ~~38½~~ ft. below surface, lowered to _____ ft.

Kind of water _____

Log of well for day: (Report each sample)

(Last sample yesterday: _____ bottom at _____ ft.)

Lithology	From	To
~~Black slate, a little~~ ls.	~~74½~~	~~77½~~
Coal, some dark gray ~~sh., probably above~~ coal	77½	80
Ashen gray clay	80	82½
Gray clay, some gray ~~shale and interbedded~~ gray ls.	82½	87
Gray ls.	87	88
Limestone and inter-~~bedded ash gray sh.~~	~~88~~	~~91~~

Lithology	From	To
Light gray lam. silty and fine sandy sh.	91	95
Med. dark gray lam. sh	95	100
Same	100	105
About same as above. Color gray, not quite as dark as sh. above. A little lighter sh. interlaminated. Gritty. Some inter-bedded ls.	105-110	

Drilled 10/12

Shut-downs: Time _____; Cause _____

Remarks: _____

_____

Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT Date 10/12/34

Time of filing 5:30 A.M. P.M.

Name of Well Lorilia #1 Bottom-hole Formation ______

Hole drilled today: 36 ft. of 8" in.; ______ ft. of ______ in.

Depth at end of day 110 ft. in a dry hole; total footage drilled since yesterday 36 ft.

Underreaming: From ______ ft. to ______ ft.; ______ in. size to ______ in. size

From ______ ft. to ______ ft.; ______ in. size to ______ in. size

Casing put in: ______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

Amount of open hole: 110 ft. 8" size

Water: At 74 ft. No. of bailers 14. No. of gallons 140

Level of water 38½ ft. below surface, lowered to 74 ft.

Kind of water ______

Log of well for day: (Report each sample)

(Last sample yesterday: ______ bottom at ______ ft.)

Lithology	From	To	Lithology	From	To
Bl. slate, a little l.s.	74½	77½	Light gray lam.		
Coal - some dark gr.			silty & fine sandy		
sh, probably also coal	77½	80	sh.	91	95
Ashen gray clay	80	82½	Med. dark gray lam.		
Gray clay - some gray			sh.	95	=
sh. & interbedded					
gray l.s.	82½	87			
Gray l.s.	87	88			
Limestone & inter-					
bedded ash gray sh.	88	91			

Shut-downs: Time ______; Cause ______

Remarks: 8" casing arrived - Will drive in morning.

G. D. Atwater
Field Geologist

ST-1384

DAILY REPORT OF DRILLING PROJECT

Date 10/11/34

Time of filing 5:30 P.M.

Name of Well Lovilia #1 Bottom-hole Formation ______

Hole drilled today: 39 ft. of 8 in.; ______ ft. of ______ in.

Depth at end of day 74 ft. in a ~~dry~~ 8" hole; total footage drilled since yesterday 39 ft.

Underreaming: From ______ ft. to ______ ft.; ______ in. size to ______ in. size

From ______ ft. to ______ ft.; ______ in. size to ______ in. size

Casing put in: ______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

Amount of open hole: 74 ft. 8" size

Water: At ______ ft. No. of bailers ______. No. of gallons ______

Level of water ______ ft. below surface, lowered to ______ ft.

Kind of water ______

Log of well for day: (Report each sample)

(Last sample yesterday: Yellow shale bottom at 35 ft.)

Lithology	From	To	Lithology	From	To
Blue laminated shale	35	50	Gray l.s. & small amount		
Dark gray lam sh.			of black l.s.	66	67½
Thin layers soft gray l.s.	50	54	Black laminated shale	67½	71
Coal	54	57	Black laminated shale	71	74½
Silty clay - carbonaceous			some black limestone		
material - grayish white	57	61	interbedded -		77½'
Silty white clay - inter-			Coal	77½'	80'
bedded l.s. at base of hole	61	64	Fire clay	80'	85'
Gray l.s.	64	66	Gray sh. & silty	85'	

Shut-downs: Time ______; Cause ______

Remarks: ______

Water surf from 140 ght. 38½ below surface

______ [signature] Field Geologist

ST-1384

DAILY REPORT
OF
DRILLING PROJECT

Date 10/10/34

Time of filing 7 P.M.

Name of Well Leslie #1 Bottom-hole Formation ______

Hole drilled today: 35 ft. of 8" in.; ______ ft. of ______ in.

Depth at end of day 35 ft. in a 8" hole; total footage drilled since yesterday 35 ft.

Underreaming: From ______ ft. to ______ ft.; ______ in. size to ______ in. size

From ______ ft. to ______ ft.; ______ in. size to ______ in. size

Casing put in: ______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

______ ft. ______ in. ______ size, from ______ ft. to ______ ft.

Amount of open hole: 35 ft. 8" size

Water: At — ft. No. of bailers — . No. of gallons ______

Level of water ______ ft. below surface, lowered to ______ ft.

Kind of water ______

Log of well for day: (Report each sample)

(Last sample yesterday: ______ bottom at ______ ft.)

Lithology	From	To	Lithology	From	To
Soil	0	4			
Oxidized & leached Till	4	25			
Yellow & green shale	25	30			
" " Includes coarse shale	30	35			

Shut-downs: Time ______; Cause ______

Remarks: First 10½ ft dug with post hole auger
Digging started at 2 PM

[signature]
Field Geologist

MATERIAL SENT TO HINMAN FOR QUANTITATIVE ANALYSIS

Lovilia W-0061 T. D. 397' 7"

Intervals

135 - 162½
363½ - 377

DEEP WELL STUDY

Well No. W— 0061
Depth 35 to 43
No. samples used 2
Analyst Talley
Date Feb 16 1935

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	38.05 gm.	100.0%	2. Wt. of F. P. 2.30
3. Wt. after solution, with filter paper	38.39 gm.		
4. Less wt. F. P. (2)	2.30 gm.		
5. Wt. Insol. Residue (3 minus 4)	36.09 gm.	94.85 %	
6. Wt. lost by solution (1 minus 5)	1.96 gm.	5.15 %	
7. To balance (5 plus 6)	38.05 gm.	100.00 %	

B. Subsidation:

1. Original Wt.	36.09 gm.	100.0%	
2. Cylinder (+1/32) 16.96 / 2.15	14.81 gm.	41.1 %	
3. Jar (1/32—1/64) 9.23 / 2.30	6.93 gm.	19.2 %	
4. Drain	14.35 gm.	39.7 %	

C. Screen Analysis 14.71

SIZE	GRAMS	%
2 plus		
2–1 mm		
1+½ mm	5.98	40.7
½–¼ mm	.87	5.9
¼–⅛ mm	1.52	10.3
⅛–1/16	3.05	20.7
Pan	3.27	22.4
Total	14.69	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) ⅛–1/16 mm.

Analyst D. Fraschetti
Date 3-4-35

Wt. of sample 3.10 gm. 100.0%

Heavy Minerals .0275 gm. .8 %

Light Minerals 3.075 gm. 99.2 %

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Zircon	3	.02%
tourmaline	1	Tr
epidote	1	Tr
limonite	280	99.98
Total	1285	100%

Classification Grouping:
Primary Minerals: 99.2 %

	Absol. %
Zircon	0
tourmaline	0
epidote	0
Quartz	1.7
clay-minerals	97.5

Light Concentrate		
quartz	30	1.7
clay-minerals	1400	98.3
Total	1430	100%

Secondary Minerals: T %
limonite .8

Total 100%

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

Shale 90% light buff to gray-mottled very slightly calcareous - Silt - 20-30% - lost by Solution 5%

DEEP WELL STUDY

Well No. W— 0061
Depth 50 to 53
No. samples used 1
Analyst Talley
Date 2/16/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 21.71 gm. 100.0%; 2. Wt. of F. P. 2.27
3. Wt. after solution, with filter paper . . . . . 20.90 gm.
4. Less wt. F. P. (2) . . . 2.27 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 18.62 gm. 85.8 %
6. Wt. lost by solution (1 minus 5) . . . . . 3.09 gm. 14.2 %
7. To balance (5 plus 6) . . 21.71 gm. 100 %

B. Subsidation:

1. Original Wt. . . . . 18.62 gm. 100.0%
2. Cylinder (+1/32) 8.52, 2.35, 4.83 — 6.17 gm. 33.2%
3. Jar (1/32—1/64) 2.26 — 2.53 gm. 13.7%
4. Drain . . . . . 9.90 gm. 53.1 %

C. Screen Analysis 5.98

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
~~½~~+¼ mm	1.45	24.9
¼–⅛ mm	1.34	23.0
⅛–1/16	1.21	20.8
Pan	1.82	31.3
Total	5.82	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 Sp. gr. Size–Grade(s) ¼–1/16 mm.

Analyst Rowser
Date 3-4-35

Wt. of sample . . . . 1.23 gm. 100.0%

Heavy Minerals . . . . .01 gm. 1 %

Light Minerals . . . . 1.22 gm. 99.2 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	989	86
Clay	167	14
Zircon	1	0
Hornblende	1	0
Total	1158	100%

Light Concentrate: clay 100%

Classification Grouping:

		Absol. %
Primary Minerals:	99.3 %	.1
Clay (Heavy)		.2
Clay (Light)		99.
Zircon		0
Hornblende		0
Secondary Minerals:	.7 %	.7
Pyrite		
Total	100%	100%

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

shale — gray — slightly calcareous — micaceous — fossil

a few fossil fragments — pyrite common

⊕ Pyrite - has replaced a few fossils - chiefly forams.

DEEP WELL STUDY

Well No. W— 0061
Depth 57 to 64
No. samples used 2
Analyst Talley
Date 2/16/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	39.08 gm.	100.0%	2. Wt. of F. P. 2.55
3. Wt. after solution, with filter paper	35.89 gm.		
4. Less wt. F. P. (2)	2.55 gm.		
5. Wt. Insol. Residue (3 minus 4)	33.29 gm.	85.3 %	
6. Wt. lost by solution (1 minus 5)	5.79 gm.	14.7 %	
7. To balance (5 plus 6)	39.08 gm.	100 %	

B. Subsidation:

1. Original Wt.	33.29 gm.	100.0%	
2. Cylinder (+1/32) 14.08 / 2.47 / 6.71	11.61 gm.	34.9 %	
3. Jar (1/32—1/64) 9.45	4.26 gm.	12.8 %	
4. Drain	17.42 gm.	52.3 %	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	5.78	51.0
¼–⅛ mm	2.13	18.8
⅛–1/16	2.14	18.9
Pan	1.28	11.3
Total	11.33	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) ¼-⅛ mm.

Analyst Powser
Date 3-4-35

Wt. of sample . . . . 2.14 gm. 100.0%

Heavy Minerals . . . . .09 gm. 4.2 %

Light Minerals . . . . 2.05 gm. 95.8 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Pyrite	889	71
Clay	362	29
Quartz	5	0

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

	Absol. %
Muscovite	0
Quartz	3.8
Clay {Heavy	1.2
Clay {Light	92.0

Total 1256 100%

Light Concentrate

Clay	916	96
Quartz	38	4
Muscovite	1	0

Secondary Minerals: ..... %

Pyrite	3.0

Total 955 100%

Total 100%

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

shale — 90-95% lt. gray, soft, calcareous; — 16%; some iron staining; a few frag. of Ls.

DEEP WELL STUDY

Well No. W— 0061
Depth 64 to 67½
No. samples used 2
Analyst Talley
Date 2/16/34

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	31.64 gm.	100.0%	2. Wt. of F. P.	2.28
3. Wt. after solution, with filter paper	11.29 gm.			
4. Less wt. F. P. (2)	2.28 gm.			
5. Wt. Insol. Residue (3 minus 4)	9.01 gm.	28.5 %		
6. Wt. lost by solution (1 minus 5)	22.63 gm.	71.5 %		
7. To balance (5 plus 6)	31.64 gm.	100 %		

B. Subsidation:

1. Original Wt.	9.01 gm.	100.0%	
2. Cylinder (+1/32) 10.06 / 2.35	7.71 gm.	85.6%	
3. Jar (1/32—1/64) 2.42 / 2.18	.24 gm.	2.6%	
4. Drain	1.06 gm.	11.8%	

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
~~½~~+¼ mm	4.98	66.2
¼–⅛ mm	1.30	17.0
⅛–1/16	1.36	17.8
Pan		
Total	7.64	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rousey
Date 3-6-35

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

Wt. of sample . . . . 1.37 gm. 100.0%

Heavy Minerals . . . . .07 gm. 5.1 %

Light Minerals . . . . 1.30 gm. 94.9 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Tourmaline/green	3	0
brown	5	1
Zircon/zoned	5	1
unzoned	2	0
Muscovite	4	0
bavite	3	0
Pyvite	912	98
Total	934	100%

Light Concentrate		
Clay	522	55
Quartz	375	40
Muscovite	31	3
Feldspar	16	2
Total	944	100%

Classification Grouping:

Primary Minerals: 95.0 %	Absol. %
Clay	52.2
Quartz	38.0
Muscovite	2.8
Feldspar	1.9
Tourmaline green	0
Tourmaline brown	0.05
Zircon zoned	0.05
Zircon unzoned	0

Secondary Minerals: 5.0 %	
Pyvite	5.0
Bavite	0.
Total	100%

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

Limestone – 70%; gray – hard – fine xline;
shaley in part – Shale – 27%; dk gray – soft;
calcareous; carbonaceous;

DEEP WELL STUDY

Well No. W— 0061
Depth 74 to 80
No. samples used 2
Analyst Talley
Date 3/16/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	34.00 gm.	100.0%	2. Wt. of F. P. 2.21
3. Wt. after solution, with filter paper	29.13 gm.		
4. Less wt. F. P. (2)	2.21 gm.		
5. Wt. Insol. Residue (3 minus 4)	26.92 gm.	79.2 %	
6. Wt. lost by solution (1 minus 5)	7.08 gm.	20.8 %	
7. To balance (5 plus 6)	34.00 gm.	100 %	

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 26.77

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	25.09	94.2
¼–⅛ mm	1.54	5.8
⅛–1/16		
Pan		
Total	26.62	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Pyre
Date 3/6/35

Acet. Tetrabr. / Bromoform ± 2.93 Sp. gr. Size–Grade(s) ¼ – Pan mm.

Wt. of sample 1.5-4 gm. 100.0%

Heavy Minerals .08 gm. 5.2 %

Light Minerals 1.46 gm. 94.8 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
pyrite	5000 (est.)	~~97.5~~
leucoxene	50	1.0
garnet	4	.1
zircon {zoned	4	.1
zircon {unzoned	14	.3
tourmaline {brown	1	.0
tourmaline {green	23	.4
sphalerite	14	.3
barite	3	.0
amphibole	3	.0
	5116	
Total		100%

Light Concentrate		
Shale & coal frags.	750	87
quartz	105	12
Feldspar	10	1
muscovite	2	0
	867	
Total		100%

Classification Grouping: Absol. %

Primary Minerals: 94.8 %

garnet	0
zircon {zoned	0
zircon {unzoned	0
tourmaline {brown	0
tourmaline {green	0
amphibole	0
Shale & coal frags.	82.5
quartz	11.4
Feldspar	.9
muscovite	0

Secondary Minerals: 5.2 %

pyrite	5.1
leucoxene	.1
Sphalerite	0
barite	0
Total	100%

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

Carbonaceous shale & Coal: Coal fair grade; 5-10% very fine quartz sand;
shale 74-77½
coal 77½-80.

DEEP WELL STUDY

Well No. W— 0061
Depth 80 to 88
No. samples used 3
Analyst Talley
Date 2/16/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	38.92 gm.	100.0%	2. Wt. of F. P. 2.28
3. Wt. after solution, with filter paper	33.34 gm.		
4. Less wt. F. P. (2)	2.28 gm.		
5. Wt. Insol. Residue (3 minus 4)	31.16 gm.	80.1 %	
6. Wt. lost by solution (1 minus 5)	7.76 gm.	19.9 %	
7. To balance (5 plus 6)	38.92 gm.	%	

B. Subsidation:

1. Original Wt.	11.91 2.30 6.16	31.16 gm.	100.0%
2. Cylinder (+1/32)		9.61 gm.	30.9%
3. Jar (1/32—1/64)	2.35	3.81 gm.	12.2%
4. Drain		17.74 gm.	56.9%

C. Screen Analysis 9.53

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	4.58	48.7
¼–⅛ mm	1.67	17.8
⅛–1/16	1.73	18.3
Pan	1.43	15.2
Total	9.41	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowsey
Date 3-6-35

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

Wt. of sample 1.68 gm. 100.0%

Heavy Minerals .28 gm. 16.7 %

Light Minerals 1.40 gm. 83.3 %

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite (estimated)	2000	99
barite	5	0
Quartz	24	1
Total	20.29	100%
Light Concentrate clay	891	84
Quartz	160	15
Muscovite	12	1
Total	1.063	100%

Classification Grouping:

	Absol. %
Primary Minerals: 83.5 %	
Quartz {Heavy .2 / Light 12.5}	12.5
clay	70.0
Muscovite	.8
Secondary Minerals: 16.5 %	
Pyrite	16.5
barite	0
Total	100%

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

Shale - 80% lgt. gray, soft, massive; calcareous - 20% soluble; slt - ± 10% pyrite abundant

DEEP WELL STUDY

Well No. W—	0061
Depth	91 to 95
No. samples used	1
Analyst	Talley
Date	2/16/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 31.50 gm. 100.0%: 2. Wt. of F. P. 2.49
3. Wt. after solution, with filter paper . . . . 30.68 gm.
4. Less wt. F. P. (2) . . . . 2.49 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . . 28.19 gm. 89 %
6. Wt. lost by solution (1 minus 5) . . . . . . 3.31 gm. 11 %
7. To balance (5 plus 6) . . 31.50 gm. 100 %

B. Subsidation:

1. Original Wt. . . . . . . 28.19 gm. 100.0%
2. Cylinder (+1/32) 13.22 / 2.28 . . . 10.94 gm. 39 %
3. Jar (1/32—1/64) 6.57 / 2.46 . . . 4.11 gm. 14 %
4. Drain . . . . 13.14 gm. 47 %

C. Screen Analysis 10.80

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	1.43	13.3
¼–⅛ mm	1.08	10.1
⅛–1/16	4.81	44.9
Pan	3.40	31.7
Total	10.72	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst	Pyre
Date	3/6/35

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 Sp. gr. Size–Grade(s) 1/8–1/16 mm.

Wt. of sample . . . . 4.76 gm. 100.0%

Heavy Minerals . . . . .03 gm. .6 %

Light Minerals . . . . 4.73 gm. 99.4 %

Shape Analysis:

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

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

Minerals Identified:

Heavy Concentrate	No. of Grains	Rel. %
pyrite	702	59
leucoxene	255	22
mica	141	12
tourmaline { blue	2	0
tourmaline { brown	18	2
tourmaline { green	37	3
anatase	2	0
sphalerite	2	0
zircon { unzoned	9	1
zircon { zoned	3	0
amphibole	2	0
garnet	6	1
rutile	2	0
Total	1187	100%

Light Concentrate	No. of Grains	Rel. %
quartz	678	52
mica	382	29
Shale Frags.	184	14
Feldspar	59	4
*Clay minerals	13	1
Total	1316	100%

Classification Grouping:

	Absol. %
Primary Minerals: 98.5 %	
mica { Heavy	.1
mica { Light	28.8
tourmaline { blue	0
tourmaline { brown	0
tourmaline { green	0
amphibole	0
garnet	0
zircon { zoned	0
zircon { unzoned	0
rutile	0
quartz	51.7
mica	0
Shale frags	13.9
feldspar	4.0
Secondary Minerals: 1.5 %	
pyrite	.4
leucoxene	.1
anatase	0
sphalerite	0
clay minerals	1.0
Total	100%

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

Shale — lgt. gry. very soft; 11% soluble; 15-20% qtz. sand; ±1% Feldspar; 5-10% micas, principally colorless muscovite but ±10% green chloritic muscovite; <1% pyrite; leucoxene relatively abundant.

*(over)

* Platy, colorless, isotropic mineral with refringence below 1.54.

DEEP WELL STUDY

Well No. W— 0061
Depth 100 to 110
No. samples used 2
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	35.72 gm.	100.0%	2. Wt. of F. P. 2.31
3. Wt. after solution, with filter paper	33.29 gm.		
4. Less wt. F. P. (2)	2.31 gm.		
5. Wt. Insol. Residue (3 minus 4)	30.92 gm.	87.4 %	
6. Wt. lost by solution (1 minus 5)	4.80 gm.	12.6 %	
7. To balance (5 plus 6)	35.72 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	30.92 gm.	100.0%	
2. Cylinder (+1/32) 13.41 2.12 1.17	11.35 gm.	36.7 %	
3. Jar (1/32—1/64) 2.30	5.87 gm.	19.0 %	
4. Drain	13.70 gm.	44.3 %	

C. Screen Analysis 11,20

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	1.90	17.3
¼–⅛ mm	1.23	11.2
⅛–1/16	4.33	39.3
Pan	3.54	32.2
Total	11.00	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 3-6-35

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) 1/8-1/16 mm.

Wt. of sample 4.37 gm. 100.0%

Heavy Minerals .01 gm. .2 %

Light Minerals 4.36 gm. 99.8 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	1135	84
zircon zoned	4	0
unzoned	2	0
Tourmaline brown	10	1
green	7	.5
Rutile	6	0
Muscovite	28	2
chlorite	21	1.5
leucoxene	19	1
garnet	1	0
Total	1353	100%

Light Concentrate		
Quartz	560	42
clay	421	32
Muscovite	340	26
Total	1321	100%

Classification Grouping:

Primary Minerals: 99.8%	Absol. %
Quartz	41.9
clay	31.9
Muscovite	26.
zircon	0
Tourmaline	0
Rutile	0
garnet	0

Secondary Minerals: .2%	
chlorite	0
Pyrite	.2
leucoxene	0
Total	100%

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

Shale - med. gray - soft - calcareous - 13% soluble; micaceous, pyrite - common but not abundant

⊕ – Muscovite – altered in 9 out of 10. ± chlorite ± clay minerals.

DEEP WELL STUDY

Well No. W—	0061
Depth	115 to 125
No. samples used	2
Analyst	Talley
Date	2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 43.99 gm. 100.0%: 2. Wt. of F. P. 2.16
3. Wt. after solution, with filter paper . . . . 42.01 gm.
4. Less wt. F. P. (2) . . . . 2.16 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . . 39.85 gm. 88.31 %
6. Wt. lost by solution (1 minus 5) . . . . . . 4.14 gm. 11.69 %
7. To balance (5 plus 6) . . 43.99 gm. 100 %

B. Subsidation:

1. Original Wt. . . . . . 39.85 gm. 100.0%
2. Cylinder (+1/32) 12.97 / 2.25 — 10.72 gm. 26.9%
3. Jar (1/32—1/64) 12.44 / 2.25 — 10.19 gm. 25.5%
4. Drain . . . . 18.94 gm. 47.6%

C. Screen Analysis 10.67

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	1.58	14.9
¼–⅛ mm	1.35	12.8
⅛–1/16	4.47	42.2
Pan	3.18	30.1
Total	10.58	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst	D. Frasche
Date	2-6-35

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) 1/8–1/16 mm.

Wt. of sample . . . . 4.41 gm. 100.0%

Heavy Minerals . . . . .01 gm. .2 %

Light Minerals . . . . 4.40 gm. 99.8 %

Shape Analysis:

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

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

Minerals Identified:

Heavy Concentrate	No. of Grains	Rel. %
zircon	30	2.6
garnet	6	.5
quartz	25	2.2
tourmaline – Brown 38	38	3.3
Green 20	20	1.9
Blue 2	2	.1 (5.3)
leucoxene	294	26.2
pyrite	617	54.9
scale	64	5.7
muscovite	21	1.9
chlorite	8	.7
Total	1125	100%

Light Concentrate	No. of Grains	Rel. %
quartz	800	54
feldspar	64	4
clay-minerals	544	36
muscovite	83	6
chlorite	2	0
tourmaline	2	0
Total	1495	100%

Classification Grouping:

Primary Minerals: 99.8 %	Absol. %
zircon	0
garnet	0
quartz	53.9
tourmaline Brown	0
Green	0
Blue	0
muscovite	6.0
chlorite	0
feldspar	4.0
clay-minerals	35.9

Secondary Minerals: .2 %	Absol. %
leucoxene	.1
pyrite	.1
scale	0
Total	100%

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

Shale 88% medium gray soft – calcareous – micaceous – silt content high – some pyrite – quartz ¼–⅛ mm – angular – lost by solution – 11%

DEEP WELL STUDY

Well No. W— 0061
Depth 130 to 135
No. samples used 1
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	25.66 gm.	100.0%	2. Wt. of F. P.	2.33
3. Wt. after solution, with filter paper	24.66 gm.			
4. Less wt. F. P. (2)	2.33 gm.			
5. Wt. Insol. Residue (3 minus 4)	22.33 gm.	87.0 %		
6. Wt. lost by solution (1 minus 5)	3.33 gm.	13.0 %		
7. To balance (5 plus 6)	25.66 gm.	100 %		

B. Subsidation:

1. Original Wt.	22.33 gm.	100.0%	
2. Cylinder (+1/32) 10.40 / 2.41 / 5.50	7.99 gm.	35.7%	
3. Jar (1/32—1/64) 2.25	3.25 gm.	14.5 %	
4. Drain	11.09 gm.	49.8 %	

C. Screen Analysis 7.83

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	1.14	15.0
¼–⅛ mm	1.44	18.9
⅛–1/16	2.74	36.0
Pan	2.29	30.1
Total	7.61	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ±2.93 Sp. gr. Size–Grade(s) ¼–1/16 mm.

Analyst Rowsey
Date 3-5-'35

Wt. of sample 2.77 gm. 100.0%

Heavy Minerals .035 gm. 1.3 %

Light Minerals 2.735 gm. 98.7 %

Shape Analysis:

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

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

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
Tourmaline Brown	16	1.4
Tourmaline blue	1	.1
Tourmaline green	1	.1
Zircon zoned	6	.5
Zircon unzoned	6	.5
Garnet	6	.5
Sphalerite	2	.2
Muscovite	75	6.7
Chlorite	2	.2
Rutile	1	.1
Pyrite	921	82.4
Leucoxene	80	7.1
Titanite	2	.2
Total	1119	100%

Light Concentrate			
Clay	387	44	
Quartz	312	35	
Feldspar	60	7	
Muscovite	129	14	
Total	888	100%	

Classification Grouping:

Primary Minerals: 98.8 %	Absol. %
Clay	43.4
Quartz	34.6
Feldspar	6.9
Muscovite (Heavy / Light)	13.8
Tourmaline	0
Zircon	0
Rutile	0
Titanite	0

Secondary Minerals: 1.2 %	
Sphalerite	0
Chlorite	0
Pyrite	1.1
Leucoxene	.1
Total	100%

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

Shale - 50-60%; gray - micaceous, calcareous, 13% soluble;
silt & ss - 40-50%; accessory minerals abundant,
particularly pyrite.

⊘ – Muscovite – has been partially altered to sericite and chlorite.

DEEP WELL STUDY

MECHANICAL ANALYSIS

Well No. W— 0061
Depth 135 to 145
No. samples used 2
Analyst Scott
Date 3/6/35

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. . . . . 20.09 gm. 100.0%
2. Cylinder (+1/32) 21.20 / 2.12 / 2.55 — 19.09 gm.....%
3. Jar (1/32—1/64) 2.31 — .24 gm.....%
4. Drain . . . . . .77 gm.....%

C. Screen Analysis 19.00

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	10.43	
¼–⅛ mm	6.53	
⅛–1/16	1.66	
Pan	.35	
Total	18.97	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 3-18-35

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 Sp. gr. Size–Grade(s) ¼-pan mm.

Wt. of sample . . . . 2.10 gm. 100.0%

Heavy Minerals . . . . .10 gm. 4.8 %

Light Minerals . . . . 2.00 gm. 95.2 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	531	75
Muscovite	2	0
chlorite	2	0
Tourmaline(brown)	4	1
garnet	5	1
zircon / zoned	6	1
zircon / unzoned	12	2
dolomite or siderite	80	11
apatite	8	1
epidote	3	0
anatase	12	2
rutile	38	5
brookite	2	0
amphibole	9	1
Total	711	100%
Light Concentrate Quartz	700	68
Feldspar	149	14
Mica	16	2
dolomite or calcite	25	2
clay	148	14
Total	1031	100%

Classification Grouping:

Primary Minerals: .....%	Absol. %
Quartz	64.9
Muscovite	0
Tourmaline	0
garnet	0
zircon	.1
Rutile	0
brookite	0
amphibole	0
apatite	0
Feldspar	13.4
clay	13.4
Mica	1.9

Secondary Minerals: .....%	
Pyrite	3.6
chlorite	0
epidote	0
anatase	.1
leucoxene	.2
dolomite {Heavy / Light}	.5
Total	1.9 100%

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

Sandstone – gray – impure – micaceous; friable – calcareous;
mas. grade – ¼–⅛ – Prin. sub. ⅛–1/16; angular;
slt. content – 10–20%;

DEEP WELL STUDY

Well No. W— 0061

Depth 168 ½ to 170'3"

No. samples used 1

Analyst Talley

Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	28.87 gm.	100.0%	2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper	18.03 gm.		
4. Less wt. F. P. (2)	2.32 gm.		
5. Wt. Insol. Residue (3 minus 4)	15.71 gm.	54 %	
6. Wt. lost by solution (1 minus 5)	13.16 gm.	46 %	
7. To balance (5 plus 6)	28.87 gm.	100 %	

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 1532

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	7.00	45.4
¼–⅛ mm	2.11	13.7
⅛–1/16	4.13	26.8
Pan	2.17	14.1
Total	15.41	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ ..... Sp. gr. ±2.93 Size–Grade(s) 1/8–1/16 mm.

Analyst Pyre

Date 3/5/1935

Wt. of sample . . . . 3.06 gm. 100.0%

Heavy Minerals . . . . 0.04 gm. 1.3 %

Light Minerals . . . . 3.02 gm. 98.7 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %	Classification Grouping: Primary Minerals: 93.7 %	Absol. %
pyrite	562	70.	Muscovite (Heavy + Light)	.1
leucoxene	168	21	garnet	9.9
muscovite	31	4	tourmaline green	0
garnet	11	1	tourmaline brown	0
tourmaline green	15	2	zircon-unzoned	0
tourmaline brown	6	1	rutile	0
zircon-unzoned	9	1	quartz	70.1
anatase	1	0	feldspar	3.9
rutile	1	0	shale frags	9.9
	804			
Total		100%		

Light Concentrate			Secondary Minerals: 6.1 %	
quartz	862	71	pyrite	.9
muscovite	126	10	leucoxene	.3
chert	60	5	anatase	0
feldspar	45	4	chert	4.9
shale frags.	115	10	opal	0
opal	1	0		
Total	120.9	100%	Total	100%

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

Limestone — 90% sal.; 2-3% chert; 3.0-4.0% qtz. sand; A-; 5-10% muscovite; 5-10% shale frags;

DEEP WELL STUDY

Well No. W— 0061	
Depth 175 to 186	
No. samples used 3	
Analyst Talley	
Date 2/18/35	

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 38.98 gm. 100.0%: 2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper . . . . 16.46 gm.
4. Less wt. F. P. (2) . . . 2.32 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . . 24.14 gm. 62 %
6. Wt. lost by solution (1 minus 5) . . . . . . 14.84 gm. 38 %
7. To balance (5 plus 6) . . 38.98 gm. 100. %

B. Subsidation:

1. Original Wt. . . . . . 24.19 gm. 100.0%
2. Cylinder (+1/32) 21.82 / 2.33 19.49 gm. %
   7.05
3. Jar (1/32—1/64) 2.33 4.72 gm. %
   24.21
4. Drain . . . . gm. %

C. Screen Analysis 19.45

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	10.15	52.4
¼–⅛ mm	2.71	14.0
⅛–1/16	3.50	18.1
Pan	3.01	15.5
Total	19.37	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst D. Frasché	
Date 3-7-35	

Acet. Tetrabr. / ~~Bromoform~~ ± 2.93 Sp. gr. Size–Grade(s) 1/8–1/16 mm.

Wt. of sample . . . . 2.87 gm. 100.0%

Heavy Minerals . . . . .03 gm. 1. %

Light Minerals . . . . 2.84 gm. 99. %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
tourmaline green 12, Brown 6, blue 3	21	1.6
quartz	50	3.8
pyrite	1174	88.7
leucoxene	64	4.8
zircon	7	.5
chlorite	3	.2
feldspar	3	.2
barite	1	.1
garnet	2	.1
Total	1325	100%

Light Concentrate	No. of Grains	Rel. %
muscovite	4165	21
quartz	960	50
feldspar	80	4
clay-minerals	480	25
Total	1936	100%

Classification Grouping:

Primary Minerals: 99.1 %	Absol. %
tourmaline green, Brown, blue	0
quartz	49.5
zircon	0
chlorite	0
feldspar	4.0
garnet	
muscovite	20.8
clay	24.8

Secondary Minerals: .9 %	
pyrite	.9
leucoxene	0
barite	0
Total	100%

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

Siltstone 62% - dark gray - calcareous - micaceous
Sandstone 35% - maj. in grade ¼-⅛ - Angular -
pyrite common - min. lost by solution 38%

DEEP WELL STUDY

Well No. W— 0061
Depth 187½ to 195
No. samples used 2
Analyst Talley
Date 7/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	25.21 gm.	100.0%	2. Wt. of F. P.	2.29
3. Wt. after solution, with filter paper	23.65 gm.			
4. Less wt. F. P. (2)	2.29 gm.			
5. Wt. Insol. Residue (3 minus 4)	21.36 gm.	84.7 %		
6. Wt. lost by solution (1 minus 5)	3.85 gm.	15.3 %		
7. To balance (5 plus 6)	25.21 gm.	100 %		

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 21.01

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	12.86	61.6
¼–⅛ mm	2.72	13.0
⅛–1/16	3.42	16.4
Pan	1.88	9.0
Total	20.88	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) ½-1/16 mm.

Analyst Rawsey
Date 3-6-35

Wt. of sample 3.443 gm. 100.0%

Heavy Minerals .035 gm. 1.0 %

Light Minerals 3.395 gm. 99.0 %

Shape Analysis:

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

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

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
Pyrite	683	80
rutile	2	.2
zircon / zoned	6	.7
zircon / unzoned	8	.9
Tourmaline / Blue	3	.4
Tourmaline / Brown	9	1.1
Tourmaline / green	6	.7
sphalerite	2	.2
Muscovite	10	1.2
Quartz	36	4.1
garnet	3	.4
baryte	2	.2
anatase	73	8.5
leycoxene	10	1.2
chlorite		
Total	854	100%

Light Concentrate			
Quartz	584	53	
clay	321	29	
Muscovite	176	16	
Feldspar	25	2	
Total	1110	100%	

Classification Grouping:

	Absol. %
Primary Minerals: 99.1 %	
Quartz	52.5
Muscovite	15.9
feldspar	2.0
clay	28.7
rutile	0
zircon / zoned	0
zircon / unzoned	0
Tourmaline / Blue	0
Tourmaline / Brown	0
Tourmaline / green	0
garnet	0
Secondary Minerals: .9 %	
Pyrite	.8
sphalerite	0
baryte	0
anatase	.1
leycoxene	0
chlorite	
Total	100%

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

Sls–50–60% – med. gray, soft, micaceous, calcareous – 1.5% soluble; Sh–40–50% – Pyrite very abundant.

DEEP WELL STUDY

Well No. W— 0061
Depth 200 to 206½
No. samples used 2
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	28.72 gm.	100.0%	2. Wt. of F. P. 2.3
3. Wt. after solution, with filter paper	27.20 gm.		
4. Less wt. F. P. (2)	2.90 gm.		
5. Wt. Insol. Residue (3 minus 4)	24.90 gm.	87	%
6. Wt. lost by solution (1 minus 5)	3.82 gm.	13	%
7. To balance (5 plus 6)	28.72 gm.	100	%

B. Subsidation:

1. Original Wt.		24.90 gm.	100.0%	
2. Cylinder (+1/32)	1.600 2.23	13.77 gm.	55	%
3. Jar (1/32—1/64)	5.45 2.27	3.18 gm.	13	%
4. Drain		7.95 gm.	32	%

C. Screen Analysis 13.58

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	7.65	57.6
¼–⅛ mm	1.81	13.6
⅛–1/16	1.97	14.8
Pan	1.86	14.0
Total	13.29	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Pyre
Date 3/6/35

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) ⅛–1/16 mm.

Wt. of sample 2.000 gm. 100.0%

Heavy Minerals 1.025 gm. 1.2 %

Light Minerals 1.975 gm. 98.8 %

Shape Analysis:

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

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

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
pyrite	840	92
leucoxene	49	5
zircon {zoned	16	2
zircon {unzoned	2	0
garnet	2	0
tourmaline (green)	7	1
muscovite	3	0
magnetite	1	0
sphalerite	2	0
Total	917	100%

Light Concentrate		
Silty shale aggregates	750	70
quartz (sand)	271	26
muscovite	31	3
feldspar	13	1
Total	1065	100%

Classification Grouping:

	Absol. %
Primary Minerals: 97.8 %	
zircon {zoned	0
zircon {unzoned	0
garnet	0
Tourmaline (green)	0
muscovite	3.0
magnetite	0
quartz (sand)	25.7
silty shale	69.1
feldspar	1.0
Secondary Minerals: 1.2 %	
pyrite	1.1
leucoxene	.1
sphalerite	0
Total	100%

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

Shale & Siltstone — 13% soluble; lgt. to dk. gry. soft; 15-20% qtz. sand; 1-2% mica; ±1% pyrite;

DEEP WELL STUDY

Well No. W— 0061	
Depth 213½ to 217½	
No. samples used 1	
Analyst Talley	
Date 2/18/35	

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 21.37 gm. 100.0%: 2. Wt. of F. P. 2.19
3. Wt. after solution, with filter paper . . . . 20.87 gm.
4. Less wt. F. P. (2) . . . . 2.19 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 18.68 gm. 87.4 %
6. Wt. lost by solution (1 minus 5) . . . . . . 2.69 gm. 12.6 %
7. To balance (5 plus 6) . . 21.37 gm. 100 %

B. Subsidation:

1. Original Wt. . . . . . 18.68 gm. 100.0%
2. Cylinder (+1/32) 11.03 / 2.29 / 5.25 — 8.74 gm. 46.7 %
3. Jar (1/32—1/64) 2.19 — 3.06 gm. 16.4 %
4. Drain . . . . 6.88 gm. 36.9 %

C. Screen Analysis 865

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	3.40	39.3
¼–⅛ mm	1.61	18.6
⅛–1/16	.18	2.1
Pan	3.45	40.0
Total	8.64	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 3-7-35

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

Wt. of sample . . . . 3.60 gm. 100.0%

Heavy Minerals . . . . .02 gm. .6 %

Light Minerals . . . . 3.58 gm. 99.4 %

Shape Analysis:

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

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

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
Barite	103	8.5
zircon zoned	5	.4
zircon unzoned	4	.3
Tourmaline (green)	5	.4
Rutile	3	.2
leucoxene	31	2.5
Epidote	2	.2
brookite	1	.1
Pyrite	1061	87.4
Total	1215	100%

Light Concentrate	No. of Grains	Rel. %
Clay	887	86
Quartz	115	11
Feldspar	26	3
Muscovite	5	0
Total	1033	100%

Classification Grouping:	Absol. %
Primary Minerals: 99.4 %	
clay	85.5
Quartz	10.9
Feldspar	3.0
Muscovite	0
zircon	0
Tourmaline	0
Rutile	0
Epidote	0
brookite	0
Secondary Minerals: .6 %	
barite	.1
leucoxene	0
Pyrite	.5
Total	100%

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

shale - med gray; micaceous; calcareous - 12% soluble; silt - ±10% - quartz and a little feldspar; pyrite common.

⊕ - pyrite - in elongate, cylindrical fragments which may be organic in origin. Identification rather doubtful, as mineral is slightly darker and has a more of a bronze-like appearance - may be millerite.

⊕⊕ Feldspar - acidic plagioclase - all primary.

DEEP WELL STUDY

Well No. W–	0061
Depth	221'3" to 230
No. samples used	3
Analyst	Talley
Date	2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 29.75 gm. 100.0%: 2. Wt. of F. P. 2.28
3. Wt. after solution, with filter paper . . . . 28.73 gm.
4. Less wt. F. P. (2) . . . . 2.28 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . . 26.45 gm. 88.81 %
6. Wt. lost by solution (1 minus 5) . . . . . . 3.30 gm. 11.19 %
7. To balance (5 plus 6) . . 29.75 gm. 100.00 %

B. Subsidation:

1. Original Wt. . . . . . 26.45 gm. 100.0%
2. Cylinder (+1/32) 15.58 / 2.45 . . . 13.13 gm. 49.65 %
3. Jar (1/32—1/64) 6.95 / 2.23 . . . 4.72 gm. 17.80 %
4. Drain . . . . 8.60 gm. 32.55 %

C. Screen Analysis 12.92

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	3.94	30.9
¼–⅛ mm	3.10	24.3
⅛–1/16	3.27	25.6
Pan	2.45	19.2
Total	12.76	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst D. Frasché
Date 5-8-35

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) 1/8–1/16 mm.

Wt. of sample . . . . 3.32 gm. 100.0%

Heavy Minerals . . . . .005 gm. .15 %

Light Minerals . . . . 3.315 gm. 99.85 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
barite	172	23
quartz	15	2
chlorite	15	2
zircon	26	3.5
tourmaline – green 16, brown 5	21	2.8
pyrite	261	35
leucoxene	91	12.2
scale	141	19
feldspar	3	.4
garnet	1	.1
Total	746	100%

Light Concentrate	No. of Grains	Rel. %
feldspar	16	1.3
muscovite	80	6.3
clay-minerals	1056	83.0
quartz	120	9.4
Total	1272	100%

Classification Grouping:

Primary Minerals: 99.9 %	Absol. %
quartz	9.4
chlorite	0
zircon	0
tourmaline	0
feldspar	1.3
garnet	0
muscovite	6.3
clay minerals	82.9

Secondary Minerals: .1 %	Absol. %
barite	0
pyrite	.1
leucoxene	0
scale	0
Total	100%

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

Shale 88%, light to medium gray – calcareous micaceous – quartz – angular – 1/4–1/8 mm. ~~weight~~ lost by solution 11%

DEEP WELL STUDY

Well No. W— 0061

Depth 232 1/2 to 237

No. samples used 1

Analyst Talley

Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 21.61 gm. 100.0%: 2. Wt. of F. P. 2.19
3. Wt. after solution, with filter paper . . . . . 21.25 gm.
4. Less wt. F. P. (2) . . . 2.19 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 19.06 gm. 88 %
6. Wt. lost by solution (1 minus 5) . . . . . 2.55 gm. 12 %
7. To balance (5 plus 6) . . 21.61 gm. 100 %

B. Subsidation:

1. Original Wt. . . . . 19.06 gm. 100.0%
2. Cylinder (+1/32) 4.12 / 2.33 / 5.22 — 8.79 gm. 46 %
3. Jar (1/32—1/64) 2.15 — 3.07 gm. 16 %
4. Drain . . . . . 7.20 gm. 38 %

C. Screen Analysis 8.66

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	3.14	36.9
¼–⅛ mm	2.10	24.7
⅛–1/16	1.98	23.2
Pan	1.30	15.2
Total	8.52	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

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

Analyst Pyre

Date 3/7/35

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

Heavy Minerals . . . . .01 gm. .5 %

Light Minerals . . . . 2.02 gm. 99.5 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
pyrite	175	~~65.3~~
leucoxene	7	2.6
amphibole	1	.4
barite	78	29.1
epidote	1	.4
garnet	3	1.1
zircon	3	1.1
Total	268 (all counted)	100%

Classification Grouping: Absol. %

Primary Minerals: 99.6 %

amphibole	0
garnet	0
epidote	0
zircon	0
shale frags	97.6
quartz	2.0

Light Concentrate

Shale Frags	980 (est.)	98
quartz	20 "	2
	1000	

Secondary Minerals: .4 %

pyrite	.3
leucoxene	0
barite	.1

Total . . . . . 100% Total 100%

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

Shale — lgt. gray; soft 12% soluble; 1-2% qtz;

DEEP WELL STUDY

Well No. W— 0061

Depth 248'3" to 255

No. samples used 2

Analyst Talley

Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 23.82 gm. 100.0%: 2. Wt. of F. P. 2.35
3. Wt. after solution, with filter paper . . . . 23.74 gm.
4. Less wt. F. P. (2) . . . . 2.35 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . . 21.39 gm. 88.4 %
6. Wt. lost by solution (1 minus 5) . . . . . . 2.43 gm. 11.6 %
7. To balance (5 plus 6) . . 23.82 gm. %

B. Subsidation:

1. Original Wt. . . . . . 21.39 gm. 100.0%
2. Cylinder (+1/32) 9.42, 2.26 — 7.16 gm. 33.60 %
3. Jar (1/32—1/64) 5.44, 2.48 — 2.96 gm. 13.60 %
4. Drain . . . . 11.27 gm. 52.10 %

C. Screen Analysis 7.03

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	3.62	51.6
¼–⅛ mm	.85	12.1
⅛–1/16	1.38	19.6
Pan	1.17	16.7
Total	7.02	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst D. Frasché

Date 3-7-35

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

Wt. of sample . . . . 2.58 gm. 100.0%

Heavy Minerals . . . . .09 gm. 3.5 %

Light Minerals . . . . 2.49 gm. 96.5 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
barite	1	0
quartz	27	2
pyrite	1260	94
leucoxene	37	3
zircon	13	1
chlorite	1	0
tourmaline (green)	5	0
rutile	1	0
Total	1345	100%

Light Concentrate	No. of Grains	Rel. %
feldspar	480	13
quartz	960	26
clay-minerals	1920	52
muscovite	342	9
Total	3702	100%

Classification Grouping: Absol. %

Primary Minerals: 96.6 %

	Absol. %
quartz (heavy .1, light)	25.1
zircon	0
chlorite	0
tourmaline	0
rutile	0
feldspar	12.5
clay-minerals	50.2
muscovite	8.7

Secondary Minerals: 3.4 %

	Absol. %
barite	0
pyrite	3.3
leucoxene	.1
Total	100%

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

Shale 88% - soft - light gray - calcareous - micaceous - contains abundant pyrite - a few black frag. of carbonaceous shale - lost by solution - 11% - quartz angular - ¼ - ⅛ mm -

DEEP WELL STUDY

Well No. W—	0061
Depth	262' 2" to 270
No. samples used	2
Analyst	Talley
Date	2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 24.63 gm. 100.0% : 2. Wt. of F. P. 2.46
3. Wt. after solution, with filter paper . . . . 25.06 gm.
4. Less wt. F. P. (2) . . . . 2.46 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . . 22.60 gm. 91.9 %
6. Wt. lost by solution (1 minus 5) . . . . . . 2.03 gm. 8.1 %
7. To balance (5 plus 6) . . 24.63 gm. %

B. Subsidation:

1. Original Wt. . . . . . . 22.60 gm. 100.0%
2. Cylinder (+1/32) 11.95 / 2.33 . . . 9.62 gm. 42.56 %
3. Jar (1/32—1/64) 6.51 / 2.35 . . . 4.26 gm. 18.91 %
4. Drain . . . . 8.72 gm. 38.53 %

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	2.54	27.3
¼–⅛ mm	.99	10.7
⅛–1/16	2.76	29.7
Pan	2.99	32.3
Total	9.28	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst	D. Frasché
Date	3-8-35

Acet. Tetrabr. / Bromoform } 2.93 Sp. gr. Size–Grade(s) 1/8–1/16 mm.

Wt. of sample . . . . 2.76 gm. 100.0%

Heavy Minerals . . . . .02 gm. .7 %

Light Minerals . . . . 2.74 gm. 99.3 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
barite	36	2.8
chlorite	12	.9
tourmaline (greenish 14, Blue 6, Brown 8)	28	2.1
feldspar	5	.4
pyrite	846	65.
leucoxene	284	21.8
zircon	28	2.1
quartz	58	4.5
muscovite	4	.3
rutile	1	.1
Total	1302	100%

Light Concentrate	No. of Grains	Rel. %
muscovite	80	7
feldspars	70	6
quartz	576	49
Clay-minerals	440	38
Total	1166	100%

Classification Grouping:

Primary Minerals: 99.3 %	Absol. %
Chlorite	0
tourmaline (green, blue, brown)	0
feldspar	6.0
zircon	0
quartz	48.7
muscovite	6.9
rutile	0
Clay-minerals	37.7

Secondary Minerals: .7 %	
barite	.5
pyrite	
leucoxene	.2
Total	100%

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

Shale 91% - light gray - micaceous - calcareous - silt content 20-30% - pyrite a trace - some quartz - angular - 1/4-1/8 mm - lost by solution 8%

DEEP WELL STUDY

Well No. W— 0061
Depth 274 to 277
No. samples used 1
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	21.89 gm.	100.0%	2. Wt. of F. P. 2.17
3. Wt. after solution, with filter paper	16.46 gm.		
4. Less wt. F. P. (2)	2.17 gm.		
5. Wt. Insol. Residue (3 minus 4)	14.29 gm.	65.3 %	
6. Wt. lost by solution (1 minus 5)	7.60 gm.	34.7 %	
7. To balance (5 plus 6)	21.89 gm.	100 %	

B. Subsidation:

1. Original Wt.	8.30	14.29 gm.	100.0%
2. Cylinder (+1/32)	2.30	6.00 gm.	41.9 %
	4.90		
3. Jar (1/32—1/64)	2.30	2.60 gm.	18.2 %
4. Drain		5.69 gm.	39.9 %

C. Screen Analysis 5.95

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	1.04	17.6
¼–⅛ mm	.70	11.9
⅛–1/16	2.21	37.5
Pan	1.95	33.0
Total	5.90	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) 1/8-1/16 mm.

Analyst Rowser
Date 3-7-35

Wt. of sample 2.23 gm. 100.0%

Heavy Minerals .02 gm. .9 %

Light Minerals 2.21 gm. 99.1 %

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

Minerals Identified; Heavy Concentrate

	No. of Grains	Rel. %
Tourmaline / blue	1	8
green	6	1
brown	16	2
Chlorite	8	1
zircon / zoned	7	1
unzoned	18	2
Muscovite	1	0
Rutile	2	0
Chitin	466	52
varite	6	1
garnet	354	39
Pyrite		
anatase		
leucoxene		
Total	8.97	100%

Classification Grouping:

	Absol. %
Primary Minerals: 99.1 %	
Quartz - zoned	44.4
Zircon / unzoned	0
Tourmaline / brown	0
green	0
Muscovite	7.6
Rutile	0
Chitin	0
garnet	0
Clay	45.6
Feldspar	1.5

Light Concentrate

Quartz	472	44.8
Clay	485	46
Feldspar	16	1.5
Muscovite	81	7.7
Total	10.54	100%

Secondary Minerals: .9 %

Chlorite	0
barite	0
Pyrite	.5
anatase	0
leucoxene	.4
Total	100%

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

Shale - gray - very calcareous - 35% soluble; pyrite very abundant - some in tubular aggregates; mica common. Silt. 10-20%.

⊕ Muscovite grains show minute xls growing in radiating clusters— probably rutile, as they show + elongation + high biref.

⊕⊕ Feldspar - acid plagioclase - all clastic.

DEEP WELL STUDY

Well No. W— 0061
Depth 280 to 285
No. samples used 1
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	21.24 gm.	100.0%	2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper	20.72 gm.		
4. Less wt. F. P. (2)	2.32 gm.		
5. Wt. Insol. Residue (3 minus 4)	18.40 gm.	86.7 %	
6. Wt. lost by solution (1 minus 5)	2.84 gm.	13.3 %	
7. To balance (5 plus 6)	21.24 gm.	100.0 %	

B. Subsidation:

1. Original Wt.	18.40 gm.	100.0%	
2. Cylinder (+1/32) 11.65 + 2.26 + 5.00	9.39 gm.	51.0 %	
3. Jar (1/32—1/64) 2.48	2.52 gm.	13.7 %	
4. Drain	6.49 gm.	35.3 %	

C. Screen Analysis 9.22

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	2.80	30.3
¼–⅛ mm	1.70	18.4
⅛–1/16	3.05	33.0
Pan	1.69	18.3
Total	9.24	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 3-7-'35

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) 1/8-1/16 mm.

Wt. of sample 3.01 gm. 100.0%

Heavy Minerals .02 gm. .7 %

Light Minerals 2.99 gm. 99.3 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate		No. of Grains	Rel. %
Tourmaline	Blue	5	1
	brown	24	3
	green	9	1
zircon	zoned	15	2
	unzoned	30	3.5
Rutile ?		8	1
garnet		3	0
barite		12	1
chlorite		6	.6
pyrite		396	46.5
chitin		3	0
Leucoxene		33	39
Muscovite		3	0
		12	1
Total		851	100%

Light Concentrate			
Quartz		688	56
clay		467	38
Feldspar		51	4
Muscovite		25	.2
Total		1231	100%

Classification Grouping:

Primary Minerals: 99.4%	Absol. %
Quartz	55.6
clay	37.8
Muscovite	2.0
Feldspar	4
Tourmaline Blue	0
brown	0
green	0
zircon zoned	0
unzoned	0
Rutile ?	0
garnet	0
Chitin	0

Secondary Minerals: .6 %

barite ?	0
chlorite	0
Leucoxene	.3
Pyrite	.3
Total	100%

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

Shale — gray — calcareous — 13% soluble; micaceous; sl. cement 10-20%; also has ± 5% of black non-calcareous shale.

DEEP WELL STUDY

Well No. W— 0061
Depth 295 to 300
No. samples used 1
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	24.57 gm.	100.0%	2. Wt. of F. P. 2.52
3. Wt. after solution, with filter paper	24.17 gm.		
4. Less wt. F. P. (2)	2.52 gm.		
5. Wt. Insol. Residue (3 minus 4)	21.65 gm.	88.1 %	
6. Wt. lost by solution (1 minus 5)	2.92 gm.	11.9 %	
7. To balance (5 plus 6)	24.57 gm.	%	

B. Subsidation:

1. Original Wt.	21.65 gm.	100.0%	
2. Cylinder (+1/32) 15.26 2.44	12.82 gm.	59.3%	
3. Jar (1/32—1/64) 4.25 2.29	2.96 gm.	11.3%	
4. Drain	6.37 gm.	29.4%	

C. Screen Analysis 12.65

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	4.60	36.5
¼–⅛ mm	1.65	13.1
⅛–1/16	3.92	31.2
Pan	2.41	19.2
Total	12.58	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 3-8-35

Acet. Tetrabr. / ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) 1/8–1/16 mm.

Wt. of sample 3.58 gm. 100.0%

Heavy Minerals .01 gm. .3 %

Light Minerals 3.57 gm. 99.7 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Tourmaline green	26	2.9
Tourmaline brown	14	1.3
Tourmaline blue	6	.3
Zircon zoned	25	2.8
Zircon unzoned	24	2.6
Rutile	5	.6
Garnet	2	.2
Muscovite and biotite	28	3.1
Chlorite	36	4.0
Hornblende	1	.1
Anatase	1	.1
Leucoxene	269	29.5
Pyrite	473	51.9
Total	910	100%

Light Concentrate		
Quartz	411	51
Feldspar	8	1
Muscovite	91	11
Clay	296	37
Total	807	100%

Classification Grouping:

Primary Minerals: 99.7 %	Absol. %
Quartz	50.9
Feldspar	1.0
Muscovite	10.9
Clay	36.9
Tourmaline green	0
Tourmaline brown	0
Tourmaline blue	0
Zircon zoned	0
Zircon unzoned	0
Rutile	0
Garnet	0
Hornblende	0

Secondary Minerals: .3 %

Chlorite	0
Anatase	0
Leucoxene	.1
Pyrite	.2
Total	100%

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

Shale – ±70% – light gray, calcareous – 12% soluble; micaceous – silty – silt = ±30% of sample; pyrite common.

⊕ Muscovite (and) or biotite - 2V is variable in different grains - vary from ±10° to ±35° - impossible to differentiate between bleached to green biotite and muscovite. many grains have inclusions of what is now leucoxene - but which was probably rutile, .

DEEP WELL STUDY

Well No. W— 0061
Depth 300 to 310
No. samples used 2
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	27.15 gm.	100.0%	2. Wt. of F. P.	2.29
3. Wt. after solution, with filter paper	27.35 gm.			
4. Less wt. F. P. (2)	2.29 gm.			
5. Wt. Insol. Residue (3 minus 4)	25.06 gm.	92 %		
6. Wt. lost by solution (1 minus 5)	2.09 gm.	8 %		
7. To balance (5 plus 6)	27.15 gm.	%		

B. Subsidation:

1. Original Wt.	25.06 gm.	100.0%	
2. Cylinder (+1/32)	16.30 gm.	65.0%	18.55 / 2.25 / 5.04
3. Jar (1/32—1/64)	2.80 gm.	11.2%	2.24
4. Drain	5.96 gm.	23.8%	

C. Screen Analysis 15.92

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
~~½~~+¼ mm	8.72	55.4
¼–⅛ mm	1.98	12.6
⅛–1/16	3.12	19.8
Pan	1.92	12.2
Total	15.74	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) 1/8–1/16 mm.

Analyst Pyre
Date 3/8/35

Wt. of sample 28.5 gm. 100.0%

Heavy Minerals .01 gm. .4 %

Light Minerals 2.84 gm. 99.6 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
pyrite	278	33
zircon {unzoned	55	6
zircon {zoned	18	2
leucoxene	396	41
tourmaline {green	45	5
tourmaline {brown	7	1
tourmaline {pk-opaque	6	1
chlorite	19	2
barite	44	5
anatase	2	0
rutile	5	1
garnet	9	1
sphalerite	14	2
Total	848	100%

Light Concentrate		
Shale Freys	372	39
quartz	492	52
Muscovite	69	7
Feldspar	15	2
	943	
Total		100%

Classification Grouping: Primary Minerals: 99.7 %	Absol. %
zircon {zoned	0
zircon {unzoned	0
tourmaline {green	0
tourmaline {brown	0
tourmaline {pk-opaque	0
chlorite	0
rutile	0
garnet	0
Shale Freys	38.9
quartz	51.8
muscovite	7.0
feldspar	2.0
Secondary Minerals: .3 %	
pyrite	.1
leucoxene	.2
barite	0
anatase	0
sphalerite	0
Total	100%

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

Shale – 8% soluble; grey 25-30% silt 5-10% fine qtz. sand; shale is med. to dk. grey. Fissile; heavies characterized by abund. leucoxene, & relative scarcity of pyrite

DEEP WELL STUDY

Well No. W— 0061
Depth 315 to 325
No. samples used 2
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	23.76 gm.	100.0%	2. Wt. of F. P. 2.3
3. Wt. after solution, with filter paper	23.85 gm.		
4. Less wt. F. P. (2)	2.30 gm.		
5. Wt. Insol. Residue (3 minus 4)	21.55 gm.	90.7 %	
6. Wt. lost by solution (1 minus 5)	2.21 gm.	9.3 %	
7. To balance (5 plus 6)	23.76 gm.	%	

B. Subsidation:

1. Original Wt.	21.55 gm.	100.0%	
2. Cylinder (+1/32) 12.25, 2.44, 5.28	9.81 gm.	45.5%	
3. Jar (1/32—1/64) 2.27	3.01 gm.	14.0%	
4. Drain	8.73 gm.	40.5%	

C. Screen Analysis 972

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm	1.70	17.9
½–¼ mm	.65	6.8
¼–⅛ mm	1.33	14.0
⅛–1/16	3.67	38.5
Pan	2.17	22.8
Total	9.52	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ± 2.93 Sp. gr. Size–Grade(s) ¼–1/16 mm.

Analyst Rouser
Date 3-8-35

Wt. of sample 3.37 gm. 100.0%

Heavy Minerals .02 gm. .6 %

Light Minerals 3.35 gm. 99.4 %

Shape Analysis:

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

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

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
Pyrite	5-05	52
Tourmaline | Brown	14	1
green	8	1
blue	1	0
Zircon | zoned	1	0
unzoned	6	1
Muscovite	40	4
chlorite	18	2
Rutile	32	3
leucoxene	8	1
barite	32	3
garnet	8	1
Total	96.6	100%

Light Concentrate		
Quartz	576	49
clay	541	46
Feldspar	21	2
Muscovite	30	3
Total	11.68	100%

Classification Grouping:

	Absol. %
Primary Minerals: 99.5 %	
Quartz	48.7
clay	45.8
Feldspar	2.
Muscovite	3.
Tourmaline | Brown	0
green	0
blue	0
Rutile	0
Zircon | zoned	0
unzoned	0
garnet	0
Secondary Minerals: .5 %	
pyrite	.3
chlorite	0
barite	0
leucoxene	.2
Total	100%

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

Shale — ±70% — med- to dk. gray-calcareous — 9% soluble — micaceous; massive — silty — silt content ±20%; traces of carbonaceous material.

DEEP WELL STUDY

Well No. W— 0061

Depth 333'4" to 339 1/2

No. samples used 2

Analyst Talley

Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	23.39 gm.	100.0%	2. Wt. of F. P.	2.37
3. Wt. after solution, with filter paper	23.87 gm.			
4. Less wt. F. P. (2)	2.37 gm.			
5. Wt. Insol. Residue (3 minus 4)	21.50 gm.	92.1 %		
6. Wt. lost by solution (1 minus 5)	1.89 gm.	7.9 %		
7. To balance (5 plus 6)	23.39 gm.	%		

B. Subsidation:

1. Original Wt.	21.50 gm.	100.0%	
2. Cylinder (+1/32) 13.03, 2.21, 5.40	10.76 gm.	50.0%	
3. Jar (1/32—1/64) 3.04, 2.44	3.04 gm.	14.2%	
4. Drain	7.70 gm.	35.8 %	

C. Screen Analysis 10.63

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	3.73	35.8
¼–⅛ mm	1.67	16.0
⅛–1/16	3.04	29.1
Pan	1.99	19.1
Total	10.43	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowsey

Date 3-8-35

Acet. Tetrabr. ~~Bromoform~~ 2.93 Sp. gr. Size–Grade(s) ⅛-1/16 mm.

Wt. of sample 2.75 gm. 100.0%

Heavy Minerals 02 gm. .7 %

Light Minerals 2.73 gm. 99.3 %

Shape Analysis:

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

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

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
garnet	4	0
zircon | zoned	8	1
zircon | unzoned	20	3
Tourmaline | blue	6	1
Tourmaline | brown	8	1
Tourmaline | green	6	1
Rutile	2	0
Chlorite	31	4
Muscovite	14	2
leucoxene	334	44
Pyrite	326	43
Epidote	1	0
Total	760	100%

Classification Grouping: Primary Minerals: 99.4 %	Absol. %
Quartz	55.8
Clay	39.0
Muscovite	3.3
Feldspar	1.3
garnet	0
zircon	0
Tourmaline	0
Rutile	0
Epidote	0

Light Concentrate			
Quartz	517	56.1	
Clay	362	39.3	
Muscovite	30	3.3	
Feldspar	12	1.3	
Total	921	100%	

Secondary Minerals: 6 %

Chlorite	0
leucoxene	.3
Pyrite	.3
Total	100%

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

Siltstone— 50 to 90 gray— massive; micaceous; calcareous— 90% soluble; Shale 50-90; some shale (5-10%) is black & carbonaceous—

DEEP WELL STUDY

Well No. W— 0061	
Depth 345 to 353	
No. samples used 2	
Analyst Talley	
Date 2/18/35	

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 22.79 gm. 100.0%: 2. Wt. of F. P. 2.35
3. Wt. after solution, with filter paper . . . . 22.91 gm.
4. Less wt. F. P. (2) . . . . 2.35 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 20.56 gm. 90.6 %
6. Wt. lost by solution (1 minus 5) . . . . . 2.23 gm. 9.4 %
7. To balance (5 plus 6) . . 22.79 gm. %

B. Subsidation:

1. Original Wt. . . . . . 20.56 gm. 100.0%
2. Cylinder (+1/32) 14.10 / 2.44 — 11.66 gm. 56.7 %
3. Jar (1/32—1/64) 4.67 / 2.25 — 2.42 gm. 11.8 %
4. Drain . . . . 6.48 gm. 31.5 %

C. Screen Analysis 11.47

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	4.68	41.5
¼–⅛ mm	1.86	16.5
⅛–1/16	2.81	24.9
Pan	1.92	17.1
Total	11.27	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Rowser
Date 3-9-35

Acet. Tetrabr. / ~~Bromoform~~ } 2.93 Sp. gr. Size–Grade(s) ⅛–1/16 mm.

Wt. of sample . . . . 2.53 gm. 100.0%

Heavy Minerals . . . . .01 gm. .4 %

Light Minerals . . . . 2.52 gm. 99.6 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
garnet	5	1
Tourmaline (green	7	1
Brown	12	1
zircon (zoned	11	1
unzoned	22	3
Rutile	4	0
barite	1	0
Muscovite	5	1
chlorite	43	5
leucoxene	319	36
Pyrite	451	51
Total	880	100%

Light Concentrate	No. of Grains	Rel. %
Quartz	436	44.6
clay	508	52
Muscovite	16	1.6
Feldspar	18	1.8
Total	978	100%

Classification Grouping:

	Absol. %
Primary Minerals: 99.7 %	
Quartz	44.5
clay	51.8
Feldspar	1.8
Muscovite	1.6
garnet	0
Tourmaline	0
zircon	0
Rutile	0
Secondary Minerals: .3 %	
Barite	0
chlorite	0
leucoxene	.1
Pyrite	.2
Total	100%

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

s/s — ±60% — gray — micaceous — calcareous — 9% soluble;
sh — 40% of sample — probably interbedded with s/t, in part;

④ clay - in separate aggregates - also surrounding many silt fragments - count not indicative of true proportions.

DEEP WELL STUDY

Well No. W—	0061
Depth	360 to 363½
No. samples used	1
Analyst	Talley
Date	2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 20.20 gm. 100.0%: 2. Wt. of F. P. 2.32
3. Wt. after solution, with filter paper . . . . 21.69 gm.
4. Less wt. F. P. (2) . . . . 2.32 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . . 19.31 gm. 96.2 %
6. Wt. lost by solution (1 minus 5) . . . . . . .83 gm. 3.8 %
7. To balance (5 plus 6) . . 20.20 gm. %

B. Subsidation:

1. Original Wt. . . . . . 19.37 gm. 100.0%
2. Cylinder (+1/32) 11.79 / 2.44 9.35 gm. 48.2%
3. Jar (1/32—1/64) 5.24 / 2.41 2.83 gm. 14.6%
4. Drain . . . . 7.19 gm. 37.2%

C. Screen Analysis

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	2.72	29.0
¼–⅛ mm	1.66	17.8
⅛–1/16	3.19	34.1
Pan	1.79	19.1
Total	9.36	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst	Rowsev
Date	3-8-'35

Acet. Tetrabr. / ~~Bromoform~~ ± 2.93 Sp. gr. Size–Grade(s) ⅛-1/16 mm.

Wt. of sample . . . . 2.89 gm. 100.0%

Heavy Minerals . . . . .01 gm. .3 %

Light Minerals . . . . 2.88 gm. 99.7 %

Shape Analysis:

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

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

Minerals Identified:

Heavy Concentrate	No. of Grains	Rel. %
zircon zoned	6	1
zircon unzoned	24	3
Tourmaline brown	12	1
Tourmaline green	8	1
Tourmaline blue	4	0
garnet	18	2
Leucoxene	363	40
Pyrite	463	51
Chlorite	8	1
barite	2	0
Rutile	4	0
Total	911	100%

Light Concentrate	No. of Grains	Rel. %
Quartz	422	48
clay	410	47
Muscovite	15	2
Feldspar	28	3
Total	875	100%

Classification Grouping:

Primary Minerals: 99.7 %

	Absol. %
Quartz	47.8
clay	46.9
Muscovite	2.0
Feldspar	3.0
zircon zoned	0
zircon unzoned	0
Tourmaline brown	0
Tourmaline green	0
Tourmaline blue	0
garnet	0
Rutile	0

Secondary Minerals: .3 %

	Absol. %
Leucoxene	.1
Pyrite	.2
chlorite	0
Barite	0
Total	100%

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

S/s — I.S.S. %, gray, slightly calcareous — 4% soluble; slightly micaceous; shale content ± 40%; g

DEEP WELL STUDY

Well No. W—	0061
Depth	363½ to 366' 8"
No. samples used	2
Analyst	Scott
Date	3/9/35

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 20.92

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½–¼ mm	3.45	
¼–⅛ mm	14.33	
⅛–1/16	2.82	
Pan	.21	
Total	20.81	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst	Rowser
Date	3-18-35

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

Wt. of sample . . . . 3.07 gm. 100.0%

Heavy Minerals . . . . .065 gm. 2.1 %

Light Minerals . . . . 3.005 gm. 97.9 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Pyrite	401	57
Muscovite	2	0
Chlorite	23	3
Tourmaline (brown)	12	2
garnet	19	3
zircon (zoned)	5	1
zircon (unzoned)	8	1
dolomite	110	16
apatite	18	3
sphalerite	1	0
anatase	28	4
leucoxene	66	9
chloritoid	2	0
titanite	3	0
Rutile	4	1
Total	703	100%

Light Concentrate	No. of Grains	Rel. %
Quartz	801	96
Feldspar	16	2
Muscovite	18	2
dolomite or calcite	4	0
Total	839	100%

Classification Grouping: Absol. %

Primary Minerals: 98.1 %

Mineral	Absol. %
Quartz	93.9
Feldspar	2.0
Muscovite	2.0
Tourmaline	0
garnet	.1
zircon	0
apatite	.1
Titanite	0
Rutile	0

Secondary Minerals: 1.9 %

Mineral	Absol. %
Pyrite	1.2
chlorite	.1
dolomite	0 / .3
sphalerite	
anatase	.1
leucoxene	.2
chloritoid	
Total	100%

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

sandstone - gray to white - size - Max and -¼-½ - prin. sub ⅛-1/16; 2ndary enlargement common; Muscovite and Feldspar rare-

⊕ Apatite - in rather large grains - $N = \pm 1.633$ - $N_o - N_e = \pm .002$ - colorless - Most grains oriented to get flash figures, but three in slide gives good optic axis figure - uniaxial - Negative.

DEEP WELL STUDY

Well No. W—	0061
Depth	370 to 377
No. samples used	2
Analyst	Scott
Date	3/4/35

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. . . . . . 20.50 gm. 100.0%
2. Cylinder (+1/32) 22.22 / 2.25 — 19.97 gm. .... %
3. Jar (1/32—1/64) 2.53 / 2.52 — .01 gm. .... %
4. Drain . . . . .52 gm. .... %

C. Screen Analysis 19.98

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
½+¼ mm	5.25	
¼–⅛ mm	13.12	
⅛–1/16	1.25	
Pan	.15	
Total	19.77	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst	Bowser
Date	3-18-35

Acet. Tetrabr. / ~~Bromoform~~ } ±2.93 Sp. gr. Size–Grade(s) ½–pan mm.

Wt. of sample . . . . 3.37 gm. 100.0%

Heavy Minerals . . . . .075 gm. 2.2%

Light Minerals . . . . 3.295 gm. 97.8%

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate

Mineral	No. of Grains	Rel. %
Pyrite	506	71
Muscovite	3	0
Chlorite	27	4
Tourmaline (brown)	16	2
garnet	6	1
zircon (zoned)	18	2
zircon (unzoned)	23	3
dolomite	20	3
Apatite	4	1
sphalerite	12	2
Anatase	72	10
leucoxene	5	1
Rutile		
Total	714	100%

Light Concentrate

Mineral	No. of Grains	Rel. %
Quartz	1010	96
Feldspar	21	2
dolomite, or calcite	5	0
Muscovite	21	2
Total	1057	100%

Classification Grouping:

Primary Minerals: 98.0%

Mineral	Absol. %
Quartz	93.9
Feldspar	2.0
Muscovite	2.0
Tourmaline	0
garnet	0
zircon	0
Apatite	.1
Rutile	0

Secondary Minerals: 2.0%

Mineral	Absol. %
Pyrite	1.6
Dolomite	.1
chlorite	.1
sphalerite	0
Anatase	0
Leucoxene	.2
Total	100%

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

Sandstone - buff - well sorted - Maj. grd. ½-⅛ - Prim. Sub. -½-¼: 2ndary enlargment common.

DEEP WELL STUDY

Well No. W— 0061
Depth 379 to 385
No. samples used 3
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight . . . . . 40.17 gm. 100.0%: 2. Wt. of F. P. 2.37
3. Wt. after solution, with filter paper . . . . . 18.06 gm.
4. Less wt. F. P. (2) . . . 2.37 gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . 15.69 gm. 40.1 %
6. Wt. lost by solution (1 minus 5) . . . . . 24.48 gm. 59.9 %
7. To balance (5 plus 6) . . 40.17 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 15.69

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
~~½~~+¼ mm	4.51	29.3
¼–⅛ mm	8.89	57.2
⅛–1/16	.99	6.4
Pan	1.10	7.1
Total	15.52	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Analyst Pyre
Date 3/8/35

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

Wt. of sample . . . . 182 gm. 100.0%

Heavy Minerals . . . . 1.07 gm. 3.6 %

Light Minerals . . . . 1.75 gm. 96.2 %

Shape Analysis:

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

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

Minerals Identified:

Heavy Concentrate	No. of Grains	Rel. %
pyrite	828	64
zircon {rounded	15	1
zircon {unrounded	86	7
garnet	18	1
anatase	3	0
rutile	15	1
tourmaline {green	23	2
tourmaline {brown	5	0
barite	80	6
chlorite	9	1
leucoxene	195	15
magnetite	21	2
Total	1298	100%

Classification Grouping:

	Absol. %
Primary Minerals: 94.9 %	
zircon {rounded	.3
garnet	0
rutile	0
tourmaline {green, brown	.1
chlorite	0
magnetite	.1
quartz	83.8
muscovite	4.8
feldspar	2.9
Shale Frags	2.9
Secondary Minerals: 5.1 %	
anatase	0
pyrite	2.4
leucoxene	.6
chert	1.9
Barite	.2
Total	100%

Light Concentrate

quartz	705	87
muscovite	93	6
feldspar	28	3
chert	19	2
Shale Frags	32	3
	812	

Total 100%

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

Dolomite — 60% soluble; buff; hard; fine; x-line; 35-40% qtz. sand; A-C; maj. grade ¼-⅛; well sorted; 1-2% pyrite; 1-2% muscovite; <1% chert; a few shale frags.

DEEP WELL STUDY

Well No. W— 2061
Depth 389 to 397' 7"
No. samples used 2
Analyst Talley
Date 2/18/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl 15 %)

1. Sample weight	41.65 gm.	100.0%	2. Wt. of F. P. 2.35
3. Wt. after solution, with filter paper	11.73 gm.		
4. Less wt. F. P. (2)	2.35 gm.		
5. Wt. Insol. Residue (3 minus 4)	9.38 gm.	22.4 %	
6. Wt. lost by solution (1 minus 5)	32.27 gm.	77.6 %	
7. To balance (5 plus 6)	41.65 gm.	100 %	

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 9.10

SIZE	GRAMS	%
2 plus		
2–1 mm		
1–½ mm		
~~½~~ +¼ mm	5.32	59.1
¼–⅛ mm	2.00	22.2
⅛–1/16	1.08	12.0
Pan	.60	6.7
Total	9.00	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

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

Analyst Rowsey
Date 3-9-35

Wt. of sample 1.442 gm. 100.0%

Heavy Minerals .035 gm. 2.5 %

Light Minerals 1.385 gm. 97.5 %

Shape Analysis:

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

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

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
garnet	14	2
Tourmaline / Brown	8	1
Tourmaline / Green	19	2
Zircon / zoned	7	1
Zircon / unzoned	50	5
barite	15	2
Chlorite	6	1
Rutile	3	0
anatase	8	1
leucoxene	125	13
Pyrite	646	69
Scale	31	3
Total	932	100%

Classification Grouping: Primary Minerals: 97.8 %	Absol. %
Quartz	76.0
clay	19.5
Feldspar	1.0
Muscovite	1.0
garnet	.1
Tourmaline (Brown, Green)	.1
Zircon (zoned, unzoned)	0
Rutile	.1

Light Concentrate			
Quartz	895	78	
clay	231	20	
Feldspar	15	1	
Muscovite	10	1	
Total	1151	100%	

Secondary Minerals: 2.2 %

barite	.1
Chlorite	0
anatase	0
leucoxene	.3
Pyrite	1.7
Scale	.1
Total	100%

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

Dolo - 78%; buff; hard; fine x line; many clear x's at dolo;
ss - 12%; much is unduly enlarged; many euhedral Qtz. x's.
Pyrite abundant.

IOWA GEOLOGICAL SURVEY W-0061

In Cooperation with U. S. Geological Survey

RECORD OF WELL

Location:

Town: Lovilia (N E / S W): County Monroe

SE-SE sec. 10 T 73 N., R. 18 W. Union Twp.

Well name and number City Well No 2 (IERA 1934)

Owner _____ Address _____

Tenant _____ Address _____

Contractor McCutcheon Well Co. Address Des Moines

Drillers _____

Drilling dates Oct 10 - Nov 12, 1934

Well data:

Elevations: Drilling curb 931'7" feet; Land surface _____ feet

Determined by _____

Topographic position Dissected upland.

Total depth: Reported 397'7" feet, Measured _____ feet

Drilling method Cable

Hole and casing data 8" drive pipe from curb to 41'8"; 6" pipe from 41'3" to 367'9" open hole to bottom.

Original depth to water _____ ft. above/below _____ Date _____

Original elevation of water level _____ ft.; Source of data _____

Sources of water: Principal Pennsylvanian; Others _____

Production data: Date _____

Static depth to water 195 Measuring point curb
Pumping level 332 at 42+ g.p.m.

Specific capacity _____ g.p.m. per ft. drawdown; Temperature _____ °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 samples	Nov. 12, 1934			
Sampled by	C. A. Waterx			
Total solids	863.0			
Insoluble matter	20.0			
Alkalinity (Meo)	330.0			
Alkalinity (Phn)	0.0			
pH	7.2			
Fe_2O_3+ Mn_2O_3+Al_2O_3	2.2			
Alkali as sodium	71.4			
Calcium	124.9			
Magnesium	37.5			
Iron (unfiltered)	0.2			
Manganese	0.1			
Nitrate	0.0			
Fluoride	1.0			
Chloride	5.0			
Sulfate	262.0			
Bicarbonate	402.6			
Hardness (ppm)	466.0			
Hardness (gpg)				

Remarks _____

Laboratory data: Sample storage location _____

Sample range 0-397'2" No. spls. 128 No. dupls. & cond. 121 Ponca to Hoard
Spls. prepared by _____ Washed range _____ by _____
Driller's log and cond. _____
Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study Huf strip log Huf
Gen. log _____ Correl. by Huf

61

Name Lovilia city well No. 1

Loc. SE/c 10-73N-18W, Monroe Co. $\frac{.30}{20.5} = 1.6 \times 10^{-2}$

T.D. 397 ½'

Drilled McCutcheon Oct.-Nov. 1934

Log W-0061 Gardiner

Casing 8" csg from 0-64'8"; 6" csg. from 41'3" to 367'9"

Prod. data

SWL 195'

PWL 332'

Yield 42+ gpm

332
195
137 | 42.0 .30
411
90

19) .30000 .0157
19
110
95
150
133

931
195
736 gpd

75% OF POP ON CITY SYS

7½ HP SUB PUMP SET AT 360

Water analyses: No. 1604 (777) 6/16/58; No. 7982 (4882) 9/28/56; No. 26053 (4745) 6/22/56

source: Penn ss. and St. Louis ls.

Check: wsyld?

1 JAN 62 24469000 }
25 JUN 62 28055800 } METER LLS 6/25/62

PWL - 260' AIR LINE

JOHN CARSON, W. Supt.

Elev. 931'

Formation	Depth	Top	Base
St. Louis	377	554	

397.5
370
20.5

28055800
-24469000

176 days | 3586800 | 20380 gpd

352
668
534
1340

475 = 75% of pop. of 630

42.9 gpd/per.

475 | 20380
1900
1380
950
4300

397
368
19