GL01513

Getty

Getty Oil Company | P. O. Box 5237, Bakersfield, California 93308 • Telephone: (805) 399-2961

Western Exploration and Production Division

September 1, 1978

University of Utah Research Institute
Research Park
391 Chipeta Way
Salt Lake City, Utah 84108

Attention: Dr. Howard P. Ross

Re: Transmittal of Final Data
Getty Oil Company Well #52-21
Roosevelt Hot Springs KGRA
Beaver County, Utah

Gentlemen:

Enclosed with this letter of transmittal are triplicate copies of the following data listed below. This data is sent to you per instructions from the Department of Energy office in Las Vegas, Nevada. A single set of this data has been sent to the Contracting Officer of that Department.

24 - Prints of Eight Flowline Sample Analyses
18 - Prints of Six Wireline Sample Analyses
3 - Prints of One Jefferson Water Well Analysis
3 - Prints of One Pruett Temperature Survey

The well is currently suspended and it is anticipated that no additional data acquisition will occur until a final resolution of the well is finalized.

When the above listed data has been received by you, please acknowledge receipt by signing and returning the enclosed duplicate copy of this letter.

Very truly yours,
GETTY OIL COMPANY

J. W. Woffington
Division Exploration Manager

JWW:WAS:br
Encls.

cc: Department of Energy
Nevada Operations Office
Attn: Mr. J. B. Cotter

DATA RECEIVED THIS 8th DAY OF
September, 1978.
By Howard P. Ross

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DATA RECEIVED THIS 8th DAY OF
September, 1978.
By Howard P. Ross

Getty Oil Company | P. O. Box 5237, Bakersfield, California 93308 • Telephone: (805) 399-2961

Western Exploration and Production Division

December 14, 1978

Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, Nevada 89114

Attention: Mr. J. B. Cotter
Contracting Officer

Re: Transmittal of Additional Test Data and Final Temperature Log from the Getty Oil Company Well #52-21, Roosevelt Hot Springs KGRA, Beaver County, Utah

Gentlemen:

Enclosed with this letter of transmittal is a single set of the final data listed below. A triplicate set of the data has been sent to the University of Utah Research Institute in Salt Lake City, Utah.

22 - Prints of Twenty-Two Flowline Sample Analyses
1 - Print of One Pruett Wireline Temperature Survey
1 - Print of a History of Test Procedures and Results

This data was acquired as a result of a Flow Test Program conducted from October 18, 1978, through November 5, 1978. The well is currently suspended and winterized until a final decision is made to its future status.

Upon receipt of the above listed data, please acknowledge by signing and returning the enclosed duplicate of this letter.

Very truly yours,

GETTY OIL COMPANY

o/s J. W. Woffington

J. W. Woffington
Division Exploration Manager

JWW:WAS:blb

cc: UURI-Dr. H. P. Ross

Enclosures

DATA RECEIVED THIS ____ DAY
OF _____ 19__
BY _____

Getty

Getty Oil Company | P. O. Box 5237, Bakersfield, California 93308 • Telephone: (805) 399-2961

Western Exploration and Production Division

December 14, 1978

University of Utah Research Institute
Research Park
391 Chipeta Way
Salt Lake City, Utah 84108

Attention: Dr. Howard P. Ross

Re: Transmittal of Additional Test Data and Final Temperature Log from the Getty Oil Company Well #57-21, Roosevelt Hot Springs KGRA, Beaver County, Utah

Gentlemen:

Enclosed with this letter of transmittal are triplicate copies of the following data listed below. This data is sent to you per instructions from the Department of Energy Office in Las Vegas, Nevada. A single set of this data has been sent to the Contracting Officer of that Department.

66 - Prints of Twenty-Two Flowline Sample Analyses
3 - Prints of One Pruett Wireline Temperature Survey
3 - Prints of a History of Test Procedure and Results

This data was acquired as a result of a Flow Test Program conducted from October 18, 1978, through November 5, 1978. The well is currently suspended and winterized until a final decision is made to its future status.

Upon receipt of the above listed data, please acknowledge by signing and returning the enclosed duplicate of this letter.

Very truly yours,

GETTY OIL COMPANY

J. W. Woffington
Division Exploration Manager

JWW:WAS:blb

cc: Department of Energy
Nevada Operations Office
Attn: Mr. J. B. Cotter

Enclosures

DATA RECEIVED THIS 18th DAY
OF December 1978
BY Howard P. Ross

6073-7500 mixed zone of f.-m.-x'line fsp-qtz.-bte gneiss and m.x'm gneiss leucocratic granite. bte. variable from 7-31% but averages about 15%; hornblende 2-5% (avg. 3%) to 6170', then 0-9% (avg 2-3%) to 7500 feet. No sill to 6170', then trace to abundant sill, locally w/ garnet, to 6460'. Sill begins again at 6920, and is present with local traces garnet to the bottom of the hole. Sphene Tr.-2% throughout (Avg. <1%)

consult main log for granite intercepts.

Probable faults.

6080-90
6090-6100
6120-30'
6140-50'
6240-50'
6260-70'
6270-80'
6290-6300'
6300-6310'
6330-6340'
6380-90'
6390-6400'
6430-40'
6450-60'
6460-70'
6570-80'
6590-6600'
6670-80'
6720-30'
6840-50'
6850-60'
6990-7050 (every 10')
7070-7110 (")
7130-50' (")
7180-7210' (")
7240-70' (")
7340-60' (")
7400-10'
7430-40'
7440-50'
7470-80'
7480-90'

below KB

0–240' Arkosic alluvium w/ abundant Pleistocene pumice, perlite and obsidian (combined total commonly exceeds 50 vol. % of specific horizons

240–570' Arkosic alluvium w/ silty traces pumice perlite and obsidian

570–700 Mafic-rich fsp-qtz-bte gneiss, f-m xln, w/ 30–50% btc Tr–3% hornblende (gen. only Tr.) ± local traces sillimanite (var. fibrolite) and sphene. avg. ~0.5% magnetite-ilmenite. cut by numerous narrow dikes of med-xline leucocratic granite and/or felsic migmatitic differentiate.

also local traces cordierite

<5'

700–850 Same as above e/c. w/ up to 9% hornblende and 3% sphene. f-line biotite granite dike from ~ 752–772'. Minor fault (>5% gouge chips) 770–80'.

850–940 Same as 570–700' w/ tr–1% garnet

940–970 same as 700–850 exc. up to 15% hbl., no sphene

970–1040 same as 700–850' { flts. 990–1000, 1030–40 }

1040–1120 same as 570–700', exc. no sill, cord., garnet. granite fr. ~ 1077–1107.

1120–(~)1155 same as 700–850 up to 4% sphene

1155–1180 bte-hbl. qtz. monz. gneiss, m. xline, w/ 20–25% hbl, 5–10% btc, 2–3% sphene.

1180–1280 Same as 700–850 flt. 1230–40'
granite 1200–1210'

1280–1330 same as 570–700 exc. avg. ~ 23% btc, tr–<1% hbl.
flts 1280–90, 1290–1300

1330–1360 — same as 700–850 flt. 1350–60

1360–1540 — Mostly same as 570–700' exc. slightly lower mafic % (avg. ~ 30% btc). generally <1% hbl., but up to 5%. flts. 1440–50, 1500–1510'

ext. mafic rich zone 20% btc, 25% hbl. 1520–30'

1630 – 1640 — same as 570-700 flts. 1600-10, 1610-20, 1620-30 –

1640 – 1690 same as 700-850 flts 1650-60, 1660-70

1690 – 1860 same as 570-700

1860 – 1900 same as 700-850

1900 – 2020 → same as 570-700 WITH

bte-hbl. qtz. microdiorite ppy dikes
55-70 vol. % of 1980-90
25 " " " 1970-2000
20 " " 2000-2010

flts. 1940-50, 1950-60

altn. increases below 1980

2020 – 2050 : f-m. x/ine leucocratic granite — 1-3% bte 0.5-1% magnetite-ilmenite

flts. 2040-50 | mod. altered | 2-3 vol. % qtz. microdiorite ppy, as above

2050 – 2090' : bte hbl. qtz. microdiorite ppy. mod-strong altered, up to 1% pyrite (diss.)
flts. 2050-60, 2060-70, 2070-80, 2080-90 (strong >2% sulf. zones)

2090 – 2210' : mixed zone : granite, fsp-phr. bte gneiss (25-40% bte, 0-3% hbl), qtz. microdiorite ppy. wk – mod. altn, 1% sulfide

also sp-qtz-bte-hbl. gneiss w/ up to 25% bte, 25% hbl

faults : 2090-2100 (strong)
2160-2110
2130-50
2140-50
2150-60
2160-70
2170-80
2180-90

5650-5770'. f-m. xline bte-hbl.-qtz monz. gneiss w/ 12-23% (avg. ~ 20%) hbl & 7-17% (avg. ~ 12%) bte. Tr sphene. flts. at top and bottom @ 5670-80'.

5770-~5912' Interstratified f-m x/n. fsp-qtz-bte gneiss and fsp-qtz-hbl-bte gneiss w/ bte. variable from 7-33% (avg. ~ 22%?); hbl. from 1-25% (avg. ~ 4%: 25% only in one sample [5850-60'] only local tr. sillimanite. Tr.-1% sphene. flts. 5840-50', 5870-80'.

~5912-~5922 — granite, as above (med. xl. leuc.)

~5922-6040 — sillimanite-bearing f-m xline fsp-qtz-bte gneiss w/ 17-31% bte (avg ~ 25%) and generally no hbl. 0-2% sphene (generally only a trace) up to 1% garnet locally present.

6040-~6063 f-m x/n mafic rich fsp-qtz-bte. hbl. gneiss w/ 17-25% hbl, 13-20% bte, 3% sphene.

4940 – 5170' f-m x/n fsp-qtz-bte gneiss w/ minor hbl., Tr. sphene, local traces sill. bte. 11-20% (avg. ~14%) hbl. <1-9% (avg ~1-2%). intruded by numerous narrow dikes m x/n. leuc. granite (or felsic migmatitic differentiate. flts. 4970-80, 4990-5000', 5010-20 5160-70'.

5170-~5214' mixed zone, same as 4540-80' qtz. monz. dikes @ ~ 5192-5198', ~5202-~5208'

~5214 – ~5275': bte hbl. qtz. monz. gneiss, w/ 20-25% hbl, 15-20% bte, Tr. sphene.

~5275 – 5320 – same as 4620 – 4780, but as low as 5% bte.

5320 – 5430 — mafic-rich fsp-qtz-hbl.-bte gneiss w/ 17-30% (avg ~ 20%) bte., 9-20% hbl. (avg ~ 15%) granite 5364 – ~5373'

5430 – ~5650' mafic-rich fsp-qtz-bte. gneiss w/ sillimanite in 60% of samples, Tr-minor amounts of garnet locally present. 23-50% (avg ~ 35%) biotite; 0-7% (avg. ~ 2%) hbl. — local traces (sphene & cordierite)
flts. 5500-5510'

4540 – 4580 – mixed zone: fsp-qtz-hbl.-bte gneiss, as above w/ dikes of mxln bte-hbl qtz. monz gneiss (25% hbl. <5% bte. the latter: → ~4542-4553', 4560-4563', 4570-4577'. flts. 4560-4570'

4580-4620: qtz. monz. gneiss, as above.
flts: 4600-4610, 4610-4620'

4620-4780: rel. felsic f.-mxln fsp-qtz-bte gneiss w/ 7-15% bte (avg ~11%, generally <1 (but up to 9%) hornblende, rare local tr. sphene.
flts. 4640-50', 4670-80' (string), 4700-10', 4710-20', 4720-30', 4750-60', 4760-70'.

4780 – ~4806': same as 4510-4540 w/ bte hbl. qtz. monz. dikes ~4786-4790, 4796-4800'.

~4806 – 4860' same as 4620-4780 w/ avg. 12% bte, 1-3% amp Tr-1% sphene

4860 – 4940' – same as 4620-4780, but 11-15% (avg ~13%) bte, 3-11 (avg ~7% hbl., Tr-1% sphene – intruded by numerous narrow dikes of bte. hbl. qtz. monz. gneiss, as 4580-4620 – flt. 4880-90'.

4040 - 4140 interstratified f-m x'ln fsp-qtz-bte gneiss and fsp-qtz-hbl-bte gneiss w 9-30% (variable) bte & <1-5% (avg 2-3%) hbl, local tr sphene sill — flt. 4100-4110'

↑ m x'ln. leucocratic granite ~ 4125-4137'

4140 - 4200 — same as above w/ 5-7% hbl. bte-hbl. qtz. monz. gneiss ~ 4184 - 4196'

4200 - ~ 4405' same as 4040-4140 — intruded by numerous narrow dikes (≤3') m x'ln. l'n leuc. granite and f-m x'ln. bte. hbl. qtz. monz. gneiss. Altn. increases below 4360'

~4405 - 4450'. Mixed zone of m-crs. x'ln bte-hbl. qtz. monz. gneiss and f-m. x'ln fsp-qtz-bte-hbl. gneiss both have 30-35% hbl, 10-12% amphibole, 1-2% sphene. flts. 4410-20, 4420-30' moderate altn.

4450 - ~4463' m. x'ln. granite, alt.

~4463 - 4510' same as 3970 - 4040 but up to 3% hbl.

4510 - 4540 relatively mafic-rich fsp-qtz-hbl-bte. gneiss w/ 20-25% bte 8-9 (avg. 7%) hbl. 1% sphene.

3540-3630'. f-m xln fsp-qtz-bte gneiss gen. w/ 7-18% (avg ~ 13%) biotite, but only 1-3% hornblende. — no sphene — a few narrow dikes bte hbl. qtz monz. gneiss. prob. flt. 3610-20'

3630-3840' f-m xln fsp-qtz-hbl.-bte. gneiss w/ generally 5-12% hbl. (avg ~ 7%) and 15-21% biotite (average about 17%). local traces sphene, sillimanite garnet in two samples. Probable minor flt 3720-30'. <1% hbl. 3660-70 & 3700-10'. (<5' thick) intruded by numerous narrow dikes bte. hbl. qtz. monz. gneiss and leuc. granite.

3840-3870': fxl fsp-qtz bte gneiss w/ 9-11% bte <1-3% hbl. (v. felsic) flt. 3850-60', 60'-70'

3870-3970' — same as 3630-3840 flts. 3890-3900', 3920-3930' (25-30% bte 3940-50'

bte hbl. qtz. monz gneiss ~3933-3940'

3970-4040 — felsic f-m. xline fsp-qtz-bte gneiss w/ 7-13% (avg 10%) bte & only traces hbl., sphene, sill. flts. 4020-30, 4030-40'

2860 – ± 3423' interstratified fsp-qtz-bte. and fisp-qtz-hbl-bte gneiss, fine – med. crystalline. Biotite varies from 5–20% – averages ± 13%. hbl. gen. varies from <1 to 7% (avg. 2-3%) only local traces sphene, sillimanite – no garnet. Cut by numerous narrow dikes of leucocratic granite & felsic migmatitic differentiate, and a few dikes of bte. hbl. qtz. monz. gneiss. (The latter increase in frequency with proximity to 3423'.

10-15% hbl.	3030-40'
30-35% hbl	3160-70'
15-25% hbl.	3230-50'
11-13% hbl	3280-90'
10-12% hbl.	3320-30'

Inferred Minor Faults

2860-70'	3120-30'
2890-2900'	3130-40'
2900-10'	3140-50'
2910-20'	3160-70'
2990-3000'	3260-70'
3100-10'	3270-80'
3110-20'	

± 3423 – ± 3457' Biotite-hbl. qtz monz. gneiss w/ 10-15% hbl, <5% bte.

± 3457 – 3540' f-m-xline fsp-qtz-hbl-bte gneiss w/ 5-12% (avg ± 7%) hbl. and 7-12% (avg. ± 11%) biotite, intruded by narrow dikes of bte-hbl. qtz. monz. gneiss, as above. probable minor fault 3490–3500. dike 3534–3540'

2675-2762 Leucocratic bte. granite, f-med. xline, w/ <0.5% bte, <0.5% magnetite-ilmenite, <0.5% sphene contaminated with up to 10% sillimanite-bearing qfsp-qtz-biotite gneiss. flt 2718-20'.

2762-2775 - same as 2550-2675'

2775-80' - granite, same as 2675-2762'

2780-2788 - dacite porphyry

2788-2796 - granite, same as 2675-2762'

2796-2800' - same as 2550-2675'.

2800-2805' → granite, same as 2675-2762'

2805-2820 → qfsp-qtz-bte hbl. gneiss w/ 15-20% amph, 20-25% hbl. — fx/n. faults 2800-10'

2820-60 → fx/n qfsp-qtz-hbl-bte gneiss, same as 700-850'

Fine-med-xline

2210 – 2420': Mafic-rich feldspar-quart-biotite gneiss with abundant, fibrolitic sillimanite and minor garnet. 30-70% biotite (avg. ~ 40%) hornblende generally absent, but local traces present (1-3% betw. 2210 and 2220'. Traces sphene locally present. ~ 0.5% magnetite-ilmenite. Local trace to minor amounts cordierite. Cut by numerous narrow dikes (avg. < 1') med-xline leucocratic granite or felsic migmatitic differentiate. Probable minor faults @ 2390-2400, 2400-2410'.

tr – 2% red-brown garnet

2420 – 2550': Same as above exc. 25-50% bte (avg. ~ 35%) and only minor sillimanite. Hornblende locally up to 5%, though generally absent or only in traces. Hbl. gen accompanied by tr-2% sphene. Probable minor faults 2460-70'. Mafics decreasing downhole.

2550 – 2675': Same as above exc bte. only 12-30% biotite (avg. ~ 22%). Probable fault @ 2550-60'.

GETTY OIL COMPANY DRILL HOLE 52-21 ROOSEVELT HOT SPRINGS KGRA

"LITHOLOGY, ALTERATION, AND MINERALIZATION LOG"

"EXPLANATION"

 PUMICEOUS AND PERLITIC ALLUVIUM	SUBROUNDED TO ANGULAR GRAINS UP TO AN OBSERVED DIAMETER OF 15 MM. (AVG. 2-3 MM.) CONSISTING OF PLEISTOCENE PUMICE, PERLITE, AND OBSIDIAN; TERTIARY GRANITIC ROCKS; AND PRECAMBRIAN GNEISSES. SILICIC VOLCANIC COMPONENT ACCOUNTS FOR UP TO 80 VOL. % OF SPECIFIC HORIZONS.
 ALLUVIUM	SAME AS ABOVE EXCEPT LITTLE OR NO SILICIC VOLCANIC COMPONENT.
 DACITE PORPHYRY	UP TO 7% EUHEDRAL PLAGIOCLASE LATHS, UP TO 1 X 0.3 MM, EMBEDDED IN A DENSE, DARK GRAY APHANITIC MATRIX. GENERALLY ASSOCIATED WITH MICRODIORITE PORPHYRY, AS DESCRIBED BELOW.
 BIOTITE HORNBLENDE QUARTZ MICRODIORITE AND QUARTZ MICRODIORITE PORPHYRY.	UP TO 25% PHENOCRYSTS (VARIABLE) CONSISTING OF EUHERAL PLAGIOCLASE W/ MINOR SUBHEDRAL TO EUHEDRAL HORNBLENDE AND ANHEDRAL TO SUBHEDRAL BIOTITE EMBEDDED IN A MICROCRYSTALLINE MATRIX. GENERALLY HYDROTHERMALLY ALTERED. COMMONLY CONTAINS MINOR DISSEMINATED PYRITE.
 LEUCOCRATIC GRANITE, ALASKITE, AND MAFIC-POOR BIOTITE GRANITE, UNDIVIDED	GENERALLY MEDIUM-CRYSTALLINE, LESS COMMONLY FINE-CRYSTALLINE. GENERALLY, LESS THAN 0.5 VOLUME PER CENT BIOTITE and LESS THAN 0.5 VOLUME PER CENT DARK OPAQUE MINERALS. PROBABLY INCLUDES ONE OR MORE PHASES OF THE MINERAL MOUNTAINS PLUTON (TERTIARY) AND GRANITIC GNEISSES AND FELSIC MIGMATITIC DIFFERENTIATES OF PRECAMBRIAN AGE.
 BIOTITE HORNBLENDE QUARTZ MONZONITE TO GRANODIORITE GNEISS.	GENERALLY MEDIUM-CRYSTALLINE, BUT VARIES FROM FINE TO COARSE-CRYSTALLINE. SUBHEDRAL HORNBLENDE VARIES FROM 7 TO 30% (AVG. ABT. 20%); BIOTITE FROM ≤1 TO 20% (AVG. ABT. 7%). UP TO 2% SPHENE AND 2% DARK OPAQUE MINERALS. FOLIATION GENERALLY NOT DISCERNIBLE IN DRILL CUTTINGS. PROBABLY CORRELATES WITH "HORNBLENDE GNEISS" (Pegn) MAPPED AT THE SURFACE (NIELSON, ET AL., 1978).
FELDSPAR-QUARTZ-BIOTITE (± HORNBLENDE) GNEISS*	FINE TO MEDIUM-CRYSTALLINE. HIGHLY VARIABLE FELSIC TO MAFIC RATIO (DENSITY OF PATTERNING APPROXIMATELY REPRESENTS MAFIC MINERAL PERCENTAGE). MAY CONTAIN ONE OR MORE OF THE MINERALS SILLIMANITE, SPHENE, ZIRCON, CORDIERITE, AND GARNET. UP TO 2% DARK OPAQUE MINERALS (ALL THESE MINERALS LISTED IN DESCRIPTIONS OF INDIVIDUAL 10-FOOT CHIP SAMPLES). BIOTITE-RICH INTERVALS COMMONLY WELL-FOLIATED AND MAY ACTUALLY BE SCHISTS. BIOTITE VARIES FROM 5 TO 50%; H HORNBLENDE FROM 0 TO 25%. PROBABLY CORRELATES WITH "BANDED GNEISS", MAPPED AT THE SURFACE (NIELSON ET AL., 1978).
 *With biotite & hornblende*	
 *With biotite & garnet (generally w/sillimanite)*	
 *With biotite*	
* (density of patterning reflects mafic mineral %)	
 INFERRED MINOR FAULT	

ABBREVIATIONS

ABT. } ABOUT
~
AB. ABUNDANT
ALT. ALTERED
ALTN. ALTERATION
ARG. ARGILLIZATION
AVG. AVERAGE
Bn BORNITE
BRN. BROWN
BTE. BIOTITE
→ © CORDIERITE PRESENT
CHL. CHLORITE
CHLTZN CHLORITIZATION
CORD. CORDIERITE
CRS. COARSE (-CRYSTALLINE)
DISS. DISSEMINATED
F. FINE (-CRYSTALLINE)
FLT. FAULT
FSP. FELDSPAR
→ ④ GARNET PRESENT
GNT GARNET
GR. GRANITE
HEM HEMATITE
HBL. HORNBLENDE
K-SPAR POTASSIUM FELDSPAR
LEUC. LEUCOCRATIC
LEUCOX. LEUCOXENE

LT. LIGHT
M. } MEDIUM (-CRYSTALLINE)
MED. }
MM. MILLIMETER
MAG. MAGNETITE
MINRLZN. MINERALIZATION
MINRLZD. MINERALIZED
MOD. MODERATE
MUSC. MUSCOVITE
PLAG. PLAGIOCLASE
PPY. PORPHYRY
PY. PYRITE
Qal QUATERNARY ALLUVIUM
QTZ. QUARTZ
QTZ. MONZ. QUARTZ MONZONITE
→ ⑤ SILLIMANITE PRESENT
SER. SERICITE
SERCTZN. SERICITIZATION
SILL. SILLIMANITE
Tr. TRACE
TL. TOTAL
V. VERY
W/ WITH
WKLY. WEAKLY
XL. CRYSTAL
XLN. CRYSTALLINE

f ALTERATION MINERAL REPLACES K-SPAR & PLAG.
g ALTERATION MINERAL REPLACES FAULT GOUGE
h ALTERATION MINERAL REPLACES HORNBLENDE
① WEAK ALTERATION
② MOD. ALTN.
③ STRONG ALTN.
v ALTERATION MINERAL OCCURS AS A CONSTITUENT OF VEINLETS AND MICROVEINLETS

Addendum

CPY. CHALCOPYRITE
VNLT. VEINLET
~VNLT. MICROVEINLET
CONT. CONTAMINATION
RHY. RHYOLITE
PERL. PERLITE
PUM. PUMICE
EXC. EXCEPT
DIA. DIAMETER
FRAG. FRAGMENT

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY J. HULEN
JULY 1978

DEPTH	ALTERATION (1. WEAK 2. MOD. 3. STRONG) CLAY 1 2 3	SER. 1 2 3	CHL. BTE. 1 2 3	CHL. HBL. 1 2 3	EPIDOTE 1 2 3	CALCITE 1 2 3	LEUCOX. SPHENE 1 2 3	EARTHY BRICK-RED TO MAROON HEMATITE est. v. % 0.50 1.00	PYRITE, est. v. % 0.50 1.00	GRAPHIC GEOLOGY	VEINLETS (Tr. TRACE 1. WEAK 2. MOD. 3. STRONG)	DESCRIPTIONS
2390'												also 15% MED. XLN. LEUCOCRATIC GRANITE Abundant Fibrolite
											Tr. SPEC. HEM. Tr. SERICITE	2370-2400': QTZ-FSP-BTE GNEISS, FINE-MED. XLINE, MED. BROWNISH-GRAY, SPECKLED; 5% SERCTD. GOUGE; 5%
2400'											Tr. CALCITE	MED.-XLINE CHL.-SER. CHIPS; TR. MICRODIORITE; CHLTZN. -⑤ SPOTTY SERCTZN. PERVASIVE. PROB. SOME PRIM. MUSC.
												2400-2410': SAME AS ABOVE W/ ABUNDANT FIBROLITE, 1%
											Tr. CALCITE	BROWN ANH. GARNET < 0.5 mm DIA: 20% GRANITE @⑤C
2410'											Tr. CHL./GOUGE	2410-20': SAME AS ABOVE EXC. ABUND. SILLIMANITE & 2% PINK-REDDISH-BRN. GARNET INTERGROWN W/ BTE.
											Tr. CALCITE	10-15% GRANITE ⑤S
2420'												2420-30': SAME AS 2390-2400' W/ ABUND. SILLIMANITE
											Tr. CALCITE	15-20% GRANITE ⑤S
2430'												2430-2440': SAME AS ABOVE W/ 15-20% GRANITE Tr. DACITE PPY.
												1-3% BROWN, RED-BROWN, & PINK GARNET ANH., < 0.5 mm DIA. ⑤S
2440'											Tr. CALCITE	2440-50': SAME AS ABOVE. CHLTZN. ERRATIC.. SERCTZN. MORE PERVASIVE.
												1-3% RESINOUS BROWN GARNET, AS ABOVE 10% GRANITE. ABUNDANT FIBROLITE ⑤S
2450'											Tr. CALCITE-HEMATITE	2450-60': MED.-XLINE BTE MARKEDLY DECREASES — FINE XLINE "SALT & PEPPER" GNEISS INCREASES — ALTN
												NOTICEABLY LESS INTENSE. 10% GRANITE. Tr. GARNET ⑤S ABUNDANT FIBROLITE.
2460'											(1-2) CALCITE	2460-70': SAME AS ABOVE EXC. 5% GOUGE, MUCH OF WHICH IS SLICKENSIDED. GARNET DROPS OUT.
												10% (?) GRANITE. GNEISS IS POORER IN MAFICS. ⑤
2470'											Tr. CALCITE	2470-80': SAME AS 2450-60': HBL. & SPHENE APPEAR. ONLY Tr. FIBROLITE
												15% GRANITE ONE GRAIN PY 1/8 MM. DIA.— SUBH. Tr. ⑤
2480'											Tr. CHL.	2480-90': SAME AS 2420-2430' SILLIMANITE INCREASES FR. 2470-80'.
											Tr. CALCITE	10-15% GRANITE (ABUNDANT SILLIMANITE — Tr.-1% RED-BROWN GARNET ⑤S
2490'											Tr. CHL.-HEM	2490-2500': QTZ-FSP-BTE GNEISS, FINE-XLINE, MED. BROWNISH-GRAY, SPECKLED "SALT & PEPPER" APPEARANCE
												A FEW CHIPS MED.-XLINE W/ABUND. BIOTITE & SILLIMANITE 1-2% CHLTZED. MICRODIORITE. 7-10% GRANITE ⑤
2500'												2500-2510': SAME AS ABOVE, BUT WELL-FOLIATED, SCHISTOSE
												10% GRANITE. ABUNDANT FIBROLITE ⑤S
2510'											Tr. QTZ-SER-HEM.	2510-20': SAME AS ABOVE. Tr. RED-BROWN GARNET
												30-35% MED. XLINE LEUC. BTE. GRANITE Tr. ALTERED MICRODIORITE W/ Tr. DISS. PY. ⑤S
2520'											Tr. QTZ-CHL.-SER.-HEM.	2520-30': SAME AS 2470-2500': 1% CHL-SER. CHIPS (FROM FAULT?)
2530'												15-20% GRANITE. ≠ Tr. ALTERED MICRODIORITE W/ Tr. DISS. PYRITE ⑤S
												2530-40': SAME AS ABOVE (ALL) Tr. ALTERED MICRODIORITE
												10-15% MED.-XLINE. LEUC. BTE. GRANITE. ⑤S
2540'											TR. BRICK-RED HEM.	2540-50': SAME AS ABOVE.
												≈ 15% GRANITE ⑤S
2550'											MINOR FLT.	2550-2560': Tr. SILLIMANITE F. XLINE FSP-QTZ BTE GNEISS W/ "SALT
												≈ 6-7% GRANITE & PEPPER" TEXTURE. Tr. ⑤
2560'												2560-2570': SAME AS ABOVE W/ 2% BTE. TR. ANH. RED-BROWN GARNET < 0.5 mm. DIA.
2570'												5-10% GRANITE. TR. FIBROLITE ⑤S
												2570-2580': SAME AS ABOVE
2580'												5-7% GRANITE Tr. ⑤S
											Tr. CALCITE	2580-2590': SAME AS ABOVE
2590'												≈ 10-15% GRANITE Tr. ⑤S
											Tr. CALCITE	2590-2600': SAME AS 2550-2560'
2600'												≈ 5-7% (?) GRANITE Tr. ⑤
												2600-2610': SAME AS 2580-2560 QTZ-FSP-BTE. GNEISS W/ SILLIMANITE 5% RED-BRN. GARNET.
2610'												SERCTZN. OF FSPS. ERRATIC — ALSO 15% MED-XLINE. QTZ & KSP., PROB. FROM LEUCOGRANITE. 20% ⑤S
												2610-20': SAME AS ABOVE. CHLORITIZATION ALSO ERRATIC
2620'											Tr. CALCITE	20-25% MED-XLN. LEUC. GRANITE. 5% GARNET, AS ABOVE ⑤S
												2620-30': SAME AS 2550-2560' W/ 65-70% LEUC. MED.-XLN. GRANITE OF FELSIC MIGMATITIC SEGREGATION REMAINDER FSP-QTZ-BTE. GNEISS Tr. ⑤S
2630'											Tr. CALCITE	
												2630-40': SAME AS ABOVE W/ ≈ 30% (?) GRANITE.
2640'											Tr. CALCITE	Traces ⑤S C
												2640-50': SAME AS 2550-60', DISTINCTIVE LT. BROWN COLOR. Tr. LT. GRAY DACITE PPY.
2650'												≈ 5% GRANITE Tr. ⑤

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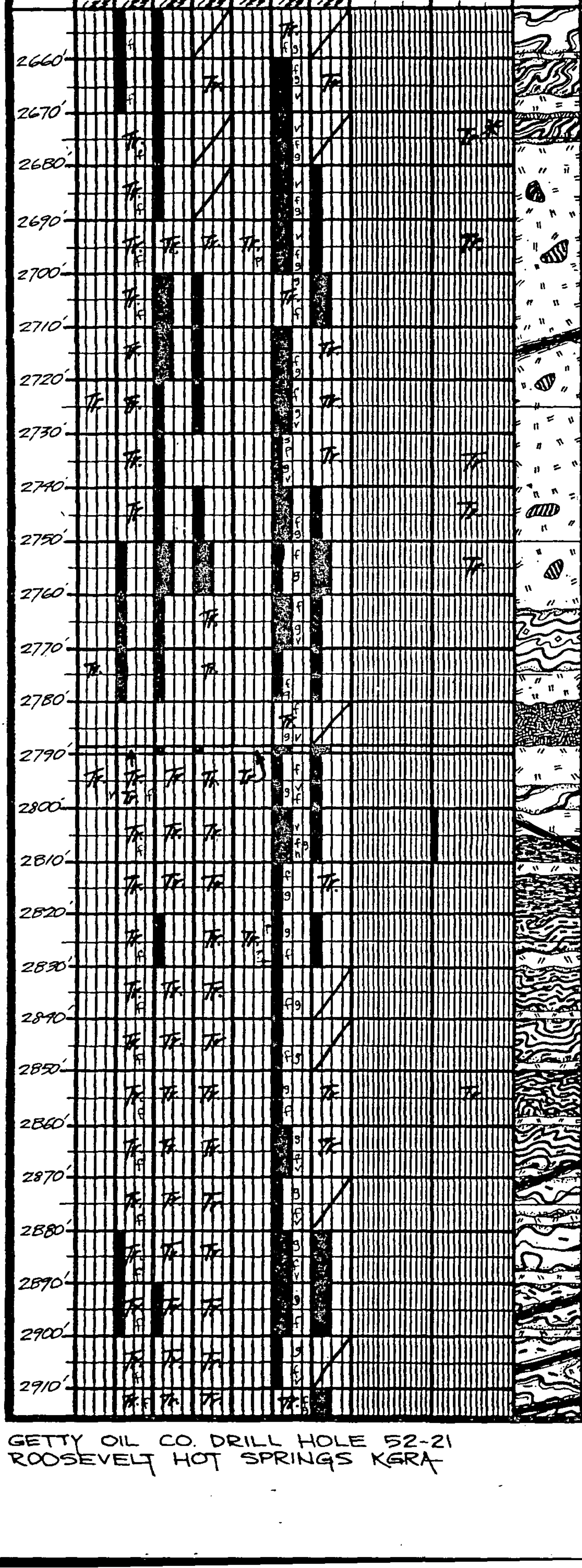
NOTE: MUCH OF THE MED.-XLINE LEUCOCRATIC GRANITE DESCRIBED ABOVE COULD BE FELSIC MIGMATITIC DIFFERENTIATE.

≠ SEE PRECEDING PAGE.

GRAPHIC LOGS

DEPTH | ALTERATION (1. WEAK 2. MOD 3. STRONG): CLAY, SER., CHL. BTE, CHL. HBL., EPI-DOTE, CAL-CITE, LEUCOX. SPHENE | EARTHY BRICK RED TO MAROON HEM. est. v.% | PYRITE, est. v. % | GRAPHIC GEOLOGY | VEINLETS (Tr. TRACE 1. WEAK 2. MOD 3. STRONG)



DESCRIPTIONS

LOGGED BY J. B. HULEN
JULY 1978

Veinlets	Descriptions
	2650-60': 10% MED. XLINE LEUCOGRANITE OR ALASKITE. REMAINDER F. XLN FSP-QTZ.-BTE. GNEISS W/ "SALT AND-PEPPER TEXTURE. Tr. SILLIMANITE. Tr. ⓢ
Tr. CALCITE	2660-70': 30% LEUCOGRANITE, REMAINDER GNEISS, AS ABOVE. Tr. ⓢ
① CALCITE	2670-80': 7% MICRODIORITE, MOSTLY UNALTERED. 40% LEUCOCRATIC BTE. GRANITE. REMAINDER F. XLN. FSP-QTZ-BTE. GNEISS, AS ABOVE. ABUND. FIBROLITE. Tr. RED-BROWN GARNET. Tr. ⓖ
① CALCITE	2680-90': 90% F-M. XLN. LEUCOCRATIC BTE. GRANITE W/ <0.5% BTE, <0.5% MAGNETITE, <0.5% SPHENE. REMAINDER F. XLN. FSP.-QTZ.-BTE. GNEISS. TR. MICRODIORITE. Tr. DACITE PPY. Tr ⓢ
① CALCITE	2690-2700': SAME AS ABOVE W/ 3% MICRODIORITE
	2700-10': SAME AS ABOVE — FOLIATION VAGUELY DISCERNIBLE ??. <3% GNEISS. & Tr. HBL. APPEARS — UNIT V. QTZ. RICH
MINOR FLT. ① CALCITE	2710-20': SAME AS ABOVE W/ ABUND. FLT. GOUGE
① CALCITE	2720-30': SAME AS ABOVE (2680-90') W/ 7% FSP-QTZ-BTE. GNEISS. Tr. HBL. IN INTRUSIVE. Tr ⓢ
Tr. CALCITE	2730-40': SAME AS ABOVE — Tr. QTZ.-FSP.-BTE GNEISS. HBL. IN INTRUSIVE INCREASES. — 1-1.5% BTE, 0.5% HBL <0.3% SPHENE.
	2740-50': SAME AS ABOVE. 5-7% FSP-QTZ.-BTE. GNEISS. Tr. ⓢ
	2750-60': SAME AS ABOVE. ALTN. INCREASES. Tr. ⓢ
① CALCITE	2760-70': 0% SAME AS ABOVE, 0% QTZ.-FSP-BTE. GNEISS W/ BTE. (?) HBL. MINOR FIBROLITE & GARNET (RED-BROWN, TRANSL., ANH., <0.5 mm.) ⓖⓢ
	2770-80': V. MIXED SMPL., W/ 3-5% MED.-CRS.-XLINE BTE, 3% MICRODIORITE. REMAINDER 65-70% GRANITE. SAME AS ABOVE W/ 4% GOUGE. PROBABLY EXTENSIVE CAVING THIS INTERVAL. ⓢ
Tr. CALC.	2780-90': 85% DK. GRAY DACITE PPY. REMAINDER MED.-XLINE LEUC. GR. W/ TR. GNEISS. REMAINDER AS 2680-2760'. GRANITE IS HEAVILY ALT. TO CALCITE, DACITE PPY QUITE FRESH. ⓢ
Tr. CLAY (ONE FRAG). Tr. CALCITE	2790-2800': 60% (?) MED.-XLN. LEUC. BTE. GRANITE. REMAINDER F-M. XLN. FSP-QTZ-BTE. GNEISS, MUCH OF WHICH IS EASILY CONFUSED W/ THE GRANITE (FELSIC PORTIONS). also 15% QUETSS AS ABOVE
① CALCITE	2800-2810': OF SMPL. IS F. XLINE BTE-HBL GNEISS W/ >50% HBL, MOD. WELL-FOLIATED. REMAINDER IS QUARTZ-FSP. FRAGS WHICH MAY BE QUARTZOFELDSPATHIC DIFFERENTIATE OR LEUCOCRATIC GRANITE? DISS. PY.
	2810-20' (?) 20-25% GRANITE. 5-10% FSP-QTZ-BTE. GNEISS, SAME AS 2790-2800 (W/ MINOR FIBROLITE. REMAINDER BTE.-HBL. GNEISS, AS ABOVE. also Tr. MICRODIORITE ⓢ
	2820-30': 75% F. XLN. QTZ-FSP-HBL.-BTE. GNEISS W/ "SALT & PEPPER" TEXTURE, 25 V.% MAFICS. REMAINDER F. XL. BTE. GRANITE (?) W/ <1% BTE. Tr. M-XLN BTE-HBL. QTZ. MONZ. GNEISS 4 CHIPS (<½%) F. XLN. CHL.-EP. AGGR. W/ QTZ. CALCITE
	2830-40': F. XL FSP-QTZ-HBL-BTE. GNEISS, 25% TL. MAFICS "SALT & EPPER" TEXTURE, CRUDE FOLIATION, MED. GRAYISH-BROWN. 10-15% (?) MED.-XLINE. LEUC. BTE. GRANITE. Tr. BTE.-HBL. QTZ. MONZ GNEISS
	2840-50': SAME AS ABOVE — POSS. W/ .... LEUC. F. XLINE GR. (MAY BE QUARTZOFELDSPATHIC DIFFERENTIATE).
	2850-60': SAME AS ABOVE, BUT GNEISS CONTAINS 7 TO 10% HBL. 15% MED-XLN. LEUC. GRANITE
① CALCITE. also 2mm. wide calcite-chlorite	2860-70': SAME AS 2830-40': ~15% F.-MED.-XLINE LEUC. GR. OR ALASKITE
Tr. "	2870-80': SAME AS ABOVE W/ DIMINISHED MAFIC CONTENT (<15%). PERHAPS 10-15% GRANITE, BUT DIFF. TO DISTINGUISH FROM THIS GNEISS.
Tr. "	2880-90': SAME AS ABOVE. 20% (??) GRANITE ?
	2890-2900': SAME AS ABOVE — 15% (?) GRANITE ?
MINOR FLT.	2900-2910': SAME AS 2830-40' ... 10% (?) GRANITE?
Tr. CALCITE	2910-20': SAME AS ABOVE — 10% (?) GRANITE? TR. FIBROLITE. ⓢ

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GRAPHIC LOGS

ALTERATION 1. WEAK 2. MOD. 3. STRONG

DEPTH	CLAY	SER	CAL-BTE	CHL-HBL	EPI-DOTE	CAL-CITE	LEUCOX-SPHENE	PYRITE est. vol. % 0.0 1.00	GRAPHIC GEOLOGY	Tr. TRACE 1. WEAK 2. MOD. 3. STRONG VEINLETS	DESCRIPTIONS
											LOGGED BY J. B. HULEN JULY 1978
2920'		Tr.	Tr.			Tr.		Tr.		Tr. SER.-PYRITE (ONE VNLT.) Tr. CO3	2920-30': QTZ.-FSP-BTE. GNEISS, MED. GRAYISH-BRN, "SALT AND PEPPER" TEXTURE, CRUDE FOLIATION, FINE-XLINE. MED.-XLINE HBL SOME CHIPS. 5-7% MED XLINE LEUC. GRNT.
2930'				Tr.							2930-40': 90% SAME AS ABOVE, 10% PROBABLE MED. XLINE LEUCOCRATIC GRANITE. Tr. DARK GRAY DACITE PPY. TR. MICRODIORITE
2940'		Tr.	Tr.	Tr.				Tr.			2940-50': SAME AS ABOVE, EXC. NO DACITE PPY. OR MICRODIORITE. Tr. DISS. PYRITE 20% GRANITE
2950'		Tr.	Tr.	Tr.							2950-60': SAME AS ABOVE 15-20% GRANITE
2960'										Tr. CALCITE	
		Tr.	Tr.	Tr.				Tr.			2960-70': SAME AS ABOVE. Tr. DISS. PY.
2970'										Tr. "	20-25% GRANITE
		Tr.	Tr.	Tr.							2970-80': SAME AS 2930-40' W/ 25% GRANITE 75% GNEISS Tr. MICRODIORITE.
2980'		Tr.	Tr.	Tr.							2980-90': SAME AS 2920-30'. W/ 15% GRANITE. Tr. FIBROLITE Tr. (S)
2990'		Tr.	Tr.	Tr.				Tr.		← MINOR FLT.	2990-3000': SAME AS ABOVE. GOUGE & BX IN-CREASE TO 7% OF SMPL. 15-20% GRANITE
3000'		Tr.	Tr.	Tr.			Tr.				3000-3010': SAME AS 2920-30' W/ 25-30% GRANITE. Tr. FIBROLITE. Tr. (S)
3010'		Tr.	Tr.	Tr.		Tr.				Tr. CALCITE	3010-20': SAME AS ABOVE W/ 20-25% GRANITE.
3020'		Tr.	Tr.	Tr.				Tr.		Tr. "	3020-30': SAME AS ABOVE W/ PERHAPS 15% MED.-XLINE ALASKITE (?) — THIS MAY BE JUST A QUARTZOFELD-SPATHIC AGGREGATE.
3030'		Tr.	Tr.	Tr.						① CALCITE	3030-40': QTZ.-FSP.-HBL.-BTE. GNEISS, SAME AS 2820-30' EXC. W/ 15-20% GRANITE ABUND. HBL. Tr. (S)
3040'		Tr.	Tr.	Tr.			Tr.				3040-50': 75% FINE-MED. XLINE LEUCOCRATIC GRANITE (OR QUARTZOFELDSPATHIC SEGREGATION W GNEISS). REMAINDER SAME AS ABOVE (2920-30')
3050'		Tr.		Tr.			Tr.			Tr. CALCITE	3050-60': SAME AS 2920-30' W/ 20% GRANITE Tr. FIBROLITE Tr. (S)
3060'		Tr.		Tr.			Tr.			① CALCITE	3060-70': SAME AS ABOVE, EXC 5-8% HBL. APPEARS 20% MED.-XLINE LEUCOGRANITE.
3070'		Tr.	Tr.	Tr.			Tr.	Tr.		① CALCITE	3070-80': W 10% SAME AS ABOVE. REMAINDER BTE.-HBL QTZ. MONZ., POSS. METAMORPHOSED. MED.-XLINE, W/ 7-10% HBL., W 3% FINE-XLN. BTE 0.5-1% SPHENE (HONEY-YELLOW) PERHAPS 10-15% LEUCOGRANITE, AS ABOVE.
3080'		Tr.	Tr.	Tr.				Tr.		① CALCITE	3080-90': SAME AS ABOVE W/ PERHAPS 35-40% LEUCOGRA-NITE (FSP & QTZ. CHIPS, HOWEVER, ALMOST CER-TAINLY PARTLY DERIVED FROM QTZ. MONZ. GNEISS.
3090'		Tr.	Tr.	Tr.				Tr.			3090-3100': 20% (?) SAME AS ABOVE: REMAINDER
3100'	Tr.			Tr.			Tr.	Tr.		← MINOR FLT. Also Tr. Fibrolite	90% MED.-XLINE LEUCOGRANITE. W/ F.XL. FSP-QTZ.-BTE GNEISS Tr. (S)
3110'		Tr.	Tr.	Tr.			Tr.			← MINOR FLT.	3100-3110': QTZ.-FSP.-BTE. GNEISS, SAME AS 2920-30', W/ 9% (?) HBL., TR. DISS. PY.
3120'		Tr.	Tr.	Tr.						← MINOR FLT.	Tr. MICRODIORITE, Tr. CEMENT. 20% MED.-XLINE LEUC. GRNT. Tr. (S)
3130'		Tr.	Tr.	Tr.						← MINOR FLT.	3110-20': SAME AS ABOVE, BUT RICHER IN HBL. ¢ 30-35% GRANITE TOTAL MAFICS. Tr. FIBROLITE Tr. (S)
3140'		Tr.	Tr.	Tr.						← MINOR FLT.	3120-30': SAME AS ABOVE: HBL. DECREASES 55-60% MED.-XLINE LEUCOGRANITE Tr. (S)
3150'		Tr.	Tr.	Tr.				Tr.		← MINOR FLT.	3130-40': SAME AS ABOVE 55-60% MED-XLINE LEUCOGRANITE.
3160'		Tr.	Tr.	Tr.			Tr.			← MINOR FLT.	3140-50': SAME AS ABOVE 15-20% LEUC. GRANITE. HBL. DECREASES
3170'		Tr.	Tr.	Tr.						← MINOR FLT.	3150-60': SAME AS ABOVE POSS. TR. RED. GARNET Tr. (G)? 25-30% MED.-XLINE LEUC. GRANITE
3180'		Tr.	Tr.	Tr.				Tr.			3160-70': QTZ-FSP-BTE. HBL GNEISS, F.XLINE, 40% TL MAFICS (30% HBL) 7% MED.-XLINE. LEUC. GRANITE.
											3170-80': SAME AS 3110-3120' 2-3% SAME AS ABOVE. 15-20% MED-XLINE LEUC. GRANITE

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NOTE: MUCH OF THE MED-XLINE LEUCOCRATIC GRANITE DESCRIBED THIS PAGE COULD BE FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

ALTERATION (1. WEAK 2. MOD. 3. STRONG)

DEPTH	CLAY (CC)	SER. (CC)	CHL. BTE. (CC)	CHL. HBL. (CC)	EPI-DOTE (CC)	CAL-CITE (CC)	LEUCOX. SPHENE (CC)	EARTHY BRICK RED HEMA-TITE.	PYRITE, est. VOL. % 0.50 1.00	GRAPHIC GEOLOGY	Tr. TRACE 1. WEAK 2. MOD. 3. STRONG VEINLETS	DESCRIPTIONS
												LOGGED BY J. B. HULEN JULY 1978
											① CALCITE	3180-90': QTZ.-FSP.-BTE. GNEISS, F. XLN., "SALT & PEPPER" APPEARANCE, LOW MAFIC CONTENT, RELATIVELY FRESH EXC. FOR CALCITIC ALTN. OF PSPS. & GOUGE. 20-25% MED. XLINE LEUC. GRANITE.
3190'		Tr.	Tr.	Tr.					Tr.		① CALCITE	3190-3200': SAME AS ABOVE. ↳10% GRANITE.
											Tr. CHL FSP.	1-3% MED XLN. BTE. HBL QTZ. MONZ. GNEISS.
3200'											① CALCITE	3200-10': SAME AS ABOVE, EXC. INCR. MAFICS & HBL. — THESE ARE WKLY. CHLTD. — CHL. ALSO APPEARS
		Tr.		Tr.							Tr. CHL FSP.	TO REPLACE SOME PLAG CHIPS & XLS. — ALSO A FEW F.XL. CHIPS OF PURE FLAKY CHL.
3210'			Tr.	Tr.					Tr.		Tr. CALCITE	3210-20': SAME AS ABOVE. 10-15% MED. XLINE LEUC. GR.
												7-10% MED. XLN. BTE. HBL. QTZ. MONZ. GNEISS W/ 10% (±) HBL.
3220'									Tr.		Tr. CALCITE	3220-30': SAME AS ABOVE, EXC. INCR. HBL. (7 VOL. %) 20% OF CHIPS ARE MED.-XLN. W/ ONLY HBL. AS
		Tr.	Tr.	Tr.							15% GRANITE	MAFIC — THESE MAY BE BTE.-HBL. QTZ. MONZ. GNEISS, SAME AS 3070-90'.
3230'											Tr. CHL.	3230-40' QTZ-FSP-BTE.-HBL. GNEISS, FINE-MED.-XLINE. DIFFERS FROM 3070-90' IN HAVING NO SPHENE
					Tr.				Tr.		① CALCITE	(QTZ. MONZ. GNEISS?) (10% OF SMPL. IS QTZ.-FSP.-BTE. GNEISS, SAME AS 3180-90' 15-20% GRANITE, AS ABOVE.
3240'											Tr. CHL.-EP.	3240-50': SAME AS ABOVE. CHL. ALSO SEEMS TO REPLACE PLAG. (A FEW HAVE A CLOUDY
		Tr.			Tr.				Tr. Tr. CPY.		① CALCITE	Tr. QTZ. MICRODIORITE PD. GRAYISH-GREEN APPEARANCE). ALSO: Tr. EPIDOTE. 10% MED. XLN. LEUC. GR.
3250'												3250-60': SAME AS 3180-90 W/ APPEARANCE OF SOME SILLIMANITE. & 20% TOTAL MAFICS.
		Tr.		Tr.					Tr.		① CALCITE	Tr. PY. 7-10% GRANITE. ALSO: 10% SAME AS IMMEDIATELY ABOVE. Tr. ③
3260'											MINOR FLT.	3260-70': SAME AS ABOVE — 1% MICRODIORITE, (FSP-QTZ.-BTE GNEISS) Tr. DACITE
	Tr.	Tr.		Tr.							① CALCITE	25-30% MED.-XLN. LEUC-GRANITE. Tr. ③
3270'											MINOR FLT.	3270-80': SAME AS ABOVE W/ NO SILLIMANITE OR DACITE.
												20-25% MED.-XLN. LEUC. GRANITE ↳ ALSO 5-7% FSP-QTZ-BTE HBL. GNEISS, AS 3230-50'.
3280'											① CALCITE	3280-90': SAME AS ABOVE — 3% GRANITE, MED.-XLINE, W/ <1% CHLTD. BTE.
		Tr.	Tr.	Tr.								35% F-M XLN. FSP-QTZ-BTE-HBL. GNEISS, / SAME AS 3230-50' REM. F-M. XLN FSP-QTZ-BTE. GNEISS. Tr. ③
3290'											① CALCITE	3290-3300': SAME AS ABOVE W/ 20-25% GRANITE. ONE CHIP QTZ.—CLAY. / ONE FRAG. OF
	Tr.	Tr.	Tr.	Tr.	Tr.			Tr.			Tr. QTZ-CHLOR.	20-25% GRANITE. GNEISS TOTALLY (FSPS) SERICITIZED. 3-5% FSP-QTZ.-BTE. HBL GNEISS Tr. ③
3300'											① CALCITE	3300-10': SAME AS ABOVE.
		Tr.	Tr.	Tr.							Tr. CHL.	
3310'											① CALCITE	3310-20': SAME AS ABOVE W/ SLIGHTLY MORE CHL. 40% (?) MED. XLINE BTE. HBL. QTZ. MONZ. GNEISS (AS 3230-50')
		Tr.	Tr.									(QTZ.-FSP.-HBL.-BTE. GNEISS REMAINDER) 10-15% (?) MED XLINE GRANITE. ③ Tr.
3320'											① CALCITE	3320-30': SAME AS ABOVE, W/ 10% (?) MED.-XLN. GRANITE. FSP-QTZ-BTE.-HBL. GNEISS W/ 17-22% TL. MAFICS.
		Tr.	Tr.	Tr.								
3330'											① CALCITE	3330-40': 10-15% MED. XLINE BTE-HBL. QTZ. MONZ. GNEISS
		Tr.	Tr.	Tr.								10-15% LEUC. GRANITE., M.XLN. REMAINDER F-M. XLN. FSP-QTZ-HBL.-BTE GNEISS.
3340'											① CALCITE.	3340-50': 10-15% MED-XLINE BTE. HBL. QTZ. MONZ. GNEISS W/ 10% HBL. 10-15% GRANITE (??)
		Tr.	Tr.	Tr.								REMAINDER F.-M. XLINE FSP-QTZ HBL.-BTE. GNEISS
3350'												3350-60': SAME AS ABOVE. FOR REMAINDER. 15-20% (?) M.XLN. BTE. HBL. QTZ. MONZ. GNEISS W
		Tr.	Tr.	Tr.					Tr.			↳ 30% MED. XLINE LEUC. GRANITE. 10-15% HBL. 5% BTE.
3360'												3360-70': SAME AS ABOVE. 40-45% BTE.-HBL. QTZ. MONZ. GNEISS W/ 10-15% HBL, <5% BTE., MED. XLINE. 20% LEUC. GRANITE (?) REMAINDER. F-M. XLINE FSP-QTZ-HBL-BTE. GNEISS
3370'											Tr. CHL-HEM.	3370-80': SAME AS ABOVE W/ 17-20% LEUC. MED.-XLN. GRANITE. 20-25% (?) MED.-XLN., BTE.-HBL. QTZ
		Tr.			Tr.				Tr.		Tr. CALCITE	VARIABLE MAFIC CONTENT MONZ. GNEISS & REMAINDER. F-M. XLN. FSP-QTZ-HBL-BTE. GNEISS Tr. ③
3380'											Tr. HEM. Tr. CHL-SER	3380-90': SAME AS ABOVE — ALTN. INCREASING, AS WELL AS 7% POWDERY BRICK-RED HEM.
											② CALCITE	20-25% MED. XLN. GRANITE Tr. MICRODIORITE. ↳15% BTE.-HBL. QTZ-MONZ. GNEISS Tr. ③
3390'		Tr.									Tr. CHL.	3390-3400' QTZ-FSP.-BTE GNEISS, F. XLN. "SALT & PEPPER" TEXTURE W/ 2% HBL. — ROCK IS DK. GRAYISH-
											② CALCITE	10% QTZ MONZ. GNEISS, AS ABOVE TO GREENISH-BROWN 10-15% MED.-XLINE LEUCOCR. GRANITE
3400'											Tr. QTZ-CHL-PYRITE	3400-10': SAME AS ABOVE W/ FEWER MAFICS, NO GR.
		Tr.		Tr.					Tr.		Tr. CHL.	7-10% GRANITE CHL. ALSO REPLACES SOME PLAG. GRAINS.
3410'											① CHL ② CALCITE	3410-20': SAME AS ABOVE, ALTN. INCREASES
		Tr.							Tr.			5-7% GRANITE. Tr. QTZ MONZ. GNEISS CHL/PLAG.
3420'											Tr. CHL.	3420-30': 20-25% MED. XLN. LEUC. GRANITE. 50-60% M-CRS. XLN. BTE. HBL. QTZ. MONZ. GNEISS W/ 15-20% HBL, 5-10% BTE. REM. F. XLN. FSP-QTZ-HBL-BTE GNEISS
3430'											① CHL ② CALCITE	3430-40' 80% BTE. HBL. QTZ. MONZ. GNEISS. 7-10% M-XLINE LEUC. GRANITE? REMAINDER F. XLN. FSP-QTZ. BTE. GNEISS. Tr. ③
3440'		Tr.	Tr.	Tr.								3440-50': BTE-HBL. QTZ. MONZ. GNEISS, AS ABOVE, W/ 10-12% HBL, 5% BTE. 5-7% (?) LEUCOGRANITE ??

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HBL. CU W/

GRAPHIC LOGS

ALTERATION (1. WEAK 2. MOD. 3. STRONG)

DEPTH | CLAY | SER. | CHL/BTE. | CHL/HBL. | EPIDOTE | CALCITE | LEUCOX./SPHENE | PYRITE, est. vol. % (0.50, 1.00) | GRAPHIC GEOLOGY

Tr. TRACE 1. WEAK 2. MOD. 3. STRONG

DESCRIPTIONS

LOGGED BY J. B. HULEN AUGUST 1978

DEPTH	VEINLETS	DESCRIPTIONS
		SEE PRECEDING PAGE.
3450'		3450-60': GNEISS, FINE-XLINE, "SALT & PEPPER" TEXTURE, MED BROWNISH-GRAY OVERALL; 10-15% MXLN LEUCOGRANITE | BARELY DISCERNIBLE FOLIATION. 70% M.XLN: BTE. HBL. QTZ. MONZ. GNEISS.
3460'		3460-70': VERY MIXED ZONE. 10% LEUCOGRANITE. 20-25% (??) M.XLN. BTE. HBL. QTZ. MONZ. GNEISS REMAINDER F-M. XLN. FSP-QTZ-BTE. HBL. GNEISS
3470'	Tr. CALCITE	3470-80': SAME AS ABOVE W/ POSS. 5-7% MED.-XLINE ALASKITE OR QTZ-FELD. DIFFERENTIATE. F-M. XLN. FSP-QTZ.-HBL.-BTE. GNEISS W/ ± 20% TL. MAFICS — MAY BE QTZ. MONZ. GNEISS IN PART, AS ABOVE. ??
3480'		3480-90': SAME AS ABOVE. ± 5% GRANITE (?) PROB. ±
3490'	MIXED ZONE	25-30% M. XLN. BTE. HBL. QTZ. MONZ. GNEISS. REMAINDER F. MXL. FSP.-QTZ.-BTE.-HBL. GNEISS W/ 20% MAFICS, 50% HBL.
	② CALCITE	3490-3500': SAME AS 3450-60': ALTN. INCREASES
3500'	Tr. CHLORITE	5-10% (?) QTZ. MONZ. GNEISS 5-10% MED. XLN. LEUCOGRANITE
	② CALCITE	3500-3510': SAME AS ABOVE W/ 10% F.-MED. XLINE ALASKITE (?) OR GRANITE.
3510'	Tr. CALCITE-CHL.	REALLY SEEMS TO BE A ZONE OF QTZ. MONZ. GNEISS GRADING INTO FSP-QTZ-HBL. BTE. GNEISS (XENOLITHS?)
		3510-20': SAME AS ABOVE — 10% GRANITE. ??
3520'		POSSIBLY 7-10% BTE. HBL QTZ. MONZONITE GNEISS Tr. FIBROLITE AFTER BTE. Tr.(3)
		3520-30': SAME AS ABOVE —
3530'		
		3530-40': 55-60% M. XLN. BTE. HBL. QTZ MONZ. GNEISS W/ 20-25% HBL., <5% BTE. POSS. 5-7% LEUCOGRANITE (??), REMAINDER F.-M. XLINE FSP-QTZ-BTE. HBL. GNEISS W/ 20% TL. MAFICS.
3540'		3540-50': W/ Tr. DK. GRAY MICRODIORITE.
		<5% MED.-XLINE LEUCOGRANITE. Tr. BTE. HBL. QTZ MONZ. GNEISS. REM. FELSIC FSP-QTZ-BTE GNEISS (11-13% MAFIC)
3550'	Tr. CHL.	3550-60': SAME AS ABOVE. GNEISS HAS BECOME V. FELSIC.
3560'		3560-70': SAME AS ABOVE.
3570'	① CALCITE Tr. CALC.-CHL.	3570-80': SAME AS ABOVE, SOMEWHAT MORE COARSE XLINE. 25-30% MED.-XLINE LEUC. GRNT. 3%
3580'	25-30% IS M.XLN. BTE.-SCHIST	MICRODIORITE. MAY BE CONTAMINATION PART. 2% DRILL STEEL. Tr. HEM. (3)
		CORE: SAME AS 3450-60' (V. FELSIC GNEISS
3590'		Tr. FIBROLITE W/ 5% MED-XLN. LEUC. GR. Tr. (3)
	Tr. CALC.-CHL	3590-3600' MIXED ZONE AGAIN. PROB. ± 40% MED-XLN. BTE.
3600'	Tr. QTZ-SER. CHL.	HBL QTZ. MONZ. GNEISS SAME AS 3530-40'. 20% (?) M. XLN. LEUC. GRANITE. REMAINDER F XLN FSP-QTZ-HBL. BTE. GNEISS. Tr.(3)
	Tr. CHL.-CALCITE-PYRITE	3600-10': SAME AS ABOVE W/ 30% (?) LEUCOCR. GRANITE. 20% QTZ. MONZ. GNEISS. REMAINDER
3610'		MIXED ZONE FSP-QTZ-HBL.-BTE. GNEISS. Tr.(3)
	Tr. CHLO-BTE-CALCITE	3610-20': SAME AS ABOVE — 20% GRANITE, Tr MICRODIORITE
3620'		APPEARANCE OF 20% FREE MED-CRS.-XLINE BTE. NONE OF THIS IN ROCK CHIPS — PROB. FR. A Tr.(3)
	← ? (SCHIST)	3620-30': APPEARANCE OF 20% FREE MED-CRS.-XLINE BTE.
3630'	Tr. CALCITE	± 15% QTZ MONZ. GNEISS | MED.-CRS.-XLINE. BTE SCHIST (?) (?). ALSO 10% GRANITE, REMAINDER SAME AS ABOVE.
	Tr. CALCITE-CHLORITE	3630-90': SAME AS ABOVE — Tr. MICRODIORITE.
3640'		Tr.(3)
	Tr. QTZ-CALCITE	3640-50': 15% GRANITE, MED.-XLINE. & REMAINDER SAME AS 3480-60' i.e. 25-30% M. XLN. BTE. HBL.
3650'	Tr, CHL.	QTZ. MONZ. GNEISS W/ 50-85% F-M. XLN. FSP-QTZ-HBL-BTE GNEISS. 1% ALT. MICRODIORITE. Tr.(3)
	Tr. QTZ-CHL-EP.	3650-60': 5% GRANITE, OTHERWISE SAME AS ABOVE.
3660'	① CALCITE	SEEMS TO BE A MIXED ZONE OF THE QTZ. MONZ. GNEISS GRADING INTO FSP-QTZ-HBL-BTE GNEISS (XENOLITHS OF LATTER?)
	Tr. QTZ-CHL-EP.	3660-70': LIGHT GRAY, F XLINE, FELSIC. QTZ-FSP-BTE.
3670'	Tr. CALCITE	5-7% QTZ. MONZ. GNEISS | W/ ONLY 10% TL. MAFICS. PROB. U 3% LEUCOCRATIC. GRANITE.
		3670-80': SAME AS W/ PROBABLY 10-15% M.XLN. BTE. HBL. QTZ. MONZ. GNEISS AS ABOVE. ALSO 10-15% MED. XLN. LEUC. GRANITE.
3680'		
	① CALCITE	3680-90': SAME AS ABOVE
3690'	Tr. CALCITE CHLOR.	
		3690-3700': SAME AS ABOVE W/ ± 25-30% MED.-XLINE LEUCOCRATIC GRANITE.
3700'	① CALCITE	PERHAPS 30% BTE-HBL. QTZ. MONZ GNEISS. THIS GRADES INTO F-M XLINE BTE-HBL-FSP-QTZ. GNEISS. Tr.(3)
		3700-3710': SAME AS ABOVE
3710'	① CALCITE	

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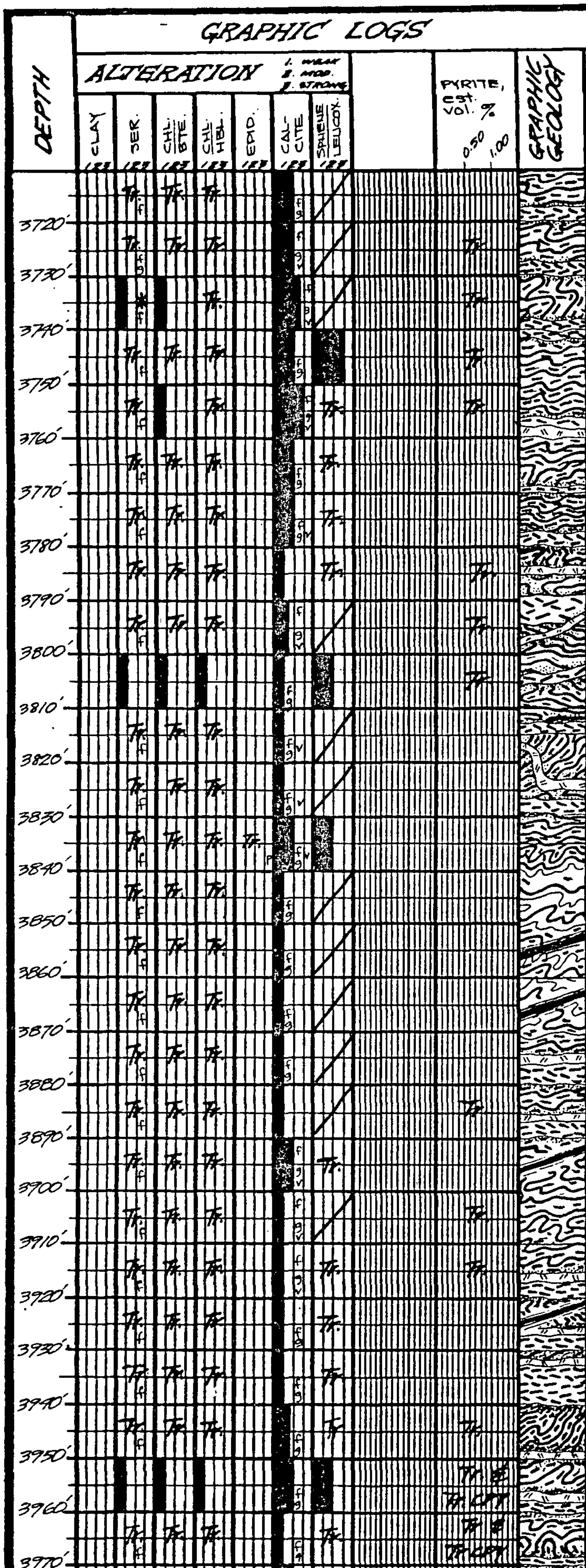
GRAPHIC LOGS



VEINLETS

Tr. TRACE
1. WEAK
2. MOD.
3. STRONG

DESCRIPTIONS

LOGGED BY
J. B. HULEN
AUGUST 1978

VEINLETS	DESCRIPTIONS
	3710-20': FSP-QTZ.-HBL.-BTE GNEISS F.-MED. XLINE, "SALT & PEPPER" TEXTURE. MOSTLY UNALT. EXC. FOR CALCITE. POSS. TR. SILLIMANITE. 15-20% (?) BTE. HBL. QTZ. MONZ GNEISS, M. XLINE Tr. (S)
(1) CALCITE	3720-30': NO SILL. ONE FRAG QTZ-SERI-CITIZED FLT. GOUGE 15-20%
Tr. ALT. MICRODIORITE	BTE-HBL. QTZ. MONZ. GNEISS, MED.-XLINE, W/ 15-18% HBL., 3-5% BTE. NO SPHENE.
(2) CALCITE	3730-40': SAME AS ABOVE, EXC. ~7% LEUC. MED.-XLINE GRANITE. ONE 7 mm. CHIP MOSTLY CHLORI-
	also 15% FSP-QTZ-BTE-HBL. GNEISS — TIZED MED.-XLINE BTE. + CHLTZD. AMPHIBOLE. PLAG. IN GRANITE SELECTIVELY SERICITIZED. *
	3740-50': SAME AS 3710-20': NO SILL. APPEARANCE Tr.(S)
	W/10-15% QTZ MONZ. GNEISS? — OF SPHENE, MOSTLY ALT. TO LEUCOXENE & CALCITE.
(2) CALCITE	3750-60': SAME AS ABOVE — MORE MAFIC RICH. SPHENE FRESHER.
Tr. PYRITE.	15% MED.-XLN. LEUC. GRANITE ONE GRAIN PYRITE 2 mm. DIA. Tr.(S)
	3760-70: SAME AS ABOVE W/ 5-7% MED.-XLN. LEUC. GRANITE ~10% MED.-XLN. BTE. HBL. QTZ MONZ. GNEISS, AS 3720-30'
(1) CALCITE	3770-80': SAME AS ABOVE W/ 2-3% MICRODIORITE, 5-7% LEUC. GRANITE. AVG.
	20% BTE-HBL QTZ MONZ. GNEISS — XL SIZE OF GNEISS APPARENTLY INCREASING. Tr.(S)
	3780-90': 30% BTE-HBL.-QTZ. MONZ. GNEISS, 35% QTZ.-FSP-BTE GNEISS, REMAINDER F.-XLN. GRANITE. Tr.(S)
(1) CALCITE	3790-3800': 25% BTE.-HBL.-QTZ MONZ. GNEISS, MED-CRS. XLN. 10% LEUC. FN.-MED. XLINE GRANITE. 2% MICRODIORITE, REMAINDER QTZ.-FSP-BTE GNEISS, SAME AS 3710-20'.
	3800-10': 15% BTE.-HBL. QTZ. MONZ. GNEISS. Tr.-1% MICRODIORITE. REMAINDER SAME AS 3710-20' WELL-DEVELOPED SILLIMANITE (FIBROLITE) PRESENT. Tr.(S)
	3810-20': 10% F.-MED. XLINE GRANITE OR ALASKITE. Tr. MICRODIORITE, 12-13% BTE. HBL. QTZ. MONZ.
Tr. CALCITE	Tr. MICRO-DIORITE — GNEISS. REM. SAME AS 3710-20'. Tr.(S)
	3820-30': SAME AS ABOVE, W/ 20-25% MED. XLINE LEU-COCRATIC GRANITE, 15% QTZ. MONZ. GNEISS
Tr. CALCITE	Tr. MICRODIORITE.
(1) CALCITE - 1 frag 1.5 mm. wide	3830-40': 15% GR., OTHERWISE SAME AS ABOVE, W/ ~10% QTZ. MONZ. GNEISS Tr.(S)
	3840-50': LT. COLORED, F.-XLN., QTZ.-FSP.-BTE GNEISS W/ 12-13% TL MAFICS, CRUDE FOLIATION POSS. Tr. LEUC. F.-XLN. GRANITE
	3850-60': SAME AS ABOVE. W/ SLIGHTLY MORE HBL. (1-3%?)
	5% MXL. GRANITE. — Tr. RED-BROWN TRANSLUCENT GARNET <1 mm. DIA. Tr.(C)
MINOR FLT.	3860-70': SAME AS ABOVE W/ 25-30% MED-XLINE QTZ. & KSPAR CHIPS (FROM LEUCOGRANITE?)
	3870-80': SAME AS ABOVE FOR 50% OF SAMPLE. THEN MAYBE 10-15% GRANITE & 40-35% MED. XLINE BTE. HBL. QTZ. MONZ. GNEISS. W/ 15% (?) HBL & <3% BTE.
	3880-90': SAME AS ABOVE, EXC. MAFICS INCREASING. 20-25% (?) QTZ. MONZ. GNEISS 15% (??) GRANITE REMAINDER FELSIC GNEISS
(1) CALCITE	3890-3900': SAME AS ABOVE. W/ 5-7% (?) QTZ MONZ. GNEISS 5-7% GRANITE, MED.-XLINE
	3900-3910': SAME AS ABOVE, PROB W/ ~5% F-M XLN. LEUCOCRATIC GRANITE
Tr. CALCITE	PERHAPS 10% QTZ. MONZ. GNEISS
	3910-20': SAME AS ABOVE W/ 20-25% (?) M-XLN. BTE. HBL. QTZ. MONZ GNEISS, SAME AS 3720-30'.
	Tr. ALT. MICRODIORITE — 10-15% (??) GRANITE, AS ABOVE. REMAINDER F-M. XLINE FSP-QTZ-HBL-BTE. GNEISS
MINOR FLT.	3920-30': SAME AS ABOVE.
Tr. QTZ-HEM-SER	3930-40': 70% MED.-XLINE BTE. HBL. QTZ. MONZONITE GNEISS SAME AS 3790-3800'. Tr. MICRODIO-
	POSS. TR BH IN HBL GNEISS — RITE. 10% (?) GRANITE, REMAINDER F-XLN QTZ.-FSP.-BTE-HBL. GNEISS SAME AS 3710-20'
Tr. QTZ.-CHL.-PYR. (BANDED)	3940-50': SAME AS 3710-20', BUT MORE MAFIC-RICH (5-10) GNEISS 10% LEUC. MED-XLINE GRANITE.
	3950-60': SAME AS 3940-50' W/ ~15% GRANITE (BTE. GR, F.XL LEUC.) Tr. MICRODIORITE. 15% MED-XLINE BTE-HBL. QTZ. MONZ. GNEISS, SAME AS 3720-30' REM. FSP-QTZ-HBL.-BTE GNEISS
	3960-70': SAME AS ABOVE. 10% QTZ. MONZ. GNEISS. 5-7% MED-XLINE LEUC. GRANITE Tr. MICRODIORITE, REMAINDER F-M. XLINE FSP-QTZ-HBL.-BTE GNEISS.
	3970-80: SAME AS ABOVE V. FELSIC (11-13% MAFICS) FSP-QTZ-BTE GNEISS. 5% GRANITE

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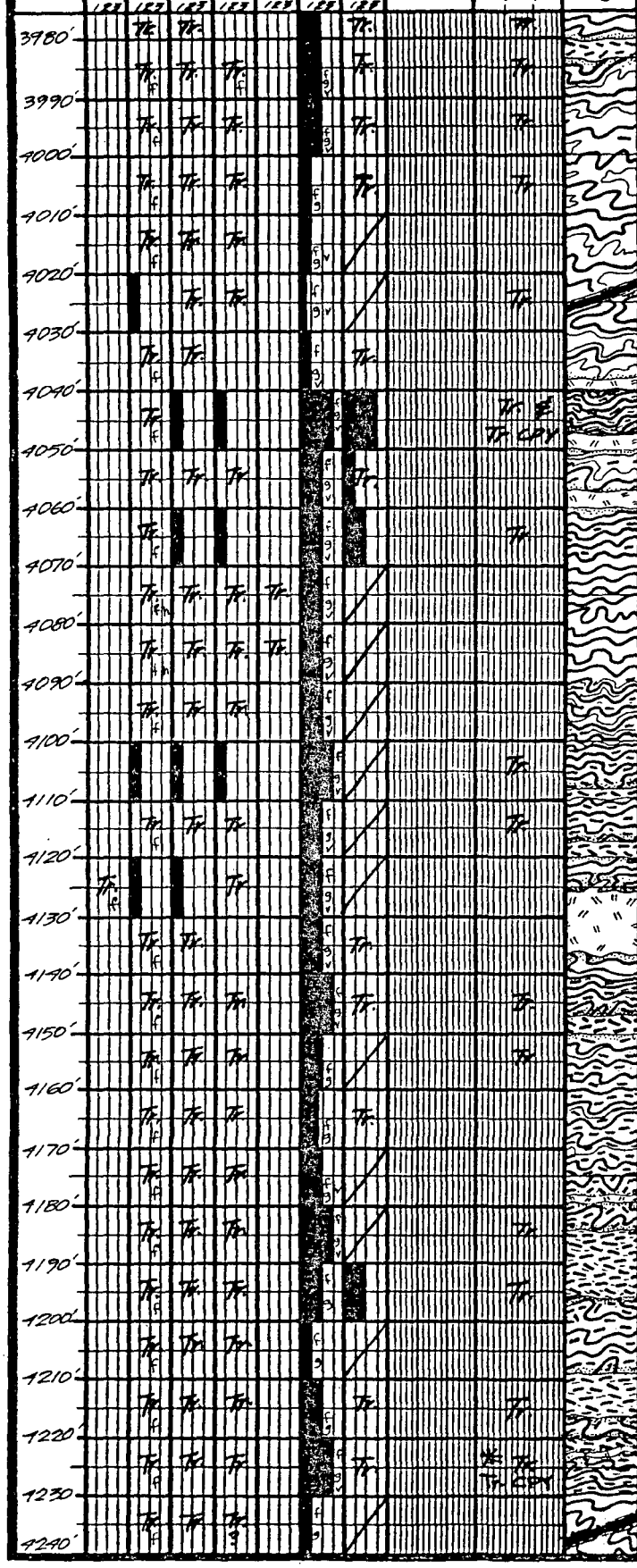
NOTE: MUCH OF THE MED.-XLINE GRANITE DESCRIBED ABOVE IS PROBABLY A FELSIC MIGMATITIC DIFFERENTIATE. SOME OF THE QTZ & KSPAR CHIPS COULD ALSO COME FROM COEXISTING BTE.-HBL. QTZ. MONZ. GNEISS

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY
J. B. HULEN
AUGUST 1978



VEINLETS	DESCRIPTIONS
	3980-90': 35% (?) FINE-MED. XLN. BTE. HBL QTZ. MONZ. GNEISS W/ AT LEAST 20% HBL, 5% BTE., Tr. SPHENE.
Tr. CALCITE	REMAINDER QTZ.-FSP.-BTE GNEISS W/ 15% TOTAL MAFICS — RX. IS F. XLN. W/ "SALT & PEPPER" TEXTURE.
	3990-4000': QTZ-FSP.-BTE GNEISS W/ MINOR HBL., F. XLN.,
Tr. CALCITE	< 10% MAFICS CRUDELY FOLIATED, "SALT & PEPPER." TEXTURE
	4000-4010': SAME AS ABOVE. FELSIC — < 10% MAFICS.
	4010-20': SAME AS ABOVE W/ 1-2% BTE.-HBL. QTZ. MONZ. GNEISS. 5-7% MED.-XLINE LEUC. GRANITE.
Tr. CALCITE	Tr. FIBROLITE. Tr. (3)
MINOR FLT.?	4020-30': SAME AS ABOVE. ONE FRAG. TOTALLY SHEARED.
Tr. CALCITE	Tr. FIBROLITE 5-7% M. XLN. BTE. HBL. QTZ. MONZ. GNEISS. 10% (??) M. XLN. LEUC. GRANITE Tr. (3)
	4030-40': SAME AS ABOVE W/ 10-15% (?) M. XLN. LEUC. GRANITE.
Tr. CALCITE	
	4040-50': SAME AS ABOVE, BUT MUCH MORE MAFIC-RICH (27-30%), CALCITE ALTN. INCREASES.
② CALCITE	ALSO W/ 20-25% MED-XLN. LEUC. GRANITE (?) Tr. FIBROLITE ONE SAMPLE. Tr. (3)
	4050-60': SAME AS 4030-40'. FELSIC-RICH AGAIN (9-11% MAFICS — 1-3% HBL. POSS. TR. M. XLN.
② CALCITE	BTE. HBL. QTZ. MONZ. GNEISS. 20% (??) MED. XLN. LEUC. GRANITE.
	4060-70': SAME AS 4030-40', BUT W/ 20% TL. MAFICS,
① CALCITE	5-7% QTZ. MONZ. GNEISS WHICH ARE MORE STRONGLY CHLTED.
Tr. CALCITE-EPIDOTE	4070-80': SAME AS ABOVE. IN A FEW FRAGS HBL.
① CALCITE	APP. ALT. TO CHL.-SER. PERHAPS 5-7% GRANITE Tr. (3)
Tr. EPIDOTE-CALCITE	4080-90': SAME AS ABOVE. PERHAPS 5-7% M. XLN BTE.
Tr. CALCITE	HBL. QTZ MONZ. GNEISS, 5-7% GRANITE
Tr. CALCITE-HEMATITE (IN MICROD.)	4090-4100': SAME AS ABOVE W/ Tr. MICRODIORITE (SELECTIVELY CHLTED. & SERICITIZED) & 5% MED.
5-7% QTZ. MONZ GN.	5-10%? → XLINE QTZ-KSPAR PEGMATITE OR ALASKITE
② CALCITE	4100-4110': SAME AS ABOVE W/ 3% ? MED.-XLINE GRANITE (?) OR QUARTZOFELDSPATHIC DIFFERENTIATE. & ≈ 10% MED.-XLN. BTE HBL. QTZ. MONZ. GNEISS, SAME AS 3780-3990
① CALCITE	4110-20': SAME AS ABOVE. PYRITE DISS., ASSOC. W/
SEE 3980-3990 → 15-20% QTZ. MONZ GNEISS	CHLTZN. OF BTE. 5-7% MXL. LEUC. GRANITE.
① CALCITE	4120-30': 40% MED.-XLINE LEUCOCR. GRANITE OR ALASKITE (?) OR MAY BE QUARTZOFELD- Tr. (3)
	SPATHIC DIFFERENTIATE IN GNEISS. REMAINDER FELSIC F. XLN QTZ.-FSP.-BTE GNEISS
① CALCITE	4130-40': SAME AS ABOVE W/ ≈ 60% GRANITE (?)
	Tr. (3)
① CALCITE	4140-50': GNEISS, F. XLN., "SALT & PEPPER" TEXTURE, W/ MINOR HBL. PERHAPS 3%
15-20% QTZ. MONZ GNEISS SAME AS 3980-90'	MED.-XLINE LEUC. GRANITE.
	4150-60': SAME AS ABOVE. SOME CHIPS QUITE RICH
≈ 17% MAFIC	IN HBL. — PERHAPS MINOR GRANITE & MINOR BTE. HBL. QTZ. MONZ. GNEISS.
	4160-70': SAME AS ABOVE. F-M XLN. FSP-QTZ-HBL-BTE. GNEISS ≈ 17% TL. MAFICS.
	5% (??) M. XLN. LEUCOGRANITE ?
	4170-80': SAME AS ABOVE. W/ PERHAPS 10% LEUCOGRANITE,
① CALCITE	5-10% BTE. HBL. QTZ. MONZ. GNEISS, SAME AS 3980-90' DIFF. TO DISTINGUISH FR OTHER GNEISS
① CALCITE	4180-90': SAME AS ABOVE. INCREASING MAFIC % (20%) 60-70% M. XLN. BTE. HBL. QTZ. MONZ. GNEISS W/ ≈ 25% HBL.
	5-10% BTE. REMAINDER F.-M. XLN. FSP-QTZ. HBL. BTE GNEISS SAME AS 4160-70'
	4190-4200': SAME AS ABOVE, SPHENE Tr. ALT. TO LEUCOX.
	4200-10': SAME AS ABOVE W/ 10% QTZ. MONZ. GNEISS, 5% (?) M. XLN. LEUCOGRANITE. REMAINDER F-M. XLN.
	FSP-QTZ-HBL. BTE. GNEISS.
	4210-20': SAME AS ABOVE W/ 50-60% M XLN. BTE HBL. QTZ. MONZ. GNEISS, SAME AS 4180-90'. REMAIN-
	DER F-M. XLN. FSP-QTZ-HBL-BTE. GNEISS, SAME AS ABOVE.
Tr. CALCITE.	4220-30': 7% MED.-XLN. LEUCOGRANITE, Tr. APLITE. REMAINDER SAME AS ABOVE W/ 15% BTE HORN.
	GNEISS — 78% F-M XLN FSP-QTZ-BTE GNEISS.
	* ALSO TR. BORNITE IN QTZ. MONZ. GNEISS
	4230-40': QTZ-FSP.-BTE GNEISS, F. XLN., SAME AS 4140-4150'.
	≤ 1% HBL 15-18% TL. MAFICS. DISTINCTIVE "SALT & PEPPER TEXTURE

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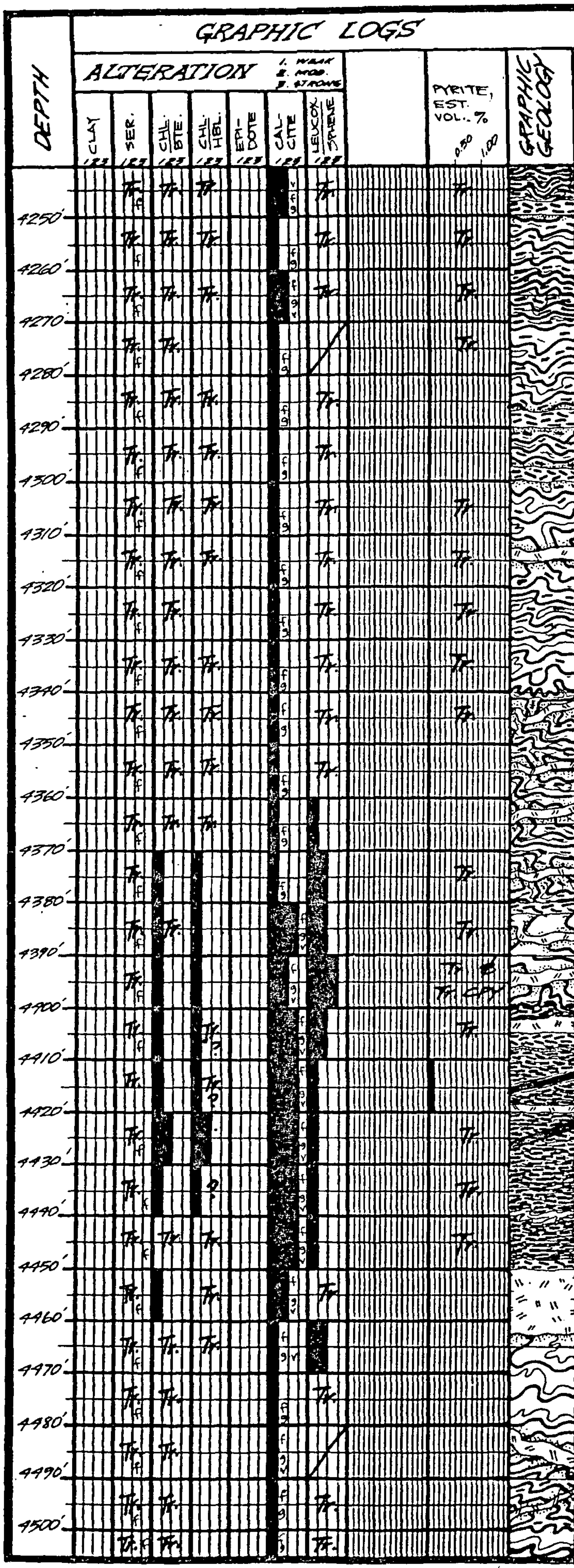
NOTE: MUCH OF THE MED.-XLINE LEUCOCRATIC GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS



DESCRIPTIONS

LOGGED BY
J.B. HULEN
AUGUST 1978

VEINLETS: Tr. TRACE, 1. WEAK, 2. MOD., 3. STRONG

VEINLETS	DESCRIPTIONS
① CALCITE	4240-50': FSP-QTZ-HBL-BTE. GNEISS, F. XLN., "SALT-AND-PEPPER" TEXTURE; MINOR HBL.; CRUDELY FOLIATED. 5-7% OF SMPL. IS MED.-CRS. XLINE LEUCOCRATIC GRANITE (OR QTZOFLDSPTHC. DIFF.) ≈20-25% QTZ. MONZ. GN.
	4250-60': F. XLN. FSP-QTZ-BTE GNEISS W/ ≈ 20% MAFIC (1-3% HBL)
① CALCITE	4260-70': SAME AS ABOVE W/ GREATER TL. MAFICS & HBL. 7-10% MED-XLN. LEUC. GRANITE. ≈5% QTZ. MONZ. GNEISS
	4270-80': SAME AS ABOVE, BUT ONLY 1-3% HBL. 2% GRANITE OR QF DIFFERENTIATE.
Tr. CHLOR.	4280-90': SAME AS 4240-50'; NO GRANITE & 20-25% QTZ. MONZ. GNEISS (SEE IMM. BELOW)
	4290-4300': SAME AS 4240-50'; " W/ ≈ 15% BTE-HBL-QTZ. MONZ GNEISS, M. XLN., W/ ≈ 25% HBL, 5% BTE.
	4300-10': SAME AS ABOVE W/ 1-3%? (PROB. 5-7%.) QTZ. MONZ. GNEISS.
	4310-20': 20% MED.-XLINE. GRANITE OR ALASKITE 5-10% BTE HBL. QM GNEISS REMAINDER SAME AS ABOVE
	4320-30': 5% GRANITE. REMAINDER SAME AS ABOVE. W/ 5-10% QTZ. MONZ. GNEISS (SEE 4290-4300')
	4330-40': SAME AS ABOVE W/ ≈ 15% QTZ. MONZ. GNEISS
	4340-50': 7-10% GRANITE(?) OR ALASKITE OR QUARTZOFELDSPATHIC METAMORPHIC DIFFERENTIATE. 5% QTZ. MONZ. GNEISS. REMAINDER SAME AS ABOVE.
	4350-60': SAME AS ABOVE.
	4360-70': SAME AS ABOVE, EXC. 15% GRANITE (SEE 4340-50')
	4370-80': SAME AS ABOVE W/ 10% GRANITE (SEE 4340-4350')
Tr. CHLORITE ② CALCITE	4380-90': SAME AS ABOVE EXC. STRONG INCREASE IN CALCITIC ALTN. (SEE 4340-50') 15% QTZ. MONZ GNEISS
① CALCITE	4390-4400': SAME AS ABOVE W/ 20% GRANITE (SEE 4340-50') ≈5% QTZ. MONZ. GNEISS. CHALCOPYRITE EMBEDDED IN HBL CRYSTAL IN QTZ. MONZ. GNEISS
Tr. PYRITE ② CALCITE Tr. CHL.	4400-10': 25% MED.-XLINE GRANITE (LEUCO-) OR ALASKITE OR QUARTZOFELDSPATHIC METAMORPHIC DIFF. ≈ 25% MED-CRS.-XLINE BTE. HBL. QTZ. MONZ., SAME AS 4290-4300. REMAINDER FSP-QTZ-BTE-HBL. GNEISS. both vnlt. & diss. pyrite
② CALCITE Tr. PYRITE Tr. CHL.	4410-20': SAME AS ABOVE W/ 10% GRANITE, REMAINDER A GRADATION BETWEEN BTE. HBL. QTZ. MONZ. (M.-CRS XLN) GNEISS AND FSP-QTZ-BTE. HBL. GNEISS
② CALCITE ① CHL.	4420-30': SAME AS ABOVE W/ 3-5% GRANITE
① CALCITE	4430-40': SAME AS ABOVE. 90% OF SMPL. IS F-M XLN MAFIC RICH BTE-HBL. GNEISS W/ 35-40% HBL, 10-12% BTE. 10% OF SMPL. IS F XLN. FSP. QTZ-BTE GNEISS W/ ONLY ≈ 11-13% MAFICS.
① CALCITE	4440-50': SAME AS ABOVE, EXC. W 10-15% M.-CRS. XLINE BTE.-HBL. QTZ. MONZ. GNEISS, AS 4290-4300
② CALCITE	4450-60': >90% MED.-XLINE GRANITE (LEUCO-) OR ALASKITE. REMAINDER F-XLN. QTZ.-FSP.-BTE. (W/HBL) GNEISS, SAME AS ABOVE
Tr. CALCITE	4460-70': 25% GRANITE, SAME AS ABOVE. REMAINDER F. XLN. FELSIC (7% MAFICS) QTZ-FSP-BTE GNEISS.
	4470-80': GNEISS, SAME AS ABOVE W/ 10-15% GRANITE, 5-10% BTE-HBL. QTZ. MONZ. GNEISS
Tr. CALCITE	4480-90': 20% GRANITE OR ALASKITE, SAME AS 4400-10' REMAINDER F. XLN. QTZ-FSP.-BTE. GNEISS.
	4490-4500': SAME AS ABOVE W/ 10% GR. OR ALASKITE.
	4500-10': FELSIC, F.-XLN. QTZ-FSP.-BTE GNEISS QTZ-RICH, DISTINCTLY FOLIATED

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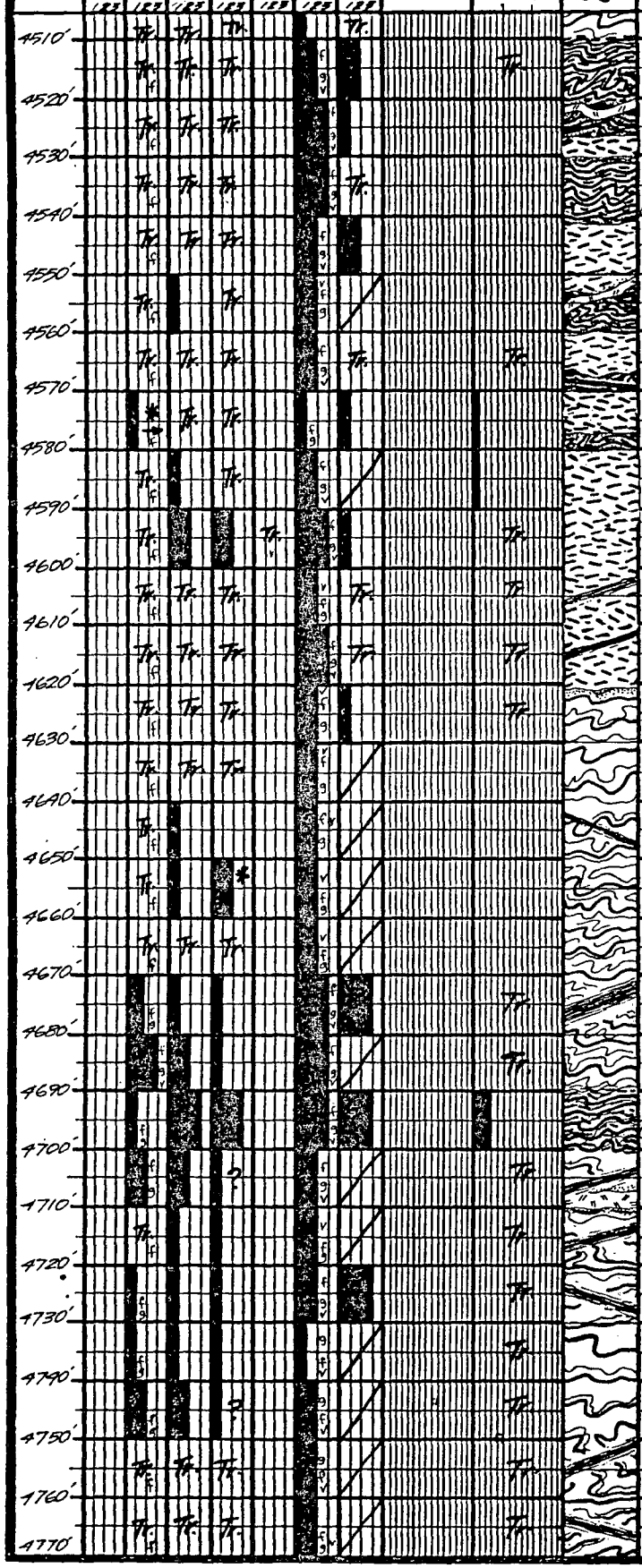
NOTE: MUCH OF THE MED.-XLINE LEUC. GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY
J. B. HULEN
AUGUST 1978



VEINLETS	DESCRIPTIONS
	HBL.
① CALCITE	4510-20': FINE-MED.-XLN. QTZ.-FSP.-BTE. GNEISS W "SALT-AND PEPPER" TEXTURE; CRUDELY FOLIATED.
Tr. CHL.	5-7% QTZ MONZ. GNEISS. CALCITE W/ ≈ 1% SPHENE PTLY. ALT. TO LEUCOXENE &
① CALCITE	4520-30': SAME AS ABOVE W/ ≈ 10% MED.-XLINE GRANITE
Tr. CHL.	15-20% QTZ MONZ. GN. (LEUCOGR.) OR ALASKITE (OR QUARTZOFELDSPATHIC METAMORPHIC DIFFERENTIATE.
Tr. CHL.-SER. Tr. QTZ-CHL.	4530-40': FINE-MED. XLINE QTZ-FSP.-HBL-BTE. GNEISS, ESSENTIALLY SIMILAR TO 4510-20'. 5%
Tr. CHL. ② CALCITE	GRANITE, SAME AS ABOVE.
	4540-50': 15% QTZ-FSP-HBL.-BTE. GNEISS, AS ABOVE, W/ "SALT-AND PEPPER" TEXTURE. REMAINDER BTE.-HBL
① CALCITE	QTZ. MONZ. GNEISS(?), MED.-XLINE, W/ ≤ 5% BTE, ≈ 25% HBL. 1% SPHENE ALT TO LEUCOXENE
① CALCITE	4550-60': 25% QTZ. MONZ. GNEISS, AS ABOVE. 10% LEUCO-GRANITE OR ALASKITE, SAME AS 4520-30'.
	REMAINDER "SALT-AND-PEPPER" QTZ-FSP-BTE. GNEISS, SAME AS 4510-20'
Tr. BANDED QTZ.-CAL-CITE-HEMA-TITE	4560-70': 65% BTE.-HBL.-QTZ. MONZ. GNEISS, SAME AS 4540-50'; APP. NO SPHENE, HOWEVER
	5-7% GRANITE, SAME AS 4520-30': REMAINDER F.-XLN. QTZ.-FSP-BTE GNEISS.
FLT.?	4570-80': 5-7% GRANITE. ?% (?) BTE.-HBL. QTZ. MONZ. GNEISS. REMAINDER F. XLN. QTZ-FSP.-BTE.-HBL. "SALT-AND-PEPPER" GNEISS. Tr. HEMATITE STAIN.
	* FSPS. IN LEUCOGRANITE SELECTIVELY SERICITIZED.
	4580-90': 5% BTE.-HBL. QTZ. MONZ. GNEISS, SAME AS 4540-50'. REMAINDER F. XLN. QTZ-FSP.-BTE
Tr. CALCITE	GNEISS, SAME AS 4510-20'.
① CHL. ② CALCITE	4590-4600': ?% BTE.-HBL QTZ. MONZ. GNEISS, SAME AS 4540-50'. 5% GRANITE, SAME AS 4520-30'.
Tr. CHL-EP.	REMAINDER F.-MED. XLINE QTZ-FSP. BTE. GNEISS, SAME AS 4510-20'.
Tr. PYRITE	4600-4610': >90% QTZ. MONZ. GNEISS, SAME AS 4540-50'
① CALCITE	
	4610-20': 50-60 % QTZ. MONZ. GNEISS, SAME AS 4540-50' 5-7% GRANITE, SAME AS 4520-30'
② CALCITE	ALSO MINOR MXLN BTE XLS — REMAINDER F.-MED. XLINE QTZ-FSP.-BTE GNEISS W/ "SALT & PEPPER" TEXTURE.
① CALCITE	4620-30': LITH. CHANGE: ALL F. XLN., FELSIC, "SALT &
	PEPPER QTZ-FSP-BTE GNEISS, SAME AS 4510-20, BUT W/ FEW MAFICS (1-2% T.)
① CHL. ② CALCITE	4630-40': SAME AS ABOVE W/ ≈ 3-5% MED.-XLINE GRA-
MINOR CAL. PLAG. → Tr. BTE-HBL QM GNEISS	NITE OR ALASKITE. MINOR CHL./PLAG (?)
① CALCITE	4640-50': SAME AS ABOVE. W/ 7-10% GRANITE.
① CALCITE	4650-60': SAME AS ABOVE W/ < 1% BTE. HBL. QTZ. MONZ SAME AS 4540-50'
Tr. CHL	* < 0.3% HBL. IN ROCK. GNEISS
① CALCITE	4660-70': SAME AS ABOVE. 7-10% (?) MED.-XLN. LEUC. GR.
Tr. CHL.	3-5% BTE. HBL. QTZ. MONZ. GNEISS.
① CALCITE	4670-80': SAME AS 4620-30'. FAIRLY STRONG SERICITI-ZATION OF FLT. GOUGE. STRONG CALCITIC
Tr. CHL-SER.	ALTERATION.
	4680-90': SAME AS ABOVE. BTE. APPEARS TO BE PARTIALLY SERICITIZED AS WELL AS
① CALCITE	CHLORITIZED. Tr. DISS. PY.
① CHL.	4690-4700': F. XLN. QTZ-FSP-HBL-BTE. GNEISS W/ "SALT & PEPPER" TEXTURE. STRONGLY ALTERED
② CALCITE	W/ ABUND. (RELATIVELY MOSTLY W/ STRONGEST) DISS. PYRITE. ASSOC. ALTN.
Tr. CHL.	4700-4710': SAME AS 4620-30'. STILL STRONGLY
① CALCITE	20-25% LEUCOGRANITE? ALTERED.
① CALCITE	4710-20': SAME AS
	F-M XLN FSP-QTZ-BTE GNEISS W/ MINOR HBL (≈ 15% TOTAL MAFICS
① CHL.-CALCITE	4720-30': SAME AS ABOVE W/ 5% MED.-XLINE. LEU-COCRATIC GRANITE OR ALASKITE
① CALCITE	
	4730-40': SAME AS ABOVE. 5-7% MXLN. BTE. HBL. QTZ. MONZ. GNEISS, SAME AS 4540-50'
Tr. CALCITE	ALSO 10% (?) MED. XLN. LEUCOCRATIC GRANITE.
	4740-50': SAME AS ABOVE W/ Tr. GRANITE, SAME AS
Tr. CALCITE	4720-30'. & Tr. QTZ. MONZ. GNEISS.
	4750-60': SAME AS ABOVE. ALTN. DECREASING.
① CALCITE	Tr. QTZ. MONZ. GNEISS
	4760-70': SAME AS ABOVE. 5% MED-XLN. LEUCOGRANITE
① CALCITE	

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NOTE: MUCH OF THE GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

DESCRIPTIONS

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J. B. HULEN
AUGUST 1978

ALTERATION 1. WEAK 2. MOD. 3. STRONG

DEPTH | CLAY (1 2 3) | SER. (1 2 3) | CHL.-BTE. (1 2 3) | CHL.-HBL. (1 2 3) | EPI-DOTE (1 2 3) | CAL-CITE (1 2 3) | LEUCOX-SPHENE (1 2 3) | PYRITE, EST. VOL. % (0.50 1.00) | GRAPHIC GEOLOGY | Tr. TRACE 1. WEAK 2. MOD. 3. STRONG VEINLETS

DEPTH	VEINLETS	DESCRIPTIONS
	Tr. CHL.	4770-80': SAME AS 4760-70': F. XLN. QTZ.-FSP. BTE. GNEISS
	Tr. CHL.-CALC.	
1780'	① CHL.	4780-90': 5-7% MED.-XLINE LEUC. GRANITE. REMAINDER F.M. XLINE. BTE-HBL-FSP.-QTZ. GNEISS GRADING INTO
	② CALCITE Tr. QTZ.	M. XLINE BTE-HBL. QTZ. MONZ. GNEISS W/ 25% HBL, 2/30 Tr. calcite-hem. 5-10% BTE. ARBITRARILY @ 40% OF LATTER.
1790'		4790-4800': QTZ-FSP.-BTE.-HBL. GNEISS, FINE-XLINE, W ? % BTE, ? % HBL. THIS GRADES INTO
1800'	2/30: 3-5% MXL. LEUCOG.	MED-XLINE BTE.-HBL. QTZ. MONZ. GNEISS W/ 20-25% HBL., 5-10% BTE. SAY 40% LATTER.
	② CALCITE	4800-4810': 60% SAME AS ABOVE } 1% SPHENE ALT.
	Tr. PYRITE.	40% SAME AS 4760-70' } TO LEUCOXENE.
1810'	② CHLORITE-CALCITE	4810-20': SAME AS 4770-80'. ALTN. AS ABOVE.
	① CALCITE	F.M XLINE FSP-QTZ-HBL-BTE GNEISS W/ 11-13% BTE., 1-3% HBL. 5-10% BTE. HBL QTZ. MONZ. GNEISS Tr. (5)
1820'	① CALCITE	4820-30': SAME AS 4770-80': F. XLN. "SALT & PEPPER"
	Tr. CHLORITE	5-7% QTZ. MONZ GNEISS } QTZ.-FSP.-BTE. GNEISS. ALTN. AS ABOVE.
1830'	Tr. CALCITE	4830-40': SAME AS ABOVE. TR. DISS. PY.
		5-10% MXLN. BTE. HBL QTZ. MONZ. GNEISS 5% (??) LEUCOGRANITE.
1840'	Tr. CHL.	4840-50': SAME AS ABOVE W/ 2-3% MED.-XLINE GRANITE OR ALASKITE.
		APPARENTLY NO QTZ. MONZ GNEISS.
1850'	① CHLORITE	4850-60': 10% SAME AS ABOVE. REMAINDER. FINE-MED. XLINE BTE GRANITE. GR. CONTAINS 3-5%
	② CALCITE	FLAKY BTE. TOTALLY ALT. TO CHL. TR. BRICK RED HEM. IN FLT. GOUGE.
1860'	① CALCITE	4860-70': 5-7% BTE. GRANITE AS ABOVE. 15-17% (?) BTE.-HBL QTZ. MONZ. GNEISS, MED. XLINE, W/ 20-30%
	① CHL. Tr. CHL.-HEM.	HBL. ---- REMAINDER SAME AS 4820-30' PYRITE & CHALCOPYRITE ASSOC. W/ CHLTZD. BTE & CHL. VNLTS.
1870'		4870-80': 15% BTE.-HBL.-QTZ. MONZ. GNEISS, AS ABOVE. Tr. MICRODIORITE W/ ONLY ALTN. CHLTZN. OF MAFICS. Tr. DK. PURPLISH-GRAY DACITE OR ANDESITE PPY. REMAINDER SAME AS 4820-30'.
	Tr. CHL.-HEM.	
1880'	① CALCITE	4880-90': 35% MED.-XLN. BTE.-HBL. QTZ. MONZ. GNEISS AS ABOVE (LG. CLEARLY RECOGNIZABLE FRAGS.)
	Tr. QTZ.-EP.	Tr. MICRODIORITE. REMAINDER SAME AS 4820-30'.
1890'		4890-4900': 50% MED XLINE BTE.-HBL. QTZ. MONZ. GNEISS 5% (?) MED.-XLINE GRANITE, REMAINDER.
1900'	① CALCITE Sulf. assoc. w/chlorite.	F. XLINE QTZ.-FSP.-HBL.-BTE GNEISS W/ "SALT & PEPPER" TEXTURE.
		4900-4910': 35% QTZ. MONZ. GNEISS, AS ABOVE. 3-5% GRANITE. REMAINDER SAME AS 4820-30'.
1910'		
	Tr. CALCITE	4910-20': 30% QTZ. MONZ. GNEISS, AS ABOVE. REMAINDER SAME AS 4820-30'
1920'	Tr. CALCITE-CHLORITE	
	Tr. CALCITE	4920-30': SAME AS 4820-30 W/ 19% TL. MAFICS. ALTN. HAS DECREASED.
1930'	Tr. CHL.-CALCITE	
	Tr. CHL.	4930-40': SAME AS ABOVE W/ 5-7% MED.-XLINE LEUCOCRATIC GRANITE.
1940'	Tr. CHL.-CALCITE	ALSO 15-20% MED-XLINE BTE.-HBL. QTZ. MONZ. GNEISS.
		4940-50': QTZ-FSP.-BTE GNEISS, F. XLINE "SALT & PEPPER TEXTURE (11% TL. MAFICS) QUITE FELSIC. 20% MED.-XLN. LEUCOCRATIC GR. Tr. UNALTERED MICRODIORITE.
1950'		4950-60': GNEISS, SAME AS ABOVE. SERICITIZATION IN
1960'	LEUCOX. ASSOC. W/CHLTZN.	MORE THAN TRACES CONFINED TO < 2% OF CHIPS. } < 5% GM. GNEISS
		4960-70': GNEISS AS ABOVE. 1% MICRODIORITE, MOST UNALTERED (1 CHIP CHLTZD.) 5-10% MXLN. BTE. HBL. QTZ. MONZ. GNEISS & 15-20% (??) MED-XLN. LEUCOGRANITE.
1970'		4970-80': GNEISS, AS ABOVE. 7% GOUGE & BRECCIA
		5-7% QTZ. MONZ. GNEISS
1980'		4980-90': GNEISS, AS ABOVE. Tr. UNALT. MICRODIORITE W/ 5-7% QTZ. MONZ. GNEISS, 7-10% LEUCOGR.
1990'		Tr. MICRODIORITE.
	① CALCITE	4990-5000': GNEISS, AS ABOVE. Tr. UNALT. MICRODIORITE 1% SPHENE — MOSTLY FRESH W/ MINOR ALTN.
5000'	Tr. CHL.	TO LEUCOXENE (W/ 20-25% BTE-HBL QTZ. MONZ. GNEISS) & 7-10% LEUCOGRANITE
		5000-5010': "SALT-AND-PEPPER" QTZ.-FSP.-BTE. GNEISS FRESH SPHENE. 15% TL. MAFICS.
5010'	Tr. QTZ. MONZ. GNEISS	5-7% MED.-XLINE LEUCOCRATIC GRANITE OR ALASKITE.
		5010-20': GNEISS, SAME AS ABOVE. Tr. MED.-XLINE BTE-HBL-QTZ. MONZ. GNEISS, SAME AS 4860-70'.
5020'		Tr. UNALT. MICRODIORITE. Tr. (3)
		5020-30': SAME AS ABOVE. W/ 5-10% MXLN. BTE. HBL QTZ. MONZ. GNEISS, SAME AS 4770-4800'.
5030'	Tr. FIBROLITE ONE CHIP.	1-3% LEUCOGRANITE. Tr. (3)
		5030-40': SAME AS ABOVE. Tr. UNALT. MICRODIORITE. 5-10% QTZ MONZ. GNEISS.

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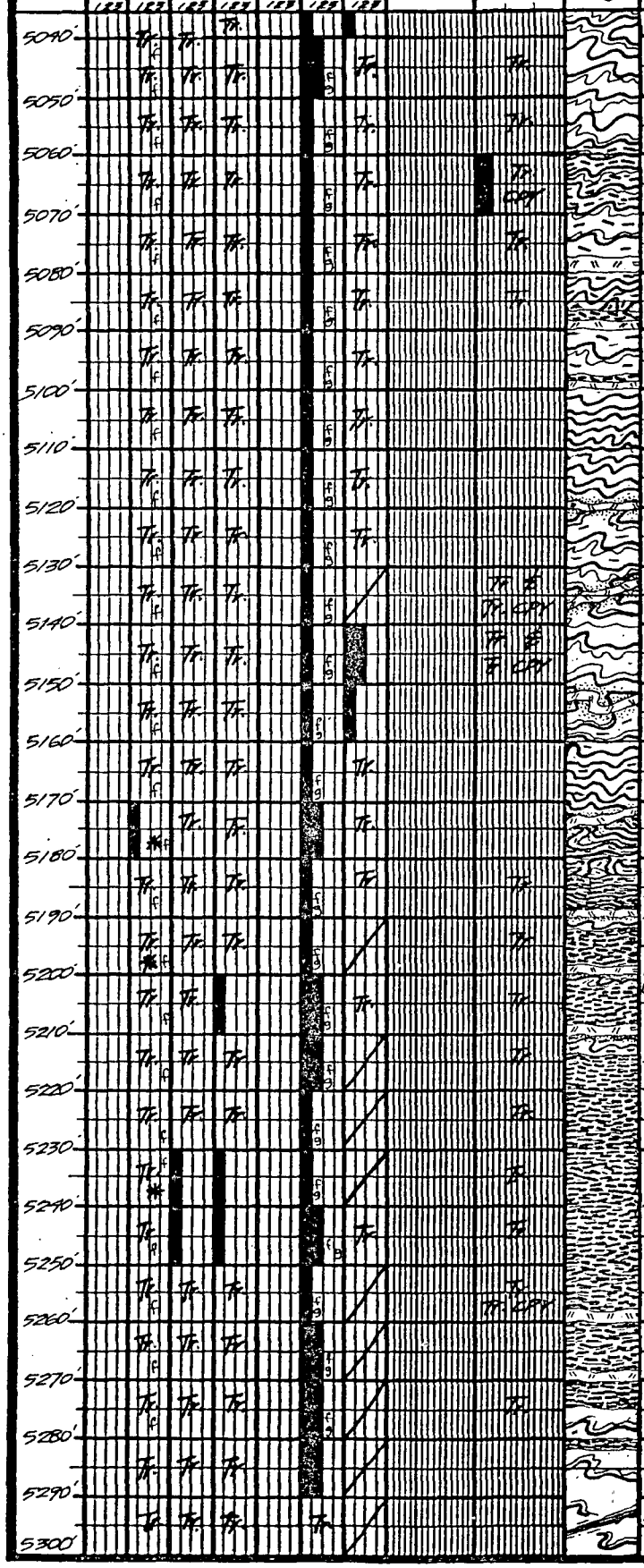
NOTE: MUCH OF THE MED-XLINE LEUCOGRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY
J. B. HULEN
AUGUST 1978



5040-5050': QTZ.-FSP.-BTE. GNEISS, FINE-XLN., "SALT-AND PEPPER" TEXTURE. 15% BTE. Tr. CHLTZD. TO Sphene pthy. ON. to Leucox. LEUC. GR. OR QTZOFELDSPATHIC DIFF.

5050-60': SAME AS ABOVE (GNEISS ONLY). SPHENE MOSTLY FRESH. 3-5% M.XLN. BTE-HBL. QTZ. MONZ. GNEISS

5060-70': GNEISS, SAME TEXTURE AS ABOVE, EXC. MORE MAFIC-RICH W/APPEARANCE OF 7% HBL.
COULD BE F.XL. EQUIV. OF BTE HBL. QTZ MONZ GNEISS IN PART | SPHENE FRESH (QTZ-FSP-HBL.-BTE. GNEISS)

Tr. PYRITE

5070-80': SAME AS 5040-50' W/ 20-25% ? MED-XLINE LEUCOGRANITE, 5-10% M. XLINE BTE. HBL. QTZ. MONZ. GNEISS.

5080-90': GNEISS, SAME AS 5060-70 W/4% HBL. | 10-15% QTZ. MONZ. GNEISS
10% MXL. LEUCOGR. | SPHENE FRESH. Tr. CHLTZD. MICRODIORITE.

10% MXL. BTE. HBL QTZ. MONZ. GNEISS
10% (?) LEUCOGRANITE

5090-5100': SAME AS 5040-50' (GNEISS) SPHENE FRESH.

5100-10': SAME AS 5040-50'. 3-5% (?) GRANITE
Tr. FIBROLITE. Tr (S)

5110-20': GNEISS, SAME AS 5040-50' W/ 10% MED-XLN. LEUCOCRATIC GRANITE OR ALASKITE (OR I QF DIFFERENTIATE. Tr (S)

UNKNOWN BANDED BUFF TRANSL.-OPAQ.

5120-30': SAME AS ABOVE W/7% GRANITE
POSS 1-5% BTE-HBL. QTZ. MONZ. GNEISS Tr (S)

Tr. QTZ-PY-CPY

5130-40': SAME AS ABOVE W/ 10-15% GRANITE.
Tr. FIBROLITE. Tr. MICRODIORITE Tr. (S)

Tr. CHL.

5140-50': SAME AS ABOVE W/ 10% GRANITE. 1%
Tr. FIBROLITE. Tr. MICRODIORITE Tr. (S)

5150-60': SAME AS ABOVE W/ 10-15% (?) GRANITE

5160-70': SAME AS ABOVE W/5-7% GRANITE. Tr. CHLTZD. MICRODIORITE.

5170-80': SAME AS ABOVE W/ ~10% GRANITE. Tr.
CHLORITIZED MICRODIORITE.
* fsps. in granite selectively sericitized-many moderately so

5180-90': 20% F.XLN. "SALT & PEPPER" GNEISS, AS ABOVE. REMAINDER MED.-XLINE MAFIC-RICH QTZ
10-15% MXL. LEUCOGR. | HBL-BTE. GNEISS NO DISCERNIBLE FOLIATION
~20% HBL., 20% BTE, BUT NO SPHENE

5190-5200' SAME AS ABOVE. 20% "SALT-AND-PEPPER" GNEISS

20-25% HBL 15-20% BTE → F.XLN. 10-15% (??) M.XLN. LEUCOGRANITE? REMAINDER MXL. BTE HBL QTZ. MONZ. GNEISS, V. MAFIC Tr (S)

(1) CHLORITE

5200-10': SAME AS ABOVE. QTZ. MONZ. GNEISS SHOWS CRUDE FOLIATION. 1% MICRODIORITE PORPHYRY & MICRODIORITE-½ CHIPS FRESH, ½ CHLTZD., ARGILLIZED(?). POSS. TR. GRANITE. Tr (S)

Tr. CHLORITE

5210-20': 35% "SALT & PEPPER" GNEISS, AS ABOVE. 1% MICRODIORITE, CHLTZD. W/1% DISS. PY. IN SEV.
5-7% ?? LEUCOGRNT. CHIPS. REMAINDER MED.-XLINE BTE. HBL. QTZ. MONZ. GNEISS, SAME AS 5180-90'. Tr (S)

Tr. QTZ.-PY.

5220-30': HBL. BTE. QTZ. MONZ. → GNEISS (?) SAME AS 5180-90' EXC. RICHER IN TL. MAFICS. <5%
5-7% ? LEUCOGRANITE "SALT & PEPPER" GNEISS. Tr. CHLTZD. MICRODIORITE W/DISS. PY

5230-40': SAME AS ABOVE. PY ASSOC. W/ CHLTZD & SERCTZD. CHIPS.
→ BUT F-M. XLINE >65% TL MAFICS. 5-7% (?) LEUCOGRANITE
* <1% OF CHIPS. STRONGLY SERICITIZED.

5240-50': SAME AS ABOVE W/ 7-10% QTZ & KSPAR CHIPS WHICH COULD COME FROM THE GNEISS OR FROM A LEUCOGRANITE. EST. 25-30% HBL. 20-25% BTE.

Tr. CHL.

5250-60': SAME AS ABOVE. W/ 15% LEUCOGRANITE (?)
Tr. MICRODIORITE.

5260-70': SAME AS ABOVE. A FEW CHIPS SHOW EXCELLENT FOLIATION.

5270-80': 40% (?) SAME AS ABOVE. REMAINDER QTZ.-RICH QTZ.-FSP.-BTE GNEISS W/ 5-7% BTE, >50% QTE., F. XLN.

5280-90': 10-15% BTE-HBL. QM. GNEISS, SAME AS 5180-90'. REMAINDER SAME AS ABOVE W/Tr. CHLTZD. MICRODIORITE.

5290-5300': 90% FELSIC GNEISS(??) EXTR. QTZ.-RICH ROCK W/ MINOR FSP & MAGNETITE, BIOTITE — F. XLINE.
Tr. BTE-HBL. GNEISS, AS 5180-90'. REMAINDER 5% "SALT-AND-PEPPER" QTZ-FSP.-BTE. GNEISS

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NOTE: MUCH OF THE MED-XLINE LEUC. GRANITE DESCRIBED ABOVE COULD BE FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY J. B. HULEN AUGUST 1978

ALTERATION (1. WEAK 2. MOD. 3. STRONG): CLAY (123), SER. (123), GDL. BTE (123), CHL. HBL. (123), EPIDOTE (123), CALCITE (123), LEUCOX. SPHENE (123)

PYRITE, EST. VOL. % (.05D, 1.00)

GRAPHIC GEOLOGY

Tr. TRACE 1. WEAK 2. MOD. 3. STRONG

DEPTH	VEINLETS	DESCRIPTIONS
		5500-5310': SAME AS 5300-5290 — TOO QTZ-RICH TO BE GRANITE 5-7% BTE HBL. QTZ. MONZ. GNEISS, AS 5180-5190
5310'	① CALCITE	5310-20' SAME AS ABOVE EXC. MAFICS INCREASE ALSO 10-15% GRANITE Tr. ⑤
5320'	① CALCITE	5320-30': 7-10% SAME AS 5300-5310'. 5-7% MED.-XLINE GRANITE OR ALASKITE, REMAINDER IS F. XLINE QTZ-FSP-HBL.-BTE. GNEISS W/ ± 30% TL. MAFICS, ABUND. SPHENE Tr. Cordierite ? Tr. MICRODIORITE. 0.1% DISS. PYRITE Tr. ③
5330'	① CALCITE	5330-40' SAME AS ABOVE — ALL RX TYPES & PERCENTAGES * A FEW CHIPS GRANITE (?) STRONGLY SERICITIZED. Tr. ⑤
5340'	Tr. CALCITE	5350-40': SAME AS ABOVE Tr. ⑤
5350'		5350-60': SAME AS ABOVE EXC. MORE MAFIC, REL. MORE HBL. SPHENE DIMINISHES.
5360'	Tr. CHL.	NO GRANITE.
5370'	① CALCITE	5360-70': 30% F. XLN. QTZ-FSP-HBL.-BTE GNEISS, SAME AS 5320-30'. TR. CHLTD. MICRODIORITE — 2 CHIPS W/1-2% DISS. PYRITE. 10% MED. XLINE BTE. & HBL. 60% MED. XLINE QTZ, K-SPAR, PLAG (LEUCOGRANITE?)
	② CALCITE	5370-80': 30% MED.-XLINE GRANITE (CHIPS OF QTZ, K-SP. PLAG. W/ Tr. BTE MAGNETITE). TR. CHLTD. MICRODIORITE, REMAINDER FINE-MED. XLINE QTZ-FSP-HBL.-BTE GNEISS.
5380'	Tr. CHL.	
	② CALCITE	5380-90': 20% GRANITE, 80% GNEISS, Tr. MICRODIORITE, AS ABOVE.
5390'	Tr. CHL.	
	Tr. CHL-HEM. ① CALCITE	5390-5400': 30% GRANITE, 69% GNEISS, 1% MICRODIORITE, AS ABOVE. ALSO Tr. DACITE (?) PPY. PK. PURPLISH-GRAY W/ 5% EUH. PLAG. PHENOS AVG. < 0.2 mm. LENGTH
5400'		5400-10': SAME AS ABOVE
5410'		5410-20': 10% GRANITE, Tr. MICRODIORITE, 70% GNEISS, AS ABOVE, EXC. REL. % HBL. DECREASING, XL. SIZE DECREASING. Tr. ③
5420'	Tr. PYRITE	5420-30': 30% GRANITE. Tr. MICRODIORITE. REMAINDER QTZ-FSP-HBL. GNEISS, AS ABOVE. (BTE.) Tr. ③
5430'		5430-40': CHANGE: MED.-CRS. XLINE BTE GNEISS W/ 50% TL. MAFIC — 7% CRS-XLINE LT. GREEN MUSCOVITE? POSS. MINOR GREENISH CORDIERITE, Tr. GARNET. NO SPHENE ⑤?
5440'		5440-50'; MED-XLN. QTZ.-FSP.-BTE GNEISS W/ Tr. SILLIMANITE. PROB. 10% CORDIERITE. NO HBL. OR SPHENE. PROB. 5-7% GRANITE, MED-XLINE, LEUCOCRATIC. ⑤?
5450'		5450-60': SAME AS 5430-40', EXC. NO OBVIOUS CORDIERITE. ⑤?
5460'	Tr. CHL.	5460-70': SAME AS 5430-40', EXC. MORE FINELY XLINE, W/ MINOR FRESH SPHENE. W 5% MED-XLN
5470'	HBL. APPEARS AGAIN	GRANITE (LEUC.) OR ALASKITE OR QTZOFELD SPATHIC, METAMORPHIC DIFFERENTIATE. ⑤?
	Tr. CHL.	5470-80': SAME AS ABOVE. MINOR CHLTD. OF FSPS. SEVERAL COARSE SILLIMANITE XLS. Tr. MICRODIORITE (ONLY DISS. PY.) ⑤
5480'		5480-90': SAME AS ABOVE W/ 1% MICRODIORITE. ③
5490'		5490-5500': SAME AS ABOVE W/ 5% HBL., 30% BTE, 1% SPHENE Tr. DK. PURPLE-GRAY DACITE PPY. Tr. MICRODIORITE ⑤
5500'		5500-10': FINE-XLN. QTZ.-FSP.-BTE GNEISS W/ "SALT & PEPPER" TEXTURE. 3% LC. PCS. FAULT GOUGE (TO MED.-XLINE) W/ CHLORITE. MINOR MED.-CRS. XLINE BTE. Tr. GREENISH-GRAY CORDIERITE.
5510'	Tr. CHL.	5510-20': SAME AS ABOVE 3-5% MED.-XLINE. GR.
5520'	Tr. CHL.	5520-30': SAME AS ABOVE. 3-5% MED.-XLINE GR. ⑤?
5530'		5530-40': SAME AS ABOVE.
5540'		5540-50': SAME AS ABOVE. Tr. CHLTD. MICRODIORITE. 5% MED.-XLINE GRANITE. (LEUCOCRATIC) ⑤
5550'		5550-60': SAME AS ABOVE EXC. ABUNDANT SILLIMANITE. * < 0.5% OF CHIPS STRONGLY SERICITIZED. ⑤
5560'	Tr. CHL-SER.	5560-70': SAME AS ABOVE ③

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NOTE: MUCH OF THE MED-XLINE LEUCOCRATIC GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY J. B. HULEN AUGUST 1978

ALTERATION 1. WEAK 2. MOD. 3. STRONG

Tr. TRACE 1. WEAK 2. MOD. 3. STRONG

DEPTH	CLAY (2)	SER. (2)	CHL. BTE (2)	CHL. HBL. (2)	EPIDOTE (2)	CALCITE (2)	LEUCOXY. SPHENE (2)	PYRITE, EST. VOL. %	GRAPHIC GEOLOGY	VEINLETS	DESCRIPTIONS
5570'		Tr. f					Tr.				
										① CALCITE	5570-80': SAME AS 5560-70' ⑤
5580'		Tr. f	Tr.	Tr.			Tr.			① CALCITE	5580-90': QTZ-FSP-BTE GNEISS, F. XLN., "SALT & PEPPER" TEXTURE, 7% HBL. ABUNDANT SPHENE. 3% MED.-XLINE LEUC. GRANITE OR ALASKITE. ONE CHIP CRS.-XLN. CHL-SER(MUSC)-SILL. SCHIST. ⑤
5590'		Tr. f		Tr.				Tr.		Tr. CALCITE	5590-5600': SAME AS ABOVE EXC. NO SPHENE. ABUND. SILLIMANITE. PROP. MINOR CORDIERITE. Chl. ALSO AFTER FSPS. ⑤
5600'		Tr. f	Tr.			Tr.		Tr.			5600-10': SAME AS ABOVE W 3% TRANSL. BROWNISH-RED SUBHEDRAL GARNET UP TO 2 mm DIA. — AVG. < 0.3 mm. STILL ABUND. SILLIMANITE. ⑤⑥
5610'			Tr.					Tr.			5610-20': 60% MED.-XLINE. FRAGS OF QTZ, KSPAR — COULD BE LEUC. GRANITE OR ALASKITE OR * mostly m + granite FELSIC DIFFERENTIATE IN GNEISS. Tr. MICRODIORITE. REST F.XL. QTZ-FSP-BTE ⑤
5620'		Tr. f								Tr. CALCITE	5620-30': 10% GRANITE. 1% CHLTZD. MICRODIORITE. REMAINDER F.XLN. QTZ-FSP-BTE "SALT & PEPPER" GNEISS W/Tr. SILLIMANITE & CORDIERITE ⑤
5630'		Tr. f	Tr.	Tr.			Tr.				5630-40': QTZ-FSP-BTE GNEISS, F-M-XLN. Tr. SILLIMANITE & RED-BROWN GNT. < 0.1 mm ⑤⑤
5640'		Tr. f	Tr.	Tr.							5640-50': SAME AS ABOVE W/10% GRANITE SAME AS 5610-20'. Tr. CHLTZD. MICRODIORITE ⑤⑥
5650'		Tr. f	Tr.	Tr.			Tr.				5650-60': 10% GRANITE, SAME AS 5610-20'. REMAINDER F-M. XLINE.
5660'		Tr. f	Tr.	Tr.			Tr.				POSS. FLT. CONTACT WITH QTZ-FSP-BTE. GNEISS ABOVE (HIGH % GOUGE & BX. CHIPS IN SMPL. 5660-70': SAME AS ABOVE W/ < 3% GRANITE.
5670'		Tr. f	Tr.	Tr.		Tr.	Tr.	Tr.			5670-80': SAME AS ABOVE.
5680'		Tr. f	Tr.	Tr.		Tr.	Tr.	Tr.			* A FEW GR. CHIPS MOD. SERCTD.
		Tr. f	Tr.	Tr.		Tr.	Tr.	Tr.		Tr. CALCITE	5680-90': SAME AS ABOVE, EXC. HBL. DECREASING. 7% GRANITE OR FELSIC DIFFERENTIATE. Tr. ⑤
5690'		Tr. f		Tr.		Tr.		Tr.		Tr. CALCITE	5690-5700': SAME AS 5650-60'. HBL. INCREASING RELATIVE TO IMMED. ABOVE.
5700'		Tr. f		Tr.		Tr.		Tr.		Tr. CHL.	1% CHLTZD. MICRODIORITE. REL. % BTE. VS. HBL. VARIES WIDELY WITH INDIVIDUAL FRAGS. (2 EX. TYPES?) Tr ⑤
		Tr. f				Tr.		Tr.		Tr. CALCITE	5700-5710': SAME AS ABOVE W/23% HBL, 12% BTE.
5710'		Tr. f	Tr.	Tr.		Tr.		Tr.		Tr. CHLOR.	< 0.5% CHLTZD. INCR. IN DISS. SULFIDES. MICRODIORITE. 1% MED.-XLINE LEUC. GRANITE.
		Tr. f	Tr.	Tr.		Tr.		Tr.			5710-20': SAME AS ABOVE. NO MICRODIORITE. 1% GRANITE.
5720'		Tr. f	Tr.	Tr.		Tr.		Tr.		① CALCITE	Tr. ⑤
		Tr. f	Tr.	Tr.		Tr.		Tr.			5720-30': SAME AS ABOVE. TOTAL MAFICS DECREASING.
5730'		Tr. f	Tr.	Tr.		Tr.		Tr.		① CALCITE	Tr. MICRODIORITE.
		Tr. f	Tr.	Tr.		Tr.		Tr.			5730-40': SAME AS ABOVE W/5-7% GRANITE (SEE BELOW)
5740'		Tr. f	Tr.	Tr.		Tr.		Tr.			5740-50': SAME AS ABOVE W/1 10% LEUCOCRATIC GR., MED.-XLINE, Tr. MICRODIORITE. Tr. ⑤
5750'			Tr.	Tr.		Tr.					5750-60': SAME AS ABOVE. 3% GRANITE. Tr. MICRODIORITE. INCR. IN SERCTN. (GRANITE FRAGS SELECTIVELY SERCTD.)
5760'						Tr.	Tr.	Tr.			
5770'		Tr. f	Tr.	Tr.				Tr.			5770-80': (CHANGE) QTZ-FSP-BTE. GNEISS, F.-M.-XLINE, "SALT & PEPPER" TEXTURE. SPHENE DROPS OUT. ALTN. DECREASES.
5780'		Tr. f	Tr.	Tr.		Tr.	Tr.	Tr.			5780-90': SAME AS ABOVE. Tr. ⑤
5790'			Tr.?					Tr.		① CALCITE	5790-5800': SAME AS ABOVE, INCR. IN ALTN.
5800'		Tr. f	Tr.	Tr.		Tr.		Tr.		Tr. CHL.	Tr. ⑤
		Tr. f	Tr.	Tr.		Tr.		Tr.			5800-10': SAME AS ABOVE. HBL. INCREASING. Tr. ⑤
5810'			Tr.?					Tr.		② CALCITE	5810-20': SAME AS ABOVE. FeOx STAIN FROM ABUNDANT DRILL CUTTINGS Tr. ⑤
5820'		Tr. f				Tr.		Tr.		Tr. CHL.	Tr. MICRODIORITE 10% LEUCOCRATIC MED. XLINE GRANITE CHIPS. THESE SELECTIVELY MORE INTENSELY SERCTD.
5830'		Tr. f	Tr.	Tr.		Tr.		Tr.		① CALCITE	5820-30': SAME AS ABOVE. 2-3% GRANITE.

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NOTE: MUCH OF THE MED-XLINE LEUCOCRATIC GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY J. HULEN
AUGUST 1978

DEPTH	ALTERATION (1. WEAK 2. MOD. 3. STRONG) CLAY 123	SER. 123	CHL. BTE. 123	CHL. HBL. 123	EPIDOTE 123	CALCITE 123	LEUCOXENE SPHENE 123	PYRITE, EST. VOL. % 0.50 1.00	GRAPHIC GEOLOGY	Tr. TRACE 1. WEAK 2. MOD. 3. STRONG VEINLETS	DESCRIPTIONS
5840		Tr. f	Tr. f	Tr. f			Tr. f				5830-40': QTZ.-FSP.-BTE GNEISS, F. XLINE. "SALT & PEPPER" TEXTURE, 40% TL. MAFICS. 5% MED.-XLINE LEUC. GRANITE OR FELSIC DIFFERENTIATE IN GNEISS. Tr. CHLTRD. MICRODIORITE.
5850		Tr. f	Tr. f	Tr. f			Tr. f			② CALCITE	5840-50': SAME AS ABOVE, EXC. HBL-RICH (SAME AS 5650-5770'. 10% GRANITE
5860		* fg	Tr. f	Tr. f			Tr. f	Tr.			5850-60': SAME AS 5830-40'. 10% GRANITE (7)
5870		Tr. f	Tr. f	Tr. f			Tr. f	Tr. CPY.			5860-70': 25% MED.-XLINE LEUC. GRANITE OR ALASKITE. Tr. MICRODIORITE, CHLTRD, W/MINOR DISS. PY. REMAINDER SAME AS 5830-40'.
5880		Tr. f	Tr. f	Tr. f			Tr. f			① CALCITE	5870-80': (CHANGE): V. FELSIC F-XLINE QTZ.-FSP.-BTE GNEISS W/ONLY 1% BTE. CRUDE FOLIATION APPARENT. Tr. DISS. PY. & CPY.
5890		Tr. f	Tr. f	Tr. f			Tr. f				5880-90': MAFIC INCREASE (TO 35%) IN GNEISS. 5-7% GRANITE, AS 5860-70'.
5900		Tr. f	Tr. f	Tr. f			Tr. f	Tr.		② CALCITE	5890-5900': SAME AS ABOVE W/ 15% GRANITE.
5910		Tr. f	Tr. f	Tr. f			Tr. f	Tr.			5900-5910': SAME AS ABOVE W/ 10% GRANITE
5920		Tr. f	Tr. f	Tr. f			Tr. f	Tr.		Tr. POWDERY MAROON HEMATITE	5910-20': 10% SAME AS 5830-40' (GNEISS). REMAINDER F.-MED.-XLN. LEUCOCRATIC BTE. GRANITE.
5930	Tr. fg	Tr. fg	Tr. fg	Tr. fg			Tr. f			Tr. CHL.	Tr. ⑤ (< 0.5% BTE). CRUDE FOLIATION APPARENT— MAY BE FELSIC METAMORPHIC DIFFERENTIATE.
5940		Tr. f	Tr. f	Tr. f			Tr. f				5920-30': 15% GRANITE, AS ABOVE. Tr. MICROXLINE LT. GRAY RHYOLITE. REMAINDER MED.-CRS. XLINE.
5950		Tr. f	Tr. f	Tr. f	Tr. f		Tr. f				Tr. ⑤ QTZ-RICH QTZ-FSP-BTE. GNEISS W/ ABUNDANT FREE BTE. XLS., SOME REPLACED W/ FIBROLITE.
5960		Tr. f	Tr. f	Tr. f			Tr. f				5930-40': SAME AS ABOVE EXC. SL. DECREASE IN GRAIN SIZE. REMAINS V. QTZ. RICH.
5970		Tr. f	Tr. f	Tr. f			Tr. f				Tr. ⑤ A FEW FRAGS W/ JUST HBL. AS MAFIC. THESE ALSO REL. RICH IN SPHENE (ANOTHER DX. TYPE?)
5980		Tr. f	Tr. f	Tr. f			Tr. f				5940-50': GNEISS, QTZ.-RICH, SAME AS 5920-30', EXC. F—MED. XLINE & MUCH LESS BTE.
5990		Tr. f	Tr. f	Tr. f			Tr. f	Tr.			Tr. ⑤ 10% (?) GRANITE, SAME AS 5910-20'.
6000		Tr. f	Tr. f	Tr. f			Tr. f				5950-60': SAME AS ABOVE. GRAIN SIZE HIGHLY VARIABLE. ONE GRAIN W/ 1 mm. BRIGHT
6010		Tr. f	Tr. f	Tr. f			Tr. f				Tr. ⑤⑥ PINK ZIRCON. POSS. Tr. < 1 mm. RED-BROWN GARNET. POSS 5-7% GRANITE
6020		Tr. f	Tr. f	Tr. f			Tr. f			① CALCITE	5960-70': QTZ.-FSP-BTE. GNEISS, F.-MED. XLINE, QTZ-RICH MUCH W/ A "SALT & PEPPER" TEXTURE.
6030		Tr. f	Tr. f	Tr. f			Tr. f			Abund. Fibrolite	15% LEUC. BTE. GRANITE, SAME AS 5910-20' ③
6040		Tr. f	Tr. f	Tr. f			Tr. f				5970-80': SAME AS ABOVE. ABUND. SILLIMANITE & 1 1% ANH— SUBH. RED-BROWN GARNET.
6050		Tr. f	Tr. f	Tr. f			Tr. f			Tr. CALCITE	Abundant Fibrolite 10% GRANITE. * SPHENE IN ONLY 2 FRAGMENTS ⑤
6060		Tr. f	Tr. f	Tr. f			Tr. f				5980-90': SAME AS 5970-80'. POSS. TR. CORDIERITE. 0.5% GARNET ⑤
6070		Tr. f	Tr. f	Tr. f			Tr. f				5990-6000': SAME AS 5970-80' — NO GARNET ③
6080		Tr. f	Tr. f	Tr. f			Tr. f				6000-6010': SAME AS 5970-80'. Tr. CORDIERITE (TRANSL. BLUISH-GRAY, ANH., < 1 mm) 0.5% GARNET ③
6090		Tr. f	Tr. f	Tr. f			Tr. f	Tr.			

DEPTH	DESCRIPTIONS
6010	6010-20': SAME AS 5970-80'. FSPS. ALT. (NOT ALL FSPS.) TO LT. GRAY-GREEN WAXY MATERIAL — PROB. SER. W/ MINOR CHL., POSS. CLAY * → "CLAY" MAY BE F. XLN SER. Tr. GARNET ⑥③
6020	① CALCITE
6030	6020-30': SAME AS ABOVE. 5-7% GRANITE, AS 5910-20' Tr. GARNET ⑥⑤
6040	② CALCITE
6050	6030-40': SAME AS ABOVE. ROCK HAS CLOUDY GRAY-GREEN ASPECT. Tr. GARNET. ⑥⑤
6060	② CALCITE
6070	6040-50': QTZ.-FSP.-HBL.-BTE. GNEISS, F.-M. XLINE., "SALT & PEPPER" TEXTURE. BTE = HBL, TL. MAFICS 35%. ALTN. SAME AS 6010-20'. 3-5% GR.
6080	② CALCITE
6090	6050-60': SAME AS ABOVE W/ HBL. > BTE. ALTN. DECREASING
6100	Tr. CALC.-HEM.
	6060-70': 30% SAME AS ABOVE. REMAINDER GRANITE, SAME AS 5910-20'. STILL MINOR CHL./PLAG.
	Tr. QTZ.-CHL-HEM.
	6070-80': 40% GRANITE, AS ABOVE, REMAINDER F. XLN. REL. FELSIC QTZ.-FSP. BTE GNEISS, SAME AS 5960-70'. Tr. DK. GRAY DACITE (?)
	Tr. CHL.
	6080-90': 30% GRANITE, AS ABOVE. REMAINDER GNEISS, ALSO AS ABOVE.
	Tr. CALCITE
	② CALCITE
	6090-6100': 55-60% GRANITE, AS ABOVE; REMAINDER GNEISS, AS ABOVE.

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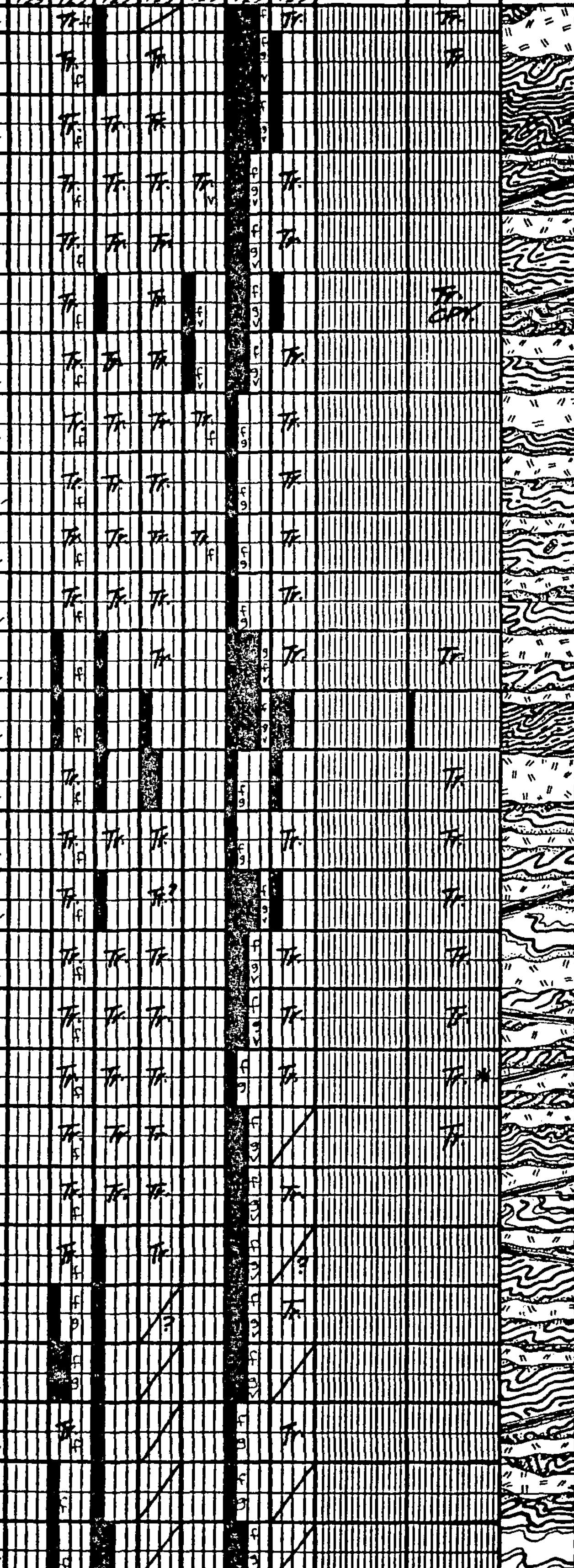
NOTE: MUCH OF THE LEUCOCRATIC GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY J. HULEN
AUGUST 1978

ALTERATION (1. WEAK 2. MOD. 3. STRONG): CLAY, SER., CHL. BTE., CHL. HBL., EPI-DOTE, CAL-CITE, LEUCOX. SPHENE — PYRITE, EST. VOL. % (0.50, 1.00) — GRAPHIC GEOLOGY



VEINLETS: Tr. TRACE, 1. WEAK, 2. MOD., 3. STRONG

DEPTH	VEINLETS	DESCRIPTIONS
6100'	① QTZ.-CHL. ② CALCITE	6100-10': 35% LEUCOGRANITE, MED.-XLINE, W/<0.5% BTE. REMAINDER QTZ.-FSP-BTE GNEISS W/MINOR
	Tr. HEM.	HBL — F. MED. XLINE — MANY PCS. HAVE "SALT & PEPPER" APPEARANCE.
6110'	① CALCITE	6110-20': 5% GRANITE, AS ABOVE. REMAINDER GNEISS, AS ABOVE, EXC. MUCH MORE
	Tr. CHL.	MAFIC-RICH, & W/MORE HBL. (5%)
6120'	Tr. CHL.-EPIDOTE	6120-30': 10-12% GRANITE, REMAINDER GNEISS } AS ABOVE
	① CALCITE	
6130'	Tr. CHL.	6130-40': 30-35% GRANITE, REMAINDER GNEISS } AS ABOVE.
	① CALCITE	
6140'	Tr. CHL.	6140-50': 10-12% GRANITE (?), REMAINDER FELSIC QTZ.-FSP.-BTE GNEISS W/MINOR HBL.
	① CALCITE Tr. EPIDOTE	STRONGEST EPIDOTE YET ENCOUNTERED — THIS PREF. DEVELOPED IN GRANITE FRAGS.
6150'	Tr. CHL. Tr. CALCITE	6150-60': 35-40% GRANITE, SAME AS 6100-10'. REMAINDER GNEISS, SAME AS 6100-10'.
	① EPIDOTE ←	ALSO TR. CALCITE-HEM.
6160'	Tr. CHL.	6160-70': 60-65% GRANITE, REMAINDER GNEISS EXC. Tr. CHLTZD. MICRODIORITE. } SAME AS 6100-6110'
6170'	Tr. CHL.	6170-80': 40-45% GRANITE, REMAINDER GNEISS } SAME AS 6100-6110'
		Tr. SILLIMANITE & GARNET Tr. MICRODIORITE. ⑥⑤
6180'	Tr. CHL.	6180-90': 25% GRANITE, REMAINDER GNEISS } SAME AS 6100-6110'. ⑥⑤
	Tr. MICRODIOR.	Tr. SILL., GARNET, 1 .05X1 mm. GRAY-GREEN (?) CORUNDUM.
6190'	Tr. HEM.	6190-6200': ALL SAME AS ABOVE. EXC. 1% MICRODIORITE
	ON MICRODIORITE	ONE PC. UNALT., OTHERS CHLTZD., SERCTZD. ⑤
6200'	② CALCITE	6200-10': 50% GRANITE, SAME AS 6100-10'. REMAINDER QTZ-FSP-BTE GNEISS, SAME AS
	Tr. CHL.	6100-10' W/NO HBL. (OR ONLY TRACES). SOME CHL. AFTER PLAG. ⑤
6210'	② CALCITE ② CALC.-HEM.	6210-20': 15% GRANITE. 1% MICRODIORITE. REMAINDER F. XLN. QTZ.-FSP.-BTE GNEISS W/MINOR HBL. &
	CHLORITE ① CHLORITE	REL. ABUND. SPHENE (5%) ALTN. IN CHIPS VARIES FROM WK.-STRONG. V. STRONG CALCITE ALTN. IIII ⑤
6220'		6220-30': 80% GRANITE, SAME AS 6100-10'. 1% MICRODIORITE. Tr. DACITE PPY. REMAINDER SAME AS ABOVE.
		ONE CHIP ⇒ MICROD → DACITE PPY ½ mm ⑤
6230'	Tr. CHL.-SER.	6230-40': 20% GRANITE. REMAINDER QTZ-FSP-BTE GNEISS, REL. FELSIC (15% MAFICS), F. XLN., "SALT-AND-PEPPER" TEXTURE. Tr. SILLIMANITE IN CRS.-XLINE BTE. ⑤
6240'	Tr. CHL.-SER.	6240-50': ?~30% GRANITE. REMAINDER GNEISS, AS ABOVE.
	② CALCITE	⑤
6250'	① CALCITE	6250-60': 50% GRANITE. Tr. MICRODIORITE. REMAINDER F.-MED. XLINE QTZ.-FSP.-BTE. GNEISS W/HIGHLY
	Abund. Fibrolite →	(IRON-STAINED) VARIABLE TOTAL MAFIC CONTENT. ONE ROUNDED ALLUVIAL GRAIN. ABUNDANT RUSTED STEEL ⑤
6260'	① CALCITE	6260-70': SAME AS ABOVE W/40% GRANITE, 60% GNEISS
	Abund. Fibrolite →	(IRON STAINED) → FR. RUSTING OF DRILL STEEL. ⑤
6270'		6270-80': 30% GRANITE, 1% MICRODIORITE } AS ABOVE (& Tr. DACITE PPY)
	Abund. Fibrolite →	(IRON-STAINED) REMAINDER GNEISS } MINOR CRS.-XLINE SILLIMANITE. ⑤
6280'	① CALCITE	6280-90': SAME AS IMMEDIATELY ABOVE.
	Abund. Fibrolite	(IRON-STAINED) ⑤
6290'	① CALCITE	6290-6300': 30% GRANITE, Tr. MICRODIORITE } SAME AS ABOVE
	Abund. Fibrolite →	(IRON-STAINED). REMAINDER QTZ-FSP-BTE. GNEISS — MINOR CRS.-XLN. SILLIMANITE. ⑤
6300'	① CALCITE	6300-10': 20% GRANITE, Tr. MICRODIORITE, REMAINDER GNEISS } SAME AS ABOVE.
	Abund. Fibrolite →	(IRON-STAINED) ⇒ ABUND. RUSTED DRILL STEEL. ⑤
6310'	Abund. Fibrolite	6310-20': ALL SAME AS ABOVE
	① CALCITE	(IRON-STAINED) INCREASE IN SERICITIZATION ⑤
6320'	Abund. Fibrolite	6320-30': 20% GRANITE. REMAINDER GNEISS, AS ABOVE, EXC. V. STRONG SILLIMANITE. CONTAMINATED
	① CALCITE	(IRON-STAINED) W/ABUNDANT CRS.-XLINE. WHITE MICA AND RUSTED DRILL STEEL. ⑤
6330'	Tr. CHL-SER.	6330-40': SAME AS DIRECTLY ABOVE.
		(IRON-STAINED) ⑤
6340'		6340-50': 35-40% (?) GRANITE, REMAINDER GNEISS } SAME AS 6100-10'.
	Abund. Fibrolite	(IRON-STAINED) ⑤
6350'	① CALCITE	6350-60': 5-7% (?) GRANITE., REMAINDER FELSIC QTZ.-FSP. BTE. GNEISS W/5-7% BTE. — V. QTZ.-RICH
6360'		⑤

GETTY OIL CO. DRILL HOLE 52-21
ROOSEVELT HOT SPRINGS KGRA

GRAPHIC LOGS

DESCRIPTIONS

LOGGED BY
J.B. HULEN
AUGUST 1978

ALTERATION 1. WEAK 2. MOD. 3. STRONG

DEPTH | CLAY | SER. | CHL. BTE. | CHL. HBL. | EPIDOTE | CALCITE | LEUCOX. SPHENE | PYRITE, EST. VOL. % (0.50 – 1.00) | GRAPHIC GEOLOGY | Tr. TRACE 1. WEAK 2. MOD. 3. STRONG VEINLETS

DEPTH	VEINLETS	DESCRIPTIONS
	Tr. CALCITE	6360-70': 15% (?) MED. XLN. LEUCOCRATIC BTE. GRANITE W/ < 0.5% BTE. REMAINDER F.-MED.-XLINE QTZ.-FSP.-BTE GNEISS, FELSIC (7% BTE), QTE-RICH. MINOR MED-CRS. XLN. BTE. WHITE MICA CONTAM. (3)
6370'	① CALCITE	6370-80': 10-15% GRANITE ? REMAINDER GNEISS } AS ABOVE.
		Tr. MICRODIORITE. MUSC. CONTAM. (5)
6380'		6380-90': 30% (?) GRANITE REMAINDER GNEISS } SAME AS 6360-70'.
		MUSCOVITE CONTAM. VARIABLE MAFIC CONTENT IN GNEISS. FEW CHIPS MED.-CRS.-XLINE BTE. W/ SILLIMANITE. (5)
6390'		6390-6400': 15-20% (?) GRANITE REMAINDER GNEISS } SAME AS 6360-70'.
		MUSCOVITE CONTAMINATION (LOST CIRCULATION MATERIAL)
6400'		6400-10': 30% GRANITE, SAME AS 6360-70'. 70% F. XLINE QTZ-FSP.-BTE GNEISS W/ MINOR HBL. —— "SALT & PEPPER TEXTURE". FSPS. IN GRANITE SELECTIVELY SERICITIZED.
		MUSCOVITE CONTAM.
6410'	Tr. SER.	6410-20': 35-40% GRANITE REMAINDER GNEISS } SAME AS 6400-10'. (5)
	① CALCITE	MUSCOVITE CONTAM.
6420'		6420-30': SAME AS ABOVE. MAFICS DECREASING IN GNEISS.
		MUSCOVITE CONTAM. (5)
6430'	Tr. SER.	6430-40': SAME AS ABOVE.
	Tr. CHL. & CALCITE	MUSCOVITE CONTAM. (5)
6440'		6440-50': SAME AS ABOVE.
		MUSC CONT (5)
6450'	Tr. SER.	6450-60': SAME AS ABOVE.
	Tr. CHL.	MUSC CONT. (5)
6460'	Tr. SER.	6460-70': 25% GRANITE, Tr. MICRODIORITE, REMAINDER GNEISS, SAME AS 6400-6410'. RATIO OF
	① CALCITE	MUSC. CONT. HBL. TO BTE. IS HIGHLY VARIABLE, BUT OVERALL BTE ≥ HBL.
6470'	① QTZ-HEM.	6470-80': 40% GRANITE, REMAINDER GNEISS, SAME AS ABOVE. NO SILL.
	Tr. CALCITE	MUSC. CONT.
6480'		6480-90': 60% GRANITE, REMAINDER GNEISS, AS ABOVE.
	Tr. CALCITE	MUSC. CONT.
6490'		6490-6500': SAME AS ABOVE.
	① CALCITE	MUSC. CONT.
6500'	Tr. QTZ-CHL.	6500-6510': 70% MED-XLINE BTE. GRANITE W/ < 0.5% BTE. REMAINDER P-H. XLN QTZ-FSP-BTE GNEISS
	Tr. CHL.	MUSC. CONT. W/ MINOR HBL. — QUITE FELSIC (< 15% TL. MAFICS — "SALT & PEPPER TEXTURE".
6510'	① CALCITE	6510-20': SAME AS ABOVE
		MUSC. CONT. (5)
6520'	② CALCITE	6520-30': 50% GRANITE, SAME AS 6500-10' REMAINDER F. XLN. QTZ-FSP-HBL. BTE GNEISS
	Tr. CHL-SER. Tr. EPID.	MUSC. CONT. V. SIMILAR TO GNEISS FR. 6300-10 BUT W/ GREATER MAFIC %
6530'	② CALCITE	6530-40': SAME AS ABOVE W/ 40% GRANITE (SOME W/ MED. XLINE, RANDOMLY-ORIENTED BTE. (ACCESSORY))
	Tr. EPIDOTE	MUSC. CONT. REMAINDER GNEISS, AS ABOVE.
6540'	① CALCITE	6540-50': SAME AS 6500-6510' W/ 65-70% GRANITE,
		MUSC. CONT. REMAINDER GNEISS. Tr. MICRODIORITE.
6550'	① CALCITE	6550-60': SAME AS ABOVE. ALSO Tr. APLITE
		MUSC. CONT.
6560'	① CALCITE	6560-70': 90% GRANITE, 60% GNEISS, AS ABOVE.
	Tr. CHL.-SER.	MUSC. CONT. VARIABLE MAFIC CONTENT IN GNEISS.
6570'	② CALCITE	6570-80': 20% GRANITE. REMAINDER, MAFIC-RICH QTZ-FSP-BTE GNEISS W/ ABUND. SPHENE,
		MUSC. CONT. F. XLN, CRUDELY FOLIATED
6580'	② CALCITE	6580-90': SAME AS ABOVE.
		MUSC. CONT.
6590'	① CALCITE	6590-6600': 80% GRANITE (W/ BTE.), MED. XLINE, AS ABOVE.
		REMAINDER F. XLN. QTZ.-FSP-BTE. GNEISS, AS MUSC. CONT. 6500-6510' (FELSIC)
6600'	Tr. CHL.	6600-10': 15% GRANITE, REMAINDER FINE-MED. XLINE QTZ-FSP-BTE GNEISS W/ VARIABLE
6610'	① CALCITE	MUSC. CONT. FELSIC/MAFIC RATIO
	Tr. QTZ-CHL-EPIDOTE	6610-20': SAME AS ABOVE, EXC. W 10-15% GRANITE
6620'	① CALCITE	MUSC. CONT.
		6620-30': 80% GRANITE, SAME AS ABOVE. REMAINDER GNEISS. ALSO AS ABOVE.

GETTY OIL CO. DRILL HOLE 52-21
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NOTE: MUCH OF THE GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE AND/OR A FELSIC GRANITIC GNEISS.

GRAPHIC LOGS

NOTE: MUCH OF THE GRANITE DESCRIBED BELOW COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

DESCRIPTIONS

NOTE: ALL SAMPLES THIS PAGE CONTAMINATED W/ COARSE-XLINE MUSCOVITE (LOST CIRCULATION MATERIAL)

ALTERATION 1. WEAK 2. MOD. 3. STRONG

PYRITE EST. VOL. % 0.50 1.00

Tr. TRACE 1. WEAK 2. MOD. 3. STRONG

DEPTH	CLAY	SER.	CHL/BTE	CHL/HBL	EPIDOTE	CALCITE	LEUCOX/SPHENE	GRAPHIC GEOLOGY	VEINLETS	DESCRIPTIONS
6630'		Tr.	Tr.	Tr.						
									① CALCITE	6630-40': 50% MED.-XLN. LEUCOCRATIC BTE. GRANITE (<0.50% BTE). REMAINDER FELSIC FINE-
6640'									Tr. QTZ-CHL.	XLN. QTZ.-FSP.-BTE. GNEISS W/ SALT & PEPPER TEXTURE. ALTN. & PYRITE INCREASE.
									② CALCITE	6640-50': SAME AS ABOVE; GNEISS HAS VARIABLE
									Tr. PYRITE Tr. QTZ-CHL.	FELSIC/MAFIC RATIO. SOME CHLTZN. OF FSP
6650'				Tr.					① CALCITE	6650-60': SAME AS ABOVE W/ 70% GRANITE, 30% GNEISS
									① CHLORITE	
6660'									① QTZ.-CHL.	6660-70': SAME AS 6630-40': 50% GRANITE 20% GNEISS
									① CALCITE	A FEW FRAGS OF QTZ.-CHL. VEINLET HAVE EUHEDRAL WATER-CLEAR QTZ. XLS (<0.5mm.)
6670'					Tr.				② CALCITE Tr. SER.	6670-80': SAME AS 6630-40': GNEISS 30% GRANITE
									Tr. QTZ-CHL.	80%
6680'					Tr.				① QTZ-CHL.	6680-90': SAME AS 6630-40': 50% GRANITE 50% GNEISS
									② CALCITE	STRONG MUSCOVITE CONTAMINATION. SPHENE ALTN. VARIABLE.
6690'									Tr. QTZ-CHL-PYRITE	6690-6700': SAME AS 6680-90': 70% GRANITE 30% GNEISS
					Tr.				② CALCITE	SPHENE ALTN. VARIABLE.
6700'									① EPIDOTE ② CALCITE	6700-10': SAME AS 6630-40': 50% GRANITE 50% GNEISS
									Tr. CHL.	STRONGEST EPIDOTE IN HOLE. THUS FAR
6710'		Tr.		Tr.					Tr. EPIDOTE	6710-20': SAME AS 6630-40': 70% GRANITE
									① CALCITE	30% GNEISS
6720'		Tr.		Tr.	Tr.		Tr.		Tr. EPIDOTE	6720-30': SAME AS ABOVE.
									① CALCITE	
6730'		Tr.	Tr.	Tr.	Tr.		Tr.		② CALCITE	6730-40': 25% GRANITE, 40% QTZ-FSP.-BTE. GNEISS, SAME AS 6630-40'. REMAINDER MED.-XLN
										BTE. HBL. QTZ. MONZ. GNEISS W/ 20% HBL.
6740'				Tr.					① CALCITE ① CALC.-CHL.	6740-50': 10% BTE. HBL. QTZ. MONZ. GNEISS 30% GRANITE } AS ABOVE.
									Tr. CHL.	REMAINDER QTZ-FSP.-BTE GNEISS }
6750'									② CALCITE	6750-60': 50% GRANITE 10% QTZ. MONZ. GNEISS }
		Tr.		Tr.	Tr.				Tr. CHL.	SPHENE ALTN. VARIABLE 40% QTZ.-FSP.-BTE. GNEISS } AS ABOVE
6760'									① CALCITE	6760-70': 60% BTE. HBL. QTZ MONZ. GNEISS 25% GRANITE
		Tr.	Tr.	Tr.					① EPIDOTE Tr. CHL	15% GNEISS, AS ABOVE (F.XL. QTZ.-FSP.-BTE.)
6770'									① CALCITE	6770-80': 7% BTE. HBL. QTZ. MONZ. GNEISS 10% F.XL. QTZ.-FSP.-BTE GNEISS } AS ABOVE.
		Tr.	Tr.	Tr.	Tr.				Tr. EPID. Tr. CHL	REMAINDER MED.-XLINE LEUC. GR. }
6780'									② CALCITE	6780-90': 5% QTZ. MONZ. GNEISS 20% F.XL. QTZ.-FSP.-BTE GNEISS } SAME AS ABOVE
		Tr.		Tr.	Tr.				Tr. CHL.-SER Tr. EPIDOTE	REMAINDER GRANITE }
6790'									① CALCITE	6790-6800': 1-2% QTZ. MONZ. GNEISS 7-10% QTZ-FSP-BTE GNEISS } AS ABOVE
		Tr.	Tr.	Tr.	Tr.		Tr.		Tr. CHL.	REMAINDER GRANITE.
6800'									① CALCITE	6800-10': 7% BTE. HBL. QTZ. MONZ. GNEISS 3-5% QTZ.-FSP.-BTE GNEISS }
		Tr.	Tr.	Tr.	Tr.		Tr.		Tr. CHL.	REMAINDER MED. XLN. LEUCOCRATIC BTE. GRANITE } AS ABOVE.
6810'									② CALCITE	1-3% BTE. HBL. QTZ MONZ. GNEISS 10% F.XL. QTZ.-FSP.-BTE. GNEISS } AS ABOVE
		Tr.	Tr.	Tr.	Tr.		Tr.			REMAINDER GRANITE
6820'				Tr.					① CALCITE	6820-30': 10% QTZ.-FSP.-BTE. GNEISS } AS ABOVE
									Tr. CHL.	REMAINDER GRANITE. (TR. QTZ. MONZ. GNEISS)
6830'				Tr.					① CALCITE	6830-40': 5% QTZ. MONZ. GNEISS (SEE 6760-70') 20% QTZ.-FSP.-BTE. GNEISS } AS ABOVE
									Tr. HEM. MAG.	REMAINDER GRANITE
6840'		Tr.		Tr.					① CALCITE	Tr. HI 6840-50': 10% BTE. HBL. QTZ. MONZ. GNEISS 15% QTZ.-FSP.-BTE GNEISS
									Tr. CHL.	Tr. HEM.-MAG. REMAINDER GRANITE.
6850'				Tr.					① CALCITE	6850-60': 25% F.XL. QTZ.-FSP.-BTE. GNEISS, Tr. QTZ. MONZ. GNEISS
									Tr. CHL.	REMAINDER GRANITE, AS ABOVE.
6860'				Tr.					Tr. CHL. Tr.-QTZ.-CHL.	6860-70': 7-10% BTE-HBL QTZ. MONZ. GNEISS 15-20% QTZ.-FSP.-BTE. GNEISS } AS ABOVE.
									Tr. QTZ-CALC. ② CALCITE	REMAINDER MED.-XLINE LEUCOCRATIC GR. }
6870'				Tr.	Tr.				② CALCITE	6870-80': 5% BTE.-HBL. QTZ. MONZ. GNEISS 20% QTZ.-FSP.-BTE. GNEISS } AS ABOVE
									Tr. EPIDOTE	Tr. HEM. REMAINDER GRANITE
6880'		Tr.	Tr.	Tr.			Tr.		① CALCITE	6880-90': Tr. QTZ MONZ. GNEISS 20-25% F-M-XLN. QTZ.-FSP.-BTE. GNEISS
6890'										REMAINDER- M-XLN LEUCOCRATIC BTE. GRANITE.

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LOCATION ROOSEVELT HOT SPRINGS KGRA.

LOGGED BY J. B. HULEN

AUG. 1978

GRAPHIC LOGS

DESCRIPTIONS

ALL SAMPLES CONTAMINATED W/ CRS.-XLINE MUSCOVITE ?

NOTE: MUCH OF THE MED-XLN. GRANITE DESCRIBED BELOW COULD BE A FELSIC MIGMATITIC DIFFERENTIATE

ALTERATION 1. WEAK 2. MOD. 3. STRONG

PYRITE, EST. VOL. % (.050 1.00)

Tr. TRACE 1. WEAK 2. MOD. 3. STRONG

DEPTH	CLAY (.125)	SER. (.125)	CHL-BTE. (.125)	CHL-HBL. (.125)	EPI-DOTE (.125)	CALC-ITE (.125)	LEUCOX/SPHENE (.125)	PYRITE	GRAPHIC GEOLOGY	VEINLETS	DESCRIPTIONS
6900'		Tr. 1	Tr. 1	Tr. 1		1		Tr.		Tr. CALCITE	6890-6900': 35-40% (?) F.-M.-XLN. QTZ.-FSP-BTE. GNEISS W/MINOR HBL — "SALT & PEPPER" TEXTURE.
										Tr. CHLORITE	REMAINDER MED.-XLN. LEUCOCRATIC BTE. GRANITE.
				Tr. 1						① CALCITE	6900-10': SAME AS ABOVE W/ 1% MED-XLN. BTE-HBL.
6910'										Tr. SERICITE	QTZ. MONZ. GNEISS (20-25% HBL, 1% SPHENE)
				Tr. 1				Tr.		Tr. SER.	6910-20': 30% F-M. XLN. QTZ.-FSP-BTE GNEISS W/MINOR HBL., TRACES SILLIMANITE. 3% QTZ. MONZ.
6920'										① CALCITE Tr. H-MEM.	Tr. HEM MAG. GNEISS (BTE.-HBL.). REMAINDER GRANITE AS ABOVE. (SILLIMANITE APPEARS) ⑤
			Tr. 1							① CALCITE Tr. SER.	6920-30': 40% F-M.XLN. QTZ-FSP.-BTE. GNEISS (Tr. SILLIM.) REMAINDER. MED-XLN. LEUCOCRATIC BTE. GR. ⑤
6930'											SPHENE ALTN. VARIES FR. V. WK. TO TOTAL LEUCOXENE BUT WEAK OVERALL (ST. JPH. ALTN. ASSOC. W/CHLTN.-MAFICS)
		Tr. 1	Tr. 1					Tr.		① CALCITE	6930-40': 60% QTZ.-FSP-BTE. GNEISS (Tr. SILL.) AS ABOVE. Tr. M. XLN. BTE. HBL. QTZ. MONZ. GNEISS
											REMAINDER GRANITE PT. ASSOC W/SER & CHL. ⑤
6940'										① CALCITE	6940-50': 15% (?) M.XLN. BTE. GRANITE 2-3% M.XLN. BTE.-HBL. QTZ. MONZ GNEISS.
											REMAINDER F-M.XLN. QTZ.-FSP.-BTE GNEISS W/MINOR HBL. VARIABLE FELSIC TO MAFIC RATIO. — Tr. SILLIMANITE ③
6950'			Tr. 1	Tr. 1						① QTZ-CHL-SER ± HEM.	6950-60': ALL SAME AS ABOVE.
										② CALCITE Tr. CHL.	⑤
6960'		Tr. 1	Tr. 1	Tr. 1				Tr.		① QTZ-CHL.	6960-70': ALL SAME AS ABOVE
										② CALCITE	⑤
6970'					Tr. 1					Tr. QTZ-CHL-SER ± HEM.	6970-80': 25% MED.-XLN. LEUCOCRATIC BTE. GRANITE. 1-3% MED. XLN. BTE. HBL. QTZ. MONZ. GNEISS.
6980'										② CALCITE Tr. EPIDOTE	Tr. QTZ. MICRODIORITE REMAINDER F-M. XLN. QTZ-FSP.-BTE GNEISS W/ ABUND. SILLIMANITE. MINOR PINK ZIRCON. ⑤
								Tr.		Tr. QTZ-SER Tr. QTZ-CHL	6980-90': 20% GRANITE, AS ABOVE. REMAINDER F-M. XLINE QTZ-FSP-BTE GNEISS W/MINOR HBL., Tr. GARNET
6990'										② CALCITE Tr. HEM.	& CORDIERITE, ABUNDANT SILLIMANITE. ⑤ ⑨ ⑩
								Tr.		Tr. SER ± QTZ. Tr. CHL.	6990-7000': 15% GRANITE, AS ABOVE. REMAINDER F-M. XLN QTZ.-FSP.-BTE GNEISS
7000'										② CALCITE	Tr. HEM. MAG. W/MINOR HBL. & SILLIMANITE ⑤
		Tr. 1	Tr. 1	Tr. 1				Tr.		① CALCITE ① CHL.	7000-7010': 20% MED. XLN. LEUCOCRATIC BTE. GRANITE (SILL.) 5-7% MED-CRS.-XLN BTE-HBL. QTZ. MONZ
7010'										Tr. SER	POSS. BORNITE GRAIN IN HBL GNEISS. GNEISS W/LG. HONEY YELLOW SPHENE. REMAINDER F.-M. XLN. QTZ.-FSP-BTE (± HBL.) GNEISS ③
		Tr. 1		Tr. 1				Tr.		Tr. SER.	7010-20': 10-15% GRANITE 5-7% BTE. HBL. QTZ. MONZ. GNEISS NO SILL.
7020'										② CALCITE ① CHL.	SPHENE EASILY OBSERVABLE REMAINDER F-M. XLN. QTZ.-FSP.-BTE GNEISS (ALL AS ABOVE) ⑤
					Tr. 1					② CALCITE Tr. CALC.-QTZ.-HEM.	7020-30': 10-15% GRANITE 10-15% BTE.-HBL. QTZ. MONZ. GNEISS
7030'										① CHL. Tr. ②	Tr. HEM. MAG. REMAINDER F.-M. XLN. QTZ.-FSP.-BTE. GNEISS W/MINOR HBL. & SILLIMANITE & MUSCOVITE ⑤
		Tr. 1		Tr. 1				Tr.		① CALCITE Tr. CHL.	7030-40': 10-15% GRANITE 5-7% BTE-HBL QTZ MONZ GNEISS (AS ABOVE)
7040'											REMAINDER F.-M.XLN. QTZ-FSP-BTE. ± HBL. GNEISS W/Tr. SILLIMANITE ⑤
		Tr. 1	Tr. 1	Tr. 1	Tr. 1			Tr.		② CALCITE Tr. CHL.	7040-50': 20-25% GRANITE, MED.-XLN 1-3% BTE.-HBL. QTZ. MONZ. GNEISS, M.XLN.
7050'											REMAINDER F-M. XLN. FSP-QTZ.-BTE. GNEISS W/MINOR HBL. & SILLIMANITE. ③
		Tr. 1	Tr. 1	Tr. 1	Tr. 1					② CALCITE ① CHL ± QTZ	7050-60': 15-20% MED. XLINE GRANITE 10-15% (?) MED.-XLINE. BTE. HBL. QTZ. MONZ. GNEISS
7060'										Tr. SERICITE	REMAINDER F-M.XLN. QTZ.-FSP-BTE. GNEISS W/MINOR HBL. & SILLIMANITE. ⑤
		Tr. 1		Tr. 1	Tr. 1			Tr.		② CALCITE Tr. SER-CHL	7060-70': 45% GRANITE Tr. QTZ. MONZ. GNEISS } AS ABOVE
7070'										Tr. QTZ-CHL Tr. EPIDOTE	Tr. HEM. MAG. REMAINDER F.-M.XLN. QTZ-FSP.-BTE. GNEISS ⑤
		Tr. 1				1		Tr.		Tr. CHL Tr. CALC.	7070-80': 15% F-M. XLN. FSP-QTZ.-BTE GNEISS REMAINDER M.XLN. LEUCOCRATIC GRANITE (<0.5% BTE.) ⑤
7080'										① CALCITE	7080-90': 30-35% (?) FELSIC QTZ-FSP.-BTE. GNEISS, SAME AS ABOVE EXC ONLY 11-15% MAFICS — RESEMBLES ③
		Tr. 1		Tr. 1				Tr.		Tr. SILL IN BTE-ROCK FRAGS	GRANITE IN SMALLER PCS. REMAINDER GRANITE. MED.-XLN., AS ABOVE. ③
7090'										① CALCITE	7090-7100': ALL SAME AS ABOVE EXC. GNEISS EVEN MORE FELSIC — 40-45% GNEISS & REMAINDER GRANITE (?) ③
7100'		Tr. 1		Tr. 1	Tr. 1			Tr.		① CALCITE Tr. SER.	7100-10': SAME AS ABOVE. 75% (?) 25% (?) GRANITE QTZ-FSP.-BTE GNEISS
7110'										Tr. CHL.-HEM. CALCITE	DIFFICULT TO DISTINGUISH GRANITE CHIPS FR. MAFIC.-POOR GNEISS CHIPS (W/Tr. SILLIMANITE & GARNET) ② ③
				Tr. 1						① CALCITE	7110-20': SAME AS ABOVE EXC. 55-60% GRANITE (?) REMAINDER GNEISS (?)
7120'										Tr. HEM-CALCITE	⑤
								Tr.		Tr. SER ± CHL	7120-30': 60% M.XLN LEUCOCRATIC BTE. GRANITE. Tr. MED-XLN. BTE.-HBL. QTZ. MONZ. GNEISS. REMAINDER
7130'										Tr. CHL ① CALCITE	F.-MED. XLN. QTZ-FSP-BTE GNEISS, CRUDELY FOLIATED W/VARIABLE MAFIC CONTENT Tr. SILL. ③
		Tr. 1		Tr. 1			Tr. 1			Tr. QTZ-SER	7130-40': 25% GRANITE, AS ABOVE. REMAINDER F-MED. XLINE. QTZ-FSP.-BTE. GNEISS W/MINOR HBL
7140'										Tr. CHL. ① CALCITE	Tr. SILLIMANITE — VARIABLE MAFIC/FELSIC RATIO IN GNEISS CHIPS. ③
		Tr. 1	Tr. 1	Tr. 1	Tr. 1		Tr. 1	Tr.		① CALCITE Tr. EPIDOTE	7140-50': 10% GRANITE. REMAINDER F-M.XLN. QTZ.-FSP.-HBL-BTE GNEISS W/MINOR SPHENE & SILLIMANITE.
7150'										Tr. CHL.	⑤
		Tr. 1		Tr. 1	Tr. 1		Tr. 1	Tr.			7150-60': 65% (GRANITE, MED. XLN., LEUC.) REMAINDER GNEISS SAME AS IMMEDIATELY ABOVE. ③

DRILL HOLE GETTY OIL 52-21

LOCATION ROOSEVELT HOT SPRINGS KGRA

LOGGED BY J.B. HULEN

AUG. 1978

GRAPHIC LOGS

ALTERATION

1. WEAK
2. MOD.
3. STRONG

DEPTH	CLAY (1,2,3)	SER. (1,2,3)	CHL. BTE. (1,2,3)	CHL. HBL. (1,2,3)	EPIDOTE (1,2,3)	CALCITE (1,2,3)	LEUCOX. SPHENE (1,2,3)	PYRITE, EST. VOL. % (0.50, 1.00)	GRAPHIC GEOLOGY	VEINLETS (Tr. TRACE; 1. WEAK; 2. MOD.; 3. STRONG)	DESCRIPTIONS
											ALL SAMPLES CONTAMINATED W/ MUSCOVITE (LOST CIRCULATION MATERIAL). NOTE: MUCH OF THE MED-XLN GRANITE DESCRIBED BELOW COULD BE A FELSIC MIGMATITIC DIFFEREN.
7160'		Tr		Tr	Tr	Tr	Tr	Tr			
										Tr. SER. Tr. CHL.	7160-70': 40% MED. XLINE LEUCOCRATIC BTE. GRANITE. REMAINDER F.-M. XLINE FSP.-QTZ-BTE GNEISS W/ MINOR HBL.,
										Tr. EP.-CHL.	SPHENE, TR. SILLIMANITE, CORDIERITE, GARNET. LATTER LT. RED, CLEAR.
7170'		Tr	Tr	Tr	Tr	Tr	Tr			Tr. EP. Tr. CHL. ①	7170-80': ?50-60% MED.-XLN. LEUC. BTE. GRANITE REMAINDER GNEISS AS ABOVE W/ TR. SILL. & GNT.
										Tr. CALC. ①	
7180'				Tr				Tr		② CALCITE Tr. CHL-SER	7180-90': 20-25% MED.-XLN. LEUCOCRATIC GRANITE 5-7% (??) MED-XLN. BTE.-HBL. QTZ. MONZ. GNEISS
								Tr		① CHL.	REMAINDER F.-M. XLN. FSP.-QTZ-BTE GNEISS W/ MINOR HBL. & SPHENE, TR. SILLIMANITE.
7190'								Tr		② CALCITE Tr. CHL. Tr. SER.	7190-7200': 10-15% GRANITE REMAINDER QTZ-FSP-BTE GNEISS } AS ABOVE;
7200'				Tr				Tr		② CALCITE	7200-10': ALL SAME AS ABOVE PYRITE ASSOC. W/ CHLTZN. OF MAFICS & SERCTZN. OF FSPS.
7210'										① CALCITE	7210-20': ~50% (?) MED.-XLN. LEUC. BTE. GRANITE. REMAINDER F.-M.-XLN. QTZ-FSP-BTE GNEISS W/
								Tr		Tr. CHL.	Tr. HEM MAG & PY MINOR SPHENE — HIGHLY VARIABLE FELSIC TO MAFIC RATIO BUT AVG. ~13%
7220'		Tr		Tr				Tr		① CALCITE	7220-30': SAME AS ABOVE EXC. 60-65% (?) GRANITE
										Tr. CHL.	SOME APPARENT ALTN. OF PLAG. TO CHL.
7230'				Tr						① CALCITE	7230-90': SAME AS ABOVE (S)(C)
										Tr. QTZ-SER-CHL.	
7240'	Tr	Tr		Tr						Tr. CHL.	7240-50': SAME AS ABOVE. V. DIFFICULT TO DISTINGUISH GRANITE FROM MUCH OF GNEISS, ESP. MORE
										Tr. CALCITE	FELSIC CHIPS.
7250'		Tr	Tr	Tr	Tr		Tr			Tr. CHL	7250-60': 60-65% GRANITE. Tr. MED.-XLINE SPHENE-RICH BTE-HBL. QTZ.
										① CALCITE	MONZ. GNEISS. REMAINDER F.-M. XLN. QTZ-FSP-BTE GNEISS W/ MINOR HBL. & SPHENE
7260'										① CALCITE	7260-70': 5-7% MED. XLINE. LEUC. GRANITE 15% (?) F. XLINE FSP-QTZ.-BTE. GNEISS
		Tr					Tr			Tr. SER. Tr. CHL. — Tr. QTZ.-CHL.-EP.	REMAINDER F.-M. XLN BTE.-HBL. QTZ. MONZ.
7270'										Tr. QTZ-CHL-PYRITE	GNEISS W/ PROMINENT SPHENE. 25% (?) Tr. MAFICS 7270-80' 10-15% MED.-XLINE LEUC. BTE. GRANITE. (S)(C)(G)
		Tr					Tr			② CALCITE	80-85% F.-M. XLINE BTE. HBL. QTZ. MONZ. GNEISS Tr. QTZ.-CHL.-EP. REMAINDER F-M. XLINE FSP-QTZ.-BTE GNEISS
7280'										Tr. QTZ-CHL-EPIDOTE	W/ MINOR HBL., SPHENE, TR. SILL. & CORD., GNT. 7280-90': 10-15% MED.-XLN. BTE. HBL. QTZ. MONZ. GNEISS
								Tr		② CALCITE ① CHL.	10-15% MED.-XLN. LEUC. BTE. GRNT. (S) REMAINDER F. XLN. FSP-QTZ-BTE GNEISS W/ MINOR HBL., SPHENE
7290'		Tr	Tr	Tr			Tr	Tr		Tr. CALCITE	7290-7300': 7-10% F-XLN, FSP-QTZ.-BTE. GNEISS W/ VARIABLE FELSIC/MAFIC RATIO, AVG. 11-15% /
7300'										DEFINITE GRANITE → LARGE GR. CHIP	17, MED.-XLN.' SPHENE-RICH BTE. HBL. QTZ. MONZ. GNEISS. REM. MED. XLN. LEUC. GRANITE. (S)
		Tr		Tr				Tr		① CALCITE Tr. CHL.	7300-10': 60-65% GRANITE Tr. QTZ. MONZ GNEISS (S)(C)(G)
7310'										Tr. CHL.-CALCITE-HEM.	REMAINDER F.-M. XLN FSP-QTZ-BTE GNEISS W/ Tr. SILL. & CORD. & GARNET
		Tr			Tr			Tr		① CALCITE ① CHLORITE	7310-20': SAME AS ABOVE EXC. 2-3% QTZ. MONZ. GNEISS
7320'										Tr. EP.-CHL.	(S)(C)
										① CALCITE	7320-30': 85-90% LEUC. MED. XLINE BTE. GRANITE. 1-3% MED. XLINE BTE. HBL. QTZ. MONZ. GNEISS
7330'										Tr. CHL. Tr. CHL.-SER.	1 0.3 mm PINK GARNET(?) REMAINDER F.-M. XLINE FSP.-QTZ.-BTE. GNEISS W/ MINOR HBL., SPHENE, Tr. SILL., CORD. (S)(C)
			Tr					Tr		② CALCITE ① CHL.	7330-40': SAME AS ABOVE EXC. 25-30% GRANITE.
7340'										Tr. SER.	(S)
			Tr					Tr		① CALCITE Tr. CHL.	7340-50': SAME AS 7320-30'
7350'											(S)
		Tr	Tr					Tr		① CALCITE	7350-60': SAME AS ABOVE.
7360'										Tr. CHL.	(S)
		Tr		?						① CALCITE ① CHLORITE	7360-70': SAME AS 7320-30'
7370'											(S)
					Tr			Tr		Tr. CHL.	7370-80': SAME AS 7320-30; EXC. 25-30% GRANITE.
7380'										Tr. EP. Tr. CAL.-CHL.-HEM.	FEWER MAFICS IN GNEISS. Abundant Fibrolite (S)
		Tr								① CALCITE	7380-90': SAME AS ABOVE.
7390'											(S)
				Tr	Tr					Tr. CHL.-EP.	7390-7400': SAME AS 7320-30', EXC. 20-25% GRANITE
7400'										② CALCITE	(S)
										② CHL. ② CALCITE	7400-7410': SAME AS ABOVE EXC. STRONG ALTN.
7410'										① SER.	& DISS. PY. (S)
										② CALCITE ① CHL	7410-20': SAME AS ABOVE. ALTN. & MINRLZ. DECREASE.
7420'										Tr. SER.	(S)

DRILL HOLE GETTY OIL 52-21

LOCATION ROOSEVELT HOT SPRINGS KGRA

LOGGED BY J. B. HULEN

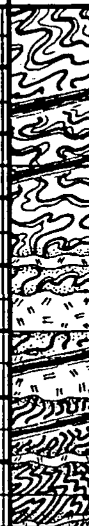
AUG. 1978

GRAPHIC LOGS

ALTERATION (1. WEAK, 2. MOD., 3. STRONG): CLAY | SER | CHL. BTE. | CHL. HBL. | EPI-DOTE | CAL-CITE | LEU-COX. SPHENE

PYRITE EST. VOL. % (0.50, 1.00)

GRAPHIC GEOLOGY



VEINLETS (Tr. TRACE, 1. WEAK, 2. MOD., 3. STRONG)

DESCRIPTIONS

ALL SAMPLES CONTAMINATED W/ MUSCOVITE, CRS.-XLINE (LOST CIRCULATION MATERIAL)

* ONLY TRACES HBL.—MAY BE CONTAMINATION IN ONE OR TWO FRAGS.

DEPTH	VEINLETS	DESCRIPTIONS
7420–7430'	① CALCITE; Tr. CHL.; Tr. SER.; Tr. CHL-SER.	7420-7430' 95% F-M. XLN. FSP-QTZ-BTE. GNEISS W/ MINOR SILLIMANITE. CRUDELY FOLIATED. 5% MED.-XLN. LEUCOCRATIC GRANITE, < 0.5% BTE. SMPL. MOD. ALT. & MINRLZD. * HBL. ONLY IN ONE CHIP. Ⓢ * 0.2% DISS. PYRITE
7430–7440'	① CALCITE; ① CHL.; Tr. CHL-SER.	7430-40': SAME AS ABOVE. Tr. REDDISH-BRN. ANHEDRAL GARNET < 0.3 mm. DIA. ⒼⓈ
7440–7450'	① CALCITE; ① CHL.-SER.; Tr. CHL.	7440-50': SAME AS ABOVE Ⓢ
7450–7460'	Tr. CHL.; ① QTZ-SER.; Tr. CHL-SER.; ① CALCITE	7450-60': SAME AS ABOVE EXC. PROBABLY 10-15% GRANITE(?) ABUNDANT SILLIMANITE. ← ONE QTZ-SER. VEIN FRAGMENT WITH 2 X 0.3 mm. TERMINATED EUHEDRAL QTZ. XL — OTHERS SMALLER. Ⓢ
7460–7470'	Tr. SER.; Tr. CHL.; ① CALCITE	7460-70': 50-60% MED.-XLINE. LEUC. BTE. GRANITE W/ <0.5% BTE. REMAINDER F-M. XLN FSP-QTZ-BTE. GNEISS W/ MINOR HBL. NO SILLIMANITE THIS SAMPLE.
7470–7480'	Tr. CALCITE; Tr. CHL.	7470-80': SAME AS ABOVE.
7480–7490'	Tr. CALCITE	7480-90': 15% MED. XLN. LEUC. GRANITE. REMAINDER F.-M. XLINE FSP.-QTZ-BTE GNEISS W/ MINOR SILLIMANITE, Tr. GARNET. ⒼⓈ
7490–7500'	Tr. CALCITE	7490-7500': 5% MED. XLINE LEUC. GRANITE (?) — MAY BE FELSIC MIGMATITIC DIFFERENTIATE. REMAINDER F-M. XLN. FSP.-QTZ.-BTE. GNEISS W/ MINOR SILLIMANITE, TR. GARNET. VARIABLE MAFIC CONTENT. ⒼⓈ

NOTE: MUCH OF THE MED. XLN. LEUCOCRATIC GRANITE DESCRIBED ABOVE COULD BE A FELSIC MIGMATITIC DIFFERENTIATE.

DRILL HOLE ROOSEVELT HOT SPRINGS

LOCATION ROOSEVELT HOT SPRINGS KGRA

LOGGED BY J. B. HULEN

DEPTH	% amp	% b/c°	% sph.	cpx?	garn	% cata-cla-site	sill ?
580	Tr	35-40	Tr.			Tr	
590	3?	40-45	1			1	
600	Tr	35-40	Tr.			Tr.	
610	35-40	7-10				Tr	✓
620	1-3	30-35				Tr.	
630	Tr.	40-45				1	✓
640	Tr.	45-50				Tr	✓co.
650	Tr.	30-35				Tr	
660		35-40				Tr	
670		35-40	Tr.	Tr.	Tr. p	Tr	
680		30-35	Tr	Tr	Tr.	Tr	✓cul
690	Tr.	30-35	Tr.	Tr		Tr	
700	<1	35-40	Tr	Tr.		Tr	
710	5-7?	35?	2	Tr		Tr	
720	3-5?	40-45	Tr.			(1?)	✓cul.
730	7-9	45-45	—				
740	7-9	30-35	—		Tr. P	Tr.	✓cul
750	5-7?	51-55	3			Tr.	cul ?
760	GRANITE!					Tr.	
770						Tr.	
780	3-5?	19-21				5	✓?
790	7-9?	45-50	3			2	
800	7-9	40-45	2			1	
810	1-3	30-35	1			Tr.	
820	1-3	30-35	1		Tr.	Tr.	
830	3-5	40-45	3		Tr.	Tr.	
840	3-5	30-40	1			2	
850	1-3	35-35?	1			1	
860	<1	35-40				1	
870	<1	30-35			Tr.	2	✓
880	<1	30-35			Tr.	1	✓c.
890		30-35			Tr.	Tr.	✓
900	<1	25-30			Tr.	Tr.	✓
910	<1	30-35			1	Tr.	✓
920	1-3	25-30			Tr.-C	1	✓
930	<1	30-35			Tr.	Tr.	✓
940		35-40			Tr.	Tr.	✓
950	10-12	30-35				1	
960	7-10	30-35				1	
970	10-15	40-45				Tr.	
980	5-7	25-30	3			Tr.	
990	5-7	30-35	4			1	
1000	7-10	35-40	3			7	
1010	3-5	35-40	2			1	
1020	5-7	35-40	1			Tr.	
1030	5-7	35-40	2			1	
1040	10-12	30-35	3			7	
1050	1-3	20-25	Tr.			3	
1060	1-3	17-20	Tr.			3	
1070	1-3?	40-45	1			Tr.	
1080	1-3	35-40	1			Tr.	
1090	1-3	35-40				Tr.	
1100	<1?	30-35?				1.	

LITHOLOGY, ESTIMATED VOLUME PER CENT

DEPTH	btc (in gneiss)	amp. (in gneiss)	sph. (in gneiss)	garn. (in gneiss)	cata. clas. (gouge)	sill.?
1110	30-35	<1			Tr.	
	20-25	<1			1	
	40-45	5-7	1		1	
	35-40	5-7	1		1	
	40-45	5-7	4		3	
	40-45	5-7	3		Tr	
70	35-40	3-5	2		Tr.	
	35-40	5-7	3		Tr.	
	40-45	5-7	2		1	
1200	40-45	3-5	1?		1	
10	40-45	3-5	1?		1	
20	35-40	7-9	2		3	
30	35-40	5-7	3		2	
40	35-40	3-5	1		7	
50	35-40	3-5	2		1	
	35-40	5-7	2		1	
	35-40	5-7	1		Tr.	
80	35-40	3-5	Tr.		5	
	20-25		Tr.		3	
1300	20-30		Tr.		5	✓
10	20-25	<1	Tr.		3	✓c
20	20-25	Tr.	Tr.		4	✓
30	25-30	Tr.	1	Tr.?	2	✓g
40	30-35	1-3	1		3	
50	35-40	3-5	3		3	
60	30-35	7-9	3		5	
70	30-35	<1	1	Tr.?	3	✓g
80	35-40				2	
	25-30	1-3	Tr.		2	
	25-30	<1	Tr.		1	✓?c
	25-30	1-3	Tr.		3	
	25-30	3-5	Tr.		4	
	20-25	<1	Tr.		3	
	20-25	1-3	Tr.		2	✓
	25-30	<1			5	
	30-35	3-5			2	
	35-40				2	✓
	35-40				Tr.	✓?c
	30-35	<1			1	✓
	25-30				2	
10	25-30	<1			5	✓
20	30-35	3-5	Tr.		2	
30	25-30	20-25	Tr.		1	
40	30-35	3-5	Tr.		1	
50	35-40	<1			2	✓
60	35-40	1-3	Tr.		2	✓
70	35-40	1-3	T		2	✓
80	35-40	<1	Tr.		2	✓
90	40-45	5-7	2	✓?	1	✓
1600	40-45	1-3	Tr.		1	✓

DEPTH	btc	amp	sph.	gnt	gouge	sill. pres.
1600-10	50-55	<1	Tr.		5	
20	30-35	<1		Tr.	5	
30	35-40	<1		Tr.	5	✓
40	40-45	<1		Tr.	1	✓
50	40-45	7-9	3		2	✓
60	40-45	9-11	4		7	
70	35-40	9-11	3		5	
80	30-35	3-5	1		3	✓
90	35-40	1-3	Tr.	Tr.	5	✓
1700	40-45			Tr.	3	✓
10	40-45				1	✓
20	40-45			Tr.	Tr.	✓
30	35-40			Tr.	1	✓
40	35-40		Tr		1	✓
50	35-40	Tr.	Tr.		1	✓
60	40-45		Tr.		Tr.	✓
70	40-45		Tr.		2	✓
80	45-50	<1	Tr	Tr.	1	✓
90	40-45				Tr.	✓
1800	40-45				2	✓
10	40-45	<1			1	✓
20	40-45				2	✓
30	40-45	1-3			2	✓
40	35-40	<1			2	✓
50	35-40	1-3			2	✓
60	25-30				2	✓
	25-35	3-5	1		1	
	40-45	1-3	1		1	✓
	35-40	1-3	Tr.		1	
1900	35-40	3-5	1		1	✓
10	45-50	<1	Tr.	Tr.	Tr.	
20	25-30	<1			1	
30	30-35				Tr.	
40	30-35			Tr.	3	✓
50	35-40	<1	Tr.		5	✓
60	30-35	<1	Tr.		7	✓
70	30-35				2	✓
80	30-35				2	✓
90	30-35		Tr.		2	✓
					2	✓
2000	25-30	<1	Tr.		2	✓
10	20-25				2	
20	30-35	1-3	2		2	
30					1	
					1	
					5	
					5	
					5	
					5	
					20	
2100					10	
10	25-30	1-3	Tr.		7	
20	25-30				3	✓
	35-40	1-3	Tr.		3	

LITHOLOGY, ESTIMATED VOLUME PER CENT — Logged by J. Hulen

DEP.	bi (in mot)	amp (in mot)	sph (in mot)	gnt	gouge	sil/pics	bte	amp	sph	gnt	gouge	sill. pres?
[illegible]	30-40?	<1			2						1	
20	21-32	1-3	1		3	✓a			Tr.		5	
30	65-70	<1	Tr.		3	✓a						
40	60-65				2	✓a					2	
50	55-60		—		1	✓a					3	
60	55-60				1	✓a					5	
70	55-60			✓	1	✓a	15-20	2	1		3	✓
80	45-50			✓	1	✓a	25-31	Tr.	Tr.		3	✓
90	50-55			✓	2	✓a					Tr.	
[illegible]	50-55			✓	1	✓a	10-15?	—	Tr.		2	✓
10	45-50			✓/	1	✓a	15-20.	20-25	1		5?	
20	35-40	/<1	Tr.	✓	3	✓a	15-20	20-25	Tr.		3	
30	30-35?			✓	2	✓?	12-15	7-10	Tr.		2	
40	30-35			✓	2	✓	12-15	7-10			3?	
50	30-35			✓	2	✓	12-15	3-5		Tr.	1	
60			?				30-35	7-10	1		2	
70	35-40		Tr.	✓	1	✓	15-20	1-3	Tr.		5	
80	40-45			✓	1	✓	11-13	<1.			2	
90	35-40					✓	9-11	<1.	1		2	
2400	25-40				5	✓a	12-15	3-5	T		5	
10	35-40			✓	5	✓a	12-15	1-3?			5	
20	35-40			2?	4	✓a	11-13	<1	Tr.		5	
30	45-50			Tr.	3	✓	15-17	1-3			2	
40	40-45		—	Tr.	5	✓	13-15	1-3			1	
50	40-45			✓	5	✓	13-15	3-5			2	
60	35-40			Tr.	3	✓	13-15	1-3			4	
70	20-25	Tr.?			15	✓	13-15	1-3			3	
80	35-40	3-5	2		?	✓?	13-15	5-7			2	
90	40-45	Tr.	Tr.		3	✓	13-15	1-3			1	✓
2500	30-35	Tr.	Tr.		3	✓	13-15	3-5			7	
10	40-45			✓+	1	✓	13-15	1-3	Tr.		3	✓
20	35-40				1	✓	11-13	<1			1	
30	25-30			✓	3	✓	11-13	<1			2	
40	25-30	Tr.	Tr.	✓	5	✓	10-15	10-15	Tr.		3	✓
50	30-35.	1-3	1	✓	1	✓			Tr.		2	
60	15-20				5	✓	13-15	1-3	Tr.		4	✓T.
70	20-25			✓	3	✓	13-15	3-5	Tr.		3	
80	20-25	1-3	Tr.	✓	Tr.	✓	11-13?	5-7?	Tr.		3	
90	20-25	1-3	Tr.	✓	Tr.	✓	11-13	3-5?			3	
2600	15-20				1	✓	11-13	1-3			3	✓
10	30-35			✓	5	✓	11-13?	1-3?	Tr.		7	✓
20	20-25			Tr.	2	✓	15-20	5-7?	Tr.		5	✓
30	15-20			✓	2	✓	12-15	3-5	Tr.		5	✓
40	20-25			✓	1	✓	12-15	5-7			5	
50	12-15		Tr.		Tr.	✓	9-11	<1	Tr.		5	
60	12-16				1	✓	9-11	<1	Tr.		3	
70	20-25	1-3	2		3	✓	7-10	20-25	Tr.		7	
80	20-25			✓	3	✓a	9-11	3-5			2	
90	20-25?				3	✓+	9-11	<1			2	
2700	20-25?	Tr			2	✓+						

GEOTHERMAL POWER CORPORATION DRILL HOLE GPCR. No.
ESTIMATED LITHOLOGIC COMPOSITION OF INDIVIDUAL SAMPLES
Binocular Microscopic Examination
ROOSEVELT HOT SPRINGS KGRA

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

5. LEASE DESIGNATION AND SERIAL NO.: USL-U27391

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME:

9. WELL NO.: KGRA 52-21

10. FIELD AND POOL, OR WILDCAT: Roosevelt Hot Springs

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 21, T27S, R9W, SLB&M

12. COUNTY OR PARISH: Beaver

13. STATE: Utah

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☐ Other: Geothermal

b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other:

2. NAME OF OPERATOR: Getty Oil Company

3. ADDRESS OF OPERATOR: Rt. 1, Box 197-X, Bakersfield, CA 93308

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: 2310' W, 990' S of NE corner Sec. 21, T27S, R9W, SLB&M
At top prod. interval reported below
At total depth

14. PERMIT NO.	DATE ISSUED
0046	10-17-77

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
2-02-78	5-04-78		5882 KB	5855

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
7500			→	X	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*

25. WAS DIRECTIONAL SURVEY MADE: Yes

26. TYPE ELECTRIC AND OTHER LOGS RUN: FIL, FDC-CNL, DIL, Sonic, Temperature Logs

27. WAS WELL CORED: Yes

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
30"	Line Pipe	30' (MAT)	36"	Ready Mix	
20"	94#	182' (KB)	28"	310 sks class B & additives	
13-3/8"	54.5#	765' (KB)	17-1/2"	465 sks class B & additives	
9-5/8"	40#	2039' (KB)	12-1/4"	535 sks class B & additives	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)

31. PERFORATION RECORD (*Interval, size and number*)

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED

33.* PRODUCTION (Not on production)

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*)

TEST WITNESSED BY:

35. LIST OF ATTACHMENTS

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED C. G. Bursell C. G. Bursell TITLE Agent DATE 6-02-78

*(See Instructions and Spaces for Additional Data on Reverse Side)

INSTRUCTIONS

General: This form is designed for submitting a complete and correct well completion report and log on all types of lands and leases to either a Federal agency or a State agency, or both, pursuant to applicable Federal and/or State laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from, the local Federal and/or State office. See instructions on items 22 and 24, and 33, below regarding separate reports for separate completions.

If not filed prior to the time this summary record is submitted, copies of all currently available logs (drillers, geologists, sample and core analysis, all types electric, etc.), formation and pressure tests, and directional surveys, should be attached hereto, to the extent required by applicable Federal and/or State laws and regulations. All attachments should be listed on this form, see item 35.

Item 4: If there are no applicable State requirements, locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local State or Federal office for specific instructions.

Item 18: Indicate which elevation is used as reference (where not otherwise shown) for depth measurements given in other spaces on this form and in any attachments.

Items 22 and 24: If this well is completed for separate production from more than one interval zone (multiple completion), so state in item 22, and in item 24 show the producing interval, or intervals, top(s), bottom(s) and name(s) (if any) for only the interval reported in item 33. Submit a separate report (page) on this form, adequately identified, for each additional interval to be separately produced, showing the additional data pertinent to such interval.

Item 29: *"Sacks Cement":* Attached supplemental records for this well should show the details of any multiple stage cementing and the location of the cementing tool.

Item 33: Submit a separate completion report on this form for each interval to be separately produced. (See instruction for items 22 and 24 above.)

37. SUMMARY OF POROUS ZONES: SHOW ALL IMPORTANT ZONES OF POROSITY AND CONTENTS THEREOF; CORED INTERVALS; AND ALL DRILL-STEM TESTS, INCLUDING DEPTH INTERVAL TESTED, CUSHION USED, TIME TOOL OPEN, FLOWING AND SHUT-IN PRESSURES, AND RECOVERIES				38. GEOLOGIC MARKERS		
FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.	NAME	TOP	
					MEAS. DEPTH	TRUE VERT. DEPTH

U.S. GOVERNMENT PRINTING OFFICE : 1963—O-683636

Production Specialists

AGNEW AND SWEET
3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

24 HOUR PHONE 327-2267
AREA CODE 805

SUBSURFACE TEMPERATURE SURVEY

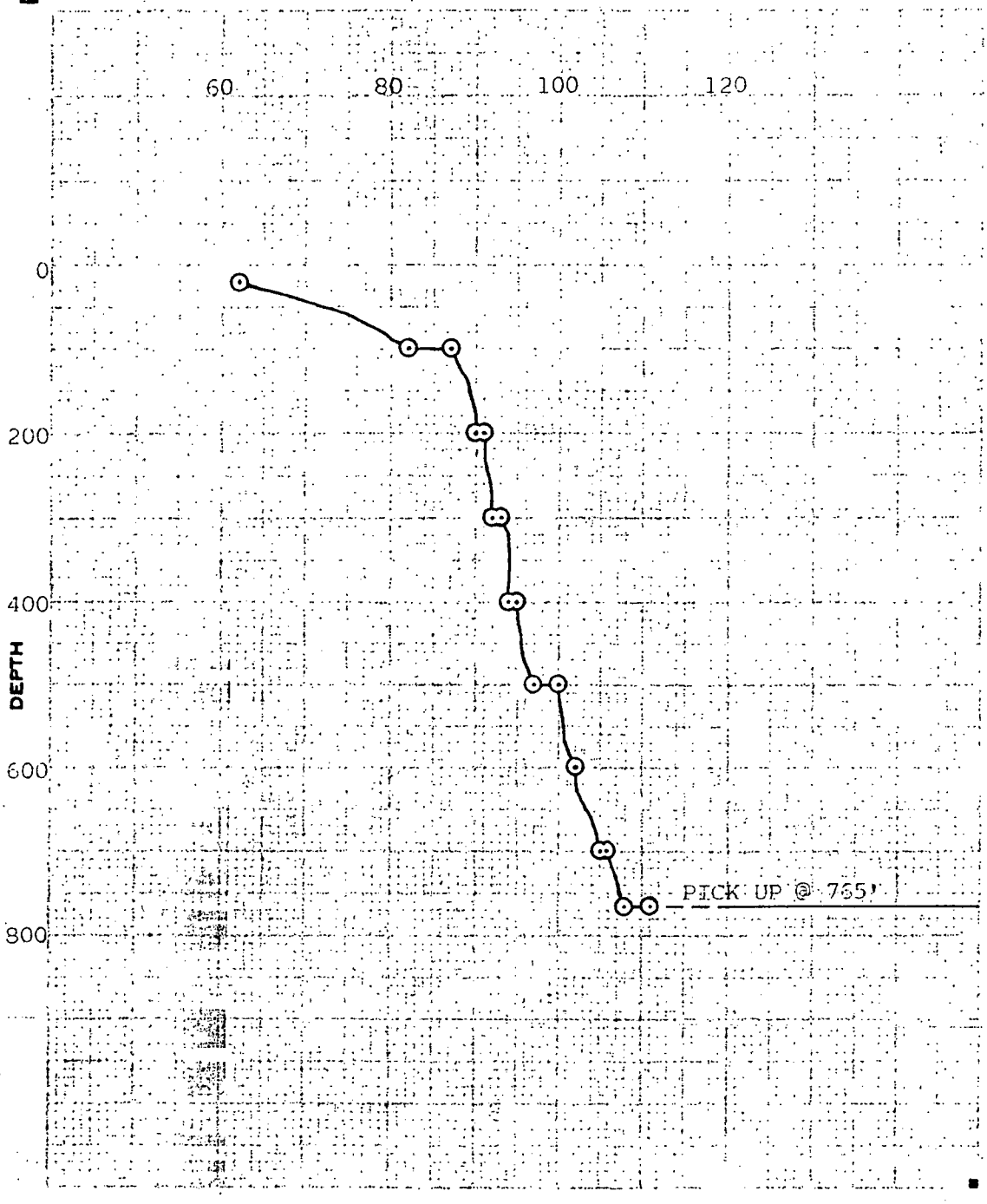
OWNER	GETTY OIL COMPANY	FIELD	ROOSEVELT
CASING		ELEV.	
LINER DESCRIPTION:			
TUBING DETAIL:	Open Hole		
PUMP SHOE	GAS ANCHOR	INTAKE:	
PURPOSE	STATIC TEMPERATURE TRAVERSE SURVEY		
REMARKS:	20'/Min. with stops every 100'		

WELL NAME KGRA 52 - 21
DATE: February 14, 1978
ZERO POINT D.F.
DEPTH
ZONE

INSTRUMENT 45 - 232 °FAHR
SERIAL NO 3290
3 hour 15 turn
MAX. TEMP 111.3 °F @ 765'

STABLIZATION PERIOD
GROSS OIL RATE B/D
NET OIL RATE B/D
FORMATION GAS MCF/D
GOR CFT BBL.
CIRCULATED GAS MCF/D
OIL DRY GRAVITY °API

PRESSURES.	OBS	COR
CASING. PSIG		
TUBING. PSIG		



DEPTH	TEMP.	DEPTH	TEMP.
20	63.9	420	95.3
40	69.9	440	95.8
60	75.8	460	95.8
80	79.9	480	96.5
100	82.6	500	97.4
	87.7		100.0
120	88.1	520	100.2
140	89.0	540	100.5
160	89.5	560	100.7
180	90.5	580	101.0
200	90.2	600	102.1
	91.1		102.1
220	91.1	620	102.1
240	91.6	640	102.8
260	91.9	660	104.2
280	92.3	680	104.9
300	92.6	700	105.4
	93.9		105.9
320	94.2	720	106.5
340	94.2	740	107.2
360	94.4	760	107.5
380	94.4	765	108.3
400	94.6		111.3
	95.3		

Time on bottom 11:19 p
Time off bottom 11:34 p

BY: WILSON & SUNDBERG

Production Specialists

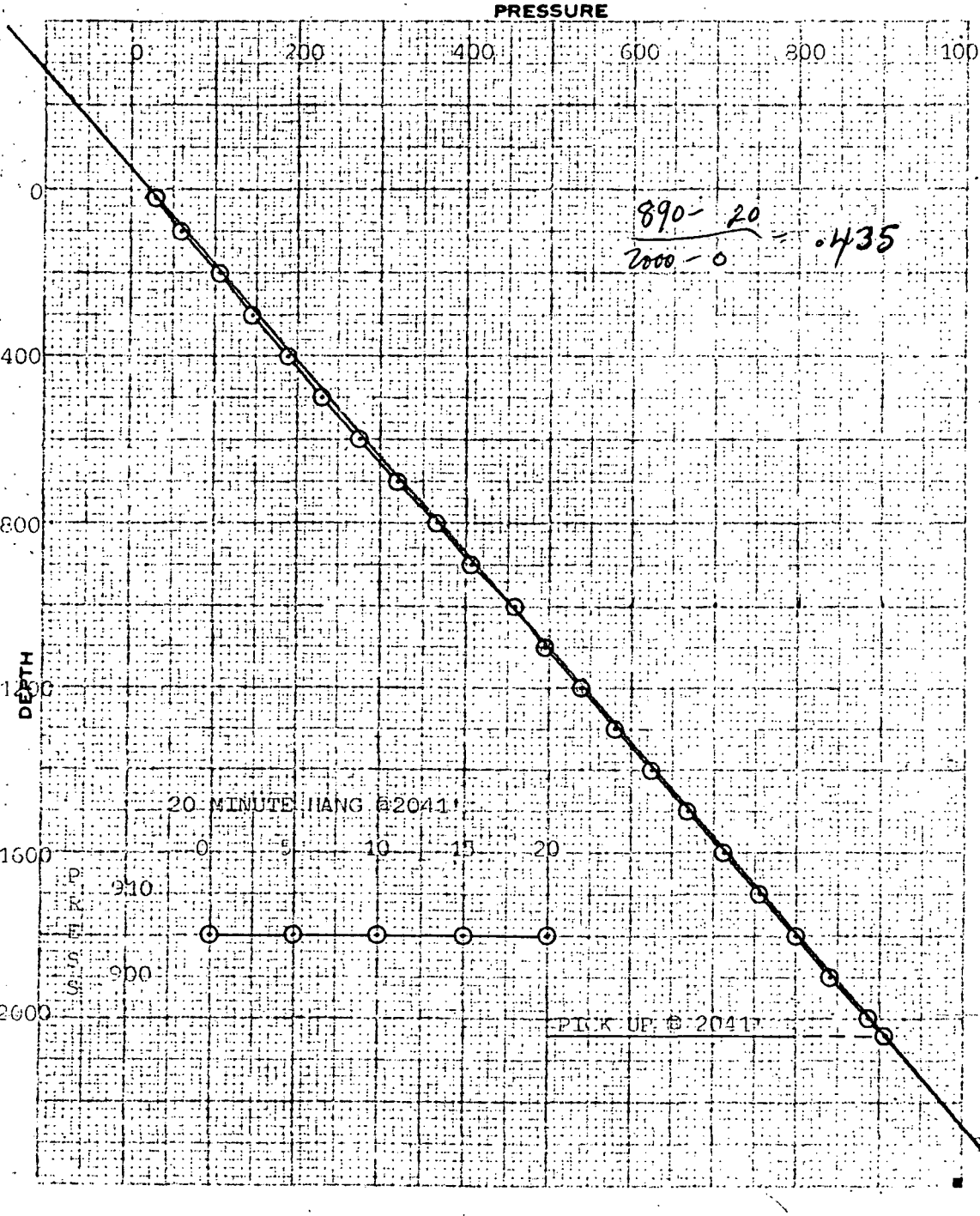
AGNEW AND SWEET

3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

24 HOUR PHONE 327-2267
AREA CODE 805

SUBSURFACE PRESSURE SURVEY

OWNER	GETTY OIL COMPANY	FIELD	ROOSEVELT	WELL NAME	KGRA 52 - 21
CASING	13-5/8" @ 765'	ELEV.	5808'	DATE	March 5, 1978
LINER DESCRIPTION:				ZERO POINT	D.F.
				DEPTH	2041'
				ZONE	
TUBING DETAIL:					
				INSTRUMENT	1800 PSIG
				SERIAL NO	5709
PUMP SHOE	GAS ANCHOR	INTAKE		12 hour	7½ turn
PURPOSE	STATIC PRESSURE TRAVERSE GRADIENT SURVEY			MAX. TEMP.	200.7°F @ 2041'
REMARKS:	Traverse 20' per min. open hole. Stopped circulating @ 6:00 am 3-4-78				



STABLIZATION PERIOD
GROSS OIL RATE B/D
NET OIL RATE B/D
FORMATION GAS MCF D
GOR CFT/BBL.
CIRCULATED GAS MCF/D
OIL DRY GRAVITY °API

PRESSURES.	OBS	COR
CASING. PSI		
TUBING. PSI		

DEPTH	PRESSURE	GRADIENT
20	29	
100	60	.398
200	105	.450
300	145	.400
400	188	.430
500	233	.450
600	276	.430
700	321	.450
800	364	.430
900	407	.430
1000	458	.510
1100	494	.360
1200	540	.460
1300	582	.420
1400	626	.440
1500	668	.420
1600	713	.450
1700	750	.430
1800	800	.440
1900	843	.430
2000	885	.420
2041	905	.488

20 MINUTE HANG @ 2041'	
0	905
5 min.	905
10	905
15	905
20	905

Time on bottom 4:18
Time off bottom 4:38

BY: SUNDBERG & MEADOR

Production Specialists

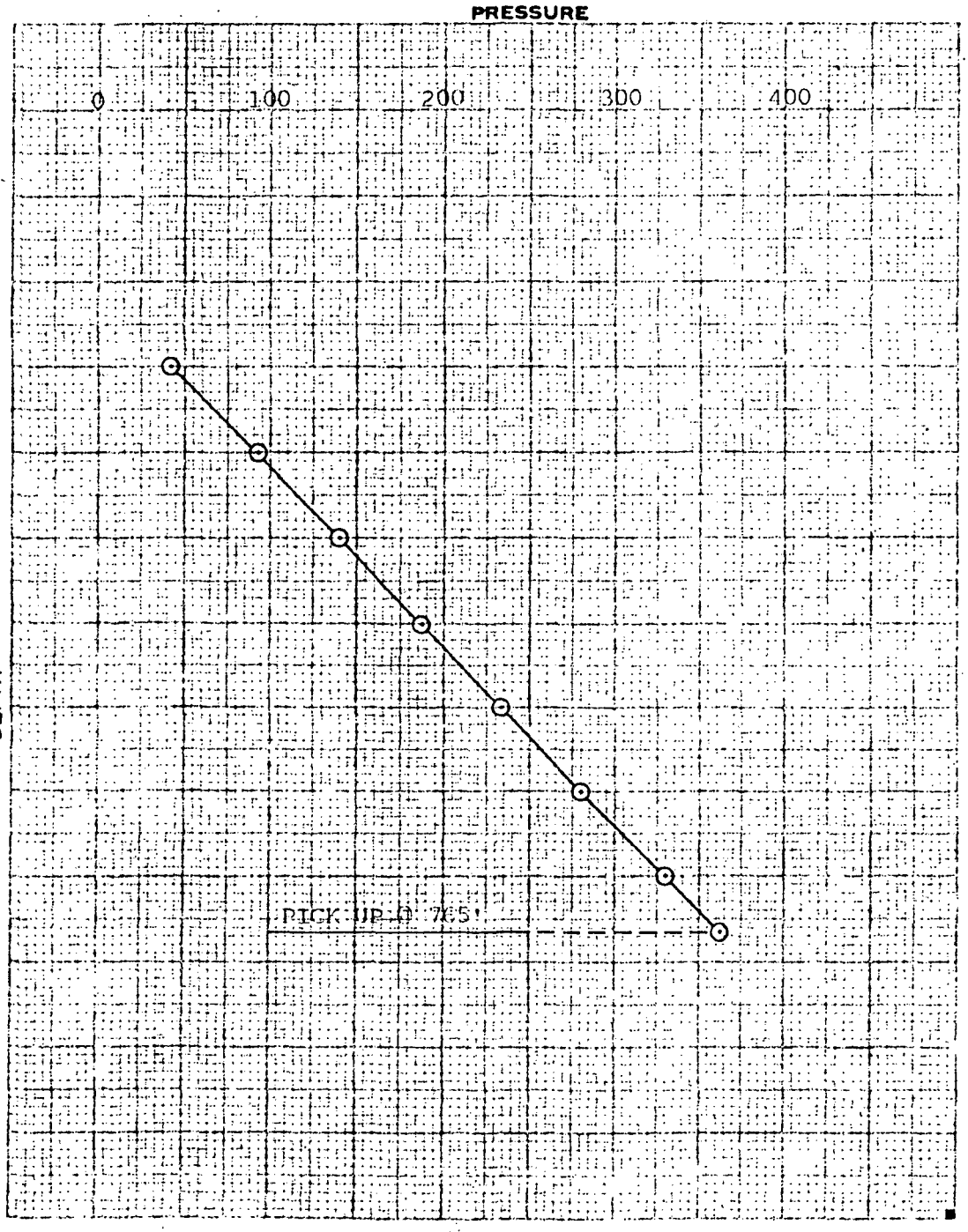
AGNEW AND SWEET

3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

24 HOUR PHONE 327-2267
AREA CODE 805

SUBSURFACE PRESSURE SURVEY

OWNER GETTY OIL COMPANY FIELD ROOSEVELT WELL NAME KGRA 52 - 21
CASING ELEV. DATE: February 14, 1978
LINER DESCRIPTION: ZERO POINT D.F.
DEPTH
ZONE
TUBING DETAIL: Open Hole
INSTRUMENT 1000 PSIG
SERIAL NO. 39980
PUMP SHOE GAS ANCHOR INTAKE: 3 hour 15 turn
PURPOSE STATIC PRESSURE GRADIENT SURVEY MAX TEMP. 111.3 °F @ 765'
REMARKS:



STABLIZATION PERIOD
GROSS OIL RATE B/D
NET OIL RATE B/D
FORMATION GAS MCF/D
GOR CFT/BBL
CIRCULATED GAS MCF/D
OIL DRY GRAVITY °API

PRESSURES	OBS	COR
CASING, PSI		
TUBING, PSI		

DEPTH	PRESSURE	GRADIENT
100	42	
200	93	.510
300	140	.470
400	187	.470
500	234	.470
600	281	.470
700	330	.490
765	363	.507

Time on bottom 11:19
Time off bottom 11:34

BY: WILSON & SUNDBERG

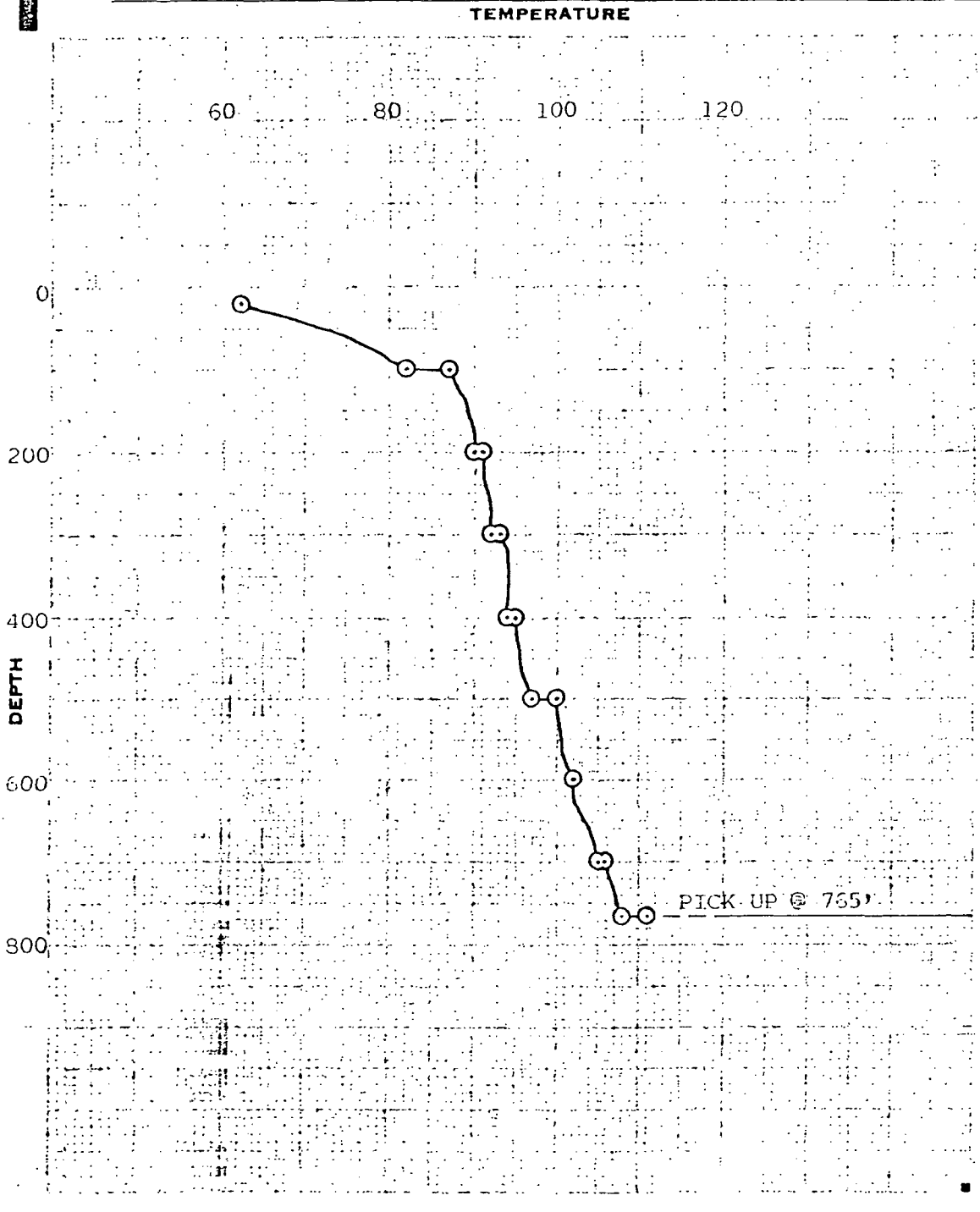
AGNEW AND SWEET
3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

24 HOUR PHONE 327-226
AREA CODE 805

Production Specialists

SUBSURFACE TEMPERATURE SURVEY

OWNER: GETTY OIL COMPANY
FIELD: ROOSEVELT
WELL NAME: KGRA 52 - 21
CASING:
ELEV.:
DATE: February 14, 1978
LINER DESCRIPTION:
ZERO POINT: D.F.
DEPTH:
ZONE:
TUBING DETAIL: Open Hole
INSTRUMENT: 45 - 232 °FA
SERIAL NO: 3290
PUMP SHOE: GAS ANCHOR: INTAKE:
3 hour 15 turn
PURPOSE: STATIC TEMPERATURE TRAVERSE SURVEY
MAX. TEMP: 111.3 °F @ 765'
REMARKS: 20'/Min. with stops every 100'



STABLIZATION PERIOD
GROSS OIL RATE B/D
NET OIL RATE B/D
FORMATION GAS MCF/D
GOR CFT BBL.
CIRCULATED GAS MCF/D
OIL DRY GRAVITY °API

PRESSURES.	OBS	COR
CASING. PSIG		
TUBING. PSIG		

DEPTH	TEMP.	DEPTH	TEMP
20	63.9	420	95.3
40	69.9	440	95.8
60	75.8	460	95.8
80	79.9	480	96.5
100	82.6	500	97.4
	87.7		100.0
120	88.1	520	100.2
140	89.0	540	100.5
160	89.5	560	100.7
180	90.5	580	101.0
200	90.2	600	102.1
	91.1		102.1
220	91.1	620	102.1
240	91.6	640	102.6
260	91.9	660	104.2
280	92.3	680	104.2
300	92.6	700	105.4
	93.9		105.9
320	94.2	720	106.5
340	94.2	740	107.2
360	94.4	760	107.5
380	94.4	765	108.3
400	94.6		111.3
	95.3		

Time on bottom 11:19 pm
Time off bottom 11:34 pm

BY: WILSON & SUNDBERG

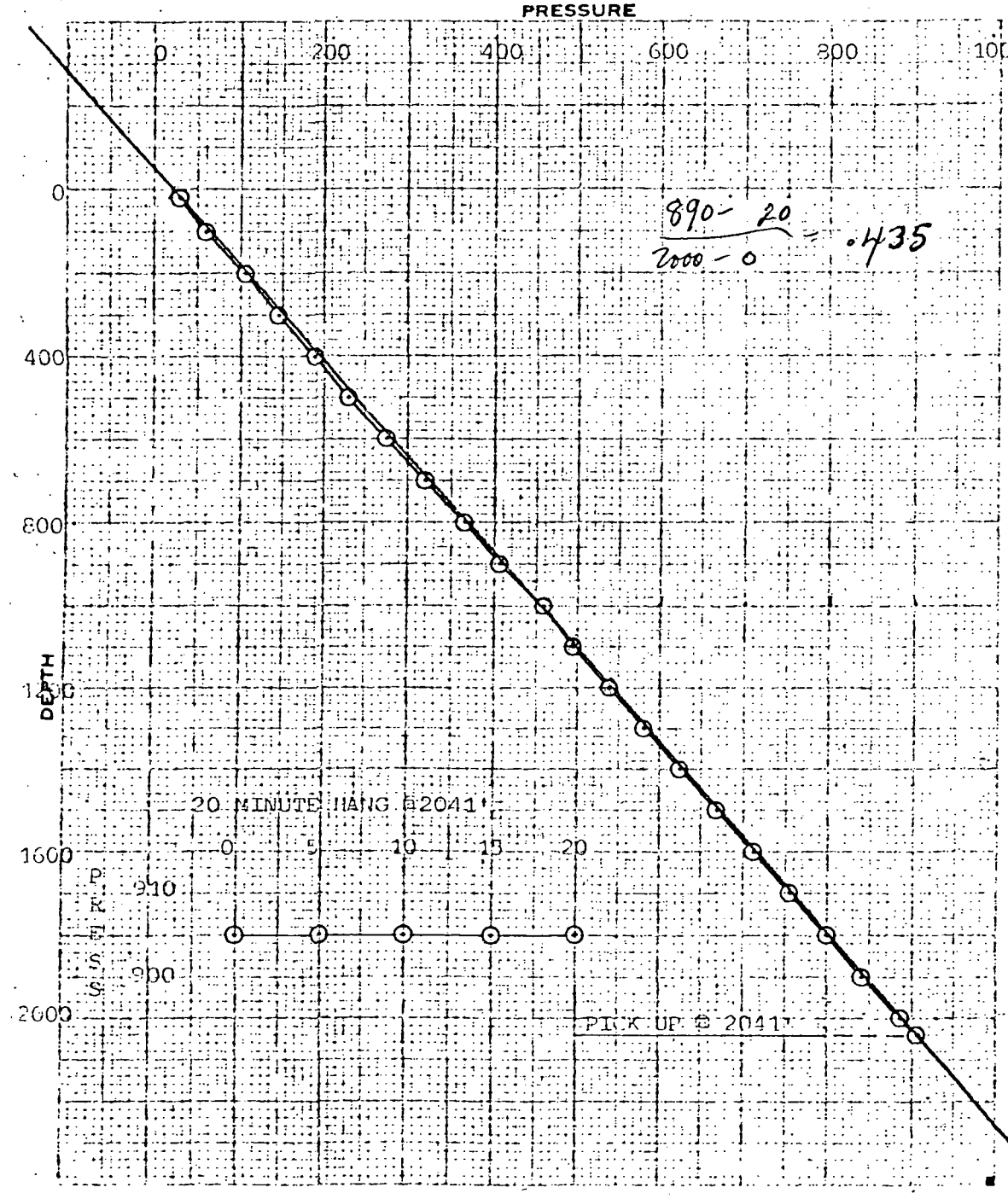
Production Specialists

AGNEW AND SWEET
3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

24 HOUR PHONE 327-226
AREA CODE 805

SUBSURFACE PRESSURE SURVEY

OWNER	GETTY OIL COMPANY	FIELD	ROOSEVELT	WELL NAME	EGRA 52 - 21
CASING	13-5/8" @ 765'	ELEV.	5808'	DATE	March 5, 1978
LINER DESCRIPTION:				ZERO POINT	D.F.
				DEPTH	2041'
				ZONE	
TUBING DETAIL:					
				INSTRUMENT	1800 PS
				SERIAL NO	5709
PUMP SHOE	GAS ANCHOR	INTAKE:			12 hour 7½ turn
PURPOSE	STATIC PRESSURE TRAVERSE GRADIENT SURVEY			MAX. TEMP.	200.7°F @ 2041'
REMARKS:	Traverse 20' per min. open hole. Stopped circulating @ 6:00 am 3-4-78				



STABLIZATION PERIOD
GROSS OIL RATE B/D
NET OIL RATE B/D
FORMATION GAS MCF D
GOR CFT/BBL.
CIRCULATED GAS MCF/D
OIL DRY GRAVITY °API

PRESSURES.	OBS	COR
CASING, PSI		
TUBING, PSI		

DEPTH	PRESSURE	GRADIEN
20	29	
100	60	.398
200	105	.450
300	145	.400
400	188	.430
500	233	.450
600	276	.430
700	321	.450
800	364	.430
900	407	.430
1000	458	.510
1100	494	.360
1200	540	.460
1300	582	.420
1400	626	.440
1500	668	.420
1600	713	.450
1700	750	.430
1800	800	.440
1900	843	.430
2000	885	.420
2041	905	.438

20 MINUTE HANG @ 2041'	
0	905
5 min.	905
10	905
15	905
20	905

Time on bottom 4:16 am
Time off bottom 4:38 am
BY: SUNBERG & MEADOR

Production Specialists

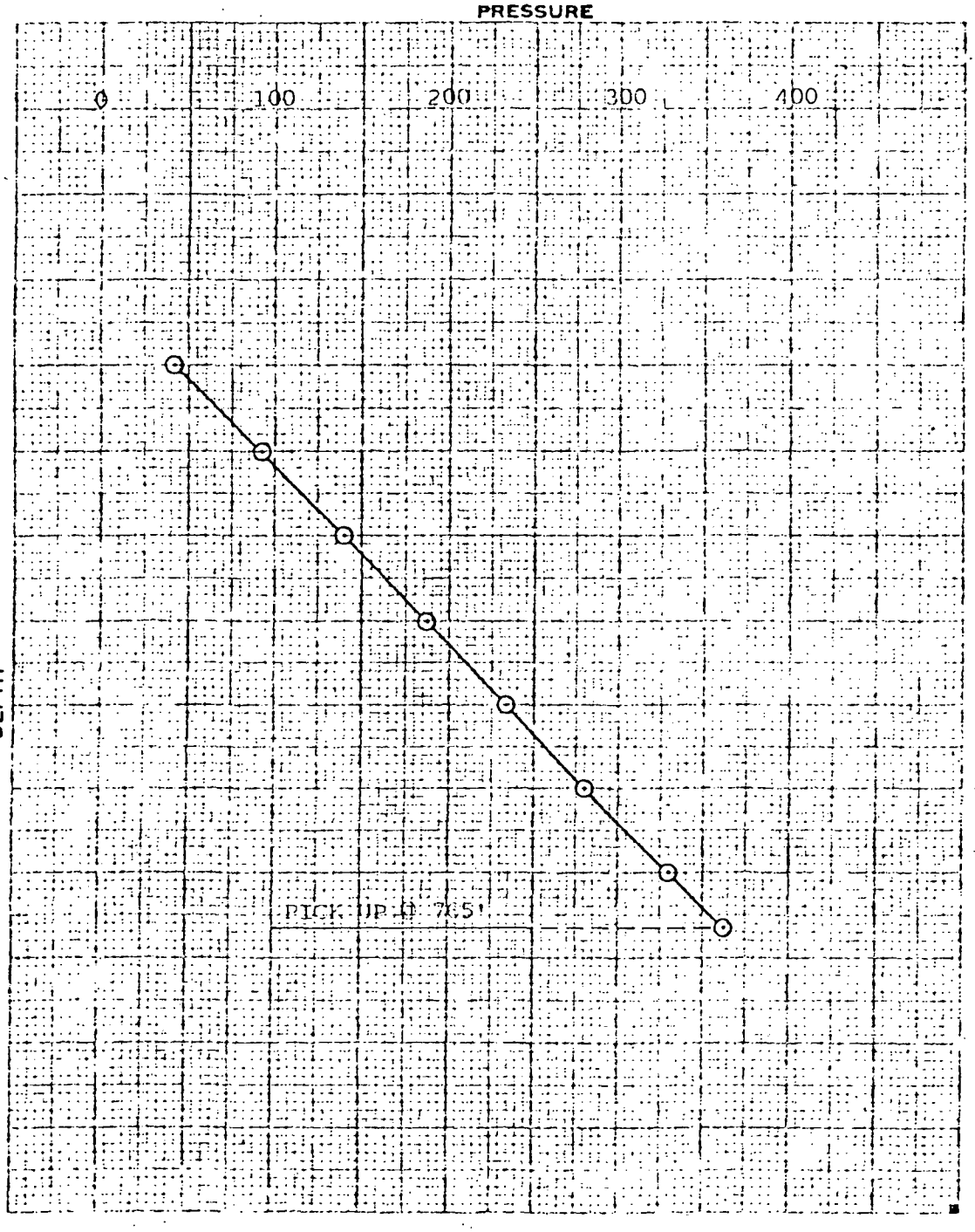
AGNEW AND SWEET

3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

24 HOUR PHONE 327-226
AREA CODE 805

SUBSURFACE PRESSURE SURVEY

OWNER GETTY OIL COMPANY FIELD ROOSEVELT WELL NAME KGRA 52 - 21
CASING ELEV. DATE February 14, 1978
LINER DESCRIPTION: ZERO POINT D.F.
DEPTH
ZONE
TUBING DETAIL: Open Hole
INSTRUMENT 1000 PS
SERIAL NO 39980
PUMP SHOE GAS ANCHOR INTAKE 3 hour 15 turn
PURPOSE STATIC PRESSURE GRADIENT SURVEY MAX TEMP. 111.3 °F @ 765'
REMARKS:



STABLIZATION PERIOD
GROSS OIL RATE B/D
NET OIL RATE B/D
FORMATION GAS MCF D
GOR CFT/BBL
CIRCULATED GAS MCF/D
OIL DRY GRAVITY °API

PRESSURES	OBS	COR
CASING, PSI		
TUBING, PSI		

DEPTH	PRESSURE	GRADIE
100	42	
200	93	.510
300	140	.470
400	187	.470
500	234	.470
600	281	.470
700	330	.490
765	363	.507

Time on bottom 11:19
Time off bottom 11:34

BY: WILSON & SUNDBERG

AGNEW and SWEET
24 HOUR PHONE 805-327-2267
3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

AGNEW AND SWEET WIRELINE SERVICE

SUBSURFACE SURVEY

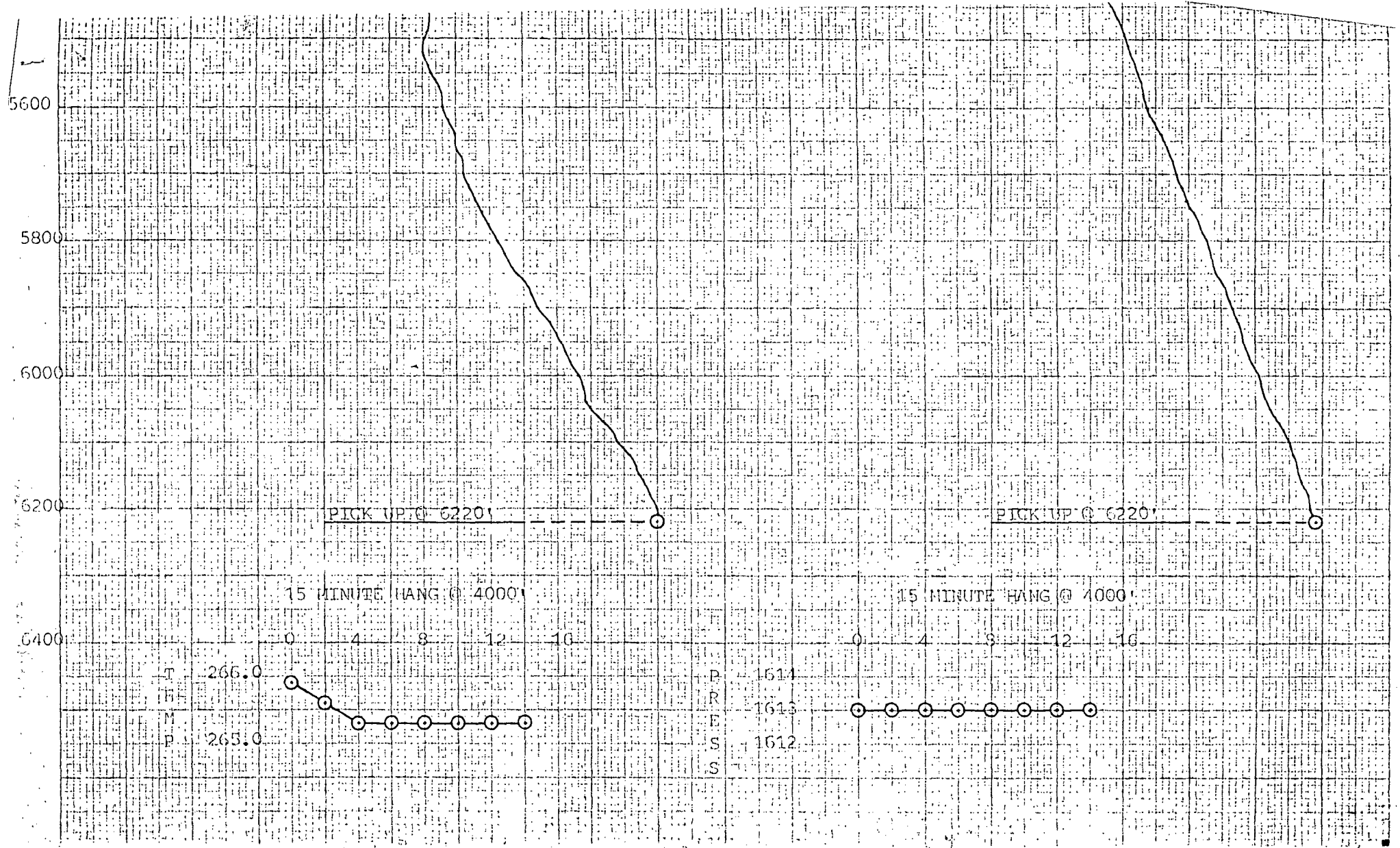
Run #2

OWNER	GETTY OIL COMPANY	FIELD	ROOSEVELT	WELL NAME	KCRA 52-21
CASING:	13-5/8" to 2000'	ELEV.		DATE:	April 12, 1973
LINER DESCRIPTION:				ZERO POINT	I.P. 23
PERFORATIONS:				MPP	
TUBING DETAIL:				DEPTH	6252' ZONE
		PUMP SHOE			
WELL STATUS	Static	SHUT IN		ON PRODUCTION	
SURVEYED	TUB. ☐ ANN ☐ Casing	ENGAGE STYLUS	3:24 pm	DISENGAGE STYLUS	7:03 pm
PICK UP @	6220'	TIME ON BOTTOM	3:41 pm	TIME OFF BOTTOM	4:44 pm
ELEMENT RANGE	76-646 / 3000	SERIAL NO.	10025 / 3923N	CLOCK	12 hour TURN 6220'
PURPOSE	STATIC TEMPERATURE & PRESSURE TRAVERSE SURVEY			MAX. °F	340.8 @ 6220'
REMARKS:	Traverse 20' per minute. Ran survey from 6220' back to 4000'			STABILIZATION PERIOD	

PRESSURES:	START	FINISH
DATE	4-12	
CASING PSI OBS		
CASING PSI COR		
TUBING PSI OBS		
TUBING PSI COR		
PRESS. STATUS	Static	

INSTRUMENT HUNG @ 6220' & 4000'

BY: CONNELL



TEMPERATURE SURVEY

DEPTH	TEMP	DEPTH	TEMP	DEPTH	TEMP
4000	265.9	4820	289.3	5640	310.1
4020	266.2	4840	291.1	5660	310.7
4040	266.5	4860	292.5	5680	311.2
4060	267.1	4880	293.7	5700	311.8

PRESSURE SURVEY

DEPTH	PRESS	DEPTH	PRESS	DEPTH	PRESS
4000	1613	4820	1932	5640	2258
4020	1616	4840	1935	5660	2268
4040	1622	4860	1945	5680	2275
4060	1627	4880	1950	5700	2280

4040	265.5	4860	292.5	5680	311.2	4040	1622	4860	1945	5680	2275
4060	267.1	4880	293.7	5700	311.8	4060	1627	4880	1950	5700	2280
4080	267.7	4900	294.6	5720	312.4	4080	1635	4900	1961	5720	2290
4100	268.2	4920	295.7	5740	313.3	4100	1644	4920	1970	5740	2297
4120	268.5	4940	296.6	5760	315.0	4120	1653	4940	1980	5760	2310
4140	269.1	4960	297.5	5780	316.2	4140	1661	4960	1989	5780	2319
4160	269.4	4980	298.1	5800	316.8	4160	1668	4980	1996	5800	2327
4180	270.0	5000	298.7	5820	317.4	4180	1673	5000	2002	5820	2332
4200	270.3	5020	299.5	5840	318.8	4200	1685	5020	2011	5840	2338
4220	270.6	5040	300.4	5860	320.0	4220	1692	5040	2022	5860	2349
4240	270.9	5060	301.3	5880	321.5	4240	1701	5060	2030	5880	2354
4260	271.5	5080	301.6	5900	322.6	4260	1708	5080	2035	5900	2365
4280	271.8	5100	301.9	5920	324.1	4280	1718	5100	2044	5920	2373
4300	272.3	5120	302.2	5940	325.3	4300	1725	5120	2050	5940	2380
4320	272.9	5140	303.0	5960	326.1	4320	1732	5140	2061	5960	2387
4340	273.2	5160	302.8	5980	327.3	4340	1742	5160	2068	5980	2397
4360	274.1	5180	302.5	6000	328.4	4360	1751	5180	2077	6000	2406
4380	274.4	5200	302.5	6020	329.0	4380	1758	5200	2087	6020	2411
4400	275.0	5220	301.9	6040	329.6	4400	1766	5220	2094	6040	2417
4420	275.3	5240	301.9	6060	331.3	4420	1775	5240	2101	6060	2430
4440	275.6	5260	301.9	6080	333.0	4440	1780	5260	2109	6080	2441
4460	276.4	5280	301.9	6100	334.8	4460	1790	5280	2116	6100	2450
4480	277.0	5300	301.9	6120	336.2	4480	1799	5300	2125	6120	2456
4500	277.6	5320	301.9	6140	337.4	4500	1806	5320	2131	6140	2463
4520	278.2	5340	301.9	6160	338.2	4520	1812	5340	2140	6160	2467
4540	278.8	5360	302.2	6180	339.7	4540	1823	5360	2148	6180	2478
4560	279.6	5380	303.3	6200	340.5	4560	1831	5380	2155	6200	2483
4580	280.5	5400	303.5	6220	340.8	4580	1836	5400	2164	6220	2491
4600	281.4	5420	304.5			4600	1847	5420	2170		
4620	282.5	5440	305.1	15 MINUTE HANG @4000'		4620	1854	5440	2177	15 MINUTE HANG @4000'	
4640	283.5	5460	306.0	0	265.9	4640	1860	5460	2188	0	1613
4660	284.0	5480	306.0	2 min.	265.6	4660	1871	5480	2197	2 min.	1613
4680	284.9	5500	305.7	4	265.3	4680	1880	5500	2203	4	1613

4400	275.0	5220	301.9	6040	329.6	4400	1766	5220	2094	6040	2417
4420	275.3	5240	301.9	6060	331.3	4420	1775	5240	2101	6060	2430
4440	275.6	5260	301.9	6080	333.0	4440	1780	5260	2109	6080	2441
4460	276.4	5280	301.9	6100	334.8	4460	1790	5280	2116	6100	2450
4480	277.0	5300	301.9	6120	336.2	4480	1799	5300	2125	6120	2456
4500	277.6	5320	301.9	6140	337.4	4500	1806	5320	2131	6140	2463
4520	278.2	5340	301.9	6160	338.2	4520	1812	5340	2140	6160	2467
4540	278.8	5360	302.2	6180	339.7	4540	1823	5360	2148	6180	2476
4560	279.6	5380	303.3	6200	340.5	4560	1834	5380	2155	6200	2483
4580	280.5	5400	303.6	6220	340.8	4580	1838	5400	2164	6220	2491
4600	281.4	5420	304.5			4600	1847	5420	2170		
4620	282.6	5440	305.1	15 MINUTE HANG @4000'		4620	1854	5440	2177	15 MINUTE HANG @4000'	
4640	283.5	5460	305.0	0	265.9	4640	1860	5460	2188	0	1613
4660	284.0	5480	306.0	2 min.	265.6	4660	1871	5480	2197	2 min.	1613
4680	284.9	5500	305.7	4	265.3	4680	1880	5500	2203	4	1613
4700	285.2	5520	305.7	6	265.3	4700	1887	5520	2210	6	1613
4720	285.8	5540	306.9	8	265.3	4720	1895	5540	2218	8	1613
4740	286.4	5560	307.7	10	265.3	4740	1904	5560	2227	10	1613
4760	287.0	5580	308.3	12	265.3	4760	1910	5580	2231	12	1613
4780	287.5	5600	308.9	14	265.3	4780	1917	5600	2236	14	1613
4800	288.7	5620	309.8	15	265.3	4800	1928	5620	2245	15 min.	1613

AGNEW AND SWEET WIRELINE SERVICE

AGNEW and SWEET

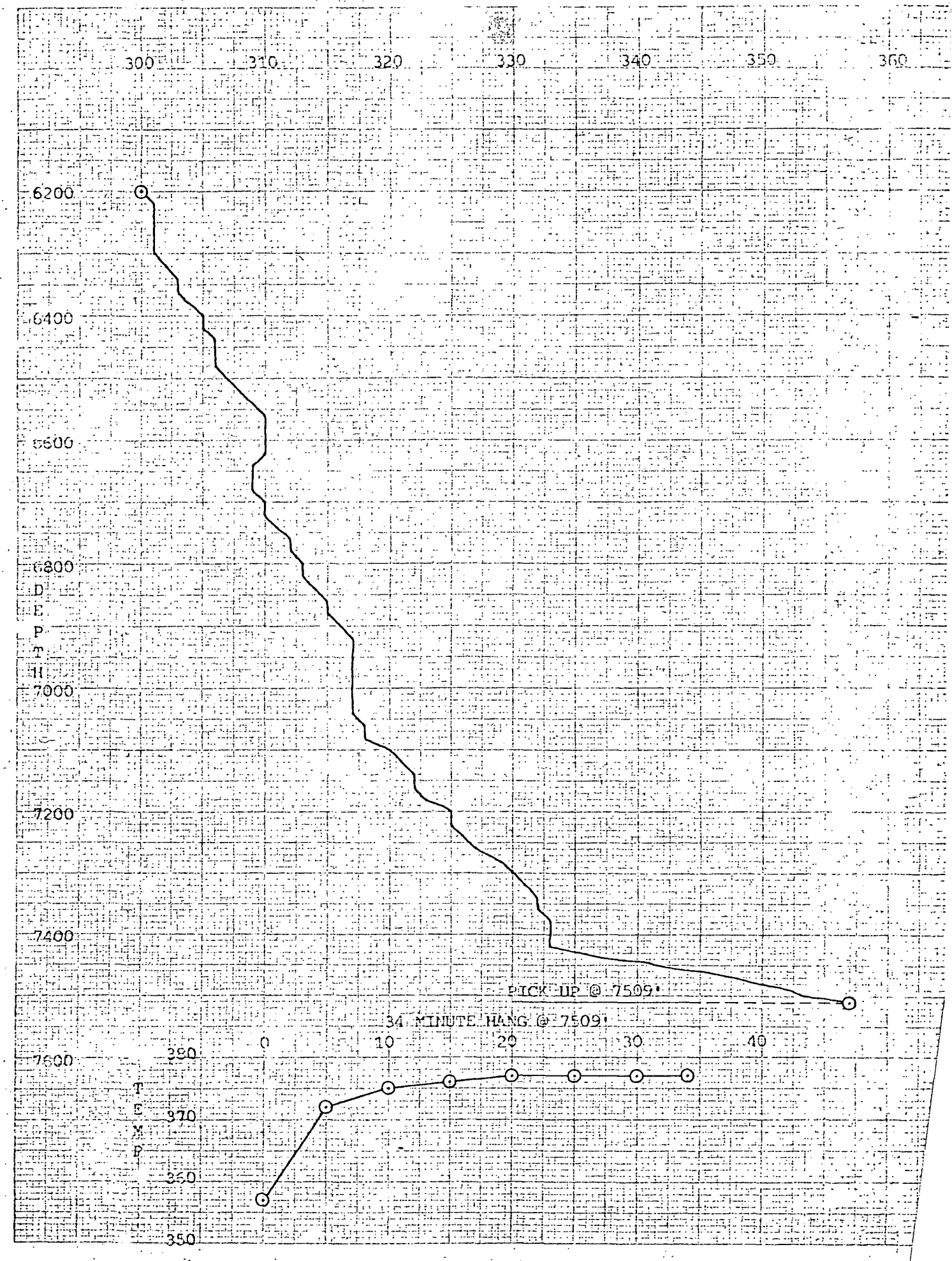
24 HOUR PHONE 805-327-2267
3914 GILMORE AVENUE
BAKERSFIELD, CALIFORNIA
93308

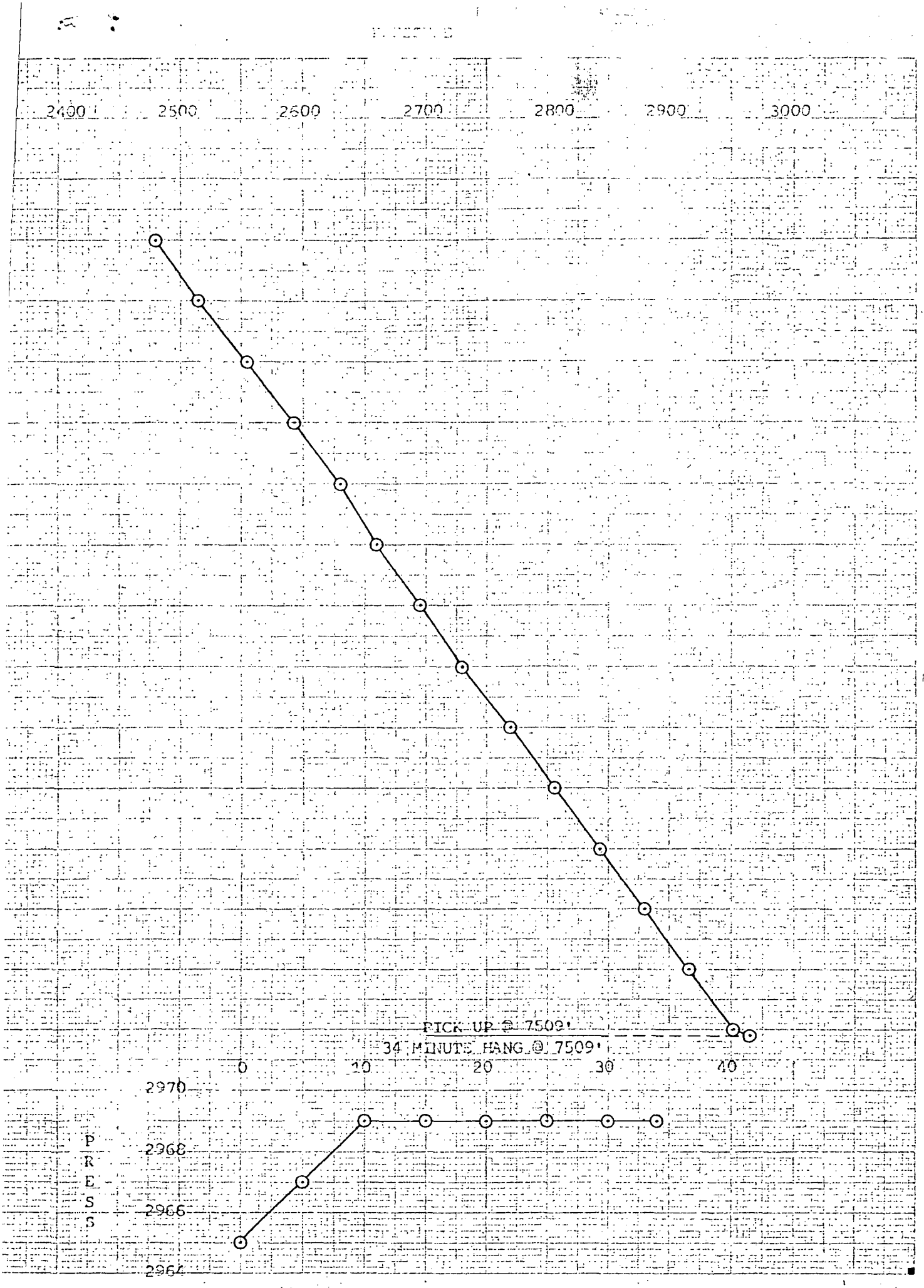
SUBSURFACE SURVEY

OWNER	GETTY OIL COMPANY	FIELD ROOSEVELT	WELL NAME KGRA 52 - 21
CASING	13-3/8" , 9-5/8" @ 2041'	ELEV	DATE May 1,1978
LINER DESCRIPTION			ZERO POINT D.F.
PERFORATIONS			MPP
TUBING DETAIL			DEPTH 7500' ZONE
		PUMP SHOE	
WELL STATUS	Static (open hole)	SHUT IN	ON PRODUCTION
SURVEYED	TUB ☐ ANN ☐	ENGAGE STYLUS 9:01 pm	DISENGAGE STYLUS 12:02 am
PICK UP @	7509'	TIME ON BOTTOM 10:56 pm	TIME OFF BOTTOM 11:30 pm
ELEMENT RANGE	75-640, 3600#	SERIAL NO. 10025, 3923K	CLOCK 12 hr. TURN 7¾
PURPOSE	STATIC TEMPERATURE &PRESSURE TRAVERSE SURVEY		MAX. °F 377.7 @ 7509'
REMARKS	Traverse 20' per minute from 6200' to pick up.		STABILIZATION PERIOD

PRESSURES:	START	FIN
DATE		
CASING PSI OBS		
CASING PSI COR		
TUBING PSI OBS		
TUBING PSI COR		
PRESS. STATUS		

INSTRUMENT HUNG @


300
310
320
330
340
350
360
6200
6400
6600
6800
DEPTH
7000
7200
7400
7600
PICK UP @ 7509'
34 MINUTE HANG @ 7509'
0
10
20
30
40
TEMP
350
360
370
380


2400
2500
2600
2700
2800
2900
3000
PICK UP @ 7509'
34 MINUTE HANG @ 7509'
0
10
20
30
40
2970
2968
2966
2964
P
R
E
S
S

DEPTH	TEMP.	PRESS.	DEPTH	TEMP.	PRESS.	DEPTH	TEMP.	PRESS.
6200	300.4	2480	6720	310.7		7240	326.4	
6220	301.0		6740	311.5		7260	327.3	
6240	301.0		6760	312.7		7280	329.6	
6260	301.3		6780	312.7		7300	330.4	2880
6280	301.3		6800	313.0	2696	7320	331.3	
6300	301.9	2515	6820	313.9		7340	332.2	
6320	302.8		6840	314.5		7360	332.9	
6340	303.3		6860	315.0		7380	333.0	
6360	303.9		6880	315.9		7400	333.3	2917
6380	304.8		6900	316.8	2730	7420	333.9	
6400	305.1	2554	6920	317.1		7440	337.9	
6420	305.7		6940	317.4		7460	345.7	
6440	306.0		6960	317.4		7480	350.0	
6460	306.3		6980	317.4		7500	353.8	2952
6480	306.9		7000	317.7	2769	7509	357.2	2965
6500	307.7	2593	7020	317.4				
6520	308.6		7040	317.7		34 MINUTE HANG @ 7509'		
6540	309.5		7060	318.3		0	357.2	2965
6560	310.7		7080	318.8		5 min.	372.5	2967
6580	310.9		7100	320.0	2806	10	375.4	2969
6600	310.7	2630	7120	321.5		15	376.2	2969
6620	310.1		7140	322.4		20	377.1	2969
6640	309.8		7160	322.4		25	377.7	2969
6660	309.2		7180	323.8		30	377.7	2969
6680	309.8		7200	325.0	2843	34	377.7	2969
6700	310.4	2659	7220	325.6				

PRUETT WIRELINE SERVICE

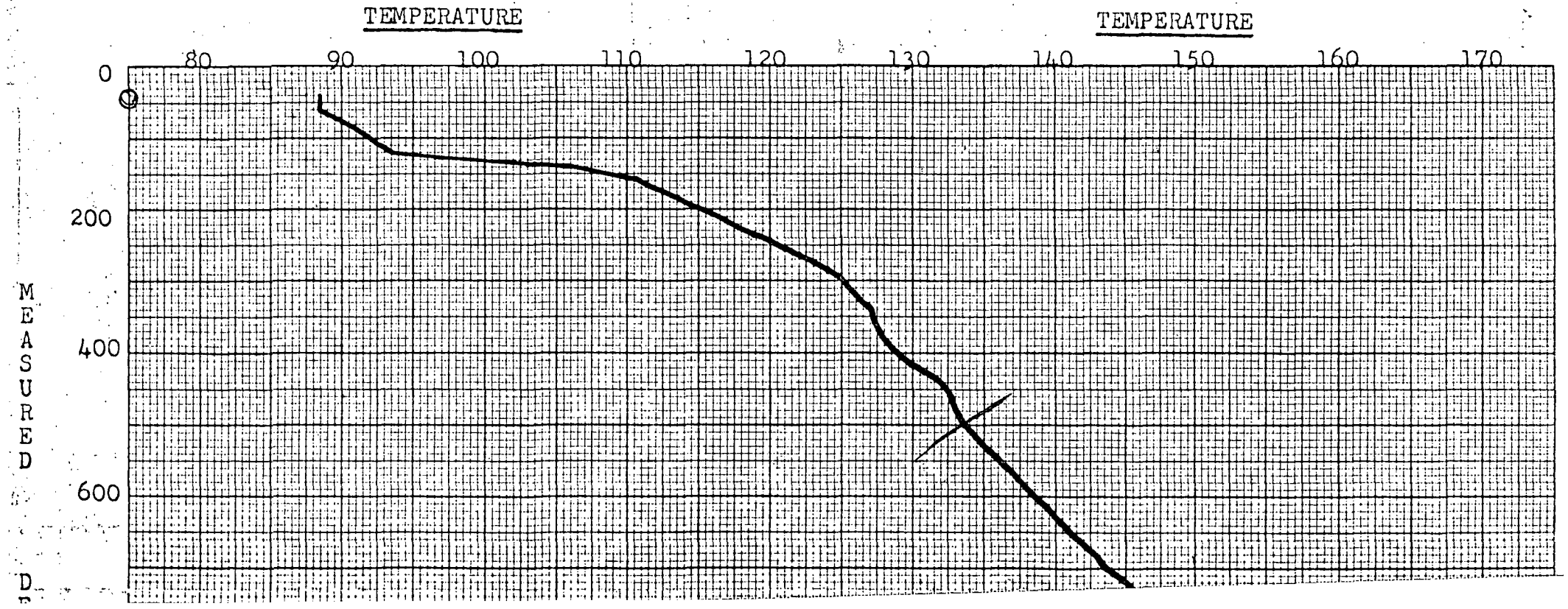
8915 ROSEDALE HWY., BAKERSFIELD, CA 93308
(805) 589-2768

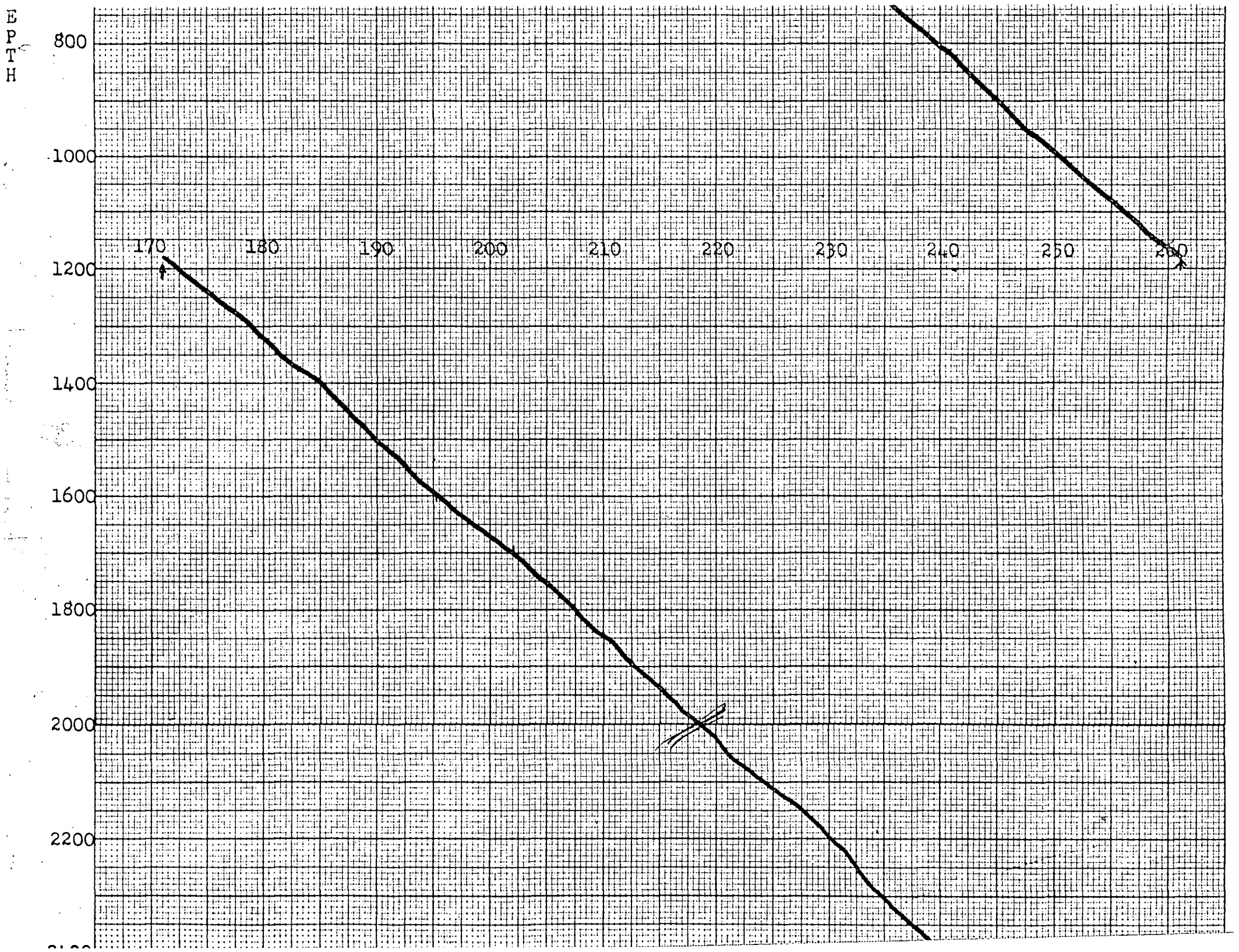
Pruett Wireline

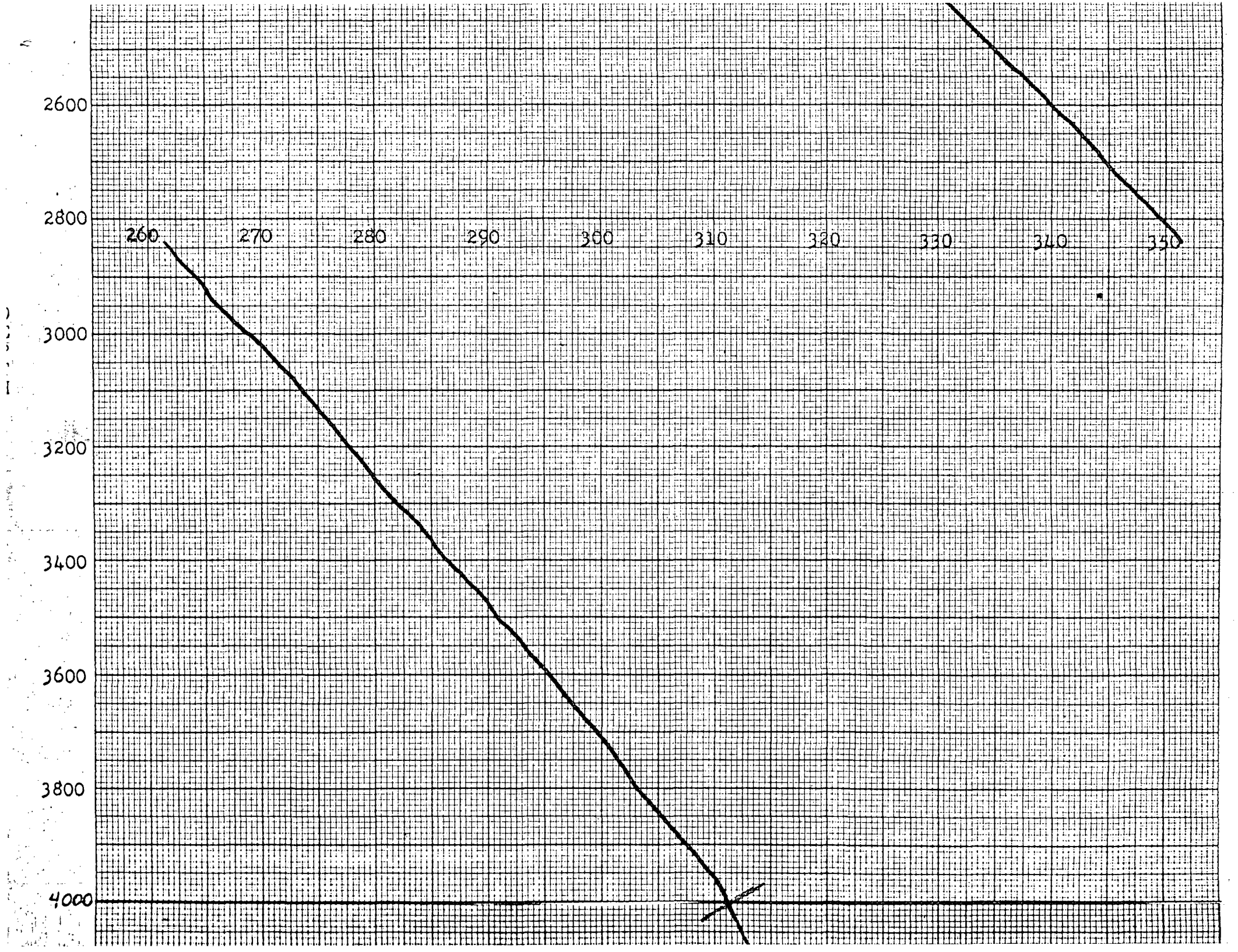
SUB—SURFACE TEMPERATURE SURVEY

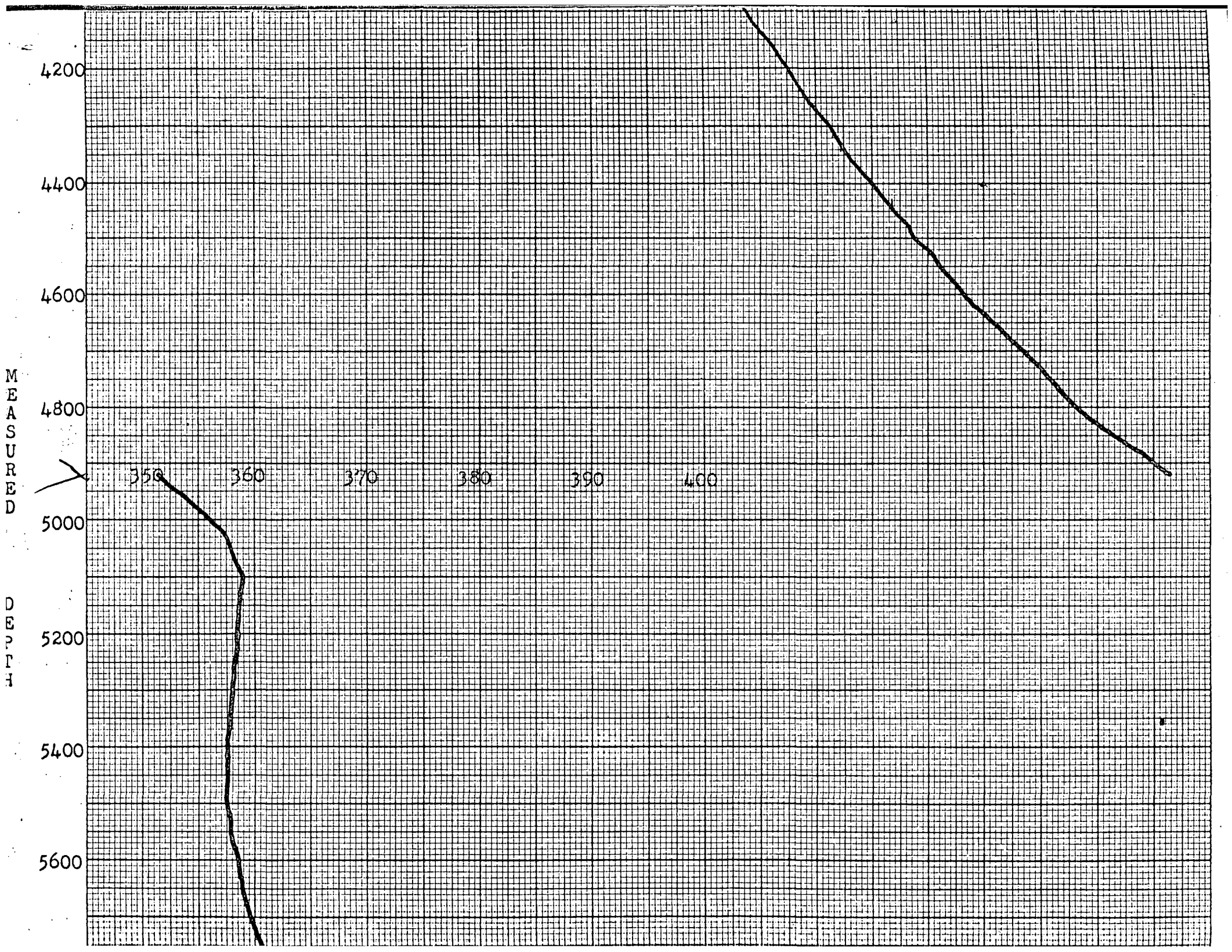
COMPANY Getty Oil **FIELD** Milford **WELL NAME** KGRA 52~~X~~ 21

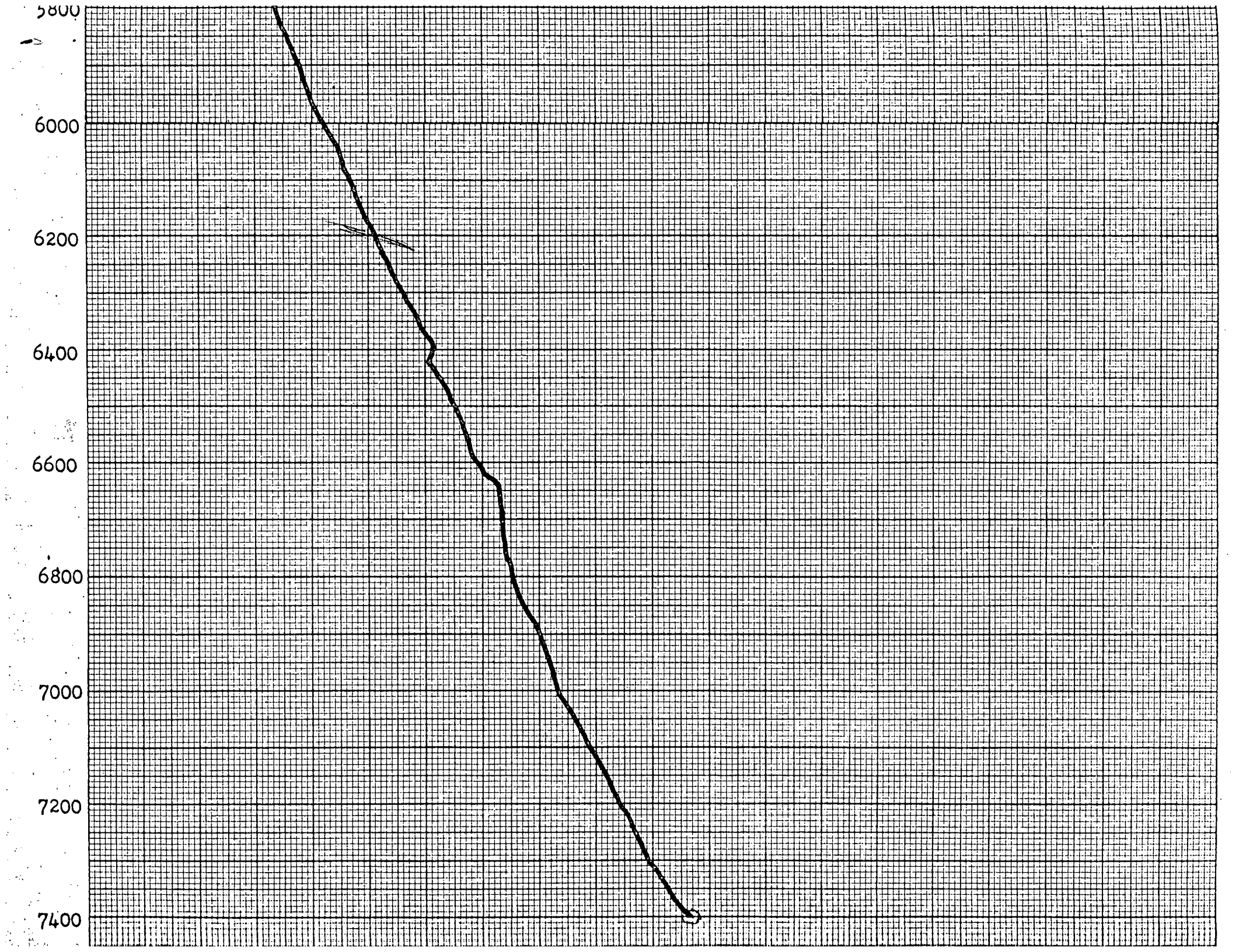
TOTAL DEPTH	7500'	WELL STATUS	Static	BOMB HUNG @	none	DATE	June 9, 1978
CASING	8 5/8" @ 2023'	CASING PRESSURE	0	TIME ON BOTTOM	12:10pm	ELEMENT RANGE	50-474°
LINER	none	TUBING PRESSURE	0	TIME OFF BOTTOM	12:30pm	ZERO POINT	22.0'
PERFORATIONS	none	ZONE	none	SHUT IN	none	ELEVATION	none
MPP	none	MAX. °F	398.3°	ON PRODUCTION	none	PICKUP	7400'
TUBING DETAIL	none			PURPOSE	Traverse Temperature Survey **		

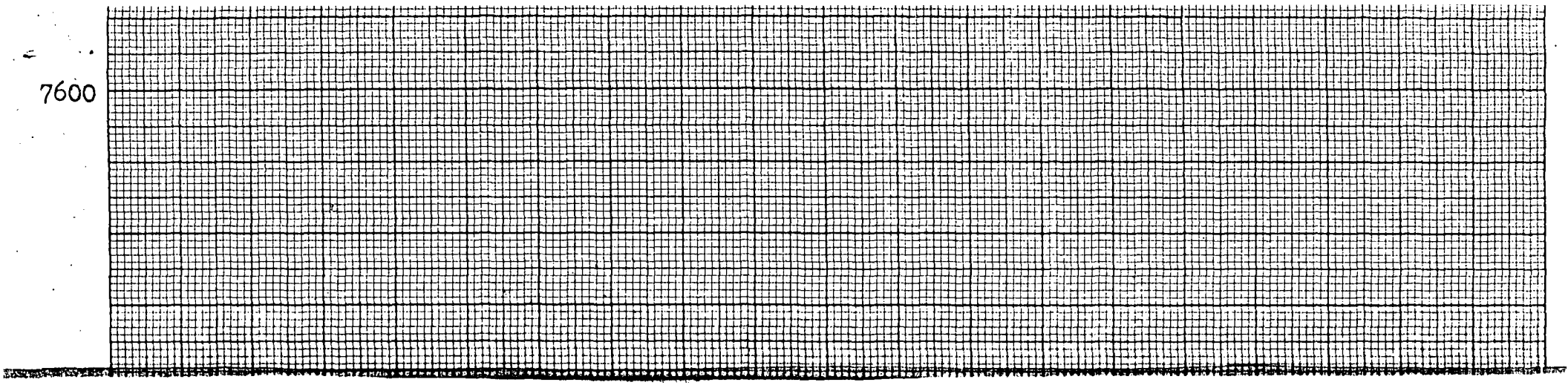



DEPTH
800
1000
1200
1400
1600
1800
2000
2200
170
180
190
200
210
220
230
240
250
260


2600
2800
260
270
280
290
300
310
320
330
340
350
3000
3200
3400
3600
3800
4000


4200
4400
4600
4800
5000
5200
5400
5600
MEASURED DEPTH
350
360
370
380
390
400


5800
6000
6200
6400
6600
6800
7000
7200
7400



SURVEY DATA

DEPTH	TEMPERATURE	DEPTH	TEMPERATURE	DEPTH	TEMPERATURE	DEPTH	TEMPERATURE
40	88.4	1900	212.8	3760	301.7	5620	358.8
60	88.4	1920	213.9	3780	302.4	5640	359.0
80	90.4	1940	215.1	3800	303.2	5660	359.2
100	92.1	1960	216.3	3820	304.1	5680	359.4
120	93.6	1980	217.4	3840	305.0	5700	359.7
140	106.1	2000	218.6/219.6	3860	305.8	5720	360.1
160	110.8	2020	220.0	3880	306.7	5740	360.5
180	113.2	2040	220.6	3900	307.5	5760	361.0
200	115.2	2060	221.5	3920	308.4	5780	361.4
220	117.4	2080	223.3	3940	309.3	5800	361.9
240	119.6	2100	224.3	3960	310.1	5820	362.3
260	121.8	2120	225.6	3980	310.8	5840	362.7
280	123.6	2140	227.2	4000	311.2/311.6	5860	363.2
300	125.0	2160	228.2	4020	311.8	5880	363.6
320	126.0	2180	229.4	4040	312.3	5900	364.1
340	127.2	2200	230.3	4060	312.7	5920	364.3
360	127.4	2220	231.5	4080	313.3	5940	364.7
380	128.0	2240	232.3	4100	314.0	5960	365.2
400	129.0	2260	232.9	4120	314.6	5980	365.6
420	130.4	2280	233.8	4140	315.5	6000	366.0/366.5
440	132.0	2300	235.0	4160	316.4	6020	366.7
460	132.8	2320	235.8	4180	317.0	6040	367.4
480	133.2	2340	237.0	4200	317.6	6060	367.8
500	133.6/134.0	2360	238.3	4220	318.3	6080	368.0
520	134.6	2380	239.3	4240	318.9	6100	368.5
540	135.8	2400	240.1	4260	319.6	6120	368.9
560	136.8	2420	241.1	4280	320.4	6140	369.3
580	137.6	2440	242.2	4300	321.3	6160	369.8
600	138.6	2460	243.0	4320	321.9	6180	370.2
620	139.8	2480	244.0	4340			

540	135.8	2400	240.1	4260	319.6	6120	368.9
560	136.8	2420	241.1	4280	320.4	6140	369.3
580	137.6	2440	242.2	4300	321.3	6160	369.8
600	138.6	2460	243.0	4320	321.9	6180	370.2
620	139.8	2480	244.0	4340	322.6	6200	370.7
640	140.8	2500	245.0/245.8	4360	323.2	6220	371.1
660	141.8	2520	246.1	4380	324.1	6240	371.5
680	143.0	2540	247.1	4400	325.0	6260	372.0
700	143.8	2560	247.9	4420	325.8	6280	372.4
720	145.2	2580	249.1	4440	326.7	6300	373.1
740	146.2	2600	250.2	4460	327.5	6320	373.7
760	147.4	2620	251.2	4480	328.4	6340	374.4
780	148.6	2640	252.2	4500	328.8/329.7	6360	374.8
800	149.8	2660	253.0	4520	330.1	6380	375.5
820	151.0	2680	253.9	4540	330.8	6400	375.9
840	152.0	2700	254.7	4560	331.6	6420	375.5
860	153.0	2720	255.6	4580	332.5	6440	375.9
880	154.0	2740	256.4	4600	333.3	6460	376.6
900	155.0	2760	257.7	4620	334.2	6480	377.3
920	156.0	2780	258.7	4640	335.3	6500	377.7/377.9
940	157.0	2800	259.6	4660	336.4	6520	378.1
960	158.2	2820	260.6	4680	337.4	6540	378.4
980	159.4	2840	261.4	4700	338.5	6560	378.8
1000	160.4/161.4	2860	262.3	4720	339.6	6580	379.2
1020	161.6	2880	263.3	4740	340.5	6600	379.7
1040	162.6	2900	264.4	4760	341.4	6620	380.3
1060	163.8	2920	265.2	4780	342.3	6640	381.4
1080	165.0	2940	265.6	4800	343.2	6660	381.7
1100	166.2	2960	266.7	4820	344.5	6680	381.7
1120	167.4	2980	267.7	4840	345.8	6700	381.9
1140	168.4	3000	268.8/269.8	4860	347.3	6720	381.9
1160	169.6	3020	270.1	4880	348.9	6740	382.1
1180	171.1	3040	270.9	4900	350.2	6760	382.1
1200	172.4	3060	271.9	4920	351.5	6780	382.6
1220	173.8	3080	273.0	4940	352.6	6800	382.8
1240	175.1	3100	273.6	4960	353.9	6820	383.2
1260	176.3	3120	274.5	4980	355.0	6840	383.5
1280	177.6	3140	275.3	5000	356.1/357.0	6860	384.1
1300	178.9	3160	276.1	5020	357.2	6880	384.8
1320	180.1	3180	277.0	5040	357.7	6900	385.3
1340	181.2	3200	277.8	5060	358.1	6920	385.5
1360	182.2	3220	278.7	5080	358.6	6940	385.9
1380	183.7	3240	279.5	5100	359.0	6960	386.2
1400	185.0	3260	280.3	5120	359.0	6980	386.4
1420	186.0	3280	281.2	5140	358.8	7000	386.6/386.8
1440	187.1	3300	282.0	5160	358.8	7020	387.3
1460	188.1	3320	283.1	5180	358.8	7040	388.0
1480	189.2	3340	284.1	5200	358.6	7060	388.4
1500	190.0/190.8	3360	284.8	5220	358.6	7080	389.1

1420	186.0	3280	281.2	5140	358.8	7000	386.6/386.8
1440	187.1	3300	282.0	5160	358.8	7020	387.3
1460	188.1	3320	283.1	5180	358.8	7040	388.0
1480	189.2	3340	284.1	5200	358.6	7060	388.4
1500	190.0/190.8	3360	284.8	5220	358.6	7080	389.1
1520	191.3	3380	285.6	5240	358.6	7100	389.5
1540	192.3	3400	286.4	5260	358.3	7120	390.2
1560	193.1	3420	287.5	5280	358.3	7140	390.7
1580	194.2	3440	288.3	5300	358.1	7160	391.1
1600	195.5	3460	289.4	5320	358.1	7180	391.6
1620	196.7	3480	290.2	5340	357.9	7200	392.2
1640	198.0	3500	290.8/291.5	5360	357.9	7220	392.9
1660	199.2	3520	291.9	5380	357.7	7240	393.4
1680	200.5	3540	292.9	5400	357.7	7260	393.8
1700	202.0	3560	293.6	5420	357.7	7280	394.3
1720	203.2	3580	294.4	5440	357.7	7300	394.7
1740	204.3	3600	295.3	5460	357.7	7320	395.4
1760	205.5	3620	296.1	5480	357.7	7340	396.1
1780	206.8	3640	297.0	5500	357.7/357.9	7360	396.7
1800	207.6	3660	297.9	5520	357.9	7380	397.4
1820	208.5	3680	298.7	5540	358.1	7400	398.3/398.3
1840	209.7	3700	299.6	5560	358.1		
1860	211.0	3720	300.4	5580	358.3		
1880	211.8	3740	301.1	5600	358.6		

COMMENTS: **Stop Checks at 500' Intervals indicated in Survey Data.
Instrument Serial Number 31, calibrated 10-28-76.
Survey traversed 20' per minute.
Final Stop at 7400' for 20 minutes remained the same.

G Doolan

/291.5

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☐ Other Geothermal

b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other

2. NAME OF OPERATOR: Getty Oil Company

3. ADDRESS OF OPERATOR: Rt. 1, Box 197-X, Bakersfield, CA 93308

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface: 2310' W, 990' S of NE corner Sec. 21, T27S, R9W, SLB&M
At top prod. interval reported below
At total depth

5. LEASE DESIGNATION AND SERIAL NO.: USL-U27391
6. IF INDIAN, ALLOTTEE OR TRIBE NAME:
7. UNIT AGREEMENT NAME:
8. FARM OR LEASE NAME:
9. WELL NO.: KGRA 52-21
10. FIELD AND POOL, OR WILDCAT: Roosevelt Hot Springs
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 21, T27S, R9W, SLB&M
12. COUNTY OR PARISH: Beaver
13. STATE: Utah

14. PERMIT NO.	DATE ISSUED
0046	10-17-77

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
2-02-78	5-04-78		5882 KB	5855

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
7500			→	X	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*

25. WAS DIRECTIONAL SURVEY MADE: Yes

26. TYPE ELECTRIC AND OTHER LOGS RUN: FIL, FDC-CNL, DIL, Sonic, Temperature Logs

27. WAS WELL CORED: Yes

28. CASING RECORD (*Report all strings set in well*)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
30"	Line Pipe	30' (MAT)	36"	Ready Mix	
20"	94#	182' (KB)	28"	310 sks class B & additives	
13-3/8"	54.5#	765' (KB)	17-1/2"	465 sks class B & additives	
9-5/8"	40#	2039' (KB)	12-1/4"	535 sks class B & additives	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)

31. PERFORATION RECORD (*Interval, size and number*)

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED

33.* PRODUCTION (Not on production)

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*)

TEST WITNESSED BY

35. LIST OF ATTACHMENTS

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED C. G. Bursell C G Bursell TITLE Agent DATE 6-02-78

*(See Instructions and Spaces for Additional Data on Reverse Side)

HISTORY OF GEOTHERMAL RESOURCES WELL

Operator: Getty Oil Company

Field: Roosevelt Hot Springs

Well No.: KGRA 52-21, U.S.L. U-27391, Section 21, T27S/R9W, SLB&M.

Date: May 23, 1978

Signed: C. G. Bursell

C. G. Bursell

Rt. 1, Box 197-X,
Bakersfield, CA 93308 (805) 399-2961

Title: District Production Manager--SJV-East

Date:

1978

2-3 Rigged up Coastal Drilling Company, rig number 2. Mixed mud; spudded well at 3 p.m., February 2, 1978. Drilled 12-1/4" hole to 182'. Made up and ran 17-1/2" hole opener. Drilled 17-1/2" hole to 125' at 6 a.m. Mud weight 68.5, viscosity 61, temperature in 60°, temperature out 60°.

2-4 Drilled 17-1/2" hole to 182'. P.O.O.H. changed 17-1/2" hole opener to 28" hole opener. Drilled 28" hole to 175' at 6 a.m.
Note: Slight amount of hole sloughing at 103'.
Mud weight 69, viscosity 52, temperature in 60°, temperature out 60°.

2-5 Continued running 28" hole opener. Drilled 28" hole to 182'. Conditioned mud and circulated. Tagged bottom--no fill. Ran 182'-20" H-40, 94# slip joint casing. Casing equipped with guide shoe. First centralizer 10' above shoe. Second centralizer 80' above shoe. Cemented casing with 310 sacks Class B cement, 1:1 perlite, 40% silica flour, 5/10 of 1% CFR-2, 2% gel, 2% CaCl. 10 BBLS water ahead. Displaced with 57 BBLS. 72 BBLS of returns. Cement in place at 5:20 p.m. WOC eight hours. Welded on 20" casing head. Assembling 20" B.O.P. stack at 6 a.m.

2-6 Nippled-up B.O.P.E.

2-7 Completed nippling up of B.O.P.E. B.O.P. stack consisted of two 20" series 900 Shaffer double B.O.P., Hydril GK B.O.P. Tested casing blind rams, pipe rams, hydril, kill line valves and blowdown manifold valves to 500 psi with mud. All checked o.k. USGS witnessed. Picked up 9" drill collars. R. F. Smith logging equipment installed and commenced operating at 182'. Prepared to drill out shoe at 6 a.m.

2-8 Drilled out shoe at 182' with water. Changed over to mud. Drilled 17-1/2" hole to 345' at 6 a.m.
Mud weight 68.5, viscosity 51, temperature in 73°, temperature out 75°.

1978

2-9 Drilled 17-1/2" hole to 586'. Drilling ahead at 6 a.m.
Mud weight 67.5, viscosity 54, temperature in 91°, temperature out 95°

2-10 Tripped for bit. 9" collars would not break. Wait on tongs. Made up new bit and drilling assembly. Prepared to drill ahead at 6 a.m.

2-11 Drilled 17-1/2" hole to 634'. Pulled out of hole at 6 a.m.
Mud weight 67.5, viscosity 47, temperature in 91°, temperature out 95°

2-12 Tried to break and lay down 9" drill collars. Collars would not break. Cut and layed down collars. Ran in hole with drilling assembly. Drilled 17-1/2" hole to 667' at 6 a.m.
Mud weight 68, viscosity 47, temperature in 96°, temperature out 99°

2-13 Drilled 17-1/2" hole to 725' at 6 a.m.
Mud weight 67.5, viscosity 46, temperature in 105°, temperature out 109°

2-14 Drilled 17-1/2" hole to 765'. Circulating and conditioning mud for loggers at 6 a.m.
Mud weight 67.5, viscosity 47, temperature in 102°, temperature out 105°

2-15 Rigged up and ran Schlumberger logs, DIL, FDC-CNL, temperature log. Rigged up and ran Agnew & Sweet temperature and pressure survey. Recorded stabilized B.H.T. of 111°F at 765'. Ran in hole, tagged bottom, no fill, circulated. Prepared to run casing at 6 a.m.

2-16 Ran 765', 13-3/8" K-55, 54.5# buttress casing. Casing equipped with guide shoe. First centralized 10' above shoe. Remaining centralizers every other joint. Cemented casing with 465 sacks Class B cement, 1:1 perlite, 40% silica flour, 5/10 of 1% CFR-2, 2% gel. 10 BBLS water ahead. Displaced with 114 BBLS. 50 BBLS of returns. Bumped plug with 1000 psi. Held 500 psi shut-in. Cement in place 2:56 p.m. WOC eight hours. Tearing out 20" B.O.P.E. stack at 6 a.m.

2-17 Completed tearing out 20" B.O.P.E. Welded on 13-3/8" casing head. Nippling up 12" B.O.P.E. stack at 6 a.m.

2-18 Nippling up 12" B.O.P.E. stack at 6 a.m.

2-19 Completed nippling up 12" B.O.P.E. stack. Stack consisted of two 12" series 900 Shaffer double B.O.P. Hydril GK B.O.P. and Grant rotating head. Pressure tested to 1000 psi. Pressure test failed. Line repair and rig repair at 6 a.m.

2-20 Rig repair.

1978

2-21 Picked up 9" drill collars and drilling assembly. Completed pressure test of B.O.P.E. USGS witnessed. Drilled out shoe at 765' with water. Changed over to mud. Drilled 12-1/4" hole to 789' at 6 a.m.
Mud weight 65.4, viscosity 40, temperature in 90°, temperature out 94°

2-22 Drilled 12-1/4" hole to 879'. Drilling ahead at 6 a.m.
Mud weight 64, viscosity, 41, temperature in 110°, temperature out 114°

2-23 Drilled 12-1/4" hole to 1004'. Drilling ahead at 6 a.m.
Mud weight 65.2, viscosity 32, temperature in 111°, temperature out 116°

2-24 Drilled 12-1/4" hole to 1105'. Drilling ahead at 6 a.m.
Mud weight 67, viscosity 32, temperature in 104°, temperature out 109°

2-25 Drilled 12-1/4" hole to 1249'. Drilling ahead at 6 a.m.
Mud weight 66.3, viscosity 30, temperature in 112°, temperature out 117°

2-26 Drilled 12-1/4" hole to 1386'. Drilling ahead at 6 a.m.
Mud weight 65.6, viscosity 27, temperature in 108°, temperature out 112°

2-27 Drilled 12-1/4" hole to 1508'. Tripped for bit. Drilling ahead at 6 a.m.
Mud weight 65, viscosity 28, temperature in 105°, temperature out 110°

2-28 Drilled 12-1/4" hole to 1633'. Drilling ahead at 6 a.m.
Mud weight 65, viscosity 29, temperature in 112°, temperature out 117°

3-1 Drilled 12-1/4" hole to 1749'. Hole took fluid at 6 BBL/hr. for three hour period at ~1680'. Drilling ahead at 6 a.m.
Mud weight 65.7, viscosity 27, temperature in 117°, temperature out 122°

3-2 Drilled 12-1/4" hole to 1874'. Drilling ahead at 6 a.m.
Mud weight 65.7, viscosity 27, temperature in 113°, temperature out 118°

3-3 Drilled 12-1/4" hole to 1950'. Drilling ahead at 6 a.m.
Mud weight 63.9, viscosity 26, temperature in 113°, temperature out 118°

3-4 Drilled 12-1/4" hole to 2041'. Conditioned mud and circulated. Pulled out of hole and laying down 9" drill collars at 6 a.m.
Mud weight 63.9, viscosity 32, temperature in 114°, temperature out 120°

3-5 Completed laying down 9" drill collars. Rigged up and ran Schlumberger DIL, FDC-CNL, sonic, temperature logs. Rigged up and ran Agnew & Sweet temperature and pressure surveys. Recorded static B.H.T. of 238.5° at 2041'. Picked up drill string and ran in hole. Circulating at 6 a.m.

1978

3-6 Pulled out of hole. Rigged up casing tong crew. Ran 2039', 9-5/8", 40# K-55 buttress casing. Casing equipped with float collar on top of first joint; stop collar ten foot off bottom. Remaining centralizers every other joint. Installed W.K.M. casing slips. Prepared to cement at 6 a.m.

3-7 Cemented casing with 535 sacks Class B cement, 1:1 perlite, 40% silica flour, 2% gel, 5/10 of 1% CFR-2. Pumped 10 BBLS water ahead. Bumped plug with 1000 psi. 30 BBLS cement returns. Cement in place at 7:45 a.m. WOC 12 hours. Picked up B.O.P.E. stack. Installed W.K.M. expansion spool and master gate valve. Nippling-up B.O.P.E. stack at 6 a.m.

3-8 Completed nippling up B.O.P.E., pressure tested with water to 1000 psi. USGS witnessed. Drilled out cement to 2041'. Drilling ahead at 6 a.m.
Mud weight 63, viscosity 26, temperature in 99°, temperature out 106°

3-9 Drilled 8-1/2" hole to 2142'. Pulled out of hole. Picked up stabilized drilling assembly. Ran in hole. Reamed hole to 2142'. Drilling ahead at 6 a.m.
Mud weight 63, viscosity 26, temperature in 120°, temperature out 126°

3-10 Drilled 8-1/2" hole to 2306'. Drilling ahead at 6 a.m.
Mud weight 62.9, viscosity 27, temperature in 126°, temperature out 132°

3-11 Drilled 8-1/2" hole to 2378'. Twisted off #4-7" drill collar. 108' fish. Circulated. Pulled out of hole. Layed down drill collars. Called out fishing tools. Waiting on fishing tools at 6 a.m.
Mud weight 62.9, viscosity 27, temperature in 131°, temperature out 137°

3-12 Made up fishing tools. Ran in hole. Circulated and worked over fish. Pulled out of hole with fish. Broke and layed down fishing tools. Made up drilling assembly with new bit. Serviced all tool connections. Reamed from 2318-2378'. Drilled 8-1/2" hole to 2426'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 29, temperature in 128°, temperature out 134°

3-13 Drilled 8-1/2" hole to 2542'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 35, temperature in 139°, temperature out 148°

3-14 Tripped for additional stabilization. Drilled 8-1/2" hole to 2650'. Drilling ahead at 6 a.m.
Mud Weight 63.7, viscosity 33, temperature in 136°, temperature out 142°

1978

3-15 Drilled 8-1/2" hole to 2762'. Drilling ahead at 6 a.m.
Mud weight 65.5, viscosity 32, temperature in 150°, temperature out 157°

3-16 Drilled 8-1/2" hole to 2819'. Pulled out of hole looking for washed out pipe. #7 drill collar washed out. Picked up additional drill collars. Replaced 6 pt. reamer and bit. Ran in hole. Reamed from 2786-2819'. Drilling ahead at 6 a.m.
Mud weight 65.4, viscosity 31, temperature in 142°, temperature out 149°

3-17 Drilled 8-1/2" hole to 2957'. Drilling ahead at 6 a.m.
Mud weight 65.2, viscosity 32, temperature in 148°, temperature out 155°

3-18 Drilled 8-1/2" hole to 3094'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 33, temperature in 149°, temperature out 155°

3-19 Drilled 8-1/2" hole to 3254'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 33, temperature in 151°, temperature out 157°

3-20 Drilled 8-1/2" hole to 3336'. Tripped for bit. Reamed from 2860' to 3356' at 6 a.m.
Mud weight 64.6, viscosity 34, temperature in 159°, temperature out 164°

3-21 Drilled 8-1/2" hole to 3499'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 33, temperature in 155°, temperature out 161°

3-22 Drilled 8-1/2" hole to 3567'. Pulled out of hole. Rigged up and ran Agnew & Sweet temperature and pressure surveys. Recorded static bottom hole temperature of 255°F. Rigged down loggers, picked up core barrel at 6 a.m.
Mud weight 64.4, viscosity 33, temperature in 151°, temperature out 158°

3-23 Ran in hole with core barrel. Circulated. Rig repair at 6 a.m.

3-24 Rig repair last 24 hours.

3-25 Reamed from 3502-3567' with 8-1/2" core bit. Cored and recovered 12' core. Layed down core barrel. Picked up monel collar and multishot survey tool. Surveyed every second stand from 3551-2120'. Pulled out of hole at 6 a.m.
Mud weight 63.7, viscosity 32, temperature in 147°, temperature out 152°

3-26 Made up drilling assembly. Drilled 8-1/2" hole to 3710'. Loosing mud at ~5 to 6 BBL/Hr. Drilling ahead at 6 a.m.
Mud weight 64, viscosity 30, temperature in 165°, temperature out 169°

1978

3-27 Drilled 8-1/2" hole to 3884'. Drilling ahead at 6 a.m.
Mud weight 64.6, viscosity 33, temperature in 171°, temperature out 179°

3-28 Drilled 8-1/2" hole to 4055'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 33, temperature in 175°, temperature out 181°

3-29 Drilled 8-1/2" hole to 4250'. Drilling ahead at 6 a.m.
Mud weight 64.1, viscosity 33, temperature in 183°, temperature out 189°

3-30 Drilled 8-1/2" hole to 4335'. Tripped for bit. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 33, temperature in 180°, temperature out 185°

3-31 Drilled 8-1/2" hole to 4510'. Losing fluid at ~9 BBLS/Hr. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 35, temperature in 172°, temperature out 180°

4-01 Drilled 8-1/2" hole to 4701'. Drilling ahead at 6 a.m.
Mud weight 65.2, viscosity 32, temperature in 175°, temperature out 180°

4-02 Drilled 8-1/2" hole to 4751'. Tripped for bit. Replaced stablizing assembly. Reamed from 4631-4751' at 6 a.m.
Mud weight 64.4, viscosity 31, temperature in 168°, temperature out 176°

4-03 Drilled 8-1/2" hole to 4910'. Drilling ahead at 6 a.m.
Mud weight 63.4, viscosity 28, temperature in 166°, temperature out 172°

4-04 Drilled 8-1/2" hole to 5094'. Drilling ahead at 6 a.m.
Mud weight 63.4, viscosity 29, temperature in 165°, temperature out 171°

4-05 Drilled 8-1/2" to 5257'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 29, temperature in 163°, temperature out 171°

4-06 Drilled 8-1/2" hole to 5430'. Tripping for bit at 6 a.m.
Mud weight 64.4, viscosity 29, temperature in 166°, temperature out 173°

4-07 Tripped for bit. Reamed from 5340-5430'. Drilled 8-1/2" hole to 5584'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 32, temperature in 176°, temperature out 181°

4-08 Drilled 8-1/2" hole to 5786'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 29, temperature in 172°, temperature out 179°

4-09 Drilled 8-1/2" hole to 5987'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 172°, temperature out 178°

4-10 Drilled 8-1/2" hole to 6174'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 173°, temperature out 180°

1978

4-11 Drilled 8-1/2" hole to 6252'. Made 5 stand wiper run. Circulated. Checked for fill. No fill. Measured out of hole at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 188°, temperature out 193°

4-12 Pulled out of hole. Rigged up Schlumberger logs: FDC-CNL, FIL, temperature log would not operate. Run in hole with sonic at 6 a.m.

4-13 Pulled out of hole. Rigged up Agnew & Sweet pressure and temperature log. Recorded static bottom hole temperature of 340°F at 6252'. Ran in hole with 4-1/2" drill pipe. Prepared swabbing tool (would not operate). Changing out pipe rams at 6 a.m.

4-14 Swabbing tool would not operate. Pulled out of hole laying down 4-1/2" drill pipe. Picked up new reamer and bit. Measured and picked up 3-1/2" drill pipe. Ran in hole at 6 a.m.

4-15 Completed running in hole with 3-1/2" drill pipe. Attempted to circulate. Plugged bit. Tripped for plugged bit. Made up and ran in swabbing tool at 6 a.m.

4-16 Swabbed well noting fluid temperature. No perceivable loss in fluid level. Tripped to pick up drilling assembly at 6 a.m.

4-17 Completed trip in. Circulated and conditioned mud. Reamed from 5870-6246'. Bit would not penetrate at 6246'. Excessive metal cuttings coming over shaker. Pulled out of hole. Four rollers on 6 point reamer locked up. Ran in hole with new reamer at 6 a.m.
Mud weight 64, viscosity 29

4-18 Mixed and conditioned mud. Made 4 surveys on bottom--indicated moderate dog leg. Drilled 8-1/2" hole to 6287'. Tripped for bit. Ran in hole. Reaming 1 joint at 6 a.m.
Mud weight 63.7, viscosity 32, temperature in 186°, temperature out 194°

4-19 Drilled 8-1/2" hole to 6380'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 190°, temperature out 198°

4-20 Drilled 8-1/2" hole to 6484'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 29, temperature in 180°, temperature out 188°

4-21 Tripped for bit. Drilled 8-1/2" hole to 6543'. Drilling ahead at 6 a.m.
Mud weight 64.6, viscosity 33, temperature in 188°, temperature out 200°

4-22 Drilled 8-1/2" hole to 6679'. Drilling ahead at 6 a.m.
Mud weight 64.7, viscosity 31, temperature in 183°, temperature out 195°

1978

4-23 Drilled 8-1/2" hole to 6862'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 30, temperature in 186°, temperature out 197°

4-24 Drilled 8-1/2" hole to 6980'. Tripped for bit at 6 a.m.
Mud weight 64.4, viscosity 31, temperature in 175°, temperature out 184°

4-25 Ran in hole. Reamed from 6730-6980'. Drilled 8-1/2" hole to 7071'. Drilling ahead at 6 a.m.
Mud weight 64, viscosity 32, temperature in 188°, temperature out 201°

4-26 Drilled 8-1/2" hole to 7205'. Drilling ahead at 6 a.m.
Mud weight 64, viscosity 34, temperature in 184°, temperature out 196°

4-27 Drilled 8-1/2" hole to 7253'. Tripped for bit. Reamed from 7150-7253'. Drilling ahead at 6 a.m.
Mud weight 63.4, viscosity 33, temperature in 186°, temperature out 198°

4-28 Drilled 8-1/2" hole to 7350'. Drilling ahead at 6 a.m.
Mud weight 64.6, viscosity 34, temperature in 192°, temperature out 206°

4-29 Drilled 8-1/2" hole to 7450'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 34, temperature in 195°, temperature out 206°

4-30 Drilled 8-1/2" hole to 7500'. Mixed gel pill and circulated. Pulled out of hole measuring out. Laying down drill collars at 6 a.m.
Mud weight 65.4, viscosity 36, temperature in 194°, temperature out 204°

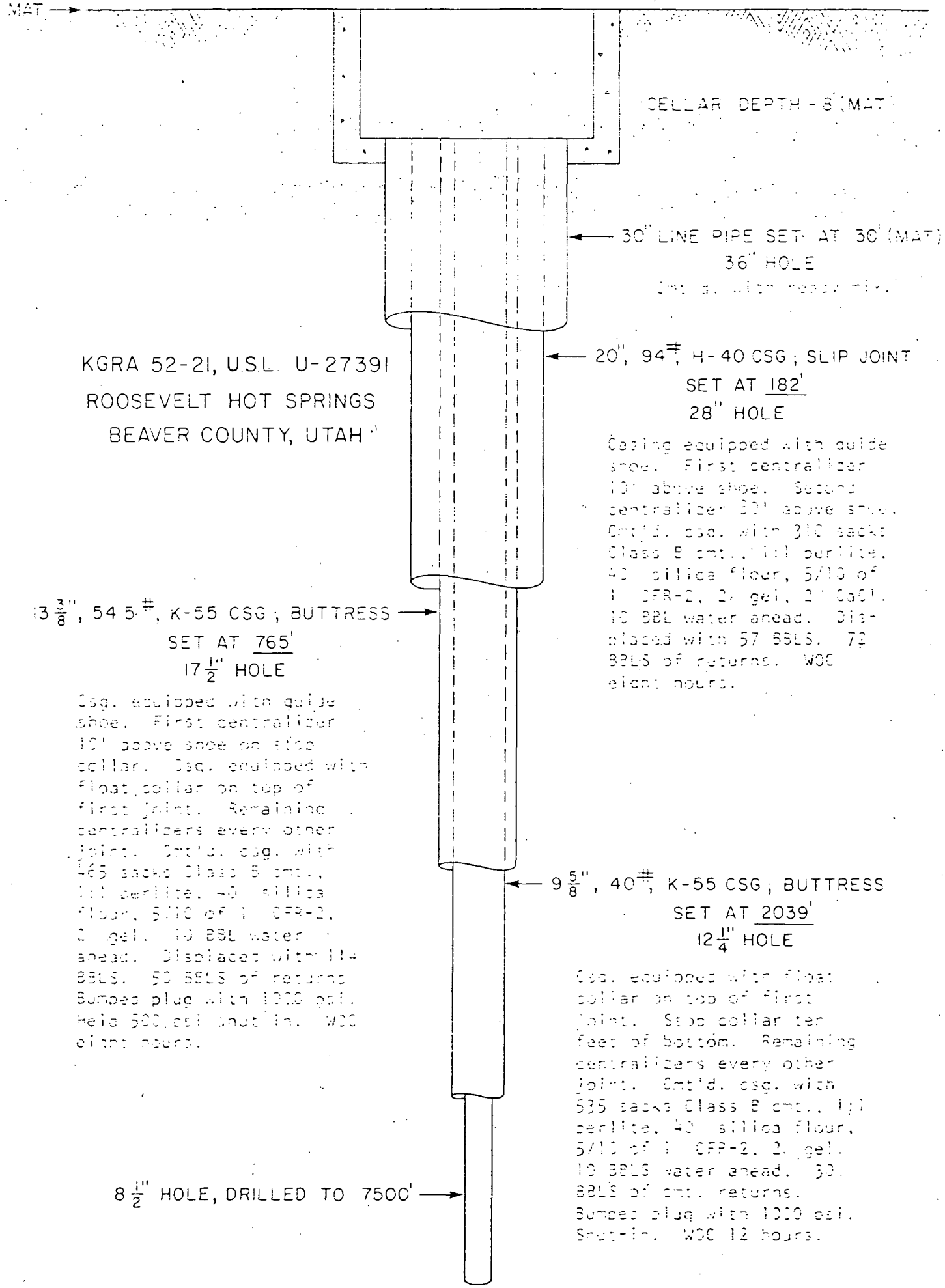
5-01 Completed laying down drill collars. Ran in hole with open ended drill pipe with tool catcher on bottom. Dumped mud tanks and changed over to water. Circulated to cool hole. Pulled out of hole. Rigged up and running Schlumberger FIL at 6 a.m.

5-02 Completed running Schlumberger logs: FIL, FDC-CNL, DIL, Sonic, temperature log. Rigged up and ran Agnew & Sweet temperature and pressure survey. Recorded static bottom hole temperature of 376°F. Ran in hole with open ended drill pipe with tool catcher on bottom. Rigged up nitrogen and pressured up well at 6 a.m.

5-03 Completed pressuring well with nitrogen, purged fluid from well. Well did not flow. Rigged up swabbing tool to check fluid level. Tagged fluid at 433' (124°F). Rigged down swabbing tool. Pulled out of hole laying down drill pipe. Shut-in well. Tearing out B.O.P.E. at 6 a.m.

5-04 Completed tearing out B.O.P.E. stack. Installed wellhead assembly. Tearing out choke manifold and flare stacks at 6 a.m.
Released contract rig at 12 noon 5-04-78.

KGRA 52-21, ROOSEVELT HOT SPRINGS, BEAVER COUNTY, UTAH
K.B. ELEVATION : 5882', ALL MEASUREMENTS FROM K.B.
MAT ELEVATION : 5860'



R. F. SMITH CORP.

GEOTHERMAL DATA LOG

COMPANY Getty Oil Company

WELL KGRA 52-21, U.S.L. U-27931

FIELD Roosevelt Hot Springs COUNTY Beaver

LOCATION SEC 21 T 27S R 9W

STATE Utah COUNTRY U.S.A.

LOGGING GEOLOGISTS Dale A. Johnson
James Hill John Dooley

PRESSURE INST. TYPE Silicon Chip TEMP. TYPE J-Thermocouple

DEPTH LOGGED FROM 184' TO 7500'

DATE LOGGED FROM 2/7/78 TO 4/29/78

ELEVATION 5860' (GL) + 22' KB ☒ DF ☐ GR ☐

-LITHOLOGY-

Sandstone	Siltstone	Graywacke Type #1	Graywacke Type #4	Solution Deposit	Basalt or Greenstone	Peridotite	Schist	
Breccia	Claystone	Graywacke Type #2	Chert	Minerlzd Deposit	Other Volcanic	Igneous Rock	Quartzite	
Conglom.	Shale or Argillite	Graywacke Type #3	Limestone	MELANGE	Tuff or Tuff Brec	Granitic Rock	Serpentine	

ENGINEERING DATA

HOLE SIZE

17 1/2" to 765'

12 1/4" to 2041'

8 1/2" to 7500'

CASING SIZE

20" to 184'

13 3/8" to 765'

9 5/8" to 2039'

DRILLING RATE ☒ FT/HR ☐ MIN/FT

ROCK DENSITY ----

DEPTH

LITHOLOGY

AIR AND MUD DRILLING DATA

TEMPERATURE (°F)

IN - - - - - - - - -

OUT ———————

CO_2 ppm on Air ———·———·———

TOTAL MUD GAIN/LOSS ———·———·———

PRESSURE PSIG

IN - - - - - -

OUT ———————

METHANE ppm ———·———·———

ETHANE ppm ———·———·———

H_2S ppm - - - -

% MOISTURE

REMARKS

DESCRIPTIONS

CORE RESULTS

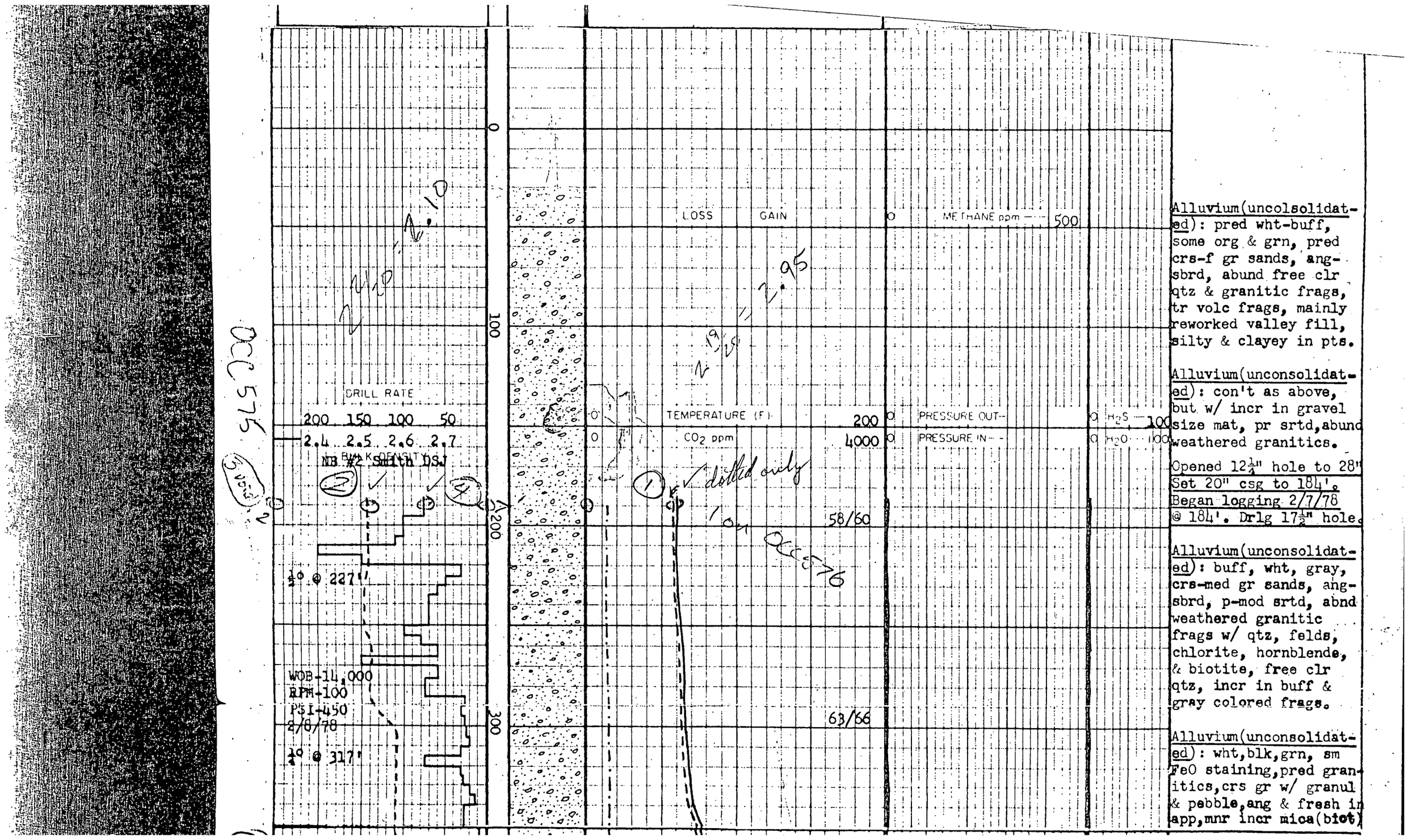
SURVEYS

FORMATION TESTS

MUD AGITATOR

ELECTRIC ☐

AIR ☒



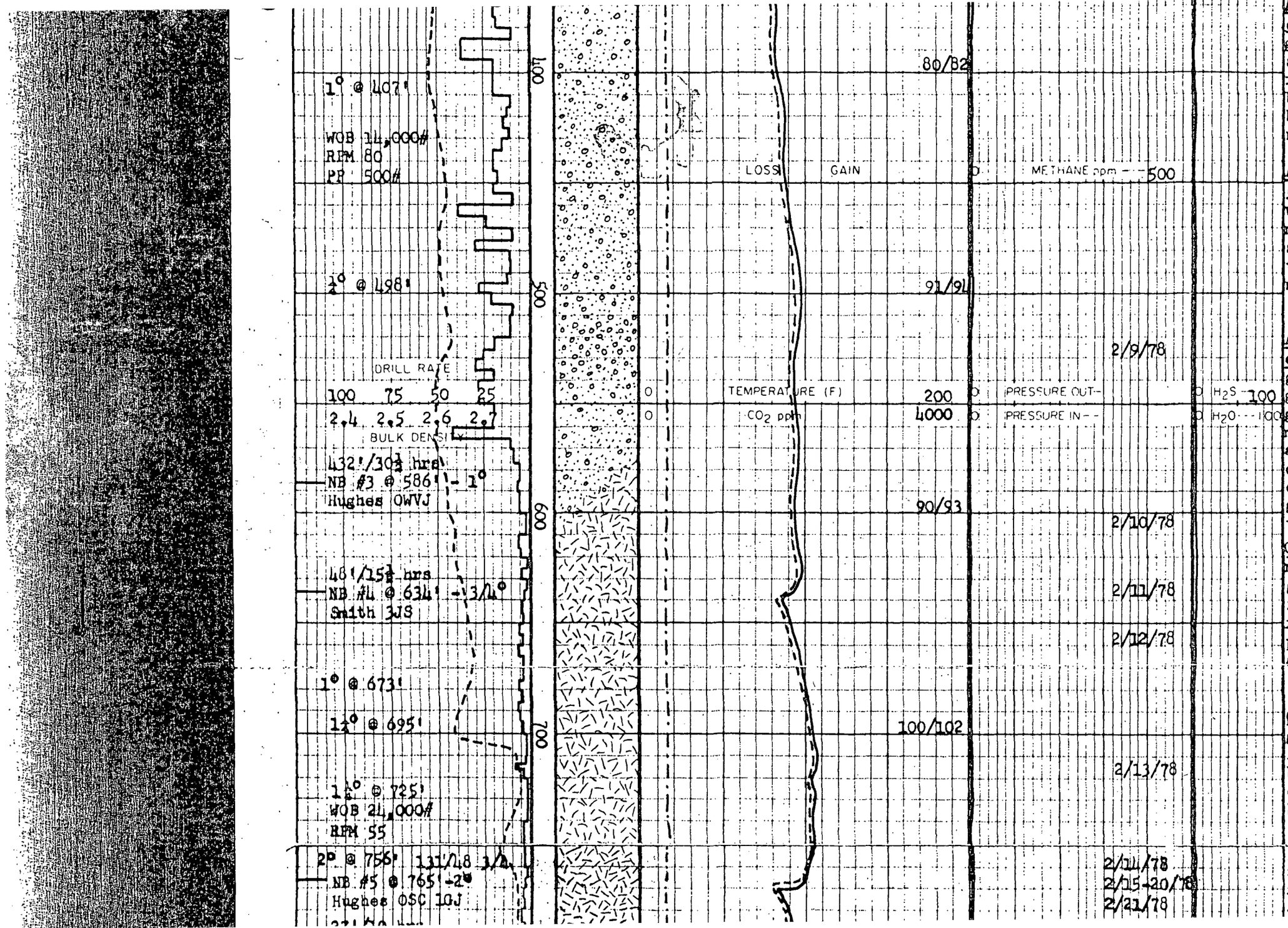
Alluvium(uncolsolidated): pred wht-buff, some org & grn, pred crs-f gr sands, ang-sbrd, abund free clr qtz & granitic frags, tr volc frags, mainly reworked valley fill, silty & clayey in pts.

Alluvium(unconsolidated): con't as above, but w/ incr in gravel size mat, pr srtd, abund weathered granitics.

Opened 12¼" hole to 28". Set 20" csg to 184'. Began logging 2/7/78 @ 184'. Drlg 17½" hole.

Alluvium(unconsolidated): buff, wht, gray, crs-med gr sands, ang-sbrd, p-mod srtd, abnd weathered granitic frags w/ qtz, felds, chlorite, hornblende, & biotite, free clr qtz, incr in buff & gray colored frags.

Alluvium(unconsolidated): wht, blk, grn, sm FeO staining, pred granitics, crs gr w/ granul & pebble, ang & fresh in app, mnr incr mica(biot)



Alluvium(unconsolidated): blk, clr, org, grn, sbrd-sbang, mod srtd, weathered granitic frags, qtz, felds, biot, wx to chlor, hbld, occ sericite, tr mafic rich(60%) frags.

Alluvium(unconsolidated): buff, gry, wht, w/ incr in pink, crs-med gr, some gravel, sbang-sbrd, pred weathered granitics, incr mafic frags w/ depth.

Alluvium(unconsolidated): pred reworked granitics, blk, wht, grn, sbang-sbrd, f-crs gr sd, sm granules, minerals & alterations as above, appearance of rd-brn, sft, sdy clay @ 540', app of gry-brn & rd, f gr, volc's @ 580'.

Granodiorite: blk, wht mnr grn & buff, f-crs gr, occ distinct foliation, schistose, qtz, felds, v abund biot, poss schist frags, tr alluvial frags.

W 9.2 V 47

Granodiorite: blk-blk grn, tr buff & wht, f-m gr, crs gr in pts, biot, qtz, felds, poss chlor, f gr app @ 710', hem mineralization on frac surfaces @ 710'.

Ran Schlumberger logs& Agnew&Sweet Temp. log. Set 13 3/8" csg to 765'.

NB #5 @ 765' -2°
Hughes OSC 1GJ
27'/10 hrs
NB #6 @ 792'
Hughes J-33
1½° @ 819'
WOB 30,000#
RPM 53
1 3/4° @ 849'
PP 600#
1½° @ 879'
2° @ 909'
2° @ 940'
DRILL RATE
100 75 50 25
2.4 2.5 2.6 2.7
BULK DENSITY
1 3/4° @ 970'
1 3/4° @ 1000'
CHANGE OF SCALE
40 30 20 10
2 3/4° @ 1029'
WOB 25-35,000#
RPM 40-60
2 3/4° @ 1058'
Trip for 9" collar @ 1058'
3° @ 1092'
3½° @ 1122'
3½° @ 1152'

800
900
1000
1100

LOSS GAIN
TEMPERATURE (F) 200
CO_2 ppm 4000
METHANE ppm 500
PRESSURE OUT-
PRESSURE IN--
H_2S 100
H_2O 100

2/15-20/78
2/21/78
87/92
2/22/78
108/113
2/23/78
110/115
2/24/78
102/108

Agnew&Sweet Temp. log.
Set 13 3/8" csg to 765'.
Drilling 12 1/4" hole.

Granodiorite: dk, blk, blk/wht, pred mgr, occ fgr, bio, qtz, felds, app of yel subhedral xlts(sphene?), fracs w/red hematite & calc.

Granodiorite: dk, blk, wht, clr, mnr grn, m-crs gr, qtz, felds, abund mafics, pred bio, mnr chlor, tr pyr & kaolinite, tr sbhedral pnk xtals, mnr hematite frac fill.
W 8.7 V 36 pH 11 F 16
Cl 2200 YP 4 PV 11
Slds 3 Ca 400 Fc 2

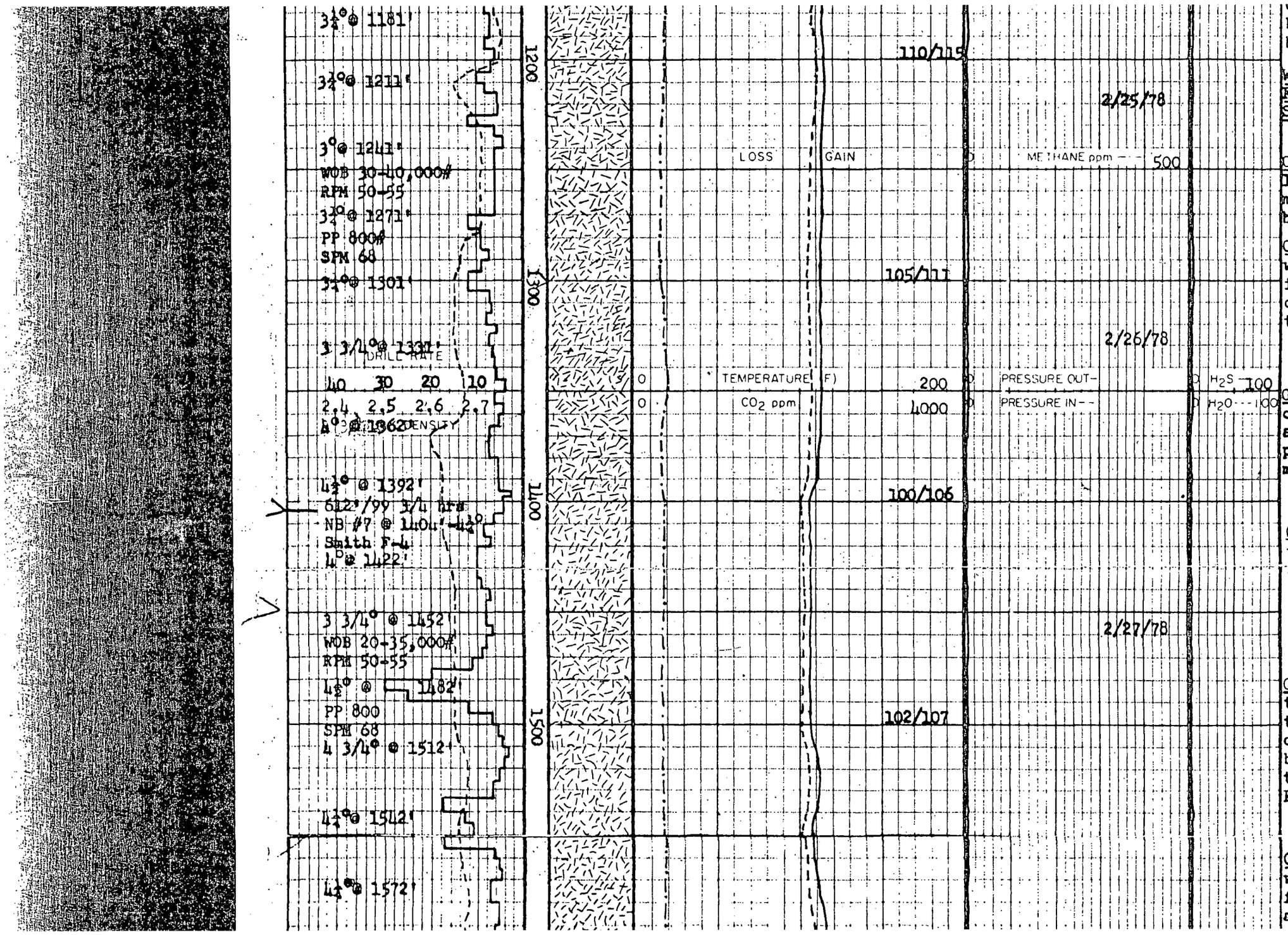
Granodiorite: dk, blk, clr, wht, grn, m gr, small frags, biot, hbld, incr in qtz%, tr chlor, mnr sphene, incr hematite @ 1010'.

Granodiorite: lt gry, blk, wht, clr, f-mgr, qtz, felds, decr in mafic%, mnr hem&chlor, fracs in pts.

W 67.0pcf V 32

Granodiorite: clr, wht, blk, pred S & P, m gr, incr qtz(30%), felds, biot, hbld, mnr chlor, tr hematite fill, diagnl, incrs in mafic% @ 1130'.

Granodiorite: dk, blk/wht, occ grn, f-mgr,



qtz, felds, bio, hornblende, mnr sphene & hem, fracs, chlorite?.

W 66.3pcf V 30 pH 10.5
F 19 CL 1200 YP 3 PV 3
Slds 4 Ca 100 Fc 1

Granodiorite: dk, loc lt streaks, blk/wht, minerals as above, occ hem frac fill.

Granodiorite: lt gry-wht, occ blk, c-mgr, incr in qtz% & felds%, decrs in mafic%, fracs tr hem stain.

Granodiorite: pred dk, occ lt, f-m gr, qtz, subhedral felds, biot, ptly alt to chlor loc, mnr hbld & sphene.

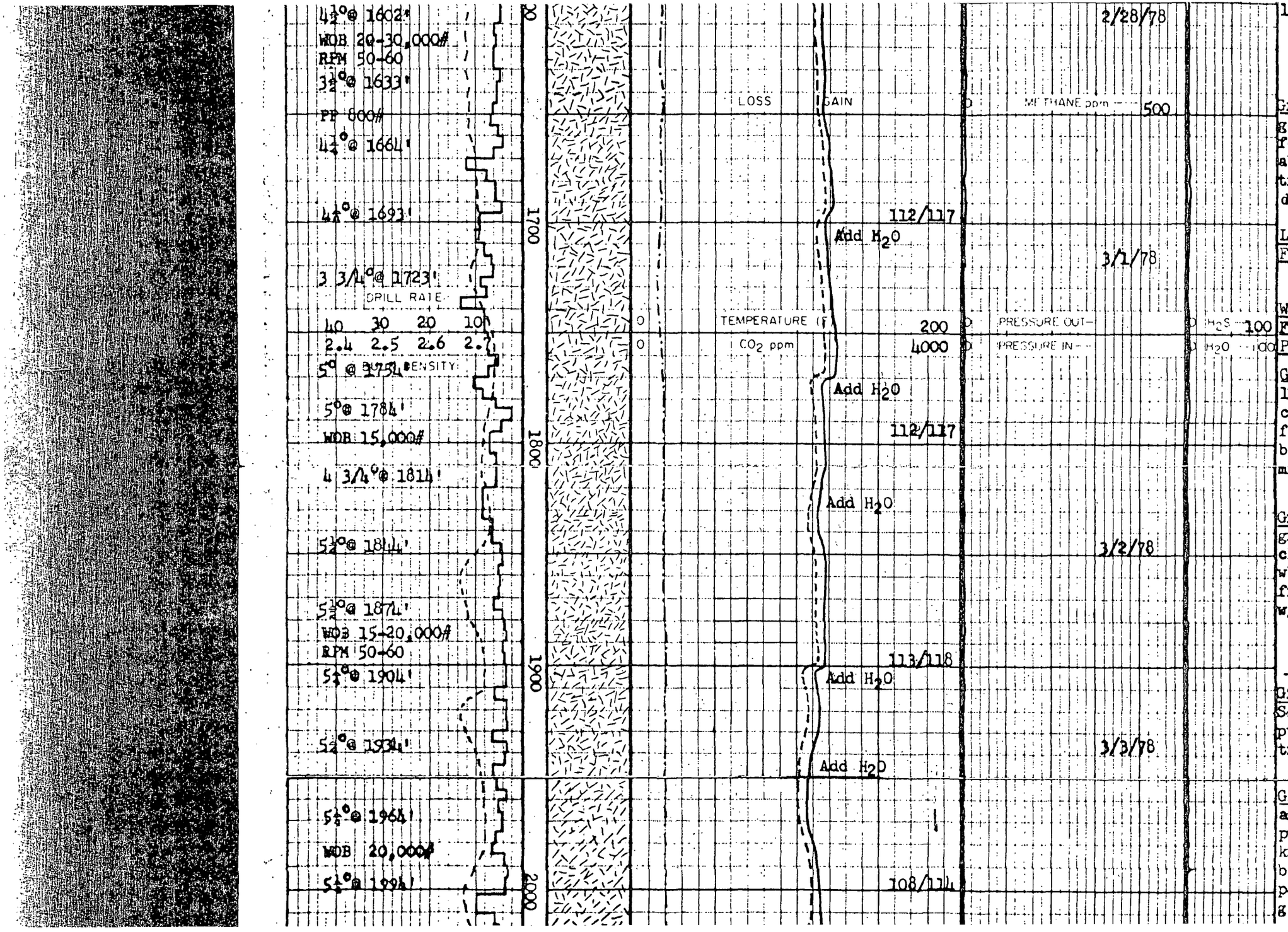
W 66.0 pcf V 27

Granodiorite: lt gry-wht, occ blk, mgr, qtz & felds a/a, sl incrs in bio%, tr chlor.

W 65.0 pcf V 28

Granodiorite: lt-dk, m to crs gr, loc variation in mineral %, clr qtz, wht felds, brn-blk biot, tr hbld, tr chlor & sphene, occ FeO frac fill & stain.

Granodiorite: dk-lt gry, wht in pts, crs-mgr, fgr in pts, qtz&felds as above, abund brn-blk



lorite, tr yel stain.

W 65.0 pcf V 29

Granodiorite: pred dk, gen'ly as above, qtz, felds is kao in pt, abund biot, tr chlor, tr sphene, tr pyrite, dk grn in pts.

Losing 6 bbl of Mud to Formation per hour.

W 65.8pcf V 27 pH 8.0
F 25+ Cl 1300 YP 1
PV 2 Slds 3½ Ca 100 Pc 1

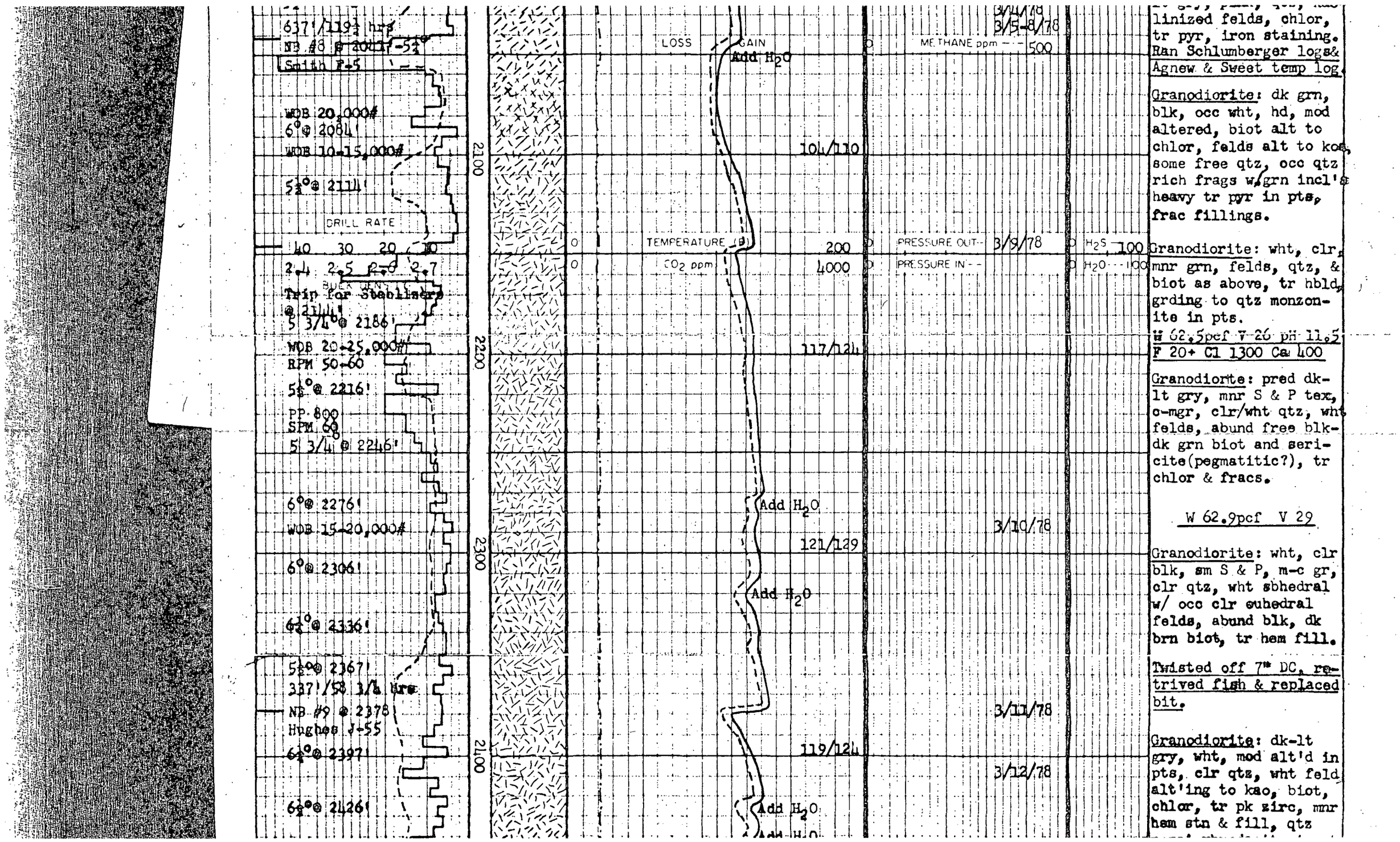
Granodiorite: pred dk-lt gry, occ wht, f-mgr, crs gr in pts, qtz & felds as above, abund biot, tr chlor & pyr, mnr hem frac fill.

Granodiorite: dk-lt gry, sm S&P, m-crs gr, clr qtz w/ biot incl's, wht sbhedral felds, sm free biot flakes, dk brn w/ sm alt to chlor.

W 65.7 pcf V 27

Granodiorite: dk-lt gry, S&P, crs-mgr, fgr in pts, minerals as above, tr chlor & frac fill.

Granodiorite: cont'd as above, but f-vfgr in pts, w/smokey qtz, tr kao, poss pegmatitic biot & sericite, sm pale grn sbhedral elong'd min xtls, @ 2020'



linized felds, chlor, tr pyr, iron staining. Ran Schlumberger logs& Agnew & Sweet temp log.

Granodiorite: dk grn, blk, occ wht, hd, mod altered, biot alt to chlor, felds alt to kao, some free qtz, occ qtz rich frags w/grn incl's & heavy tr pyr in pts, frac fillings.

Granodiorite: wht, clr, mnr grn, felds, qtz, & biot as above, tr hbld, grding to qtz monzonite in pts.
W 62.5pcf V 26 pH 11.5
F 20+ Cl 1300 Ca 400

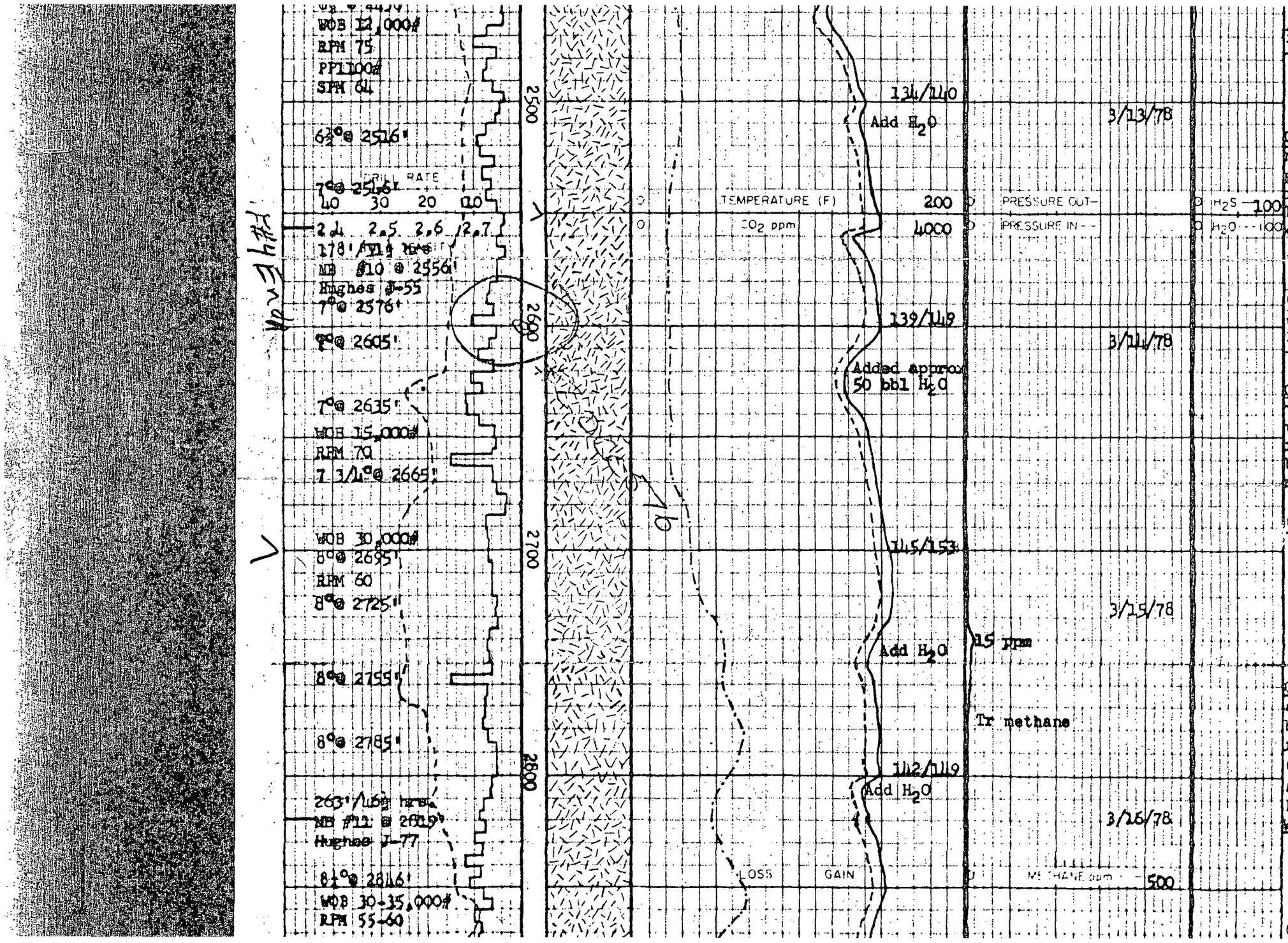
Granodiorte: pred dk-lt gry, mnr S & P tex, c-mgr, clr/wht qtz, wht felds, abund free blk-dk grn biot and sericite(pegmatitic?), tr chlor & fracs.

W 62.9pcf V 29

Granodiorite: wht, clr blk, sm S & P, m-c gr, clr qtz, wht sbhedral w/ occ clr euhedral felds, abund blk, dk brn biot, tr hem fill.

Twisted off 7" DC, retrived fish & replaced bit.

Granodiorite: dk-lt gry, wht, mod alt'd in pts, clr qtz, wht feld alt'ing to kao, biot, chlor, tr pk zirc, mnr hem stn & fill, qtz



Add gel to mud system to raise viscosity.

W 65pcf V 32

Granodiorite: pred dk, mnr lt & wht, m gr, f gr in pts, qtz w/ biot incl's, frge brn-blk biot, wht felds, mnr chlor, schistose in pt.

W 64.8pcf V 35 pH 8.5
PV 9 YP 6 F 16 Slds 2½
Cl 1000 Ca 100 Sd ½

WOB increased F/12,000 to 15,000#.

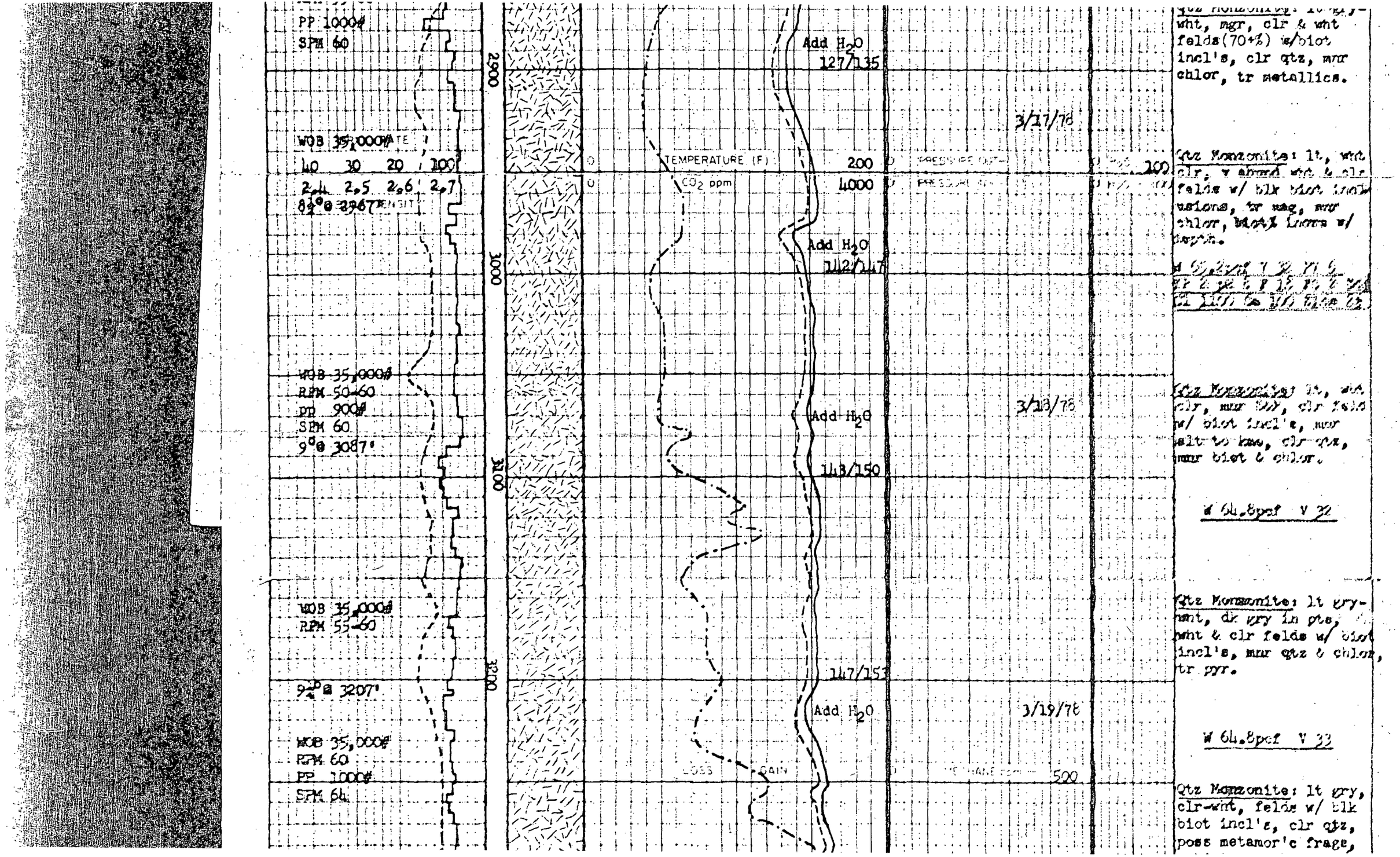
Granodiorite: dk, lt, v wht @ 2630', m gr, wht felds, clr qtz w/ f gr abund incl's of biot, rre free biot, mnr chlor & kao.

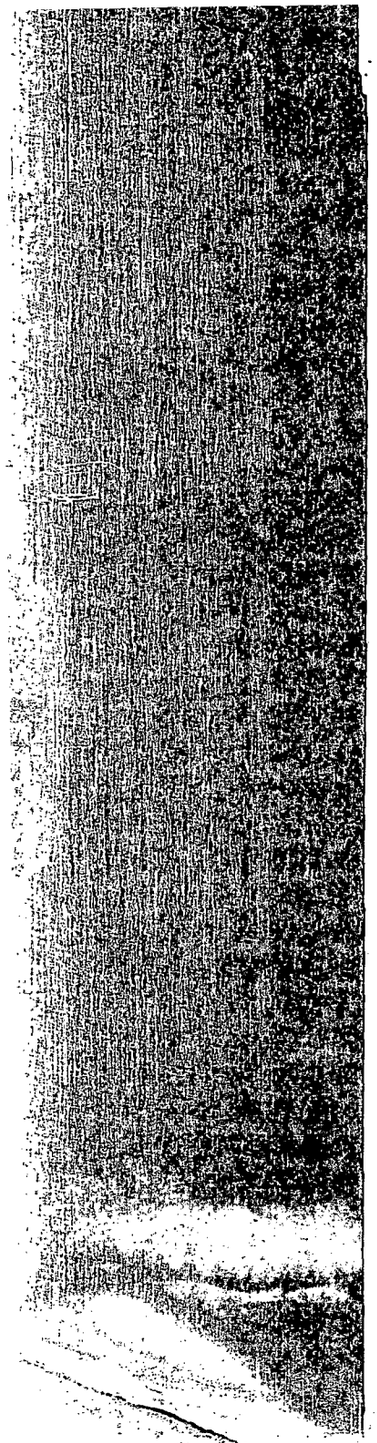
Qtz Monzonite: wht-lt gry, cgr, clr & wht felds (>70%), blr qtz (10%), mnr biot incl's, hd, massive, tr chlor, pyr, & poss magnetite,

Granodiorite m brn-clr, abund clr qtz w/ f gr brn biot incl's, wht felds, minrls gen a/a, @ 2780' gry-blk fgr granitics, grading in pts to qtz monzonite.
WASHOUT: 7" collar-2819'

W 62.4pcf V 31

Qtz Monzonite: lt gry-


PP 1000#
SPM 60
WOB 35,000#
40 30 20 10
2.4 2.5 2.6 2.7
8½° @ 2967'
WOB 35,000#
RPM 50-60
PP 900#
SPM 60
9° @ 3087'
WOB 35,000#
RPM 55-60
9½° @ 3207'
WOB 35,000#
RPM 60
PP 1000#
SPM 64
2900
3000
3100
3200
Add H2O
127/135
3/17/78
TEMPERATURE (F)
200
CO2 ppm
4000
Add H2O
112/117
Add H2O
3/18/78
113/150
147/153
Add H2O
3/19/78
LOSS
GAIN
500
Qtz Monzonite: lt gry-wht, mgr, clr & wht felds(70+%) w/biot incl's, clr qtz, mnr chlor, tr metallics.
Qtz Monzonite: lt, wht clr, v abund wht & clr felds w/ blk biot incl usions, tr mag, mnr chlor, blot% lines w/ depth.
Qtz Monzonite: lt, wht clr, mnr blk, clr felds w/ biot incl's, mnr salt to kao, clr qtz, mnr biot & chlor.
W 64.8pcf V 32
Qtz Monzonite: lt gry-wht, dk gry in pts, wht & clr felds w/ biot incl's, mnr qtz & chlor, tr pyr.
W 64.8pcf V 33
Qtz Monzonite: lt gry, clr-wht, felds w/ blk biot incl's, clr qtz, poss metamor'c frags,



21 1/4 hrs
NB #12 @ 3350'
Hughes J-55
40 30 20 10
2.4 2.5 2.6 2.7
BULK DENSITY
WOB 36-38,000#
RPM 60
PP 1000#
SPM 60
10 3/4" @ 3349'
3400
3500
21 2'/27½ hrs
10" @ 3578'
Core Bit #1 @ 3578'
Christensen
NB #13 @ 3591'
Hughes J-88
WOB 35-39,000#
RPM 60
PP 1000#
SPM 66
3600
3700
8" @ 3729'
Trip CO_2
0 5500 ppm
TEMPERATURE (F) 200
CO_2 ppm 4000
3/20/78
PRESSURE OUT
PRESSURE IN
H_2S 100
H_2O 100
149/155
3/21/78
150/158
Add H_2O
10' Depth Correction f/3568'-3578'
3/22-24/78
3/25/78
140/150
LOSS GAIN
METHANE ppm 500
3/26/78
165/170

frac fill, fracs in pts.

Slowly adding water to mud system.

W 64.4pcf V 34 YP 6 PV 7 pH 8 F 16 FC 2 Cl 1300 Ca 100 Slds 2½

Qtz Monzonite: lt gry-wht, occ clr, wht & clr felds w/ biot incl's, biot abund in pts, mnr qtz & chlor; @ 3320' frac zone w/alter's, hem frac fill w/ tr pyr, calc, & mag, abund chlor mnr kao.

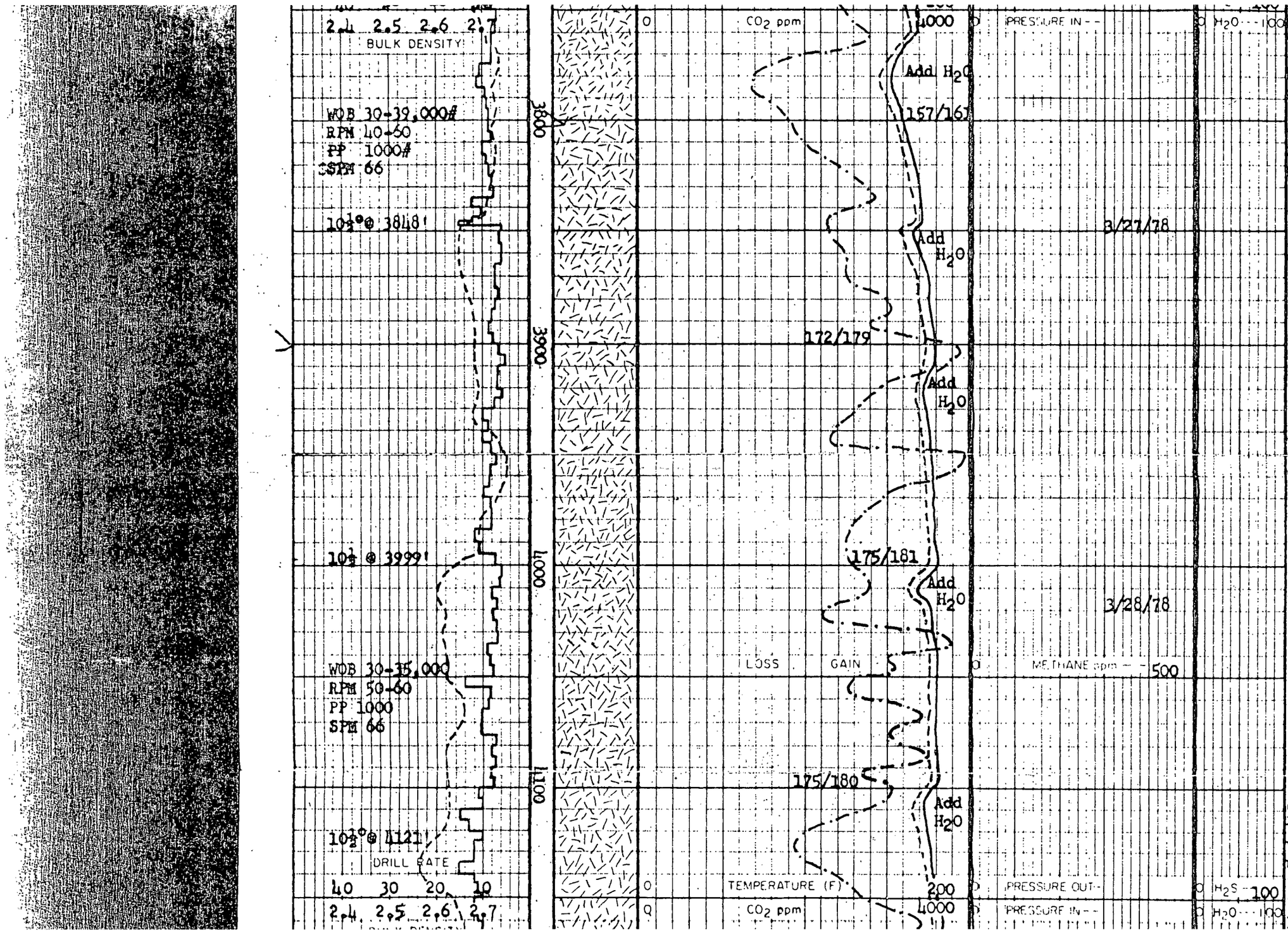
W 64.4pcf V 33

Qtz Monzonite: lt gry, wht, S & P appearance, subhedral wht & clr felds w/ abund incl's of biot, mnr clr qtz, mnr chlor, tr py.

Rem Agnew&Sweet temp & press logs @ 3578'. Cut 12½' of 4" core f/ 3578½'-3591. Retrieved 12½' of core.

Granodiorte: lt-dk gry, wht, mgr, occ fgr, clr qtz, wht & clr felds, tr chlor, kao, calc, pyr, & mag, occ mnr alter's, grading to lt gry qtz monzonite in pts, biot abund in pts.

Qtz Monzonite: lt gry-wht, dk gry in pts, clr & wht felds w/biot incl's, mnr qtz & chlor tr pyr.



W 64pcf V 30 PV 3 YP 4
pH 8 F 20FC 2 Cl 1300
Ca 80 Sd ½ Slds 1½

Qtz Monzonite: con't as above, but w/occ blk -brn biot layers, abund chlor in pts, grn & red frac fill mat, tr lt grn-gry fgr granitics.

Qtz Monzonite: wht to clr, m gr, decrease in mafic % at 3850', clr qtz, clr & wht felds w/ f incl's of blk biot, tr mag, tr hbld, poss gneissic texture.

W 64.8pcf V 33

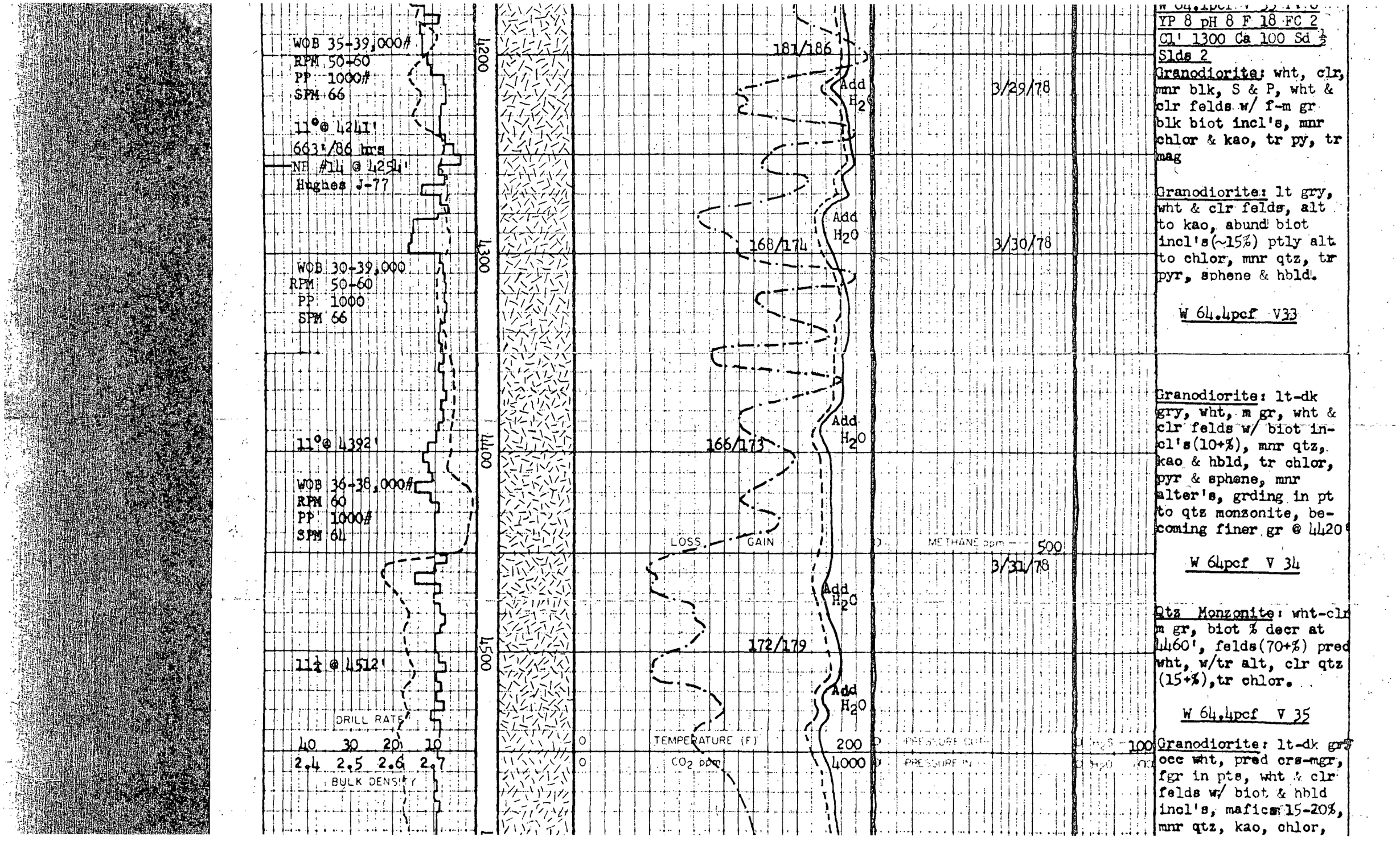
Losing approx 2-3bbl/hr fluid to hole.

Qtz Monzonite: wht-lt gry, wht & clr felds/w biot incl's, mnr qtz, chlor, & kao, tr pyr.

W 64.8pcf V 33

Qtz Monzonite: lt gry, abund wht & clr felds, num biot incl's, grdng to granodiorite in pts, felds alt to kaol, biot alt to chlor, grn & red alt of mafic rich smpl, mnr qtz &chlor, tr pyr & sphene.

Qtz Monzonite: lt gry-wht, wht & clr felds w/ mnr biot incl's, mnr qtz, kao, & chlor in pts, tr pyr, hem, & sphene, @ 4120-4130' pred wht w/tr-mnr biot.



W 64.4pcf V 33 PV 14.8
YP 8 pH 8 F 18 FC 2
Cl' 1300 Ca 100 Sd ½
Slds 2

Granodiorite: wht, clr, mnr blk, S & P, wht & clr felds w/ f-m gr blk biot incl's, mnr chlor & kao, tr py, tr mag

Granodiorite: lt gry, wht & clr felds, alt to kao, abund biot incl's(~15%) ptly alt to chlor, mnr qtz, tr pyr, sphene & hbld.

W 64.4pcf V33

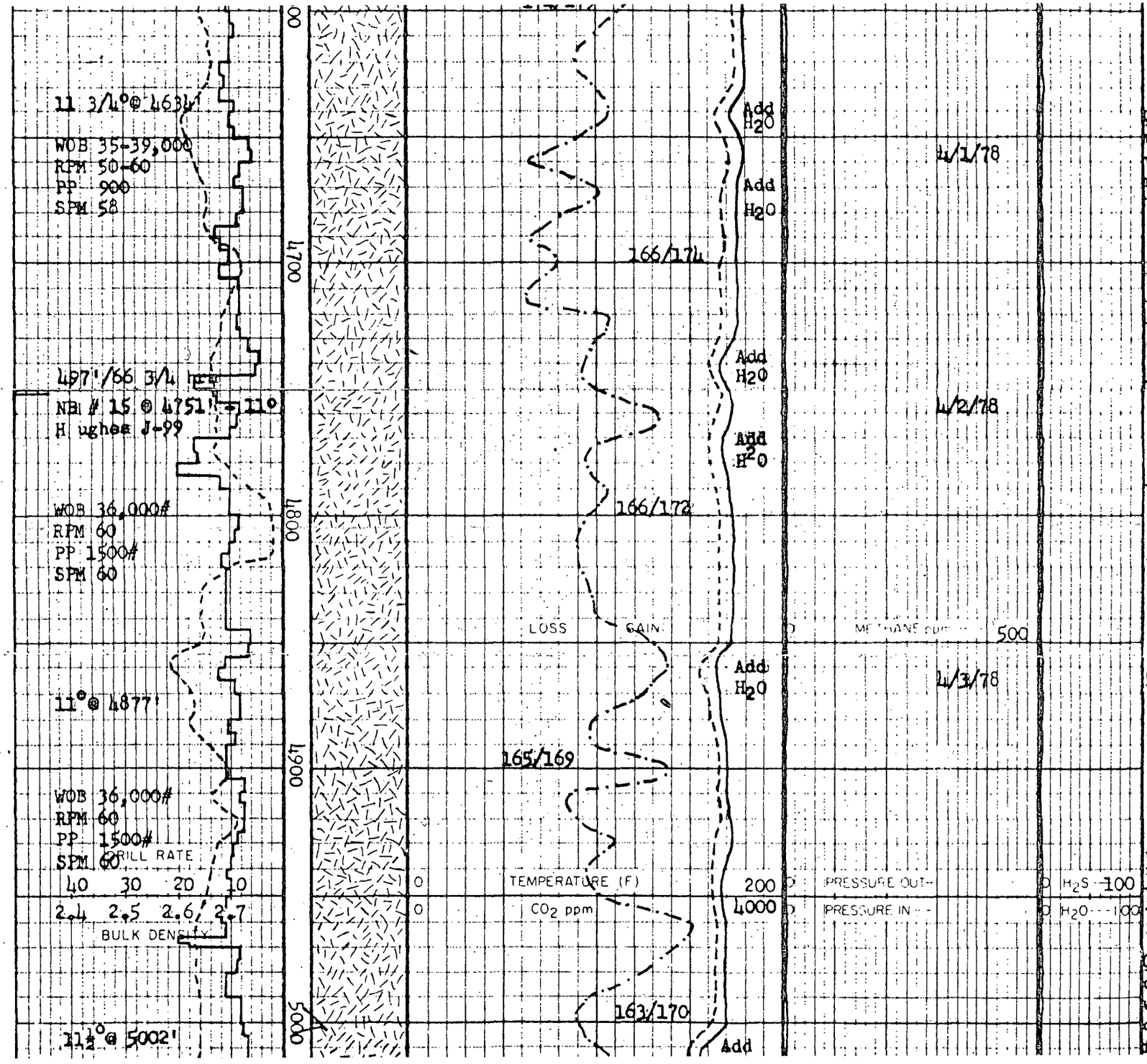
Granodiorite: lt-dk gry, wht, m gr, wht & clr felds w/ biot incl's(10+%), mnr qtz, kao & hbld, tr chlor, pyr & sphene, mnr alter's, grding in pt to qtz monzonite, becoming finer gr @ 4420'

W 64pcf V 34

Qtz Monzonite: wht-clr m gr, biot % decr at 4460', felds(70+%) pred wht, w/tr alt, clr qtz (15+%), tr chlor.

W 64.4pcf V 35

Granodiorite: lt-dk gry occ wht, pred crs-mgr, fgr in pts, wht & clr felds w/ biot & hbld incl's, mafics 15-20%, mnr qtz, kao, chlor,



grn & red alter's, tr calc & hem frac fill.

Qtz Monzonite: wht, clr w/ lt grn cast, m gr, wht felds alt'd in pts, mnr clr qtz, mnr biot, tr pyr, gen'ly mnr alterations w/ abund chlite @ 4700', tr hem, poss fracs @ 4745'.

W 64.4pcf V 32 PV 4
YP 8 pH 7.5 F 40.4
FC 3 Cl 1000 Ca 25
Sd 3/4 Slds 2½

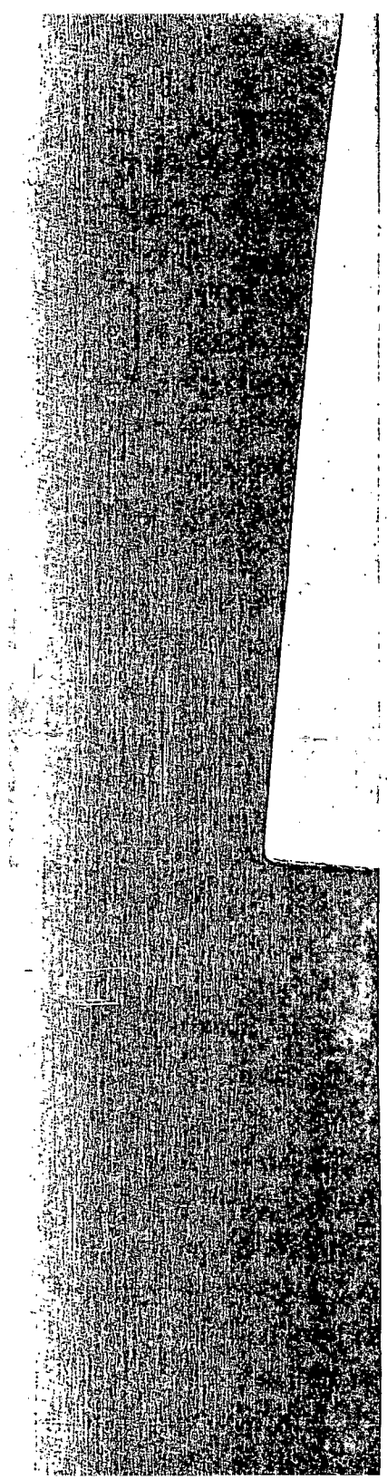
Qtz Monzonite: cont'd as above, but w/ tr yel grn, biot 5%.
Granodiorite: pred lt-dk gry, blk in pts, m-med fgr, clr & wht felds, biot & hbld 20%, mnr chlor & qtz, tr sphene, tr calc & red hem frac fill mat.

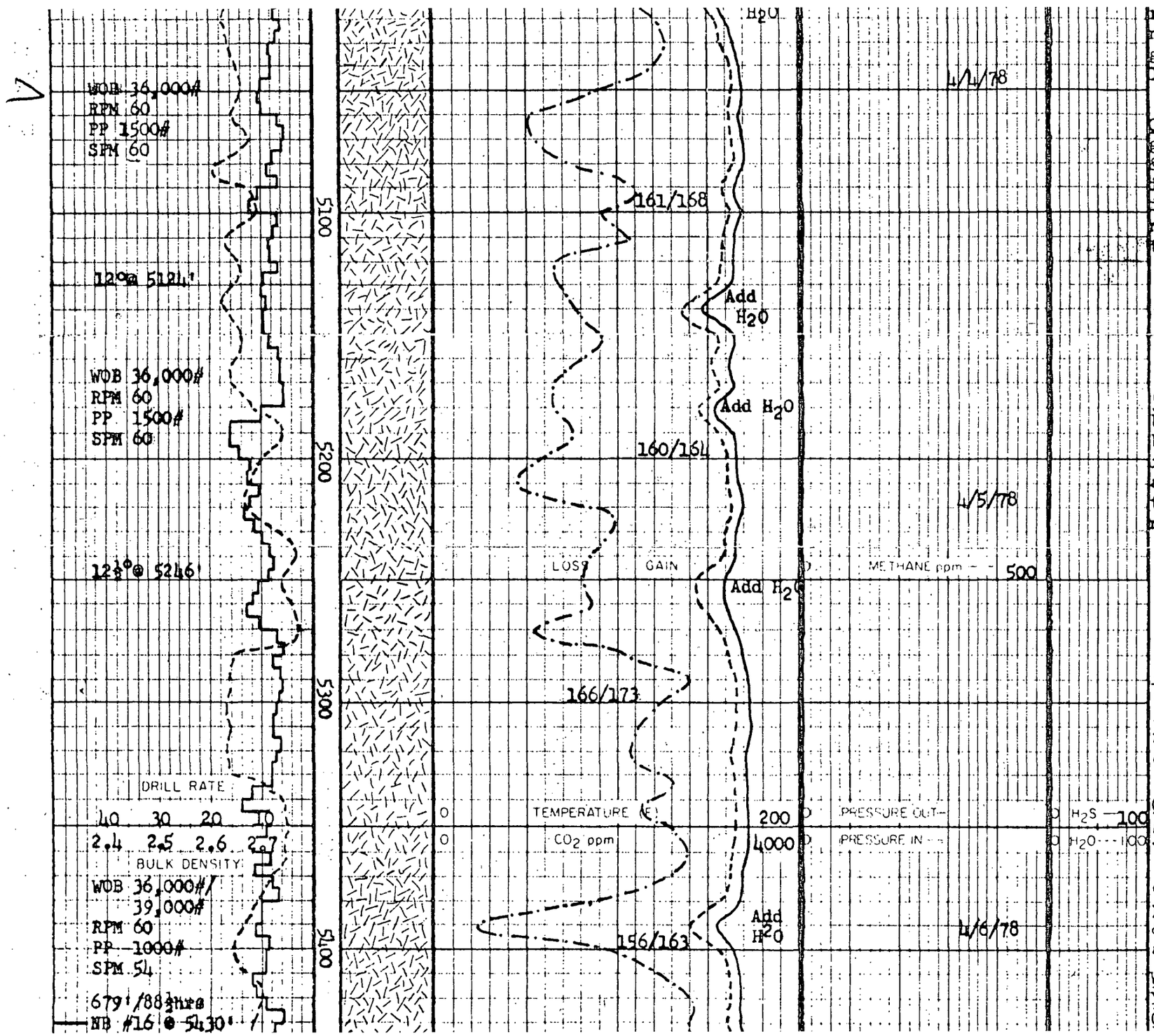
W 64pcf V 32

Granodiorite: lt to dk gry, m gr, wht & clr felds w/biot incl's, mnr qtz, chlor & kao, tr sphene, grading to qtz monzonite @ 4820'-4880'.

W 63.4pcf V 28 PV 3
YP 3 pH 7 F 60.4 FC <1
Cl' 900 Ca 80 Sd ¼
Slds 1¼

Granodiorite: lt-dk gry, occ wht, wht & clr feld, w/biot(10%) incl's, mnr qtz & kao, tr-mnr chlor tr sphene & pyr, mnr





red & yel grn alter'd mat, tr lt grn-gry fgr granitic(?) w/ elong'd lt grn-gry xtals.

Granodiorite: lt-dk gry, m gr, clr qtz, wht & clr felds, biot abund in pts, red & grn alt in pts, mnr kao, tr pyr mag & sphene, grading to qtz monzonite in pts.

W 64pcf V 30

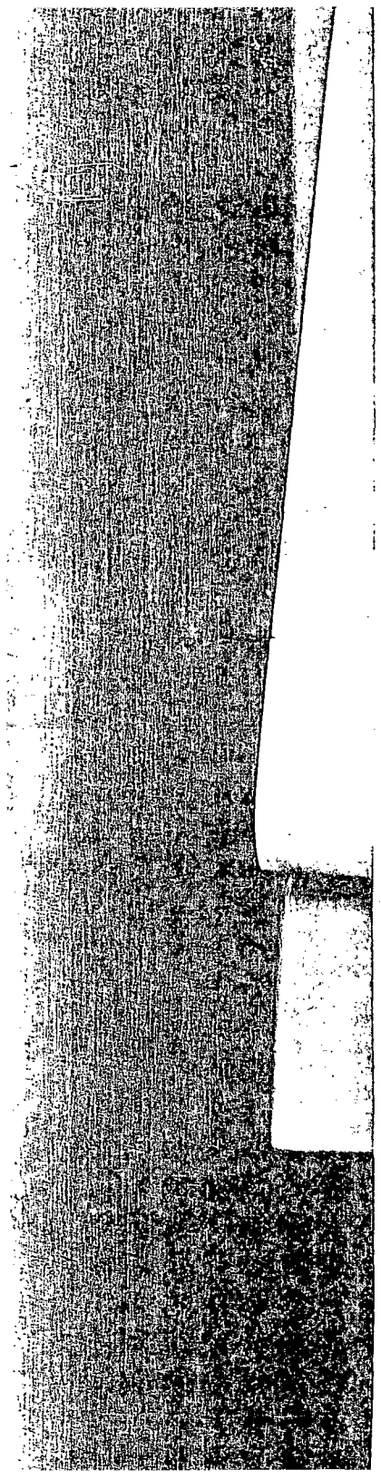
Granodiorite: dk gry, blk, mnr qtz, felds w/ biot incl's w/ abund free dk brn biot flakes app @ 5180', biot alt to chlor in pts, tr py, mnr kao, biot 25-30%

W 64.4pcf V 29

Qtz Monzonite: wht-clr occ lt gry, wht & clr felds w/biot(5%) incl's mnr qtz, tr chlor, mag, & kao.

Granodiorite: lt-dk gry, occ blk, m gr, wht & clr felds w/biot (10-15%) incl's, mnr qtz, chlor, & kao, tr pyr & sphene, mnr red & grn alt'd mat in pts abund fr biot in pts.

W 64.4pcf V 29 PV 2
YP 4 pH 7 F 55 FC 2
Cl 1200 Ca 80 Slds 2



12½°@ 5430'

WOB 39,000#
RPM 60
PP 1000#
SPM 64

5500

5600

WOB 38,000#
RPM 60
PP 1000#
SPM 64

14+°@ 5676'

5700

DRILL RATE
40 30 20 10

2.4 2.5 2.6 2.7
BULK DENS

5800

WOB 35000#/
39000#

Add H_2O

167/173

4/7/78

Add H_2O

159/165

LOSS GAIN

500

Add H_2O

150/156

4/8/78

0 TEMPERATURE °F 200

0 CO_2 ppm 1000

Add H_2O

131/143

0 H_2S 100

0 H_2O 100

Granodiorite: dk gry, mgr, finer gr in pts, wht & clr felds w/biot(10+%) incl's, mnr qtz, kao, chlor, tr sphene & pyr, abund fr biot & chlor flks in pts, mnr alter's.

Granodiorite: lt-dk gry qtz & felds as above, continued abund free biot(15+%), tr py, mnr chlor, sphene & kao.

Granodiorite: lt gry, m gr, wht & clr felds, w/biot incl's ptly alt to chlor, mnr qtz, tr sphene & pyr, grading to qtz monzonite in pts.

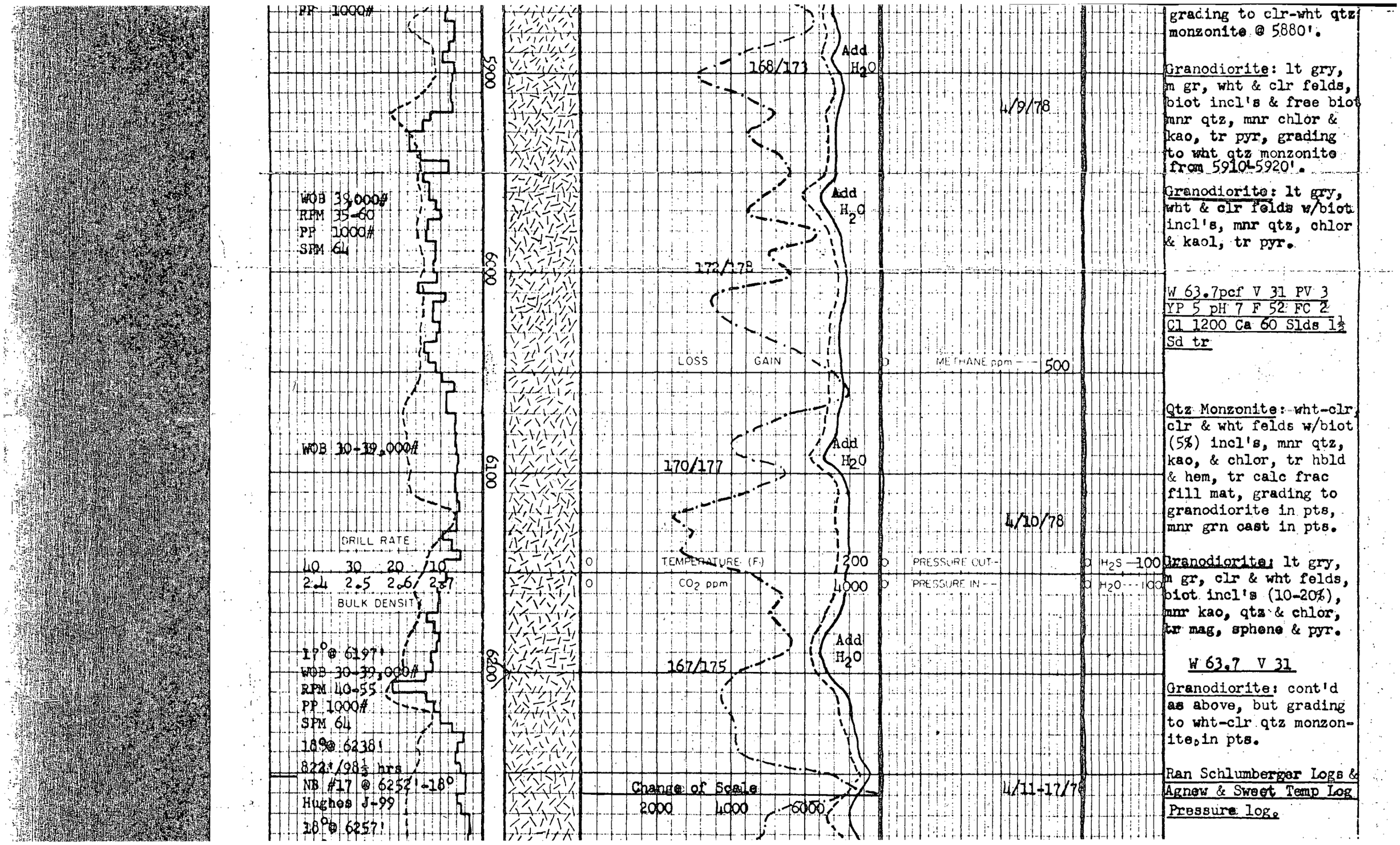
W 64.4pcf V 32 PV 2
YP 4 pH 7 F 55 FC 3
Cl 1200 Ca 85 Slds 2

Granodiorite: lt-dk gry blk in pts, mgr, wht & clr felds w/biot(10-15%) incl's, mnr qtz, kao, chlor, tr sphene & pyr, tr-mnr red & grn alter'd mat, poss hem, tr grn-gry fgr granitics(?) w/elong'd wht-grn xtals.

Granodiorite: lt gry, m gr, clr & wht felds, mnr qtz & kao, biot incl's, tr chlor, pyr, sphene, mag, & hem red stain.

W 64.8 V 29

Granodiorite: cont'd as above, but dk gry-blk in pts, biot 10-



grading to clr-wht qtz monzonite @ 5880'.

Granodiorite: lt gry, m gr, wht & clr felds, biot incl's & free biot mnr qtz, mnr chlor & kao, tr pyr, grading to wht qtz monzonite from 5910-5920'.

Granodiorite: lt gry, wht & clr felds w/biot incl's, mnr qtz, chlor & kaol, tr pyr.

W 63.7pcf V 31 PV 3 YP 5 pH 7 F 52 FC 2 Cl 1200 Ca 60 Slds 1½ Sd tr

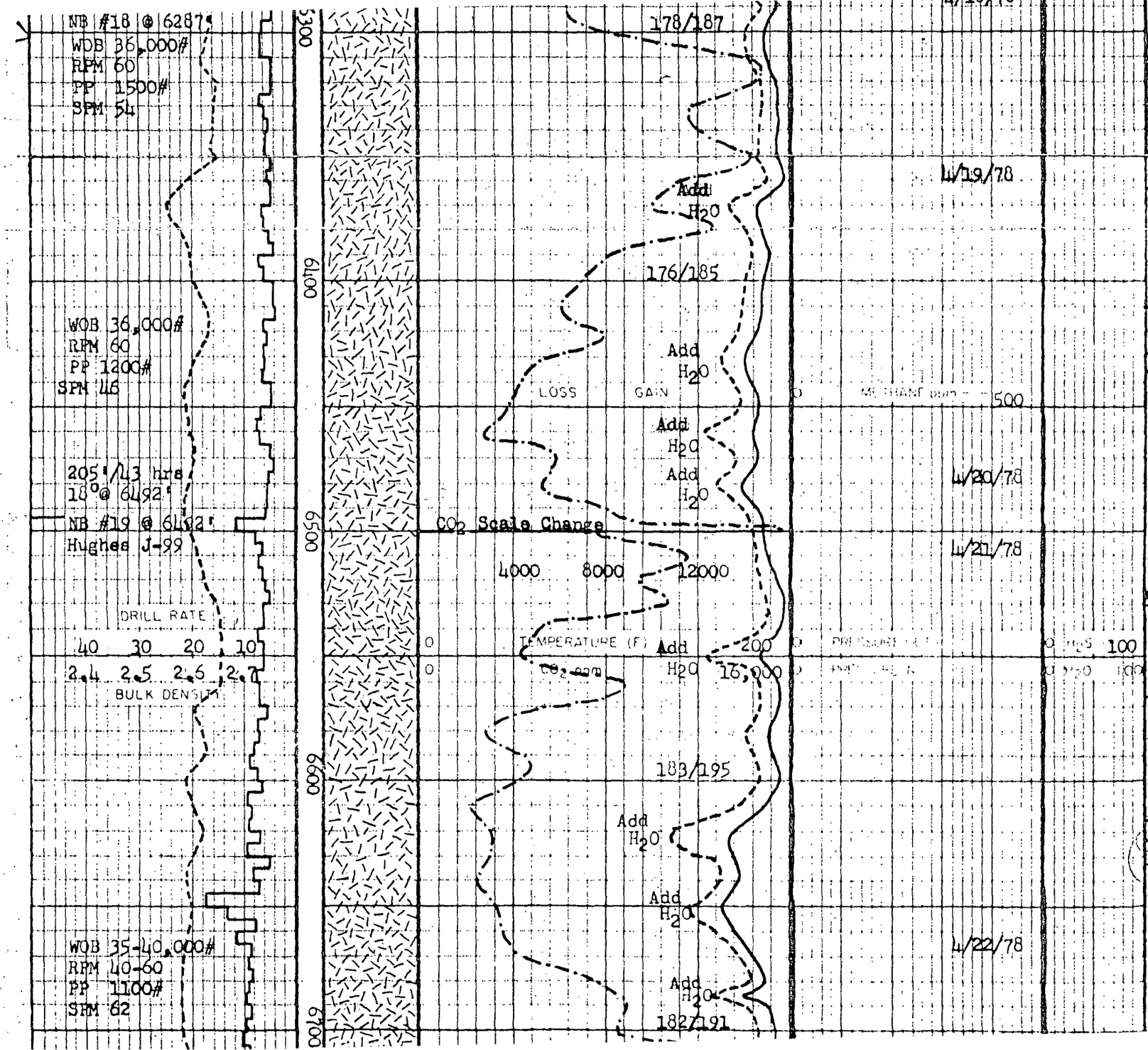
Qtz Monzonite: wht-clr, clr & wht felds w/biot (5%) incl's, mnr qtz, kao, & chlor, tr hbld & hem, tr calc frac fill mat, grading to granodiorite in pts, mnr grn cast in pts.

Granodiorite: lt gry, m gr, clr & wht felds, biot incl's (10-20%), mnr kao, qtz & chlor, tr mag, sphene & pyr.

W 63.7 V 31

Granodiorite: cont'd as above, but grading to wht-clr qtz monzonite, in pts.

Ran Schlumberger Logs & Agnew & Sweet Temp Log Pressure log.



4/19/78

Granodiorite: lt gry, m gr, clr & wht felds, biot incl's (10-20%), mnr kao, qtz, & chlor, tr pyr & red hem stain.

Qtz Monzonite: lt gry, m gr, wht-clr felds/ brn biot incl's (5%), wht-clr qtz, mnr chlor & hem.

Added white-gold mica and diesel fuel to mud system @ 6320', maintained diesel @ 4%.

Qtz Monzonite: con't as above, but w/pyr & grading to lt gry granodiorite in pt s.

4/20/78

W 63.7pcf V 29 PV 3 YP 3 pH 7 F 49 FC 1 Cl 1200 Ca 120 Slds 2 Sd tr

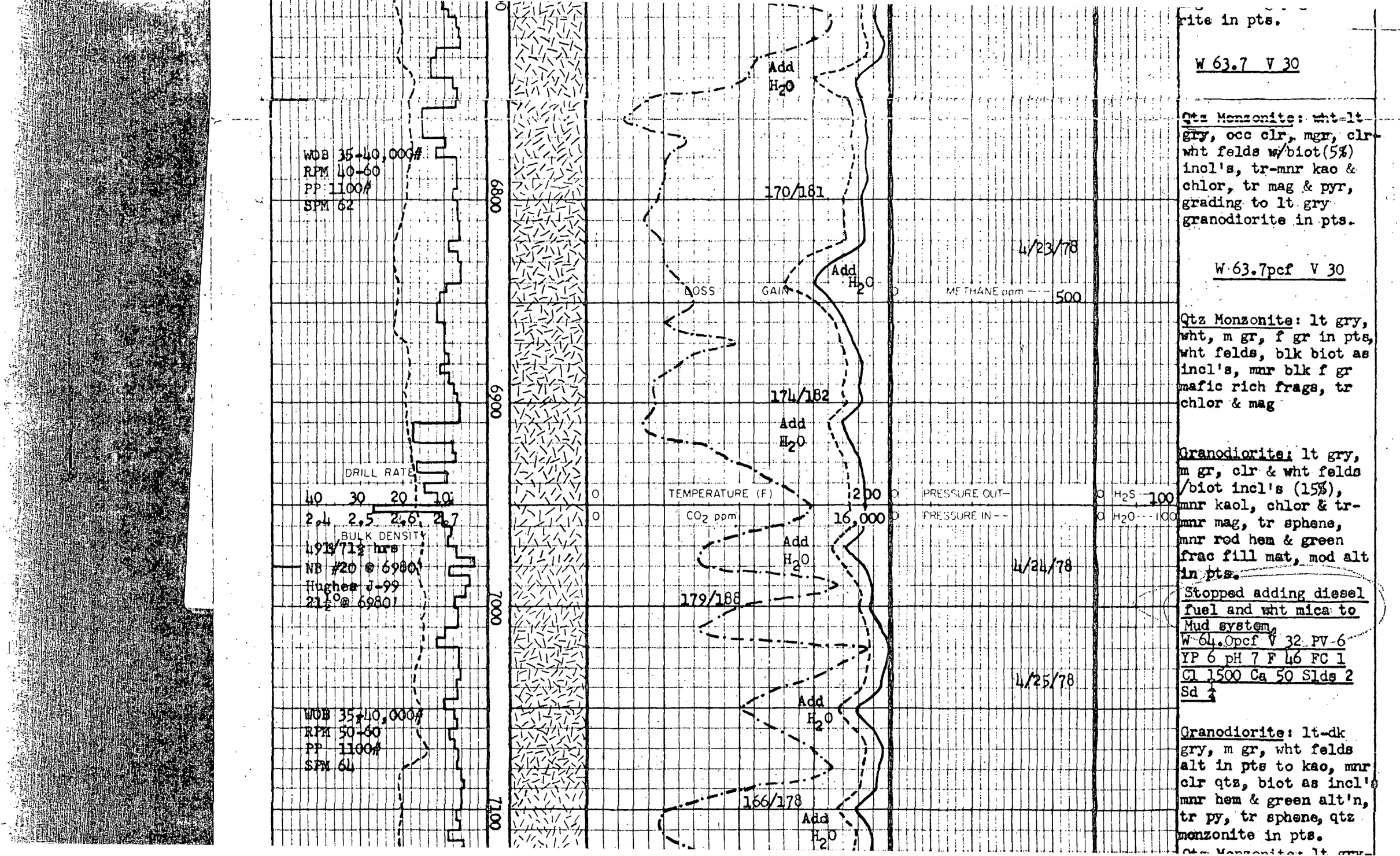
4/21/78

Granodiorite: lt gry, S & P, m gr, wht-clr felds, biot incl's (10%), mnr free biot & qtz, mnr chlor & kaol, tr-mnr mag & pyr, mod alt f/6570'-6590' w/ poss zeolite mineralization, mnr calc filling qtz & calc xtal's.

Added diesel fuel @ 6610' and adding 10 sks mica/day to mud system, maintained diesel @ 4%.

4/22/78

Qtz Monzonite: wht-lt gry, m gr, clr-wht felds w/ biot(<5%) incl's, mnr chlor, tr mag w/ hem stain, tr pyrite & sphene, grad-



rite in pts.

W 63.7 V 30

Qtz Monzonite: wht-lt gry, occ clr, mgr, clr-wht felds w/biot(5%) incl's, tr-mnr kao & chlor, tr mag & pyr, grading to lt gry granodiorite in pts.

W 63.7pcf V 30

Qtz Monzonite: lt gry, wht, m gr, f gr in pts, wht felds, blk biot as incl's, mnr blk f gr mafic rich frags, tr chlor & mag

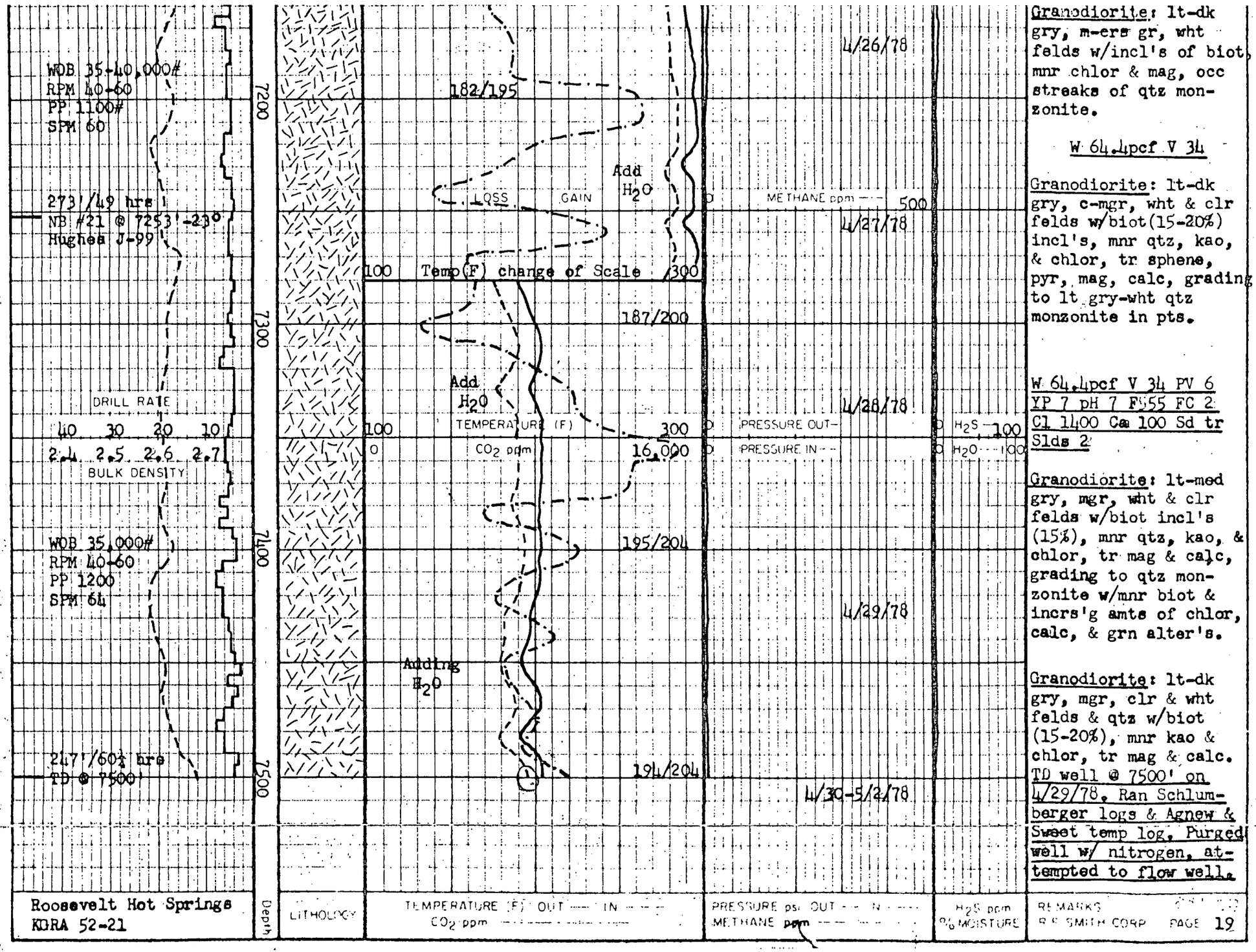
Granodiorite: lt gry, m gr, clr & wht felds /biot incl's (15%), mnr kaol, chlor & tr-mnr mag, tr sphene, mnr rod hem & green frac fill mat, mod alt in pts.

Stopped adding diesel fuel and wht mica to Mud system.

W 64.0pcf V 32 PV 6 YP 6 pH 7 F 46 FC 1 Cl 1500 Ca 50 Slds 2 Sd ¼

Granodiorite: lt-dk gry, m gr, wht felds alt in pts to kao, mnr clr qtz, biot as incl's mnr hem & green alt'n, tr py, tr sphene, qtz monzonite in pts.

Qtz Monzonite: lt gry-



Granodiorite: lt-dk gry, m-crs gr, wht felds w/incl's of biot, mnr chlor & mag, occ streaks of qtz monzonite.

W 64.4pcf V 34

Granodiorite: lt-dk gry, c-mgr, wht & clr felds w/biot(15-20%) incl's, mnr qtz, kao, & chlor, tr sphene, pyr, mag, calc, grading to lt gry-wht qtz monzonite in pts.

W 64.4pcf V 34 PV 6 YP 7 pH 7 F 55 FC 2 Cl 1400 Ca 100 Sd tr Slds 2

Granodiorite: lt-med gry, mgr, wht & clr felds w/biot incl's (15%), mnr qtz, kao, & chlor, tr mag & calc, grading to qtz monzonite w/mnr biot & incrs'g amts of chlor, calc, & grn alter's.

Granodiorite: lt-dk gry, mgr, clr & wht felds & qtz w/biot (15-20%), mnr kao & chlor, tr mag & calc. TD well @ 7500' on 4/29/78. Ran Schlumberger logs & Agnew & Sweet temp log. Purged well w/ nitrogen, attempted to flow well.

Roosevelt Hot Springs
KDRA 52-21

Depth | LITHOLOGY | TEMPERATURE (F) OUT — IN - - - CO2 ppm | PRESSURE psi OUT - - IN - - - METHANE ppm | H2S ppm % MOISTURE | REMARKS

R E SMITH CORP PAGE 19

PRUETT WIRELINE SERVICE

8915 ROSEDALE HWY., BAKERSFIELD, CA 93308
(805) 589-2768

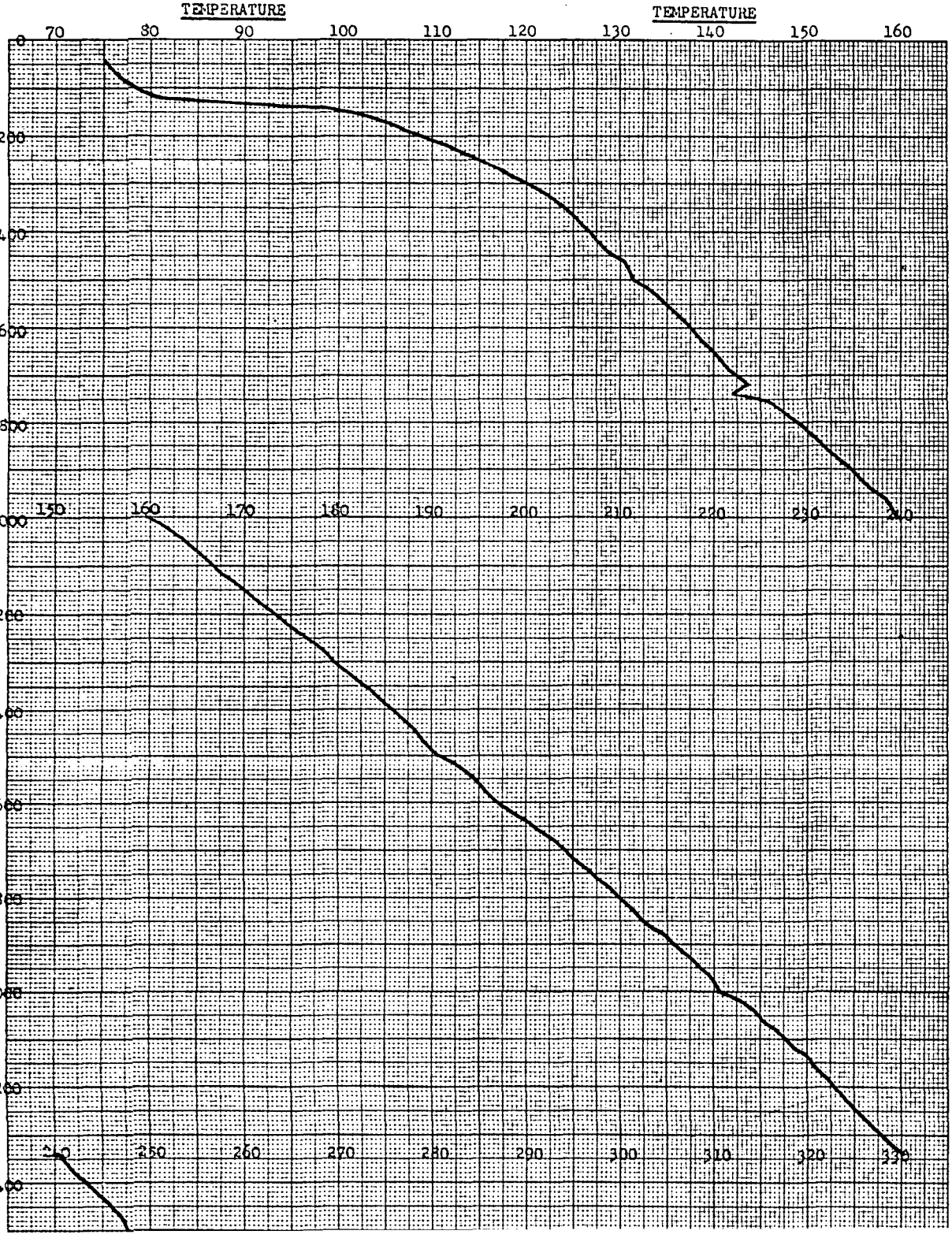
Pruett Wireline

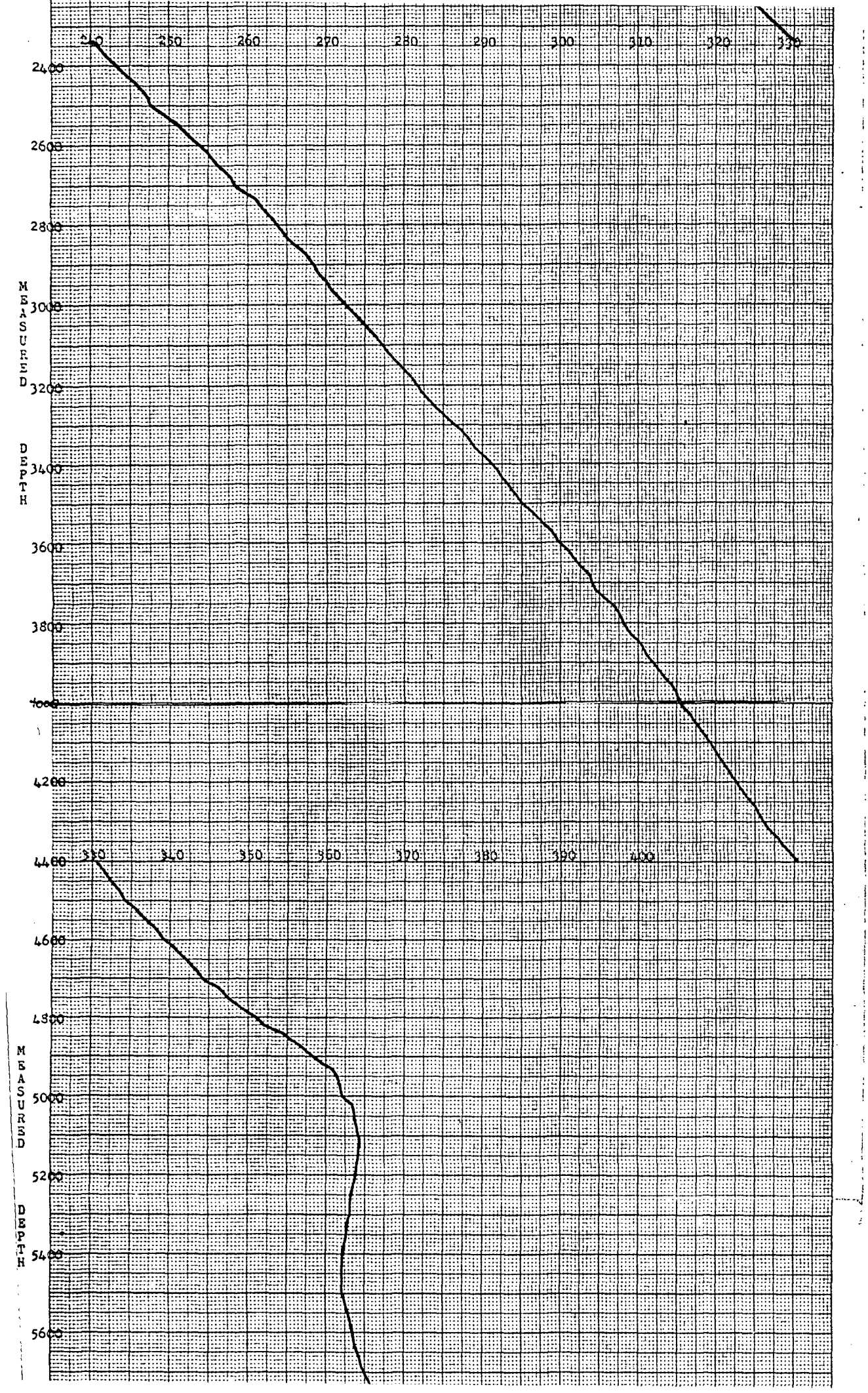
SUB—SURFACE TEMPERATURE SURVEY

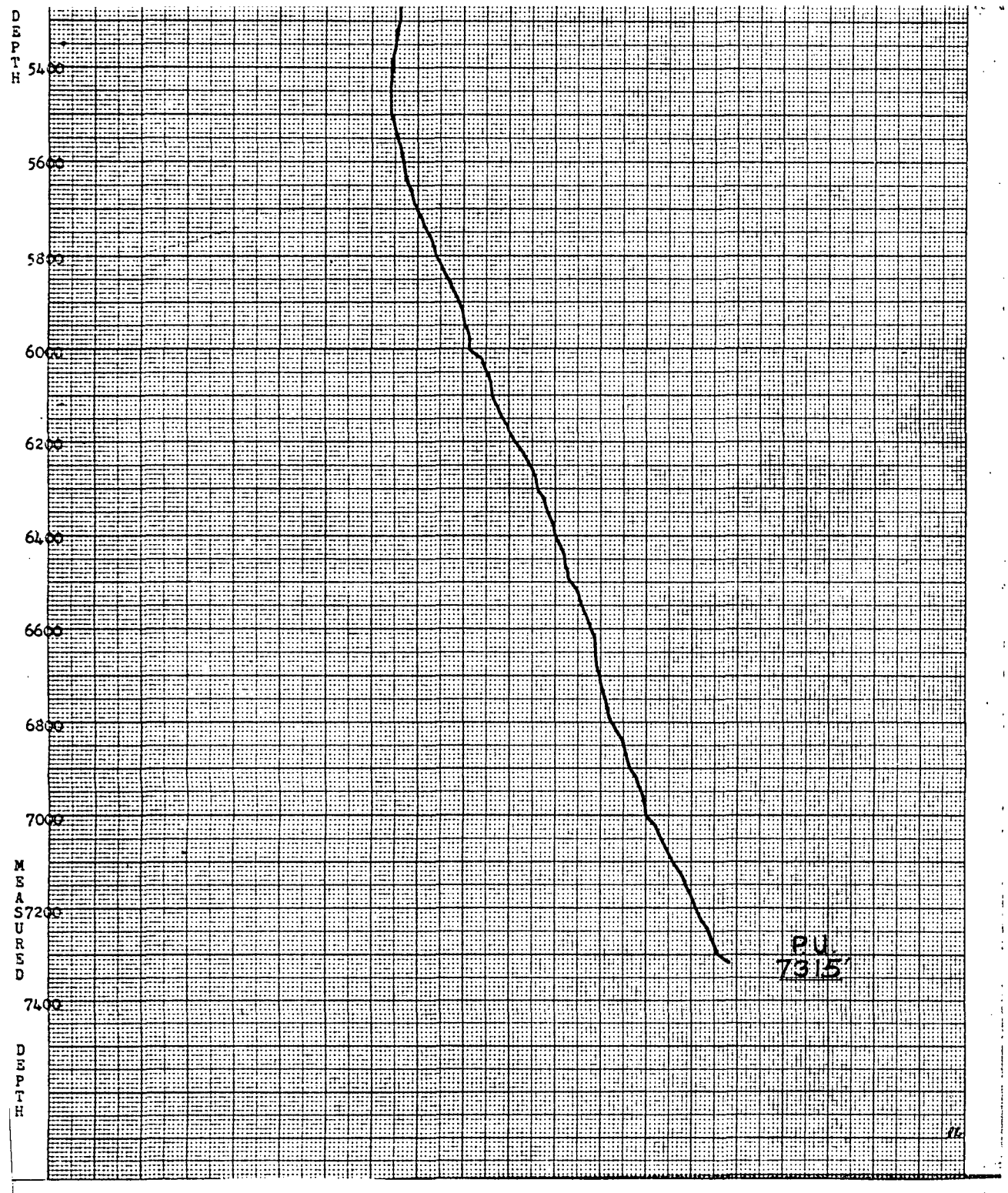
COMPANY Getty Oil **FIELD** Milford **WELL NAME** KGRA 52-21

TOTAL DEPTH	7500'	WELL STATUS	Static	BOMB HUNG @	7315' *
CASING	8 5/8" @ 2023'	CASING PRESSURE	--	TIME ON BOTTOM	2:07pm
LINER	none	TUBING PRESSURE	--	TIME OFF BOTTOM	3:07pm
PERFORATIONS	none	ZONE	none	SHUT IN	none
MPP	none	MAX. °F.		ON PRODUCTION	none
TUBING DETAIL	none			PURPOSE	Traverse Temperature Survey **

DATE	July 13, 1978		
ELEMENT RANGE	50-474°		
ZERO POINT	22.0'		
ELEVATION	none		
PICKUP	7315'		




240
250
260
270
280
290
300
310
320
330
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
MEASURED DEPTH
340
350
360
370
380
390
400
MEASURED DEPTH



SURVEY DATA

DEPTH	TEMPERATURE	DEPTH	TEMPERATURE	DEPTH	TEMPERATURE	DEPTH	TEMPERATURE
40	75.2	1860	212.8	3680	303.7	5520	362.5
60	75.8	1880	214.7	3700	304.1	5540	362.7
80	77.0	1900	215.5	3720	304.7	5560	363.0
100	78.6	1920	216.7	3740	305.8	5580	363.2
120	81.0	1940	218.0	3760	307.1	5600	363.4
140	97.6	1960	219.2	3780	307.8	5620	363.6
160	103.3	1980	220.0	3800	308.2	5640	363.8
180	106.3	2000	220.4/221.2	3820	308.8	5660	364.3
200	108.8	2020	223.3	3840	309.7	5680	364.5
220	111.6	2040	224.5	3860	310.6	5700	364.7
240	113.8	2060	225.3	3880	311.2	5720	365.4
260	116.2	2080	226.8	3900	312.1	5740	365.8
280	118.0	2100	227.8	3920	312.7	5760	366.5
300	120.2	2120	228.8	3940	313.6	5780	366.7
320	122.8	2140	230.3	3960	314.4	5800	366.9
340	123.6	2160	231.1	3980	314.9	5820	367.6
360	124.8	2180	232.3	4000	315.3/315.9	5840	368.2
380	125.6	2200	232.9	4020	316.6	5860	368.7
400	126.8	2220	234.0	4040	317.2	5880	369.1
420	127.4	2240	234.8	4060	318.1	5900	369.6
440	128.6	2260	235.3	4080	318.7	5920	370.0
460	130.4	2280	236.8	4100	319.4	5940	370.2
480	131.0	2300	237.9	4120	320.0	5960	370.4
500	131.4/132.2	2320	239.1	4140	320.7	5980	370.7
520	133.4	2340	240.3	4160	321.3	6000	370.7/371.1

380	125.6	2200	232.9	4020	316.6	5860	368.7
400	126.8	2220	234.0	4040	317.2	5880	369.1
420	127.4	2240	234.8	4060	318.1	5900	369.6
440	128.6	2260	235.3	4080	318.7	5920	370.0
460	130.4	2280	236.8	4100	319.4	5940	370.2
480	131.0	2300	237.9	4120	320.0	5960	370.4
500	131.4/132.2	2320	239.1	4140	320.7	5980	370.7
520	133.4	2340	240.3	4160	321.3	6000	370.7/371.1
540	134.4	2360	241.3	4180	321.9	6020	372.2
560	135.6	2380	242.2	4200	322.8	6040	372.4
580	136.6	2400	243.4	4220	323.5	6060	372.9
600	137.6	2420	244.4	4240	324.3	6080	373.1
620	138.6	2440	245.4	4260	325.2	6100	373.3
640	139.6	2460	246.5	4280	325.6	6120	373.7
660	140.4	2480	247.3	4300	326.2	6140	374.2
680	141.2	2500	247.7/248.5	4320	326.9	6160	374.6
700	142.6	2520	249.3	4340	328.0	6180	375.1
720	143.3	2540	250.8	4360	328.8	6200	375.5
740	142.2	2560	251.8	4380	329.7	6220	376.4
760	146.4	2580	252.8	4400	330.5	6240	377.0
780	147.6	2600	253.9	4420	331.4	6260	377.5
800	149.0	2620	255.1	4440	332.1	6280	377.9
820	150.0	2640	255.8	4460	333.1	6300	378.1
840	151.2	2660	256.8	4480	333.8	6320	378.8
860	152.2	2680	257.9	4500	334.2/334.8	6340	379.2
880	153.6	2700	258.5	4520	335.7	6360	379.5
900	154.6	2720	259.8	4540	336.6	6380	379.9
920	155.6	2740	261.4	4560	337.7	6400	380.1
940	156.8	2760	261.9	4580	338.5	6420	380.6
960	158.4	2780	262.9	4600	339.2	6440	381.0
980	159.0	2800	263.8	4620	340.7	6460	381.2
1000	159.6/160.2	2820	264.6	4640	341.4	6480	381.4
1020	161.8	2840	265.4	4660	342.5	6500	381.4/382.1
1040	163.2	2860	266.7	4680	343.4	6520	382.6
1060	164.4	2880	267.7	4700	344.0	6540	382.8
1080	165.6	2900	268.4	4720	346.2	6560	383.2
1100	166.8	2920	269.0	4740	347.1	6580	383.7
1120	168.0	2940	270.1	4760	348.2	6600	383.9
1140	169.6	2960	270.7	4780	349.5	6620	384.4
1160	170.7	2980	271.5	4800	351.1	6640	384.4
1180	172.1	3000	272.4/273.0	4820	352.0	6660	384.4
1200	173.4	3020	273.6	4840	354.4	6680	384.6
1220	174.7	3040	274.5	4860	355.5	6700	385.0
1240	175.9	3060	275.5	4880	357.2	6720	385.0
1260	177.4	3080	276.4	4900	358.3	6740	385.3
1280	178.7	3100	277.4	4920	359.7	6760	385.7
1300	179.5	3120	278.2	4940	361.2	6780	385.9
1320	181.0	3140	278.9	4960	361.6	6800	386.2
1340	182.2	3160	279.9	4980	361.9	6820	386.8
1360	183.5	3180	281.2	5000	362.1/362.5	6840	387.5
1380	184.5	3200	281.8	5020	363.4	6860	387.7
1400	185.8	3220	282.4	5040	363.6	6880	388.0
1420	187.1	3240	283.3	5060	363.8	6900	388.2
1440	188.1	3260	284.3	5080	364.1	6920	388.9
1460	188.9	3280	285.4	5100	364.3	6940	389.3
1480	189.8	3300	286.4	5120	364.3	6960	389.8
1500	190.4/191.3	3320	287.5	5140	364.1	6980	390.0
1520	192.7	3340	288.3	5160	364.1	7000	390.0/390.7
1540	194.0	3360	289.2	5180	363.8	7020	391.1
1560	195.0	3380	290.4	5200	363.8	7040	391.6
1580	195.7	3400	291.3	5220	363.6	7060	392.0
1600	196.9	3420	292.1	5240	363.4	7080	392.5
1620	198.4	3440	292.7	5260	363.2	7100	392.9
1640	200.3	3460	293.6	5280	363.0	7120	393.6
1660	201.5	3480	294.4	5300	363.0	7140	394.3
1680	203.0	3500	295.1/295.7	5320	362.7	7160	394.7
1700	204.3	3520	296.4	5340	362.7	7180	395.2
1720	205.3	3540	297.4	5360	362.5	7200	395.6
1740	206.4	3560	298.3	5380	362.3	7220	396.1
1760	207.4	3580	299.2	5400	362.3	7240	396.7
1780	208.9	3600	299.8	5420	362.1	7260	397.2
1800	209.9	3620	301.1	5440	362.1	7280	397.6
1820	211.0	3640	301.7	5460	362.1	7300	398.1
1840	212.0	3660	302.6	5480	362.1	7315	399.2
				5500	362.1/362.5		

COMMENTS: *Final Stop at 7315' for 1 hour - Temperature remained the same.

**Survey traversed 20' per minute.

Instrument Serial Number 31, calibrated 10-28-76.

Stop checks at 500' intervals indicated in Survey Data.

D Pruett
C Trott

HISTORY OF GEOTHERMAL RESOURCES WELL

Operator: Getty Oil Company

Field: Roosevelt Hot Springs

Well No.: KGRA 52-21, U.S.L. U-27391, Section 21, T27S/R9W, SLB&M.

Date: May 23, 1978

Signed: C. G. Bursell
C. G. Bursell

Rt. 1, Box 197-X,
Bakersfield, CA 93308 (805) 399-2961

Title: District Production Manager--SJV-East

Date:

1978

2-3 Rigged up Coastal Drilling Company, rig number 2. Mixed mud; spudded well at 3 p.m., February 2, 1978. Drilled 12-1/4" hole to 182'. Made up and ran 17-1/2" hole opener. Drilled 17-1/2" hole to 125' at 6 a.m. Mud weight 68.5, viscosity 61, temperature in 60°, temperature out 60°.

2-4 Drilled 17-1/2" hole to 182'. P.O.O.H. changed 17-1/2" hole opener to 28" hole opener. Drilled 28" hole to 175' at 6 a.m.
Note: Slight amount of hole sloughing at 103'.
Mud weight 69, viscosity 52, temperature in 60°, temperature out 60°.

2-5 Continued running 28" hole opener. Drilled 28" hole to 182'. Conditioned mud and circulated. Tagged bottom--no fill. Ran 182'-20" H-40, 94# slip joint casing. Casing equipped with guide shoe. First centralizer 10' above shoe. Second centralizer 80' above shoe. Cemented casing with 310 sacks Class B cement, 1:1 perlite, 40% silica flour, 5/10 of 1% CFR-2, 2% gel, 2% CaCl. 10 BBLS water ahead. Displaced with 57 BBLS. 72 BBLS of returns. Cement in place at 5:20 p.m. WOC eight hours. Welded on 20" casing head. Assembling 20" B.O.P. stack at 6 a.m.

2-6 Nippled-up B.O.P.E.

2-7 Completed nippling up of B.O.P.E. B.O.P. stack consisted of two 20" series 900 Shaffer double B.O.P., Hydril GK B.O.P. Tested casing blind rams, pipe rams, hydril, kill line valves and blowdown manifold valves to 500 psi with mud. All checked o.k. USGS witnessed. Picked up 9" drill collars. R. F. Smith logging equipment installed and commenced operating at 182'. Prepared to drill out shoe at 6 a.m.

2-8 Drilled out shoe at 182' with water. Changed over to mud. Drilled 17-1/2" hole to 345' at 6 a.m.
Mud weight 68.5, viscosity 51, temperature in 73°, temperature out 75°.

1978

2-9 Drilled 17-1/2" hole to 586'. Drilling ahead at 6 a.m.
Mud weight 67.5, viscosity 54, temperature in 91°, temperature out 95°

2-10 Tripped for bit. 9" collars would not break. Wait on tongs. Made up new bit and drilling assembly. Prepared to drill ahead at 6 a.m.

2-11 Drilled 17-1/2" hole to 634'. Pulled out of hole at 6 a.m.
Mud weight 67.5, viscosity 47, temperature in 91°, temperature out 95°

2-12 Tried to break and lay down 9" drill collars. Collars would not break. Cut and layed down collars. Ran in hole with drilling assembly. Drilled 17-1/2" hole to 667' at 6 a.m.
Mud weight 68, viscosity 47, temperature in 96°, temperature out 99°

2-13 Drilled 17-1/2" hole to 725' at 6 a.m.
Mud weight 67.5, viscosity 46, temperature in 105°, temperature out 109°

2-14 Drilled 17-1/2" hole to 765'. Circulating and conditioning mud for loggers at 6 a.m.
Mud weight 67.5, viscosity 47, temperature in 102°, temperature out 105°

2-15 Rigged up and ran Schlumberger logs, DIL, FDC-CNL, temperature log. Rigged up and ran Agnew & Sweet temperature and pressure survey. Recorded stabilized B.H.T. of 111°F at 765'. Ran in hole, tagged bottom, no fill, circulated. Prepared to run casing at 6 a.m.

2-16 Ran 765', 13-3/8" K-55, 54.5# buttress casing. Casing equipped with guide shoe. First centralized 10' above shoe. Remaining centralizers every other joint. Cemented casing with 465 sacks Class B cement, 1:1 perlite, 40% silica flour, 5/10 of 1% CFR-2, 2% gel. 10 BBLS water ahead. Displaced with 114 BBLS. 50 BBLS of returns. Bumped plug with 1000 psi. Held 500 psi shut-in. Cement in place 2:56 p.m. WOC eight hours. Tearing out 20" B.O.P.E. stack at 6 a.m.

2-17 Completed tearing out 20" B.O.P.E. Welded on 13-3/8" casing head. Nippling up 12" B.O.P.E. stack at 6 a.m.

2-18 Nippling up 12" B.O.P.E. stack at 6 a.m.

2-19 Completed nippling up 12" B.O.P.E. stack. Stack consisted of two 12" series 900 Shaffer double B.O.P. Hydril GK B.O.P. and Grant rotating head. Pressure tested to 1000 psi. Pressure test failed. Line repair and rig repair at 6 a.m.

2-20 Rig repair.

1978

2-21 Picked up 9" drill collars and drilling assembly. Completed pressure test of B.O.P.E. USGS witnessed. Drilled out shoe at 765' with water. Changed over to mud. Drilled 12-1/4" hole to 789' at 6 a.m.
Mud weight 65.4, viscosity 40, temperature in 90°, temperature out 94°

2-22 Drilled 12-1/4" hole to 879'. Drilling ahead at 6 a.m.
Mud weight 64, viscosity, 41, temperature in 110°, temperature out 114°

2-23 Drilled 12-1/4" hole to 1004'. Drilling ahead at 6 a.m.
Mud weight 65.2, viscosity 32, temperature in 111°, temperature out 116°

2-24 Drilled 12-1/4" hole to 1105'. Drilling ahead at 6 a.m.
Mud weight 67, viscosity 32, temperature in 104°, temperature out 109°

2-25 Drilled 12-1/4" hole to 1249'. Drilling ahead at 6 a.m.
Mud weight 66.3, viscosity 30, temperature in 112°, temperature out 117°

2-26 Drilled 12-1/4" hole to 1386'. Drilling ahead at 6 a.m.
Mud weight 65.6, viscosity 27, temperature in 108°, temperature out 112°

2-27 Drilled 12-1/4" hole to 1508'. Tripped for bit. Drilling ahead at 6 a.m.
Mud weight 65, viscosity 28, temperature in 105°, temperature out 110°

2-28 Drilled 12-1/4" hole to 1633'. Drilling ahead at 6 a.m.
Mud weight 65, viscosity 29, temperature in 112°, temperature out 117°

3-1 Drilled 12-1/4" hole to 1749'. Hole took fluid at 6 BBL/hr. for three hour period at ~1680'. Drilling ahead at 6 a.m.
Mud weight 65.7, viscosity 27, temperature in 117°, temperature out 122°

3-2 Drilled 12-1/4" hole to 1874'. Drilling ahead at 6 a.m.
Mud weight 65.7, viscosity 27, temperature in 113°, temperature out 118°

3-3 Drilled 12-1/4" hole to 1950'. Drilling ahead at 6 a.m.
Mud weight 63.9, viscosity 26, temperature in 113°, temperature out 118°

3-4 Drilled 12-1/4" hole to 2041'. Conditioned mud and circulated. Pulled out of hole and laying down 9" drill collars at 6 a.m.
Mud weight 63.9, viscosity 32, temperature in 114°, temperature out 120°

3-5 Completed laying down 9" drill collars. Rigged up and ran Schlumberger DIL, FDC-CNL, sonic, temperature logs. Rigged up and ran Agnew & Sweet temperature and pressure surveys. Recorded static B.H.T. of 238.5° at 2041'. Picked up drill string and ran in hole. Circulating at 6 a.m.

1978

3-6 Pulled out of hole. Rigged up casing tong crew. Ran 2039', 9-5/8", 40# K-55 buttress casing. Casing equipped with float collar on top of first joint; stop collar ten foot off bottom. Remaining centralizers every other joint. Installed W.K.M. casing slips. Prepared to cement at 6 a.m.

3-7 Cemented casing with 535 sacks Class B cement, 1:1 perlite, 40% silica flour, 2% gel, 5/10 of 1% CFR-2. Pumped 10 BBLS water ahead. Bumped plug with 1000 psi. 30 BBLS cement returns. Cement in place at 7:45 a.m. WOC 12 hours. Picked up B.O.P.E. stack. Installed W.K.M. expansion spool and master gate valve. Nippling-up B.O.P.E. stack at 6 a.m.

3-8 Completed nippling up B.O.P.E., pressure tested with water to 1000 psi. USGS witnessed. Drilled out cement to 2041'. Drilling ahead at 6 a.m.
Mud weight 63, viscosity 26, temperature in 99°, temperature out 106°

3-9 Drilled 8-1/2" hole to 2142'. Pulled out of hole. Picked up stabilized drilling assembly. Ran in hole. Reamed hole to 2142'. Drilling ahead at 6 a.m.
Mud weight 63, viscosity 26, temperature in 120°, temperature out 126°

3-10 Drilled 8-1/2" hole to 2306'. Drilling ahead at 6 a.m.
Mud weight 62.9, viscosity 27, temperature in 126°, temperature out 132°

3-11 Drilled 8-1/2" hole to 2378'. Twisted off #4-7" drill collar. 108' fish. Circulated. Pulled out of hole. Layed down drill collars. Called out fishing tools. Waiting on fishing tools at 6 a.m.
Mud weight 62.9, viscosity 27, temperature in 131°, temperature out 137°

3-12 Made up fishing tools. Ran in hole. Circulated and worked over fish. Pulled out of hole with fish. Broke and layed down fishing tools. Made up drilling assembly with new bit. Serviced all tool connections. Reamed from 2318-2378'. Drilled 8-1/2" hole to 2426'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 29, temperature in 128°, temperature out 134°

3-13 Drilled 8-1/2" hole to 2542'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 35, temperature in 139°, temperature out 148°

3-14 Tripped for additional stabilization. Drilled 8-1/2" hole to 2650'. Drilling ahead at 6 a.m.
Mud Weight 63.7, viscosity 33, temperature in 136°, temperature out 142°

1978

3-15 Drilled 8-1/2" hole to 2762'. Drilling ahead at 6 a.m.
Mud weight 65.5, viscosity 32, temperature in 150°, temperature out 157°

3-16 Drilled 8-1/2" hole to 2819'. Pulled out of hole looking for washed out pipe. #7 drill collar washed out. Picked up additional drill collars. Replaced 6 pt. reamer and bit. Ran in hole. Reamed from 2786-2819'. Drilling ahead at 6 a.m.
Mud weight 65.4, viscosity 31, temperature in 142°, temperature out 149°

3-17 Drilled 8-1/2" hole to 2957'. Drilling ahead at 6 a.m.
Mud weight 65.2, viscosity 32, temperature in 148°, temperature out 155°

3-18 Drilled 8-1/2" hole to 3094'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 33, temperature in 149°, temperature out 155°

3-19 Drilled 8-1/2" hole to 3254'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 33, temperature in 151°, temperature out 157°

3-20 Drilled 8-1/2" hole to 3336'. Tripped for bit. Reamed from 2860' to 3356' at 6 a.m.
Mud weight 64.6, viscosity 34, temperature in 159°, temperature out 164°

3-21 Drilled 8-1/2" hole to 3499'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 33, temperature in 155°, temperature out 161°

3-22 Drilled 8-1/2" hole to 3567'. Pulled out of hole. Rigged up and ran Agnew & Sweet temperature and pressure surveys. Recorded static bottom hole temperature of 255°F. Rigged down loggers, picked up core barrel at 6 a.m.
Mud weight 64.4, viscosity 33, temperature in 151°, temperature out 158°

3-23 Ran in hole with core barrel. Circulated. Rig repair at 6 a.m.

3-24 Rig repair last 24 hours.

3-25 Reamed from 3502-3567' with 8-1/2" core bit. Cored and recovered 12' core. Layed down core barrel. Picked up monel collar and multishot survey tool. Surveyed every second stand from 3551-2120'. Pulled out of hole at 6 a.m.
Mud weight 63.7, viscosity 32, temperature in 147°, temperature out 152°

3-26 Made up drilling assembly. Drilled 8-1/2" hole to 3710'. Loosing mud at ~5 to 6 BBL/Hr. Drilling ahead at 6 a.m.
Mud weight 64, viscosity 30, temperature in 165°, temperature out 169°

1978

3-27 Drilled 8-1/2" hole to 3884'. Drilling ahead at 6 a.m.
Mud weight 64.6, viscosity 33, temperature in 171°, temperature out 179°

3-28 Drilled 8-1/2" hole to 4055'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 33, temperature in 175°, temperature out 181°

3-29 Drilled 8-1/2" hole to 4250'. Drilling ahead at 6 a.m.
Mud weight 64.1, viscosity 33, temperature in 183°, temperature out 189°

3-30 Drilled 8-1/2" hole to 4335'. Tripped for bit. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 33, temperature in 180°, temperature out 185°

3-31 Drilled 8-1/2" hole to 4510'. Losing fluid at ~9 BBLS/Hr. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 35, temperature in 172°, temperature out 180°

4-01 Drilled 8-1/2" hole to 4701'. Drilling ahead at 6 a.m.
Mud weight 65.2, viscosity 32, temperature in 175°, temperature out 180°

4-02 Drilled 8-1/2" hole to 4751'. Tripped for bit. Replaced stablizing assembly. Reamed from 4631-4751' at 6 a.m.
Mud weight 64.4, viscosity 31, temperature in 168°, temperature out 176°

4-03 Drilled 8-1/2" hole to 4910'. Drilling ahead at 6 a.m.
Mud weight 63.4, viscosity 28, temperature in 166°, temperature out 172°

4-04 Drilled 8-1/2" hole to 5094'. Drilling ahead at 6 a.m.
Mud weight 63.4, viscosity 29, temperature in 165°, temperature out 171°

4-05 Drilled 8-1/2" to 5257'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 29, temperature in 163°, temperature out 171°

4-06 Drilled 8-1/2" hole to 5430'. Tripping for bit at 6 a.m.
Mud weight 64.4, viscosity 29, temperature in 166°, temperature out 173°

4-07 Tripped for bit. Reamed from 5340-5430'. Drilled 8-1/2" hole to 5584'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 32, temperature in 176°, temperature out 181°

4-08 Drilled 8-1/2" hole to 5786'. Drilling ahead at 6 a.m.
Mud weight 64.8, viscosity 29, temperature in 172°, temperature out 179°

4-09 Drilled 8-1/2" hole to 5987'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 172°, temperature out 178°

4-10 Drilled 8-1/2" hole to 6174'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 173°, temperature out 180°

1978

4-11 Drilled 8-1/2" hole to 6252'. Made 5 stand wiper run. Circulated. Checked for fill. No fill. Measured out of hole at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 188°, temperature out 193°

4-12 Pulled out of hole. Rigged up Schlumberger logs: FDC-CNL, FIL, temperature log would not operate. Run in hole with sonic at 6 a.m.

4-13 Pulled out of hole. Rigged up Agnew & Sweet pressure and temperature log. Recorded static bottom hole temperature of 340°F at 6252'. Ran in hole with 4-1/2" drill pipe. Prepared swabbing tool (would not operate). Changing out pipe rams at 6 a.m.

4-14 Swabbing tool would not operate. Pulled out of hole laying down 4-1/2" drill pipe. Picked up new reamer and bit. Measured and picked up 3-1/2" drill pipe. Ran in hole at 6 a.m.

4-15 Completed running in hole with 3-1/2" drill pipe. Attempted to circulate. Plugged bit. Tripped for plugged bit. Made up and ran in swabbing tool at 6 a.m.

4-16 Swabbed well noting fluid temperature. No perceivable loss in fluid level. Tripped to pick up drilling assembly at 6 a.m.

4-17 Completed trip in. Circulated and conditioned mud. Reamed from 5870-6246'. Bit would not penetrate at 6246'. Excessive metal cuttings coming over shaker. Pulled out of hole. Four rollers on 6 point reamer locked up. Ran in hole with new reamer at 6 a.m.
Mud weight 64, viscosity 29

4-18 Mixed and conditioned mud. Made 4 surveys on bottom--indicated moderate dog leg. Drilled 8-1/2" hole to 6287'. Tripped for bit. Ran in hole. Reaming 1 joint at 6 a.m.
Mud weight 63.7, viscosity 32, temperature in 186°, temperature out 194°

4-19 Drilled 8-1/2" hole to 6380'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 31, temperature in 190°, temperature out 198°

4-20 Drilled 8-1/2" hole to 6484'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 29, temperature in 180°, temperature out 188°

4-21 Tripped for bit. Drilled 8-1/2" hole to 6543'. Drilling ahead at 6 a.m.
Mud weight 64.6, viscosity 33, temperature in 188°, temperature out 200°

4-22 Drilled 8-1/2" hole to 6679'. Drilling ahead at 6 a.m.
Mud weight 64.7, viscosity 31, temperature in 183°, temperature out 195°

1978

4-23 Drilled 8-1/2" hole to 6862'. Drilling ahead at 6 a.m.
Mud weight 63.7, viscosity 30, temperature in 186°, temperature out 197°

4-24 Drilled 8-1/2" hole to 6980'. Tripped for bit at 6 a.m.
Mud weight 64.4, viscosity 31, temperature in 175°, temperature out 184°

4-25 Ran in hole. Reamed from 6730-6980'. Drilled 8-1/2" hole to 7071'. Drilling ahead at 6 a.m.
Mud weight 64, viscosity 32, temperature in 188°, temperature out 201°

4-26 Drilled 8-1/2" hole to 7205'. Drilling ahead at 6 a.m.
Mud weight 64, viscosity 34, temperature in 184°, temperature out 196°

4-27 Drilled 8-1/2" hole to 7253'. Tripped for bit. Reamed from 7150-7253'. Drilling ahead at 6 a.m.
Mud weight 63.4, viscosity 33, temperature in 186°, temperature out 198°

4-28 Drilled 8-1/2" hole to 7350'. Drilling ahead at 6 a.m.
Mud weight 64.6, viscosity 34, temperature in 192°, temperature out 206°

4-29 Drilled 8-1/2" hole to 7450'. Drilling ahead at 6 a.m.
Mud weight 64.4, viscosity 34, temperature in 195°, temperature out 206°

4-30 Drilled 8-1/2" hole to 7500'. Mixed gel pill and circulated. Pulled out of hole measuring out. Laying down drill collars at 6 a.m.
Mud weight 65.4, viscosity 36, temperature in 194°, temperature out 204°

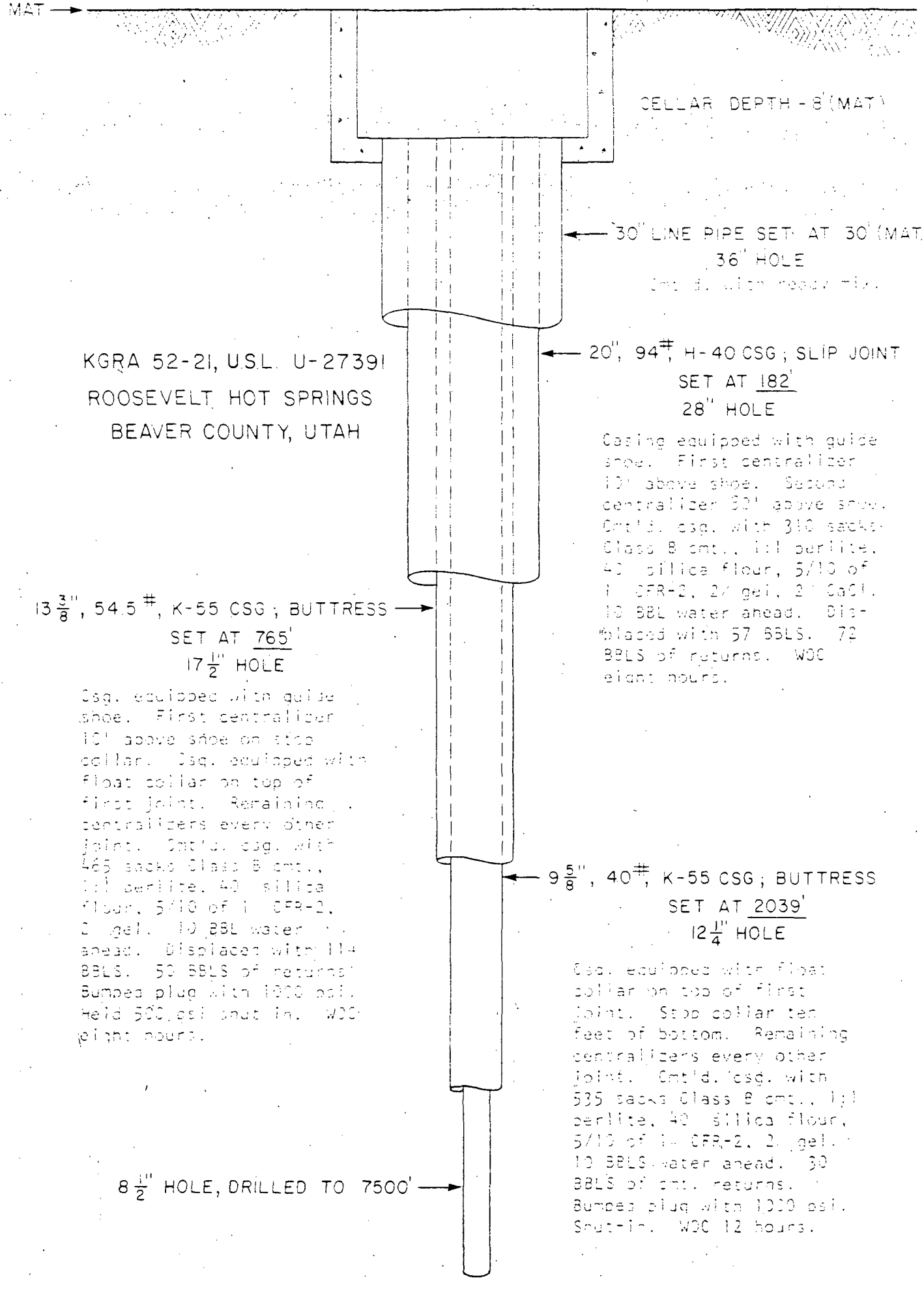
5-01 Completed laying down drill collars. Ran in hole with open ended drill pipe with tool catcher on bottom. Dumped mud tanks and changed over to water. Circulated to cool hole. Pulled out of hole. Rigged up and running Schlumberger FIL at 6 a.m.

5-02 Completed running Schlumberger logs: FIL, FDC-CNL, DIL, Sonic, temperature log. Rigged up and ran Agnew & Sweet temperature and pressure survey. Recorded static bottom hole temperature of 376°F. Ran in hole with open ended drill pipe with tool catcher on bottom. Rigged up nitrogen and pressured up well at 6 a.m.

5-03 Completed pressuring well with nitrogen, purged fluid from well. Well did not flow. Rigged up swabbing tool to check fluid level. Tagged fluid at 433' (124°F). Rigged down swabbing tool. Pulled out of hole laying down drill pipe. Shut-in well. Tearing out B.O.P.E. at 6 a.m.

5-04 Completed tearing out B.O.P.E. stack. Installed wellhead assembly. Tearing out choke manifold and flare stacks at 6 a.m.
Released contract rig at 12 noon 5-04-78.

KGRA 52-21, ROOSEVELT HOT SPRINGS, BEAVER COUNTY, UTAH
K.B. ELEVATION : 5882', ALL MEASUREMENTS FROM K.B.
MAT ELEVATION : 5860'



TELEPHONE (805) 327-8567

P. O. BOX 867

OILWELL RESEARCH, INC.
HORNKOHL LABORATORIES DIVISION
CHEMICAL AND TESTING ENGINEERS
714 TRUXTUN AVENUE
BAKERSFIELD, CALIFORNIA 93302

January 23, 1978

Laboratory No 258845 Marked Jefferson Water Well #1

Sample Water

Received January 17, 1978

Submitted by Getty Oil Company
Route 1, Box 197-X
Bakersfield, CA 93308
ATTN: Frank Lawrence

* * * * * *

INDUSTRIAL WATER ANALYSIS

Constituents		Parts per Million
Carbonates, CO_3	—	0.0
Bicarbonates, HCO_3	—	213.5
Chlorides, Cl	—	606.4
Sulfates, SO_4	—	19.7
Sulfides, S	—	0.0
Nitrates, NO_3	—	1.6
Silica, SiO_2	—	55.8
Boron, B	—	2.3
Calcium, Ca	—	150.4
Magnesium, Mg	—	27.8
Sodium, Na	—	258.2
Iron, Fe	—	under 0.1
Hardness as $CaCO_3$	—	490.0
Total Dissolved Solids	—	1356.0

pH Value @ 25°C.	8.1
Conductivity: Micromhos/cm @ 25°C.	2145
Resistivity: Ohm Meters @ 25°C.	4.66

Color : Water White
Odor : None
Turbidity: Clear (sediment)

Theoretical Analysis

Calcium Bicarbonate	—	283.7
Calcium Sulfate	—	27.2
Calcium Chloride	—	200.9
Magnesium Chloride	—	108.6
Sodium Chloride	—	654.8
Sodium Nitrate	—	2.6

Respectfully submitted,
HORNKOHL LABORATORIES

dw

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Marked: Jefferson Water Well, Beaver Co. Utah

Date Reported: 8/7/78
Date Received: 7/3/78
Laboratory No.: 5483

WATER ANALYSIS

Sample Description

pH	7.6
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	1760.
Resistivity, Ohm M²/M	5.68

Constituents, P.P.M. (parts per million)

Boron, (B)	3.1
Calcium, (Ca)	95.0
Magnesium, (Mg)	33.
Sodium, (Na)	245.0
Potassium, (K)	10.0
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	142.1
Chlorides, (Cl)	548.0
Sulphates, (SO_4)	26.0
Nitrate, (NO_3)	1.3
Fluoride, (F)	0.26
Total Iron, (Fe)	72.0*
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.44
Chromium, (Cr)	
Zinc, (Zn)	0.07
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	39.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	373.5 (21.8 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	1143.
Total Suspended Solids	

Phosphate, PO_4 less-than 0.1 ppm

*Note: The inside of can appears rusted.

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93309
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2474

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 Initial Fluid 5:03 AM 105°F

WATER ANALYSIS

Sample Description	
pH	7.1
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	2000.
Resistivity, Ohm M^2/M	5.0

Constituents, P.P.M. (parts per million)	
Boron, (B)	2.2
Calcium, (Ca)	92.
Magnesium, (Mg)	15.6
Sodium, (Na)	316.
Potassium, (K)	23.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	137.7
Chlorides, (Cl)	601.8
Sulphates, (SO_4)	45.
Nitrate, (NO_3)	less-than 0.5
Fluoride, (F)	0.64
Total Iron, (Fe)	0.18
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.59
Chromium, (Cr)	
Zinc, (Zn)	0.47
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	28.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	294.4 (17.2 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	1194.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. P. Gallo

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2477

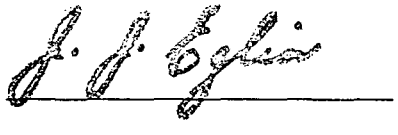
Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 5:40 AM 175°

WATER ANALYSIS

Sample Description	
pH	7.7
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	2160.
Resistivity, Ohm M^2/M	4.63

Constituents, P.P.M. (parts per million)	
Boron, (B)	2.4
Calcium, (Ca)	70.
Magnesium, (Mg)	9.0
Sodium, (Na)	368.
Potassium, (K)	29.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	133.4
Chlorides, (Cl)	619.5
Sulphates, (SO_4)	60.
Nitrate, (NO_3)	1.8
Fluoride, (F)	0.74
Total Iron, (Fe)	0.24
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.11
Chromium, (Cr)	
Zinc, (Zn)	0.01
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	66.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	212.2 (12.4 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	1293.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.



AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2471

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 5:45 AM 200°F

WATER ANALYSIS

Sample Description	
pH	7.6
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	2040.
Resistivity, Ohm M^2/M	4.90

Constituents, P.P.M. (parts per million)	
Boron, (B)	2.2
Calcium, (Ca)	82.
Magnesium, (Mg)	9.4
Sodium, (Na)	345.
Potassium, (K)	28.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	126.5
Chlorides, (Cl)	616.0
Sulphates, (SO_4)	52.
Nitrate, (NO_3)	0.9
Fluoride, (F)	0.70
Total Iron, (Fe)	4.7
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.26
Chromium, (Cr)	
Zinc, (Zn)	0.27
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	118.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	243.9 (14.2 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	1322.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

R. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Exploration Department
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2470

Marked:

Getty KGRA 52-21 Milford, Utah 5/2/78 6:40 AM 203°F

WATER ANALYSIS

Sample Description

pH		8.1
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		250.
Resistivity, Ohm M^2/M		40.0

Constituents, P.P.M. (parts per million)

Boron, (B)		0.58
Calcium, (Ca)		18.6
Magnesium, (Mg)		0.61
Sodium, (Na)		28.
Potassium, (K)		3.7
Carbonates, (CO_3)		0.
Bicarbonates, (HCO_3)		48.5
Chlorides, (Cl)		43.5
Sulphates, (SO_4)		12.
Nitrate, (NO_3)	less-than	0.5
Fluoride, (F)		0.28
Total Iron, (Fe)		1.2
Copper, (Cu)	less-than	0.01
Manganese, (Mn)		0.06
Chromium, (Cr)		
Zinc, (Zn)		0.02
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)		34.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		49.1 (2.9 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		167.
Total Suspended Solids		
Phosphate (PO_4)	less-than	0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

B C LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2476

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 7:00 AM 168°F

WATER ANALYSIS

Sample Description	
pH	8.2
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	3600.
Resistivity, Ohm M^2/M	2.78

Constituents, P.P.M. (parts per million)	
Boron, (B)	5.5
Calcium, (Ca)	67.
Magnesium, (Mg)	2.2
Sodium, (Na)	710.
Potassium, (K)	38.
Carbonates, (CO_3)	8.5
Bicarbonates, (HCO_3)	149.0
Chlorides, (Cl)	998.3
Sulphates, (SO_4)	211.
Nitrate, (NO_3)	1.8
Fluoride, (F)	1.1
Total Iron, (Fe)	4.6
Copper, (Cu)	0.02
Manganese, (Mn)	0.17
Chromium, (Cr)	
Zinc, (Zn)	0.10
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	55.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	176.7 (10.3 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	2177.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. J. Colin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2472

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 7:45 160°F

WATER ANALYSIS

Sample Description

pH	8.0
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	3250.
Resistivity, Ohm M^2/M	3.08

Constituents, P.P.M. (parts per million)

Boron, (B)	5.0
Calcium, (Ca)	106.
Magnesium, (Mg)	3.5
Sodium, (Na)	565.
Potassium, (K)	47.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	256.4
Chlorides, (Cl)	867.3
Sulphates, (SO_4)	124.
Nitrate, (NO_3)	2.7
Fluoride, (F)	1.6
Total Iron, (Fe)	0.47
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.05
Chromium, (Cr)	
Zinc, (Zn)	0.02
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	153.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	279.6 (16.3 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	2004.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

R. J. Eyli

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2473

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 8:00 AM 199°F

WATER ANALYSIS

Sample Description	
pH	8.6
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	150.
Resistivity, Ohm M^2/M	66.67
Constituents, P.P.M. (parts per million)	
Boron, (B)	0.69
Calcium, (Ca)	10.4
Magnesium, (Mg)	0.34
Sodium, (Na)	20.
Potassium, (K)	3.1
Carbonates, (CO_3)	7.7
Bicarbonates, (HCO_3)	31.2
Chlorides, (Cl)	20.9
Sulphates, (SO_4)	5.
Nitrate, (NO_3)	1.8
Fluoride, (F)	0.38
Total Iron, (Fe)	0.74
Copper, (Cu)	0.01
Manganese, (Mn)	0.05
Chromium, (Cr)	
Zinc, (Zn)	0.02
Aluminum (Al) less-than	0.1
Silica, (SiO_2)	50.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	27.4 (1.6 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	136.
Total Suspended Solids	
Phosphate (PO_4) less-than	0.1

B C LABORATORIES, INC.

[signature]

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2478

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 Swabbing sample 124°F 3:00 PM
Fluid Level @ 433'

WATER ANALYSIS

Sample Description	
pH	6.9
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	9200.
Resistivity, Ohm M^2/M	1.09

Constituents, P.P.M. (parts per million)	
Boron, (B)	24.4
Calcium, (Ca)	62.
Magnesium, (Mg)	11.1
Sodium, (Na)	1980.
Potassium, (K)	260.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	693.
Chlorides, (Cl)	2878.
Sulphates, (SO_4)	190.
Nitrate, (NO_3)	less-than 0.5
Fluoride, (F)	1.5
Total Iron, (Fe)	0.16
Copper, (Cu)	0.01
Manganese, (Mn)	3.0
Chromium, (Cr)	
Zinc, (Zn)	0.01
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	38.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	200.8 (11.7 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	5794.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. J. Galin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9767

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S,R9W
Beaver Co. , Utah Sample #1 12:45 3rd Swab Run 110° 60005'

WATER ANALYSIS

Sample Description		
pH		7.9
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)		4090
Resistivity, Ohm M²/M		2.44

Constituents, P.P.M. (parts per million)		
Boron, (B)		5.6
Calcium, (Ca)		103
Magnesium, (Mg)		26
Sodium, (Na)		645
Potassium, (K)		38
Carbonates, (CO_3)		-
Bicarbonates, (HCO_3)		226.9
Chlorides, (Cl)		1161.1
Sulphates, (SO_4)		37
Nitrate, (NO_3)		1.3
Fluoride, (F)		0.83
Total Iron, (Fe)		0.74
Copper, (Cu)		0.01
Manganese, (Mn)		0.49
Chromium, (Cr)		
Zinc, (Zn)		0.12
Aluminum (Al)		(-) 0.1
Silica, (SiO_2)		71
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		364.7 (21.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		2155
Total Suspended Solids		
Phosphate (PO_4)		(-) 0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9768

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec., T27S, R9W
Beaver Co., Utah Sample #2 12:45 4th Swab Run 130° 6005'

WATER ANALYSIS

Sample Description		
pH	--------	8.0
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	--------	4140
Resistivity, Ohm M²/M	--------	2.42

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	5.4
Calcium, (Ca)	--------	108
Magnesium, (Mg)	--------	29
Sodium, (Na)	--------	650
Potassium, (K)	--------	38
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	244.3
Chlorides, (Cl)	--------	1164.7
Sulphates, (SO_4)	--------	37
Nitrate, (NO_3)	--------	1.3
Fluoride, (F)	--------	0.81
Total Iron, (Fe)	--------	2.8
Copper, (Cu)	--------	0.02
Manganese, (Mn)	--------	1.0
Chromium, (Cr)		
Zinc, (Zn)	--------	0.26
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	84
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	389.6 (22.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	2212
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9769

Marked: GOCO #52-51 Roosevelt Hat Springs KGRA Sec.21,T27S, R9W
Beaver Co., Utah Sampel#3 13:05 135° -7500 5th Run

WATER ANALYSIS

Sample Description		
pH	--------	7.9
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	--------	3850
Resistivity, Ohm M^2/M	--------	2.60

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	5.6
Calcium, (Ca)	--------	65
Magnesium, (Mg)	--------	15.8
Sodium, (Na)	--------	650
Potassium, (K)	--------	38
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	175.0
Chlorides, (Cl)	--------	1100.9
Sulphates, (SO_4)	--------	30
Nitrate, (NO_3)	--------	0.5
Fluoride, (F)	--------	0.72
Total Iron, (Fe)	--------	0.08
Copper, (Cu)	--------	(-) 0.01
Manganese, (Mn)	--------	0.68
Chromium, (Cr)		
Zinc, (Zn)	--------	0.04
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	30
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	227.7 (13.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	1985
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9770

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S,R9W
Beaver Co., Sample #4 13:20 155° 6th Swab 6005'-7500'

WATER ANALYSIS

Sample Description

pH	-------	7.0
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	-------	7550
Resistivity, Ohm M^2/M	-------	1.32

Constituents, P.P.M. (parts per million)

Boron, (B)	-------	19.4
Calcium, (Ca)	-------	125
Magnesium, (Mg)	-------	3.1
Sodium, (Na)	-------	1440
Potassium, (K)	-------	182
Carbonates, (CO_3)	-------	-
Bicarbonates, (HCO_3)	-------	574.3
Chlorides, (Cl)	-------	2279.8
Sulphates, (SO_4)	-------	79
Nitrate, (NO_3)	-------	0.5
Fluoride, (F)	-------	3.2
Total Iron, (Fe)	-------	2.1
Copper, (Cu)	-------	0.01
Manganese, (Mn)	-------	0.32
Chromium, (Cr)		
Zinc, (Zn)	-------	0.13
Aluminum (Al)	-------	1.6
Silica, (SiO_2)	-------	238
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	325.5 (19.0 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	4578
Total Suspended Solids		
Phosphate (PO_4)	-------	0.7

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9771

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #5 13:35 6005'

WATER ANALYSIS

Sample Description		
pH		7.4
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		8770
Resistivity, Ohm M^2/M		1.14

Constituents, P.P.M. (parts per million)		
Boron, (B)		26.2
Calcium, (Ca)		71
Magnesium, (Mg)		1.5
Sodium, (Na)		1700
Potassium, (K)		242
Carbonates, (CO_3)		-
Bicarbonates, (HCO_3)		439.2
Chlorides, (Cl)		2701.0
Sulphates, (SO_4)		84
Nitrate, (NO_3)		1.3
Fluoride, (F)		3.8
Total Iron, (Fe)		16.0
Copper, (Cu)		(-) 0.01
Manganese, (Mn)		0.49
Chromium, (Cr)		
Zinc, (Zn)		0.57
Aluminum (Al)		(-) 0.1
Silica, (SiO_2)		388
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		183.8 (10.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		5379
Total Suspended Solids		
Phosphate (PO_4)		0.3

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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1. Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9772

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #6 13:50 6005'

WATER ANALYSIS

Sample Description		
pH	-------	7.3
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	-------	8130
Resistivity, Ohm M²/M	-------	1.23

Constituents, P.P.M. (parts per million)		
Boron, (B)	-------	23.8
Calcium, (Ca)	-------	60
Magnesium, (Mg)	-------	0.9
Sodium, (Na)	-------	1635
Potassium, (K)	-------	225
Carbonates, (CO_3)	-------	-
Bicarbonates, (HCO_3)	-------	403.7
Chlorides, (Cl)	-------	2563.0
Sulphates, (SO_4)	-------	71
Nitrate, (NO_3)	-------	1.3
Fluoride, (F)	-------	3.6
Total Iron, (Fe)	-------	4.8
Copper, (Cu)	-------	0.01
Manganese, (Mn)	-------	0.30
Chromium, (Cr)		
Zinc, (Zn)	-------	0.34
Aluminum (Al)	-------	(-) 0.1
Silica, (SiO_2)	-------	354
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	153.8 (9.0 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	5168
Total Suspended Solids		
Phosphate (PO_4)	-------	0.2

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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9773

Marked: GOCO #52-21 Roosevelt Hst Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #7 6005'-TD

WATER ANALYSIS

Sample Description		
pH		7.9
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		8770
Resistivity, Ohm M^2/M		1.14

Constituents, P.P.M. (parts per million)		
Boron, (B)		27.0
Calcium, (Ca)		49
Magnesium, (Mg)		0.46
Sodium, (Na)		1815
Potassium, (K)		257
Carbonates, (CO_3)		-
Bicarbonates, (HCO_3)		443.5
Chlorides, (Cl)		2775.4
Sulphates, (SO_4)		71
Nitrate, (NO_3)		0.5
Fluoride, (F)		4.0
Total Iron, (Fe)		2.0
Copper, (Cu)		(-) 0.01
Manganese, (Mn)		0.12
Chromium, (Cr)		
Zinc, (Zn)		0.10
Aluminum (Al)		(-) 0.1
Silica, (SiO_2)		425
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		124.5 (7.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		5648
Total Suspended Solids		
Phosphate (PO_4)		0.3

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9774

Marked: GOCO #52-21 Roosevelt Hat Spring KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #8 6005'-TD 201°F

WATER ANALYSIS

Sample Description		
pH	----------	7.6
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	----------	9250
Resistivity, Ohm M²/M	----------	1.08

Constituents, P.P.M. (parts per million)		
Boron, (B)	----------	28.8
Calcium, (Ca)	----------	46
Magnesium, (Mg)	----------	0.44
Sodium, (Na)	----------	1890
Potassium, (K)	----------	273
Carbonates, (CO_3)	----------	-
Bicarbonates, (HCO_3)	----------	422.7
Chlorides, (Cl)	----------	2906.3
Sulphates, (SO_4)	----------	70
Nitrate, (NO_3)	----------	2.7
Fluoride, (F)	----------	4.1
Total Iron, (Fe)	----------	3.9
Copper, (Cu)	----------	(-) 0.01
Manganese, (Mn)	----------	0.09
Chromium, (Cr)		
Zinc, (Zn)	----------	0.06
Aluminum (Al)	----------	(-) 0.1
Silica, (SiO_2)	----------	405
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	----------	116.9 (6.8 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	----------	5887
Total Suspended Solids		
Phosphate (PO_4)	----------	0.9

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B C LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9775

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #9 15:50 6005'-6350'

WATER ANALYSIS

Sample Description		
pH		7.1
E.C. Micromhos/cm ($K \times 10^6$) @ 25°C (salinity)		2680
Resistivity, Ohm M^2/M		3.73

Constituents, P.P.M. (parts per million)		
Boron, (B)		2.9
Calcium, (Ca)		67
Magnesium, (Mg)		25
Sodium, (Na)		407
Potassium, (K)		22
Carbonates, (CO_3)		-
Bicarbonates, (HCO_3)		110.9
Chlorides, (Cl)		789.4
Sulphates, (SO_4)		30
Nitrate, (NO_3)		1.3
Fluoride, (F)		0.64
Total Iron, (Fe)		0.14
Copper, (Cu)		(-) 0.01
Manganese, (Mn)		1.3
Chromium, (Cr)		
Zinc, (Zn)		1.3
Aluminum (Al)		(-) 0.1
Silica, (SiO_2)		65
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		270.5 (15.8 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		1428
Total Suspended Solids		
Phosohate (PO_4)		(-) 0.1

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9776

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #10 16:35 6005-6350'

WATER ANALYSIS

Sample Description		
pH	---------	6.5
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---------	3110
Resistivity, Ohm M^2/M	---------	3.22

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	3.7
Calcium, (Ca)	--------	101
Magnesium, (Mg)	--------	24
Sodium, (Na)	--------	485
Potassium, (K)	--------	29
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	166.3
Chlorides, (Cl)	--------	874.4
Sulphates, (SO_4)	--------	32
Nitrate, (NO_3)	--------	0.5
Fluoride, (F)	--------	0.94
Total Iron, (Fe)	--------	0.44
Copper, (Cu)	--------	0.02
Manganese, (Mn)	--------	2.6
Chromium, (Cr)		
Zinc, (Zn)	--------	3.8
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	73
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	351.5 (20.5 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	1746
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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CHEMICAL ANALYSIS
PETROLEUM

B C LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9777

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #1 3320-2742'

WATER ANALYSIS

Sample Description		
pH	------	7.7
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	------	4720
Resistivity, Ohm M^2/M	------	2.12

Constituents, P.P.M. (parts per million)		
Boron, (B)	------	5.9
Calcium, (Ca)	------	95
Magnesium, (Mg)	------	25
Sodium, (Na)	------	830
Potassium, (K)	------	61
Carbonates, (CO_3)	------	-
Bicarbonates, (HCO_3)	------	272.9
Chlorides, (Cl)	------	1313.3
Sulphates, (SO_4)	------	43
Nitrate, (NO_3)	------	1.3
Fluoride, (F)	------	1.2
Total Iron, (Fe)	------	4.0
Copper, (Cu)	------	0.03
Manganese, (Mn)	------	0.74
Chromium, (Cr)		
Zinc, (Zn)	------	0.08
Aluminum (Al)	------	(-) 0.1
Silica, (SiO_2)	------	126
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	340.6 (1.9 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	2691
Total Suspended Solids		
Phosphate (PO_4)	------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9778

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #1 2750- Shoe

WATER ANALYSIS

Sample Description		
pH	--------	7.7
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	--------	3360
Resistivity, Ohm M²/M	--------	2.98

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	1.7
Calcium, (Ca)	--------	110
Magnesium, (Mg)	--------	30
Sodium, (Na)	--------	510
Potassium, (K)	--------	12
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	166.3
Chlorides, (Cl)	--------	973.5
Sulphates, (SO_4)	--------	36
Nitrate, (NO_3)	--------	4.4
Fluoride, (F)	--------	0.38
Total Iron, (Fe)	--------	0.34
Copper, (Cu)	--------	(-) 0.01
Manganese, (Mn)	--------	0.26
Chromium, (Cr)		
Zinc, (Zn).	--------	0.03
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	66
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	398.7 (32.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	1799
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9779

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21,T27S, R9W
Beaver Co., Utah Flow Sample #1 7170-7500'

WATER ANALYSIS

Sample Description		
pH	--------	6.4
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	--------	9010
Resistivity, Ohm M²/M	--------	1.11

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	24.4
Calcium, (Ca)	--------	106
Magnesium, (Mg)	--------	5.2
Sodium, (Na)	--------	1845
Potassium, (K)	--------	237
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	602.9
Chlorides, (Cl)	--------	2810.8
Sulphates, (SO_4)	--------	78
Nitrate, (NO_3)	--------	0.5
Fluoride, (F)	--------	2.8
Total Iron, (Fe)	--------	0.31
Copper, (Cu)	--------	0.01
Manganese, (Mn)	--------	1.0
Chromium, (Cr)		
Zinc, (Zn)	--------	0.16
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	500
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	286.6 (16.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	5940
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9780

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #2 3310-2750'

WATER ANALYSIS

Sample Description

pH	---------	7.9
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---------	4630
Resistivity, Ohm M^2/M	---------	2.16

Constituents, P.P.M. (parts per million)

Boron, (B)	---------	5.6
Calcium, (Ca)	---------	79
Magnesium, (Mg)	---------	23
Sodium, (Na)	---------	805
Potassium, (K)	---------	61
Carbonates, (CO_3)	---------	-
Bicarbonates, (HCO_3)	---------	201.8
Chlorides, (Cl)	---------	1362.9
Sulphates, (SO_4)	---------	45
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	1.2
Total Iron, (Fe)	---------	0.31
Copper, (Cu)	---------	(-) 0.01
Manganese, (Mn)	---------	0.54
Chromium, (Cr)		
Zinc, (Zn)	---------	0.05
Aluminum (Al)	---------	(-) 0.1
Silica, (SiO_2)	---------	176
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	292.3 (17.1 gr.gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	2645
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9781

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #2 2750'-Shoe

WATER ANALYSIS

Sample Description

pH	--------	6.5
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	--------	8280
Resistivity, Ohm M²/M	--------	1.2

Constituents, P.P.M. (parts per million)

Boron, (B)	--------	23.0
Calcium, (Ca)	--------	89
Magnesium, (Mg)	--------	5.3
Sodium, (Na)	--------	1700
Potassium, (K)	--------	213
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	524.9
Chlorides, (Cl)	--------	2506.3
Sulphates, (SO_4)	--------	103
Nitrate, (NO_3)	--------	1.3
Fluoride, (F)	--------	3.8
Total Iron, (Fe)	--------	8.8
Copper, (Cu)	--------	(-) 0.01
Manganese, (Mn)	--------	0.29
Chromium, (Cr)		
Zinc, (Zn)	--------	0.48
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	272
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	244.5 (14.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	5293
Total Suspended Solids		
Phosphate (PO_4)	--------	0.4

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J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9782

Marked: GOCO #52-21 roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Flow Sample #2 7170-7500'

WATER ANALYSIS

Sample Description

pH	7.3
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	9250
Resistivity, Ohm M²/M	1.08

Constituents, P.P.M. (parts per million)

Boron, (B)	27.0
Calcium, (Ca)	114
Magnesium, (Mg)	3.9
Sodium, (Na)	1900
Potassium, (K)	218
Carbonates, (CO_3)	-
Bicarbonates, (HCO_3)	550.0
Chlorides, (Cl)	2885.1
Sulphates, (SO_4)	86
Nitrate, (NO_3)	1.3
Fluoride, (F)	3.4
Total Iron, (Fe)	6.9
Copper, (Cu)	0.01
Manganese, (Mn)	0.73
Chromium, (Cr)	
Zinc, (Zn)	0.05
Aluminum (Al)	(-) 0.1
Silica, (SiO_2)	143
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	301.3 (17.6 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	5727
Total Suspended Solids	
Phosphate (PO_4)	0.2

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9783

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #3 3310-2750'

WATER ANALYSIS

Sample Description		
pH	-------	8.0
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	-------	4680
Resistivity, Ohm M^2/M	-------	2.14

Constituents, P.P.M. (parts per million)		
Boron, (B)	-------	3.3
Calcium, (Ca)	-------	69
Magnesium, (Mg)	-------	25
Sodium, (Na)	-------	840
Potassium, (K)	-------	62
Carbonates, (CO_3)	-------	-
Bicarbonates, (HCO_3)	-------	188.8
Chlorides, (Cl)	-------	1405.4
Sulphates, (SO_4)	-------	44
Nitrate, (NO_3)	-------	3.1
Fluoride, (F)	-------	1.2
Total Iron, (Fe)	-------	3.0
Copper, (Cu)	-------	0.02
Manganese, (Mn)	-------	0.80
Chromium, (Cr)		
Zinc, (Zn)	-------	0.16
Aluminum (Al)	-------	(-) 0.1
Silica, (SiO_2)	-------	157
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	275.5 (16.1 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	2701
Total Suspended Solids		
Phosphate (PO_4)	-------	(-) 0.1

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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9784

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #3 2750'-Shoe

WATER ANALYSIS

Sample Description		
pH	------	7.1
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	------	8520
Resistivity, Ohm M²/M	------	1.17

Constituents, P.P.M. (parts per million)		
Boron, (B)	------	17.8
Calcium, (Ca)	------	86
Magnesium, (Mg)	------	4.9
Sodium, (Na)	------	1700
Potassium, (K)	------	213
Carbonates, (CO_3)	------	-
Bicarbonates, (HCO_3)	------	518.0
Chlorides, (Cl)	------	2538.2
Sulphates, (SO_4)	------	103
Nitrate, (NO_3)	------	1.3
Fluoride, (F)	------	3.8
Total Iron, (Fe)	------	4.8
Copper, (Cu)	------	0.01
Manganese, (Mn)	------	0.30
Chromium, (Cr)		
Zinc, (Zn)	------	0.16
Aluminum (Al)	------	(-) 0.1
Silica, (SiO_2)	------	241
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	235.3 (13.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	5237
Total Suspended Solids		
Phosphate (PO_4)	------	0.5

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AGRICULTURE
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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9785

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #3 7170-7500'

WATER ANALYSIS

Sample Description		
pH	-----	6.8
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	-----	9250
Resistivity, Ohm M^2/M	-----	1.08

Constituents, P.P.M. (parts per million)		
Boron, (B)	-----	27.0
Calcium, (Ca)	-----	107
Magnesium, (Mg)	-----	4.0
Sodium, (Na)	-----	1900
Potassium, (K)	-----	216
Carbonates, (CO_3)	-----	-
Bicarbonates, (HCO_3)	-----	615.0
Chlorides, (Cl)	-----	2881.6
Sulphates, (SO_4)	-----	85
Nitrate, (NO_3)	-----	1.3
Fluoride, (F)	-----	3.6
Total Iron, (Fe)	-----	6.3
Copper, (Cu)	-----	0.01
Manganese, (Mn)	-----	0.40
Chromium, (Cr)		
Zinc, (Zn)	-----	0.03
Aluminum (Al)	-----	(-) 0.1
Silica, (SiO_2)	-----	139
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-----	284.2 (16.6 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-----	5677
Total Suspended Solids		
Phosphate (PO_4)	-----	(-) 0.1

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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9786

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S. R9W
Beaver Co., Utah Sample #11 10:12 4193-4997' 11/4/78

WATER ANALYSIS

Sample Description		
pH	------	7.9
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	------	2630
Resistivity, Ohm M²/M	------	3.80

Constituents, P.P.M. (parts per million)		
Boron, (B)	------	3.1
Calcium, (Ca)	------	105
Magnesium, (Mg)	------	30
Sodium, (Na)	------	380
Potassium, (K)	------	19
Carbonates, (CO_3)	------	-
Bicarbonates, (HCO_3)	------	187.1
Chlorides, (Cl)	------	708.0
Sulphates, (SO_4)	------	30
Nitrate, (NO_3)	------	1.8
Fluoride, (F)	------	0.58
Total Iron, (Fe)	------	2.9
Copper, (Cu)	------	(-) 0.01
Manganese, (Mn)	------	0.52
Chromium, (Cr)		
Zinc, (Zn)	------	0.05
Aluminum (Al)	------	(-) 0.1
Silica, (SiO_2)	------	66
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	386.2 (22.5 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	1489
Total Suspended Solids		
Phosphate (PO_4)	------	(-) 0.1

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B C LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9787

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #2 10:45 4193-4997'

WATER ANALYSIS

Sample Description		
pH	--------	6.8
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	--------	9010
Resistivity, Ohm M²/M	--------	1.11

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	19.2
Calcium, (Ca)	--------	86
Magnesium, (Mg)	--------	6.5
Sodium, (Na)	--------	1850
Potassium, (K)	--------	231
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	461.7
Chlorides, (Cl)	--------	2867.4
Sulphates, (SO_4)	--------	99
Nitrate, (NO_3)	--------	1.8
Fluoride, (F)	--------	4.0
Total Iron, (Fe)	--------	3.4
Copper, (Cu)	--------	0.01
Manganese, (Mn)	--------	0.80
Chromium, (Cr)		
Zinc, (Zn)	--------	1.4
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	214
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	241.9 (14.1 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	5617
Total Suspended Solids		
Phosphate (PO_4)	--------	0.2

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9788

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #13 11:20 am 4193-4997' 11/4/78

WATER ANALYSIS

Sample Description		
pH		7.0
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		8770
Resistivity, Ohm M^2/M		1.14

Constituents, P.P.M. (parts per million)		
Boron, (B)		23.4
Calcium, (Ca)		82
Magnesium, (Mg)		3.0
Sodium, (Na)		1800
Potassium, (K)		237
Carbonates, (CO_3)		-
Bicarbonates, (HCO_3)		534.5
Chlorides, (Cl)		2732.9
Sulphates, (SO_4)		96
Nitrate, (NO_3)		1.8
Fluoride, (F)		3.9
Total Iron, (Fe)		6.6
Copper, (Cu)		(-) 0.01
Manganese, (Mn)		0.52
Chromium, (Cr)		
Zinc, (Zn)		0.85
Aluminum (Al)		(-) 0.1
Silica, (SiO_2)		280
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		217.5 (12.7gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		5542
Total Suspended Solids		
Phosphate (PO_4)		0.4

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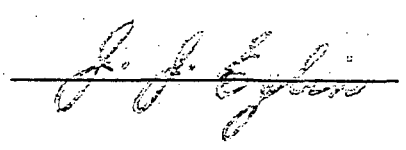

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5962

Marked: Well #KGRA 52-21 Sample #1 2165' 7/13/78

WATER ANALYSIS

Sample Description	
pH	6.3
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	8000.
Resistivity, Ohm M^2/M	1.25

Constituents, P.P.M. (parts per million)	
Boron, (B)	21.0
Calcium, (Ca)	100.
Magnesium, (Mg)	6.2
Sodium, (Na)	1700.
Potassium, (K)	222.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	580.4
Chlorides, (Cl)	2545.3
Sulphates, (SO_4)	169.
Nitrate, (NO_3)	3.1
Fluoride, (F)	3.0
Total Iron, (Fe)	6.6
Copper, (Cu)	0.03
Manganese, (Mn)	0.47
Chromium, (Cr)	
Zinc, (Zn)	0.81
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	270.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	275.7 (16.1 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	5337.
Total Suspended Solids	
Phosphate (PO4)	0.7

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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5963

Marked: Well #KGRA 52-21 Sample #2 2665' 7/13/78

WATER ANALYSIS

Sample Description		
pH	----------	6.5
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	----------	8000.
Resistivity, Ohm M^2/M	-------	1.25

Constituents, P.P.M. (parts per million)		
Boron, (B)	----------	19.0
Calcium, (Ca)	----------	86.
Magnesium, (Mg)	----------	4.6
Sodium, (Na)	----------	1700.
Potassium, (K)	----------	226.
Carbonates, (CO_3)	----------	0.
Bicarbonates, (HCO_3)	-------	524.9
Chlorides, (Cl)	----------	2559.4
Sulphates, (SO_4)	----------	160.
Nitrate, (NO_3)	----------	2.2
Fluoride, (F)	----------	2.8
Total Iron, (Fe)	----------	6.0
Copper, (Cu)	----------	0.05
Manganese, (Mn)	----------	0.30
Chromium, (Cr)		
Zinc, (Zn)	----------	0.32
Aluminum (Al)	less-than-	0.1
Silica, (SiO_2)	----------	260.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	234.1 (13.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	5288.
Total Suspended Solids		
Phosphate (PO_4)	-------	0.6

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5964

Marked: Well #KGRA 52-21 Sample #3 @ 3430' 7/13/78

WATER ANALYSIS

Sample Description	
pH	6.4
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	8000.
Resistivity, Ohm M²/M	1.25

Constituents, P.P.M. (parts per million)	
Boron, (B)	19.0
Calcium, (Ca)	67.
Magnesium, (Mg)	2.2
Sodium, (Na)	1700.
Potassium, (K)	228.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	520.3
Chlorides, (Cl)	2495.7
Sulphates, (SO_4)	202.
Nitrate, (NO_3)	1.3
Fluoride, (F)	3.2
Total Iron, (Fe)	3.5
Copper, (Cu)	0.01
Manganese, (Mn)	0.30
Chromium, (Cr)	
Zinc, (Zn)	0.30
Aluminum (Al)	less than 0.1
Silica, (SiO_2)	240.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	176.7 (10.3 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	5219.
Total Suspended Solids	
Phosphate (PO_4)	1.0

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5965

Marked: Well #KGRA 52-21 Sample #4 @ 4080' 7/13/78

WATER ANALYSIS

Sample Description		
pH	---------	6.3
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---------	8000.
Resistivity, Ohm M^2/M	---------	1.25

Constituents, P.P.M. (parts per million)		
Boron, (B)	---------	19.0
Calcium, (Ca)	---------	62.
Magnesium, (Mg)	---------	2.0
Sodium, (Na)	---------	1750.
Potassium, (K)	---------	228.
Carbonates, (CO_3)	---------	0.
Bicarbonates, (HCO_3)	---------	469.5
Chlorides, (Cl)	---------	2594.8
Sulphates, (SO_4)	---------	194.
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	3.0
Total Iron, (Fe)	---------	4.0
Copper, (Cu)	---------	0.02
Manganese, (Mn)	---------	0.29
Chromium, (Cr)		
Zinc, (Zn)	---------	0.34
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)	---------	270.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	163.4 (9.5 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	---------	5363.
Total Suspended Solids		
Phosphate (PO4)	------	1.0

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AGRICULTURE
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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5966

Marked: Well #KGRA 52-21 Sample #5 @ 4750' 7/13/78

WATER ANALYSIS

Sample Description		
pH	---------	6.3
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---------	8400.
Resistivity, Ohm M^2/M	---------	1.19

Constituents, P.P.M. (parts per million)		
Boron, (B)	---------	21.0
Calcium, (Ca)	---------	58.
Magnesium, (Mg)	---------	1.9
Sodium, (Na)	---------	1800.
Potassium, (K)	---------	244.
Carbonates, (CO_3)	---------	0.
Bicarbonates, (HCO_3)	---------	460.8
Chlorides, (Cl)	---------	2693.9
Sulphates, (SO_4)	---------	180.
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	3.2
Total Iron, (Fe)	---------	3.6
Copper, (Cu)	---------	0.05
Manganese, (Mn)	---------	0.24
Chromium, (Cr)		
Zinc, (Zn)	---------	0.38
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)	---------	250.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	152.9 (8.9 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	5488.
Total Suspended Solids		
Phosphate (PO_4)	-------	0.8

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5967

Marked: Well #KGRA 52-21 Sample #6 @ 6210' 7/13/78

WATER ANALYSIS

Sample Description

pH	---------	6.1
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---------	8400.
Resistivity, Ohm M^2/M	--------	1.19

Constituents, P.P.M. (parts per million)

Boron, (B)	---------	19.0
Calcium, (Ca)	---------	59.
Magnesium, (Mg)	---------	1.95
Sodium, (Na)	---------	1800.
Potassium, (K)	---------	246.
Carbonates, (CO_3)	---------	0.
Bicarbonates, (HCO_3)	---------	460.8
Chlorides, (Cl)	---------	2701.
Sulphates, (SO_4)	---------	176.
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	3.0
Total Iron, (Fe)	---------	5.0
Copper, (Cu)	---------	0.17
Manganese, (Mn)	---------	0.30
Chromium, (Cr)		
Zinc, (Zn)	---------	0.64
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)	---------	250.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-----	155.6 (9.1 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	---------	5493.
Total Suspended Solids		
Phosphate (PO_4)	------	0.4

B C LABORATORIES, INC.

J. J. Eglin

November 7, 1978

Rework of GOCO #52-21
Sec 21-T27S-RSW
Beaver County, California

10-18-78 Colorado Well Service moved workover rig onto location, rigged up and prep to "fish" junk.
10-19-78 Rigging up
10-20-78 Ran in with fishing tools and recovered "fish"
10-21-78 Made bit run to bottom cleaned out hole
10-22-78 Pruett Wireline Services rigged up and ran temperature survey, maximum temperature on bottom 402.7°F
10-23-78 Rigged up packer and swab equipment, ran in hole, set packer 7,710'; made swab runs and swabbed fluid to 3,000' maximum temperature 145°F. Took water samples.
10-24-78 Resumed swabbing. Hole full. Slight heading blow after each swabbing run. Very minor and mostly due to fluid movement after swab run stopped. Pulled pkr 10:45 AM. Out of hole, rigged up stradle pkr's, ran in hole to test interval 6599' - 7170'
10-25-78 Running in hole with pkrs. Insufficient time to test 6,599' - 7,170'. Will test first zone below shoe. 2,750' to shoe (2,040') pkr's would not go. Pulled out of hole. Lost pkr elements. Made bit run. Ran in hole with pkrs level down each run 200'±; swabbed fluid to 1,900'. Took water samples. Rigged down lubricator and swab, pulled pkrs. Started out of hole. Maximum temperature 125°F.
10-26-78 Finished coming out of hole, left pkr elements in hole; picked up D.C. and bit. Hit obstruction at 3,180' could not push to bottom. Picked up power swivel, milled on junk. Finally worked to 3,200'. Shut down at dark.
10-27-78 Ran to bottom chasing junk ahead. Reached T.D. Layed down power swivel. Changed elevators. Ran in hole with stradle packers 3,320' - 2,742'. Expanded pkr's, picked up swab and lubricator, started swabbing first run 1,500' (100°F)
Second run 2,600' (120°F) Top of tool
Very muddy rust colored fluid with brackish taste. Dark streaked H_2O probably due to pipe dope and old asphaltum in pipe. Swabbed fluid down as far as top of tool (packer tool) Pulled out of hole. Left bottom pkr element in hole. Made up bit, ran in hole, chased element to bottom (7400't) Pulled out of hole. Secured rig; crew off for Sunday.

10-29-78 Sunday - Crew off.

10-30-78 Rigged up stradle packers, ran in hole to test 7,150' - 6,575'. Could not seat packers. Test failed. Pulled out of hole. Left packer element in hole, made bit run, pushed obstruction to bottom.

10-31-78 Pulled bit out of hole, rigged up single packer assembly. Set packer at 6,005'. Pressured up, set packer at 12:20 PM, rigged up swab, and ran in hole at 12:30 PM. Swabbed fluid with temperatures ranging from 150°F to 204°F. Light heading blow after each swab run. White plume of hot H_20 and steam develops with receding heads as pressure diminishes. Maximum pressure 12 PSI.

11-1-78 Continued testing from 10-31-78. Continued to swab and flow by heads. Could not deplete fluid head or increase heat flow. At 14:20 broke off swabbing and pulled packers. Left pkr elements in hole. Picked up DC and bit, chased obstruction to bottom.

11-2-78 Rigged up, finished pushing pkr element to bottom (7412') Pulled out of hole at 11:15. Picked up bottom pkr assembly to run in and test interval 6,005' - 6,350'. Set pkr's at 14:45. Started swabbing 15:08. Swabbed dry with maximum temperature 185°F. Unseated pkr's, pulled out of hole 1700 hours. Corkscrewed 12 joints of tubing.

11-3-78 Finished pulling pkr's, both elements gone. Out of hole at 10:00 AM. Tripped to bottom with bit and out of hole at 15:20 PM. Pick up pkr's to stradle interval 4,193' - 4,997'.
Started in hole.

11-4-78 Rigged up, finished running in hole. Set pkr's 09:20 AM. Started swabbing 09:50 AM. Swabbed fluid down with no entry after four swab runs. Waited 30 minutes, reran swab, no fluid. Pulled pkr's with difficulty. Made trip to bottom with bit pushing pkr elements to bottom. Rigged down equipment, secured for day.

11-5-78 Laid down D.P., mast, and secured lease and equipment. Loaded out D.P. Tubing and BOP Head. Installed flange on master gate valve. Released rig and cleaned location.

W. A. SHAW

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9767

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co. , Utah Sample #1 12:45 3rd Swab Run 110° 60005'

WATER ANALYSIS

Sample Description

pH	----------	7.9
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	----------	4090
Resistivity, Ohm M/M	----------	2.44

Constituents, P.P.M. (parts per million)

Boron, (B)	----------	5.6
Calcium, (Ca)	----------	103
Magnesium, (Mg)	----------	26
Sodium, (Na)	----------	645
Potassium, (K)	----------	38
Carbonates, (CO_3)	----------	-
Bicarbonates, (HCO_3)	----------	226.9
Chlorides, (Cl)	----------	1161.1
Sulphates, (SO_4)	----------	37
Nitrate, (NO_3)	----------	1.3
Fluoride, (F)	----------	0.83
Total Iron, (Fe)	----------	0.74
Copper, (Cu)	----------	0.01
Manganese, (Mn)	----------	0.49
Chromium, (Cr)		
Zinc, (Zn)	----------	0.12
Aluminum (Al)	----------	(-) 0.1
Silica, (SiO_2)	----------	71
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	----------	364.7 (21.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	----------	2155
Total Suspended Solids		
Phosphate (PO_4)	----------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9768

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec., T27S, R9W
Beaver Co., Utah Sample #2 12:45 4th Swab Run 130° 6005'

WATER ANALYSIS

Sample Description		
pH	--------	8.0
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	--------	4140
Resistivity, Ohm M²/M	--------	2.42

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	5.4
Calcium, (Ca)	--------	108
Magnesium, (Mg)	--------	29
Sodium, (Na)	--------	650
Potassium, (K)	--------	38
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	244.3
Chlorides, (Cl)	--------	1164.7
Sulphates, (SO_4)	--------	37
Nitrate, (NO_3)	--------	1.3
Fluoride, (F)	--------	0.81
Total Iron, (Fe)	--------	2.8
Copper, (Cu)	--------	0.02
Manganese, (Mn)	--------	1.0
Chromium, (Cr)		
Zinc, (Zn)	--------	0.26
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	84
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	389.6 (22.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	2212
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9770

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S,R9W
Beaver Co., Sample #4 13:20 155° 6th Swab 6005'-7500'

WATER ANALYSIS

Sample Description

pH	-------	7.0
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	-------	7550
Resistivity, Ohm M²/M	-------	1.32

Constituents, P.P.M. (parts per million)

Boron, (B)	-------	19.4
Calcium, (Ca)	-------	125
Magnesium, (Mg)	-------	3.1
Sodium, (Na)	-------	1440
Potassium, (K)	-------	182
Carbonates, (CO_3)	-------	-
Bicarbonates, (HCO_3)	-------	574.3
Chlorides, (Cl)	-------	2279.8
Sulphates, (SO_4)	-------	79
Nitrate, (NO_3)	-------	0.5
Fluoride, (F)	-------	3.2
Total Iron, (Fe)	-------	2.1
Copper, (Cu)	-------	0.01
Manganese, (Mn)	-------	0.32
Chromium, (Cr)		
Zinc, (Zn)	-------	0.13
Aluminum (Al)	-------	1.6
Silica, (SiO_2)	-------	238
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	325.5 (19.0 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	4578
Total Suspended Solids		
Phosphate (PO_4)	-------	0.7

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9769

Marked: GOCO #52-51 Roosevelt Hat Springs KGRA Sec.21,T27S, R9W
Beaver Co., Utah Sampel#3 13:05 135° -7500 5th Run

WATER ANALYSIS

Sample Description		
pH	--------	7.9
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	--------	3850
Resistivity, Ohm M^2/M	--------	2.60

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	5.6
Calcium, (Ca)	--------	65
Magnesium, (Mg)	--------	15.8
Sodium, (Na)	--------	650
Potassium, (K)	--------	38
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	175.0
Chlorides, (Cl)	--------	1100.9
Sulphates, (SO_4)	--------	30
Nitrate, (NO_3)	--------	0.5
Fluoride, (F)	--------	0.72
Total Iron, (Fe)	--------	0.08
Copper, (Cu)	--------	(-) 0.01
Manganese, (Mn)	--------	0.68
Chromium, (Cr)		
Zinc, (Zn)	--------	0.04
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	30
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	227.7 (13.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	1985
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9771

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #5 13:35 6005'

WATER ANALYSIS

Sample Description		
pH		7.4
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		8770
Resistivity, Ohm M²/M		1.14

Constituents, P.P.M. (parts per million)		
Boron, (B)		26.2
Calcium, (Ca)		71
Magnesium, (Mg)		1.5
Sodium, (Na)		1700
Potassium, (K)		242
Carbonates, (CO_3)		-
Bicarbonates, (HCO_3)		439.2
Chlorides, (Cl)		2701.0
Sulphates, (SO_4)		84
Nitrate, (NO_3)		1.3
Fluoride, (F)		3.8
Total Iron, (Fe)		16.0
Copper, (Cu)		(-) 0.01
Manganese, (Mn)		0.49
Chromium, (Cr)		
Zinc, (Zn)		0.57
Aluminum (Al)		(-) 0.1
Silica, (SiO_2)		388
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		183.8 (10.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		5379
Total Suspended Solids		
Phosphate (PO_4)		0.3

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AGRICULTURE
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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1. Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9772

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #6 13:50 6005'

WATER ANALYSIS

Sample Description

pH	-------	7.3
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	-------	8130
Resistivity, Ohm M²/M	-------	1.23

Constituents, P.P.M. (parts per million)

Boron, (B)	-------	23.8
Calcium, (Ca)	-------	60
Magnesium, (Mg)	-------	0.9
Sodium, (Na)	-------	1635
Potassium, (K)	-------	225
Carbonates, (CO_3)	-------	-
Bicarbonates, (HCO_3)	-------	403.7
Chlorides, (Cl)	-------	2563.0
Sulphates, (SO_4)	-------	71
Nitrate, (NO_3)	-------	1.3
Fluoride, (F)	-------	3.6
Total Iron, (Fe)	-------	4.8
Copper, (Cu)	-------	0.01
Manganese, (Mn)	-------	0.30
Chromium, (Cr).		
Zinc, (Zn)	-------	0.34
Aluminum (Al)	-------	(-) 0.1
Silica, (SiO_2)	-------	354
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	153.8 (9.0 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	5168
Total Suspended Solids		
Phosphate (PO_4)	-------	0.2

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9773

Marked: GOCO #52-21 Roosevelt Hst Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #7 6005'-TD

WATER ANALYSIS

Sample Description		
pH	--------	7.9
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	--------	8770
Resistivity, Ohm M²/M	--------	1.14

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	27.0
Calcium, (Ca)	--------	49
Magnesium, (Mg)	--------	0.46
Sodium, (Na)	--------	1815
Potassium, (K)	--------	257
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	443.5
Chlorides, (Cl)	--------	2775.4
Sulphates, (SO_4)	--------	71
Nitrate, (NO_3)	--------	0.5
Fluoride, (F)	--------	4.0
Total Iron, (Fe)	--------	2.0
Copper, (Cu)	--------	(-) 0.01
Manganese, (Mn)	--------	0.12
Chromium, (Cr)		
Zinc, (Zn)	--------	0.10
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	425
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	124.5 (7.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	5648
Total Suspended Solids		
Phosphate (PO_4)	--------	0.3

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AGRICULTURE
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PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1,Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9774

Marked: GOCO #52-21 Roosevelt Hat Spring KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #8 6005'-TD 201°F

WATER ANALYSIS

Sample Description		
pH	---	7.6
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	---	9250
Resistivity, Ohm M² M	---	1.08

Constituents, P.P.M. (parts per million)		
Boron, (B)	---	28.8
Calcium, (Ca)	---	46
Magnesium, (Mg)	---	0.44
Sodium, (Na)	---	1890
Potassium, (K)	---	273
Carbonates, (CO_3)	---	-
Bicarbonates, (HCO_3)	---	422.7
Chlorides, (Cl)	---	2906.3
Sulphates, (SO_4)	---	70
Nitrate, (NO_3)	---	2.7
Fluoride, (F)	---	4.1
Total Iron, (Fe)	---	3.9
Copper, (Cu)	---	(-) 0.01
Manganese, (Mn)	---	0.09
Chromium, (Cr)		
Zinc, (Zn)	---	0.06
Aluminum (Al)	---	(-) 0.1
Silica, (SiO_2)	---	405
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	---	116.9 (6.8 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	---	5887
Total Suspended Solids		
Phosphate (PO_4)	---	0.9

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9777

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #1 3320-2742'

WATER ANALYSIS

Sample Description		
pH	------	7.7
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	------	4720
Resistivity, Ohm M^2/M	------	2.12

Constituents, P.P.M. (parts per million)		
Boron, (B)	------	5.9
Calcium, (Ca)	------	95
Magnesium, (Mg)	------	25
Sodium, (Na)	------	830
Potassium, (K)	------	61
Carbonates, (CO_3)	------	-
Bicarbonates, (HCO_3)	------	272.9
Chlorides, (Cl)	------	1313.3
Sulphates, (SO_4)	------	43
Nitrate, (NO_3)	------	1.3
Fluoride, (F)	------	1.2
Total Iron, (Fe)	------	4.0
Copper, (Cu)	------	0.03
Manganese, (Mn)	------	0.74
Chromium, (Cr)		
Zinc, (Zn)	------	0.08
Aluminum (Al)	------	(-) 0.1
Silica, (SiO_2)	------	126
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	340.6 (1.9 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	2691
Total Suspended Solids		
Phosphate (PO_4)	------	(-) 0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9775

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #9 15:50 6005'-6350'

WATER ANALYSIS

Sample Description		
pH	---	7.1
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---	2680
Resistivity, Ohm M^2/M	---	3.73

Constituents, P.P.M. (parts per million)		
Boron, (B)	---	2.9
Calcium, (Ca)	---	67
Magnesium, (Mg)	---	25
Sodium, (Na)	---	407
Potassium, (K)	---	22
Carbonates, (CO_3)	---	-
Bicarbonates, (HCO_3)	---	110.9
Chlorides, (Cl)	---	789.4
Sulphates, (SO_4)	---	30
Nitrate, (NO_3)	---	1.3
Fluoride, (F)	---	0.64
Total Iron, (Fe)	---	0.14
Copper, (Cu)	---	(-) 0.01
Manganese, (Mn)	---	1.3
Chromium, (Cr)		
Zinc, (Zn)	---	1.3
Aluminum (Al)	---	(-) 0.1
Silica, (SiO_2)	---	65
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	---	270.5 (15.8 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	---	1428
Total Suspended Solids		
Phosohate (PO_4)	---	(-) 0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9776

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #10 16:35 6005-6350'

WATER ANALYSIS

Sample Description		
pH	---------	6.5
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	---------	3110
Resistivity, Ohm M²/M	---------	3.22

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	3.7
Calcium, (Ca)	--------	101
Magnesium, (Mg)	--------	24
Sodium, (Na)	--------	485
Potassium, (K)	--------	29
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	166.3
Chlorides, (Cl)	--------	874.4
Sulphates, (SO_4)	--------	32
Nitrate, (NO_3)	--------	0.5
Fluoride, (F)	--------	0.94
Total Iron, (Fe)	--------	0.44
Copper, (Cu)	--------	0.02
Manganese, (Mn)	--------	2.6
Chromium, (Cr)		
Zinc, (Zn)	--------	3.8
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	73
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	351.5 (20.5 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	1746
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/7/78
Date Received: 11/6/78
Laboratory No.: 9778

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #1 2750- Shoe

WATER ANALYSIS

Sample Description		
pH	--------	7.7
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	--------	3360
Resistivity, Ohm M/M	--------	2.98

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	1.7
Calcium, (Ca)	--------	110
Magnesium, (Mg)	--------	30
Sodium, (Na)	--------	510
Potassium, (K)	--------	12
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	166.3
Chlorides, (Cl)	--------	973.5
Sulphates, (SO_4)	--------	36
Nitrate, (NO_3)	--------	4.4
Fluoride, (F)	--------	0.38
Total Iron, (Fe)	--------	0.34
Copper, (Cu)	--------	(-) 0.01
Manganese, (Mn)	--------	0.26
Chromium, (Cr)		
Zinc, (Zn)	--------	0.03
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	66
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	398.7 (32.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	1799
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9781

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #2 2750'-Shoe

WATER ANALYSIS

Sample Description

pH	--------	6.5
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	--------	8280
Resistivity, Ohm M^2/M	--------	1.2

Constituents, P.P.M. (parts per million)

Boron, (B)	--------	23.0
Calcium, (Ca)	--------	89
Magnesium, (Mg)	--------	5.3
Sodium, (Na)	--------	1700
Potassium, (K)	--------	213
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	524.9
Chlorides, (Cl)	--------	2506.3
Sulphates, (SO_4)	--------	103
Nitrate, (NO_3)	--------	1.3
Fluoride, (F)	--------	3.8
Total Iron, (Fe)	--------	8.8
Copper, (Cu)	--------	(-) 0.01
Manganese, (Mn)	--------	0.29
Chromium, (Cr)		
Zinc, (Zn)	--------	0.48
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	272
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	244.5 (14.3 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	5293
Total Suspended Solids		
Phosphate (PO_4)	--------	0.4

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9784

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #3 2750'-Shoe

WATER ANALYSIS

Sample Description		
pH	------	7.1
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	------	8520
Resistivity, Ohm M/M	------	1.17

Constituents, P.P.M. (parts per million)		
Boron, (B)	------	17.8
Calcium, (Ca)	------	86
Magnesium, (Mg)	------	4.9
Sodium, (Na)	------	1700
Potassium, (K)	------	213
Carbonates, (CO_3)	------	-
Bicarbonates, (HCO_3)	------	518.0
Chlorides, (Cl)	------	2538.2
Sulphates, (SO_4)	------	103
Nitrate, (NO_3)	------	1.3
Fluoride, (F)	------	3.8
Total Iron, (Fe)	------	4.8
Copper, (Cu)	------	0.01
Manganese, (Mn)	------	0.30
Chromium, (Cr)		
Zinc, (Zn)	------	0.16
Aluminum (Al)	------	(-) 0.1
Silica, (SiO_2)	------	241
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	235.3 (13.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	5237
Total Suspended Solids		
Phosphate (PO_4)	------	0.5

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CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9780

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #2 3310-2750'

WATER ANALYSIS

Sample Description

pH	---------	7.9
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	---------	4630
Resistivity, Ohm M^2/M	---------	2.16

Constituents, P.P.M. (parts per million)

Boron, (B)	---------	5.6
Calcium, (Ca)	---------	79
Magnesium, (Mg)	---------	23
Sodium, (Na)	---------	805
Potassium, (K)	---------	61
Carbonates, (CO_3)	---------	-
Bicarbonates, (HCO_3)	---------	201.8
Chlorides, (Cl)	---------	1362.9
Sulphates, (SO_4)	---------	45
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	1.2
Total Iron, (Fe)	---------	0.31
Copper, (Cu)	---------	(-) 0.01
Manganese, (Mn)	---------	0.54
Chromium, (Cr)		
Zinc, (Zn)	---------	0.05
Aluminum (Al)	---------	(-) 0.1
Silica, (SiO_2)	---------	176
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	292.3 (17.1 gr.gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	2645
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9783

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #3 3310-2750'

WATER ANALYSIS

Sample Description		
pH	-------	8.0
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	-------	4680
Resistivity, Ohm M²/M	-------	2.14

Constituents, P.P.M. (parts per million)		
Boron, (B)	-------	3.3
Calcium, (Ca)	-------	69
Magnesium, (Mg)	-------	25
Sodium, (Na)	-------	840
Potassium, (K)	-------	62
Carbonates, (CO_3)	-------	-
Bicarbonates, (HCO_3)	-------	188.8
Chlorides, (Cl)	-------	1405.4
Sulphates, (SO_4)	-------	44
Nitrate, (NO_3)	-------	3.1
Fluoride, (F)	-------	1.2
Total Iron, (Fe)	-------	3.0
Copper, (Cu)	-------	0.02
Manganese, (Mn)	-------	0.80
Chromium, (Cr)		
Zinc, (Zn)	-------	0.16
Aluminum (Al)	-------	(-) 0.1
Silica, (SiO_2)	-------	157
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	275.5 (16.1 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	2701
Total Suspended Solids		
Phosphate (PO_4)	-------	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9786

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S. R9W
Beaver Co., Utah Sample #11 10:12 4193-4997' 11/4/78

WATER ANALYSIS

Sample Description		
pH	------	7.9
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	------	2630
Resistivity, Ohm M²/M	------	3.80

Constituents, P.P.M. (parts per million)		
Boron, (B)	------	3.1
Calcium, (Ca)	------	105
Magnesium, (Mg)	------	30
Sodium, (Na)	------	380
Potassium, (K)	------	19
Carbonates, (CO_3)	------	-
Bicarbonates, (HCO_3)	------	187.1
Chlorides, (Cl)	------	708.0
Sulphates, (SO_4)	------	30
Nitrate, (NO_3)	------	1.8
Fluoride, (F)	------	0.58
Total Iron, (Fe)	------	2.9
Copper, (Cu)	------	(-) 0.01
Manganese, (Mn)	------	0.52
Chromium, (Cr)		
Zinc, (Zn)	------	0.05
Aluminum (Al)	------	(-) 0.1
Silica, (SiO_2)	------	66
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	386.2 (22.5 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	1489
Total Suspended Solids		
Phosphate (PO_4)	------	(-) 0.1

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BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9787

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #2 10:45 4193-4997'

WATER ANALYSIS

Sample Description		
pH	--------	6.8
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	--------	9010
Resistivity, Ohm M/M	--------	1.11

Constituents, P.P.M. (parts per million)		
Boron, (B)	-------	19.2
Calcium, (Ca)	-------	86
Magnesium, (Mg)	-------	6.5
Sodium, (Na)	-------	1850
Potassium, (K)	-------	231
Carbonates, (CO_3)	-------	-
Bicarbonates, (HCO_3)	-------	461.7
Chlorides, (Cl)	-------	2867.4
Sulphates, (SO_4)	-------	99
Nitrate, (NO_3)	-------	1.8
Fluoride, (F)	-------	4.0
Total Iron, (Fe)	-------	3.4
Copper, (Cu)	-------	0.01
Manganese, (Mn)	-------	0.80
Chromium, (Cr)		
Zinc, (Zn)	-------	1.4
Aluminum (Al)	-------	(-) 0.1
Silica, (SiO_2)	-------	214
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	241.9 (14.1 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-------	5617
Total Suspended Solids		
Phosphate (PO_4)	-------	0.2

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9788

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #13 11:20 am 4193-4997' 11/4/78

WATER ANALYSIS

Sample Description		
pH		7.0
E.C. Micromhos/cm (K x 10³) @ 25°C (salinity)		8770
Resistivity, Ohm M²/M		1.14

Constituents, P.P.M. (parts per million)		
Boron, (B)		23.4
Calcium, (Ca)		82
Magnesium, (Mg)		3.0
Sodium, (Na)		1800
Potassium, (K)		237
Carbonates, (CO_3)		-
Bicarbonates, (HCO_3)		534.5
Chlorides, (Cl)		2732.9
Sulphates, (SO_4)		96
Nitrate, (NO_3)		1.8
Fluoride, (F)		3.9
Total Iron, (Fe)		6.6
Copper, (Cu)		(-) 0.01
Manganese, (Mn)		0.52
Chromium, (Cr)		
Zinc, (Zn)		0.85
Aluminum (Al)		(-) 0.1
Silica, (SiO_2)		280
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		217.5 (12.7gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		5542
Total Suspended Solids		
Phosphate (PO_4)		0.4

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9779

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21,T27S, R9W
Beaver Co., Utah Flow Sample #1 7170-7500'

WATER ANALYSIS

Sample Description		
pH	--------	6.4
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	--------	9010
Resistivity, Ohm M^2/M	--------	1.11

Constituents, P.P.M. (parts per million)		
Boron, (B)	--------	24.4
Calcium, (Ca)	--------	106
Magnesium, (Mg)	--------	5.2
Sodium, (Na)	--------	1845
Potassium, (K)	--------	237
Carbonates, (CO_3)	--------	-
Bicarbonates, (HCO_3)	--------	602.9
Chlorides, (Cl)	--------	2810.8
Sulphates, (SO_4)	--------	78
Nitrate, (NO_3)	--------	0.5
Fluoride, (F)	--------	2.8
Total Iron, (Fe)	--------	0.31
Copper, (Cu)	--------	0.01
Manganese, (Mn)	--------	1.0
Chromium, (Cr)		
Zinc, (Zn)	--------	0.16
Aluminum (Al)	--------	(-) 0.1
Silica, (SiO_2)	--------	500
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	--------	286.6 (16.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	5940
Total Suspended Solids		
Phosphate (PO_4)	--------	(-) 0.1

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CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9782

Marked: GOCO #52-21 roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Flow Sample #2 7170-7500'

WATER ANALYSIS

Sample Description		
pH	----------	7.3
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	----------	9250
Resistivity, Ohm M²/M	----------	1.08

Constituents, P.P.M. (parts per million)		
Boron, (B)	----------	27.0
Calcium, (Ca)	----------	114
Magnesium, (Mg)	----------	3.9
Sodium, (Na)	----------	1900
Potassium, (K)	----------	218
Carbonates, (CO_3)	----------	-
Bicarbonates, (HCO_3)	----------	550.0
Chlorides, (Cl)	----------	2885.1
Sulphates, (SO_4)	----------	86
Nitrate, (NO_3)	----------	1.3
Fluoride, (F)	----------	3.4
Total Iron, (Fe)	----------	6.9
Copper, (Cu)	----------	0.01
Manganese, (Mn)	----------	0.73
Chromium, (Cr)		
Zinc, (Zn)	----------	0.05
Aluminum (Al)	----------	(-) 0.1
Silica, (SiO_2)	----------	143
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	----------	301.3 (17.6 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	----------	5727
Total Suspended Solids		
Phosphate (PO_4)	----------	0.2

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CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308

Date Reported: 12/8/78
Date Received: 11/6/78
Laboratory No.: 9785

Marked: GOCO #52-21 Roosevelt Hat Springs KGRA Sec. 21, T27S, R9W
Beaver Co., Utah Sample #3 7170-7500'

WATER ANALYSIS

Sample Description		
pH	-----	6.8
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	-----	9250
Resistivity, Ohm M^2/M	-----	1.08

Constituents, P.P.M. (parts per million)		
Boron, (B)	-----	27.0
Calcium, (Ca)	-----	107
Magnesium, (Mg)	-----	4.0
Sodium, (Na)	-----	1900
Potassium, (K)	-----	216
Carbonates, (CO_3)	-----	-
Bicarbonates, (HCO_3)	-----	615.0
Chlorides, (Cl)	-----	2881.6
Sulphates, (SO_4)	-----	85
Nitrate, (NO_3)	-----	1.3
Fluoride, (F)	-----	3.6
Total Iron, (Fe)	-----	6.3
Copper, (Cu)	-----	0.01
Manganese, (Mn)	-----	0.40
Chromium, (Cr)		
Zinc, (Zn)	-----	0.03
Aluminum (Al)	-----	(-) 0.1
Silica, (SiO_2)	-----	139
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-----	284.2 (16.6 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	-----	5677
Total Suspended Solids		
Phosphate (PO_4)	-----	(-) 0.1

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5962

Marked: Well #KGRA 52-21 Sample #1 2165' 7/13/78

WATER ANALYSIS

Sample Description	
pH	6.3
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	8000.
Resistivity, Ohm M²/M	1.25

Constituents, P.P.M. (parts per million)	
Boron, (B)	21.0
Calcium, (Ca)	100.
Magnesium, (Mg)	6.2
Sodium, (Na)	1700.
Potassium, (K)	222.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	580.4
Chlorides, (Cl)	2545.3
Sulphates, (SO_4)	169.
Nitrate, (NO_3)	3.1
Fluoride, (F)	3.0
Total Iron, (Fe)	6.6
Copper, (Cu)	0.03
Manganese, (Mn)	0.47
Chromium, (Cr)	
Zinc, (Zn)	0.81
Aluminum (Al)	less than 0.1
Silica, (SiO_2)	270.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	275.7 (16.1 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	5337.
Total Suspended Solids	
Phosphate (PO_4)	0.7

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AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5963

Marked: Well #KGRA 52-21 Sample #2 2665' 7/13/78

WATER ANALYSIS

Sample Description		
pH		6.5
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		8000.
Resistivity, Ohm M^2/M		1.25
Constituents, P.P.M. (parts per million)		
Boron, (B)		19.0
Calcium, (Ca)		86.
Magnesium, (Mg)		4.6
Sodium, (Na)		1700.
Potassium, (K)		226.
Carbonates, (CO_3)		0.
Bicarbonates, (HCO_3)		524.9
Chlorides, (Cl)		2559.4
Sulphates, (SO_4)		160.
Nitrate, (NO_3)		2.2
Fluoride, (F)		2.8
Total Iron, (Fe)		6.0
Copper, (Cu)		0.05
Manganese, (Mn)		0.30
Chromium, (Cr)		
Zinc, (Zn)		0.32
Aluminum (Al)	less-than-	0.1
Silica, (SiO_2)		260.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		234.1 (13.7 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		5288.
Total Suspended Solids		
Phosphate (PO_4)		0.6

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5964

Marked: Well #KGRA 52-21 Sample #3 @ 3430' 7/13/78

WATER ANALYSIS

Sample Description	
pH	6.4
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	8000.
Resistivity, Ohm M^2/M	1.25

Constituents, P.P.M. (parts per million)	
Boron, (B)	19.0
Calcium, (Ca)	67.
Magnesium, (Mg)	2.2
Sodium, (Na)	1700.
Potassium, (K)	228.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	520.3
Chlorides, (Cl)	2495.7
Sulphates, (SO_4)	202.
Nitrate, (NO_3)	1.3
Fluoride, (F)	3.2
Total Iron, (Fe)	3.5
Copper, (Cu)	0.01
Manganese, (Mn)	0.30
Chromium, (Cr)	
Zinc, (Zn)	0.30
Aluminum (Al)	less than 0.1
Silica, (SiO_2)	240.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	176.7 (10.3 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	5219.
Total Suspended Solids	
Phosphate (PO_4)	1.0

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

B C LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5965

Marked: Well #KGRA 52-21 Sample #4 @ 4080' 7/13/78

WATER ANALYSIS

Sample Description		
pH	---------	6.3
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---------	8000.
Resistivity, Ohm M^2/M	---------	1.25

Constituents, P.P.M. (parts per million)		
Boron, (B)	---------	19.0
Calcium, (Ca)	---------	62.
Magnesium, (Mg)	---------	2.0
Sodium, (Na)	---------	1750.
Potassium, (K)	---------	228.
Carbonates, (CO_3)	---------	0.
Bicarbonates, (HCO_3)	---------	469.5
Chlorides, (Cl)	---------	2594.8
Sulphates, (SO_4)	---------	194.
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	3.0
Total Iron, (Fe)	---------	4.0
Copper, (Cu)	---------	0.02
Manganese, (Mn)	---------	0.29
Chromium, (Cr)		
Zinc, (Zn)	---------	0.34
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)	---------	270.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	------	163.4 (9.5 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	--------	5363.
Total Suspended Solids		
Phosphate (PO_4)	------	1.0

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5966

Marked: Well #KGRA 52-21 Sample #5 @ 4750' 7/13/78

WATER ANALYSIS

Sample Description		
pH	---------	6.3
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	---------	8400.
Resistivity, Ohm M^2/M	---------	1.19

Constituents, P.P.M. (parts per million)		
Boron, (B)	---------	21.0
Calcium, (Ca)	---------	58.
Magnesium, (Mg)	---------	1.9
Sodium, (Na)	---------	1800.
Potassium, (K)	---------	244.
Carbonates, (CO_3)	---------	0.
Bicarbonates, (HCO_3)	---------	460.8
Chlorides, (Cl)	---------	2693.9
Sulphates, (SO_4)	---------	180.
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	3.2
Total Iron, (Fe)	---------	3.6
Copper, (Cu)	---------	0.05
Manganese, (Mn)	---------	0.24
Chromium, (Cr)		
Zinc, (Zn)	---------	0.38
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)	---------	250.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-------	152.9 (8.9 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	------	5488.
Total Suspended Solids		
Phosphate (PO_4)	-------	0.8

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
Route 1, Box 197-X
Bakersfield, California 93308
Attention Mr. W. A. Shaw

Date Reported: 8/14/78
Date Received: 7/17/78
Laboratory No.: 5967

Marked: Well #KGRA 52-21 Sample #6 @ 6210' 7/13/78

WATER ANALYSIS

Sample Description		
pH	---------	6.1
E.C. Micromhos/cm (K x 10⁶) @ 25°C (salinity)	---------	8400.
Resistivity, Ohm M²/M	-------	1.19

Constituents, P.P.M. (parts per million)		
Boron, (B)	---------	19.0
Calcium, (Ca)	---------	59.
Magnesium, (Mg)	---------	1.95
Sodium, (Na)	---------	1800.
Potassium, (K)	---------	246.
Carbonates, (CO_3)	---------	0.
Bicarbonates, (HCO_3)	---------	460.8
Chlorides, (Cl)	---------	2701.
Sulphates, (SO_4)	---------	176.
Nitrate, (NO_3)	---------	1.3
Fluoride, (F)	---------	3.0
Total Iron, (Fe)	---------	5.0
Copper, (Cu)	---------	0.17
Manganese, (Mn)	---------	0.30
Chromium, (Cr)		
Zinc, (Zn)	---------	0.64
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)	---------	250.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$	-----	155.6 (9.1 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids	---------	5493.
Total Suspended Solids		
Phosphate (PO_4)	------	0.4

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93309
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2474

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 Initial Fluid 5:03 AM 105°F

WATER ANALYSIS

Sample Description		
pH		7.1
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		2000.
Resistivity, Ohm M²/M		5.0

Constituents, P.P.M. (parts per million)		
Boron, (B)		2.2
Calcium, (Ca)		92.
Magnesium, (Mg)		15.6
Sodium, (Na)		316.
Potassium, (K)		23.
Carbonates, (CO_3)		0.
Bicarbonates, (HCO_3)		137.7
Chlorides, (Cl)		601.8
Sulphates, (SO_4)		45.
Nitrate, (NO_3)	less-than	0.5
Fluoride, (F)		0.64
Total Iron, (Fe)		0.18
Copper, (Cu)	less-than	0.01
Manganese, (Mn)		0.59
Chromium, (Cr)		
Zinc, (Zn)		0.47
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)		28.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		294.4 (17.2 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		1194.
Total Suspended Solids		
Phosphate (PO_4)	less-than	0.1

B C LABORATORIES, INC.

J. F. Baker

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

B C LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2477

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 5:40 AM 175

WATER ANALYSIS

Sample Description	
pH	7.7
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	2160.
Resistivity, Ohm M/M	4.63

Constituents, P.P.M. (parts per million)	
Boron, (B)	2.4
Calcium, (Ca)	70.
Magnesium, (Mg)	9.0
Sodium, (Na)	368.
Potassium, (K)	29.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	133.4
Chlorides, (Cl)	619.5
Sulphates, (SO_4)	60.
Nitrate, (NO_3)	1.8
Fluoride, (F)	0.74
Total Iron, (Fe)	0.24
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.11
Chromium, (Cr)	
Zinc, (Zn)	0.01
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	66.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	212.2 (12.4 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	1293.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. J. Bolin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2471

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 5:45 AM 200°F

WATER ANALYSIS

Sample Description	
pH	7.6
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	2040.
Resistivity, Ohm M/M	4.90

Constituents, P.P.M. (parts per million)	
Boron, (B)	2.2
Calcium, (Ca)	82.
Magnesium, (Mg)	9.4
Sodium, (Na)	345.
Potassium, (K)	28.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	126.5
Chlorides, (Cl)	616.0
Sulphates, (SO_4)	52.
Nitrate, (NO_3)	0.9
Fluoride, (F)	0.70
Total Iron, (Fe)	4.7
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.26
Chromium, (Cr)	
Zinc, (Zn)	0.27
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	118.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	243.9 (14.2 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	1322.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

B C LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Exploration Department
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2470

Marked:

Getty KGRA 52-21 Milford, Utah 5/2/78 6:40 AM 203°F

WATER ANALYSIS

Sample Description		
pH		8.1
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)		250.
Resistivity, Ohm M²/M		40.0

Constituents, P.P.M. (parts per million)		
Boron, (B)		0.58
Calcium, (Ca)		18.6
Magnesium, (Mg)		0.61
Sodium, (Na)		28.
Potassium, (K)		3.7
Carbonates, (CO_3)		0.
Bicarbonates, (HCO_3)		48.5
Chlorides, (Cl)		43.5
Sulphates, (SO_4)		12.
Nitrate, (NO_3)	less-than	0.5
Fluoride, (F)		0.28
Total Iron, (Fe)		1.2
Copper, (Cu)	less-than	0.01
Manganese, (Mn)		0.06
Chromium, (Cr)		
Zinc, (Zn)		0.02
Aluminum (Al)	less-than	0.1
Silica, (SiO_2)		34.
Lithium, (Li)		
Lead, (Pb)		
Phenol		
Sulfides as H_2S		
Total Hardness as $CaCO_3$		49.1 (2.9 gr/gal)
Oil (chloroform extractable)		
Total Dissolved Solids		167.
Total Suspended Solids		
Phosphate (PO_4)	less-than	0.1

B C LABORATORIES, INC.

J. J. Eglin

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2476

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 7:00 AM 168°F

WATER ANALYSIS

Sample Description	
pH	8.2
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	3600.
Resistivity, Ohm M²/M	2.78

Constituents, P.P.M. (parts per million)	
Boron, (B)	5.5
Calcium, (Ca)	67.
Magnesium, (Mg)	2.2
Sodium, (Na)	710.
Potassium, (K)	38.
Carbonates, (CO_3)	8.5
Bicarbonates, (HCO_3)	149.0
Chlorides, (Cl)	998.3
Sulphates, (SO_4)	211.
Nitrate, (NO_3)	1.8
Fluoride, (F)	1.1
Total Iron, (Fe)	4.6
Copper, (Cu)	0.02
Manganese, (Mn)	0.17
Chromium, (Cr)	
Zinc, (Zn)	0.10
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	55.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	176.7 (10.3 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	2177.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. J. Eckis

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2472

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 7:45 160°F

WATER ANALYSIS

Sample Description	
pH	8.0
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	3250.
Resistivity, Ohm M^2/M	3.08

Constituents, P.P.M. (parts per million)	
Boron, (B)	5.0
Calcium, (Ca)	106.
Magnesium, (Mg)	3.5
Sodium, (Na)	565.
Potassium, (K)	47.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	256.4
Chlorides, (Cl)	867.3
Sulphates, (SO_4)	124.
Nitrate, (NO_3)	2.7
Fluoride, (F)	1.6
Total Iron, (Fe)	0.47
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.05
Chromium, (Cr)	
Zinc, (Zn)	0.02
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	153.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	279.6 (16.3 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	2004.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. J. Sgl

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2473

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 8:00 AM 199°F

WATER ANALYSIS

Sample Description	
pH	8.6
E.C. Micromhos/cm (K x 10^3) @ 25°C (salinity)	150.
Resistivity, Ohm M^2/M	66.67

Constituents, P.P.M. (parts per million)	
Boron, (B)	0.69
Calcium, (Ca)	10.4
Magnesium, (Mg)	0.34
Sodium, (Na)	20.
Potassium, (K)	3.1
Carbonates, (CO_3)	7.7
Bicarbonates, (HCO_3)	31.2
Chlorides, (Cl)	20.9
Sulphates, (SO_4)	5.
Nitrate, (NO_3)	1.8
Fluoride, (F)	0.38
Total Iron, (Fe)	0.74
Copper, (Cu)	0.01
Manganese, (Mn)	0.05
Chromium, (Cr)	
Zinc, (Zn)	0.02
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	50.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	27.4 (1.6 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	136.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. J. Bale

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM

BC LABORATORIES, INC.

4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 5/22/78
Date Received: 5/5/78
Laboratory No.: 2478

Marked: Getty KGRA 52-21 Milford, Utah 5/2/78 Swabbing sample 124°F. 3:00 PM
Fluid Level @ 433'

WATER ANALYSIS

Sample Description

pH	6.9
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	9200.
Resistivity, Ohm M^2/M	1.09

Constituents, P.P.M. (parts per million)

Boron, (B)	24.4
Calcium, (Ca)	62.
Magnesium, (Mg)	11.1
Sodium, (Na)	1980.
Potassium, (K)	260.
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	693.
Chlorides, (Cl)	2878.
Sulphates, (SO_4)	190.
Nitrate, (NO_3)	less-than 0.5
Fluoride, (F)	1.5
Total Iron, (Fe)	0.16
Copper, (Cu)	0.01
Manganese, (Mn)	3.0
Chromium, (Cr)	
Zinc, (Zn)	0.01
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	38.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	200.8 (11.7 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	5794.
Total Suspended Solids	
Phosphate (PO_4)	less-than 0.1

B C LABORATORIES, INC.

J. F. Sullivan

AGRICULTURE
CHEMICAL ANALYSIS
PETROLEUM
BC LABORATORIES, INC.
4100 PIERCE ROAD, 93308 BAKERSFIELD, CALIFORNIA 93308 PHONE 327-4911

Submitted By: Getty Oil Company
P. O. Box 5237
Bakersfield, California 93308
Attention Mr. Wayne Shaw

Date Reported: 8/7/78
Date Received: 7/3/78
Laboratory No.: 5483

Marked: Jefferson Water Well, Beaver Co. Utah

WATER ANALYSIS

Sample Description	
pH	7.6
E.C. Micromhos/cm (K x 10^6) @ 25°C (salinity)	1760.
Resistivity, Ohm M^2/M	5.68

Constituents, P P.M. (parts per million)	
Boron, (B)	3.1
Calcium, (Ca)	95.0
Magnesium, (Mg)	33.
Sodium, (Na)	245.0
Potassium, (K)	10.0
Carbonates, (CO_3)	0.
Bicarbonates, (HCO_3)	142.1
Chlorides, (Cl)	548.0
Sulphates, (SO_4)	26.0
Nitrate, (NO_3)	1.3
Fluoride, (F)	0.26
Total Iron, (Fe)	72.0*
Copper, (Cu)	less-than 0.01
Manganese, (Mn)	0.44
Chromium, (Cr)	
Zinc, (Zn)	0.07
Aluminum (Al)	less-than 0.1
Silica, (SiO_2)	39.
Lithium, (Li)	
Lead, (Pb)	
Phenol	
Sulfides as H_2S	
Total Hardness as $CaCO_3$	373.5 (21.8 gr/gal)
Oil (chloroform extractable)	
Total Dissolved Solids	1143.
Total Suspended Solids	

Phosphate, PO_4 less-than 0.1 ppm

*Note: The inside of can appears rusted

B C LABORATORIES, INC.

J. J. Eglin

November 7, 1978

Rework of GOCO #52-21
Sec 21-T27S-RSW
Beaver County, California

10-18-78 Colorado Well Service moved workover rig onto location, rigged up and prep to "fish" junk.
10-19-78 Rigging up
10-20-78 Ran in with fishing tools and recovered "fish"
10-21-78 Made bit run to bottom cleaned out hole
10-22-78 Pruett Wireline Services rigged up and ran temperature survey, maximum temperature on bottom 402.7°F
10-23-78 Rigged up packer and swab equipment, ran in hole, set packer 7,710'; made swab runs and swabbed fluid to 3,000' maximum temperature 145°F. Took water samples.
10-24-78 Resumed swabbing. Hole full. Slight heading blow after each swabbing run. Very minor and mostly due to fluid movement after swab run stopped. Pulled pkr 10:45 AM. Out of hole, rigged up stradle pkr's, ran in hole to test interval 6599' - 7170'
10-25-78 Running in hole with pkrs. Insufficient time to test 6,599' - 7,170'. Will test first zone below shoe. 2,750' to shoe (2,040') pkr's would not go. Pulled out of hole. Lost pkr elements. Made bit run. Ran in hole with pkrs level down each run 200'±; swabbed fluid to 1,900'. Took water samples. Rigged down lubricator and swab, pulled pkrs. Started out of hole. Maximum temperature 125°F.
10-26-78 Finished coming out of hole, left pkr elements in hole; picked up D.C. and bit. Hit obstruction at 3,180' could not push to bottom. Picked up power swivel, milled on junk. Finally worked to 3,200'. Shut down at dark.
10-27-78 Ran to bottom chasing junk ahead. Reached T.D. Layed down power swivel. Changed elevators. Ran in hole with stradle packers 3,320' - 2,742'. Expanded pkr's, picked up swab and lubricator, started swabbing first run 1,500' (100°F)
Second run 2,600' (120°F) Top of tool
Very muddy rust colored fluid with brackish taste. Dark streaked H_2O probably due to pipe dope and old asphaltum in pipe. Swabbed fluid down as far as top of tool (packer tool) Pulled out of hole. Left bottom pkr element in hole. Made up bit, ran in hole, chased element to bottom (7400't) Pulled out of hole. Secured rig; crew off for Sunday.

10-29-78 Sunday - Crew off.

10-30-78 Rigged up stradle packers, ran in hole to test 7,150' - 6,575'. Could not seat packers. Test failed. Pulled out of hole. Left packer element in hole, made bit run, pushed obstruction to bottom.

10-31-78 Pulled bit out of hole, rigged up single packer assembly. Set packer at 6,005'. Pressured up, set packer at 12:20 PM, rigged up swab, and ran in hole at 12:30 PM. Swabbed fluid with temperatures ranging from 150°F to 204°F. Light heading blow after each swab run. White plume of hot H_2O and steam develops with receding heads as pressure diminishes. Maximum pressure 12 PSI.

11-1-78 Continued testing from 10-31-78. Continued to swab and flow by heads. Could not deplete fluid head or increase heat flow. At 14:20 broke off swabbing and pulled packers. Left pkr elements in hole. Picked up DC and bit, chased obstruction to bottom.

11-2-78 Rigged up, finished pushing pkr element to bottom (7412') Pulled out of hole at 11:15. Picked up bottom pkr assembly to run in and test interval 6,005' - 6,350'. Set pkr's at 14:45. Started swabbing 15:08. Swabbed dry with maximum temperature 185°F. Unseated pkr's, pulled out of hole 1700 hours. Corkscrewed 12 joints of tubing.

11-3-78 Finished pulling pkr's, both elements gone. Out of hole at 10:00 AM. Tripped to bottom with bit and out of hole at 15:20 PM. Pick up pkr's to stradle interval 4,193' - 4,997'.
Started in hole.

11-4-78 Rigged up, finished running in hole. Set pkr's 09:20 AM. Started swabbing 09:50 AM. Swabbed fluid down with no entry after four swab runs. Waited 30 minutes, reran swab, no fluid. Pulled pkr's with difficulty. Made trip to bottom with bit pushing pkr elements to bottom. Rigged down equipment, secured for day.

11-5-78 Laid down D.P., mast, and secured lease and equipment. Loaded out D.P. Tubing and BOP Head. Installed flange on master gate valve. Released rig and cleaned location.

W. A. SHAW