GL 04477_6

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MIDLAND, TEXAS 79701

8 **REFERENCE** # C 1335B

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R. F. SMITH CORP.

GEOTHERMAL DATA LOG

COMPANY Getty Oil Company
WELL KORA 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 5060' (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 ½" to 765'
12 ¼" to 2041'
8 ½" to 7500'

CASING SIZE
20" to 194'
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 ———

CO₂ ppm on Air — · — · —
TOTAL MUD GAIN/LOSS — — — —

PRESSURE PSIG
IN - - - - - -
OUT ———

METHANE ppm — · — · —
ETHANE ppm — — — —

H₂S ppm - - - -
% MOISTURE

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REMARKS

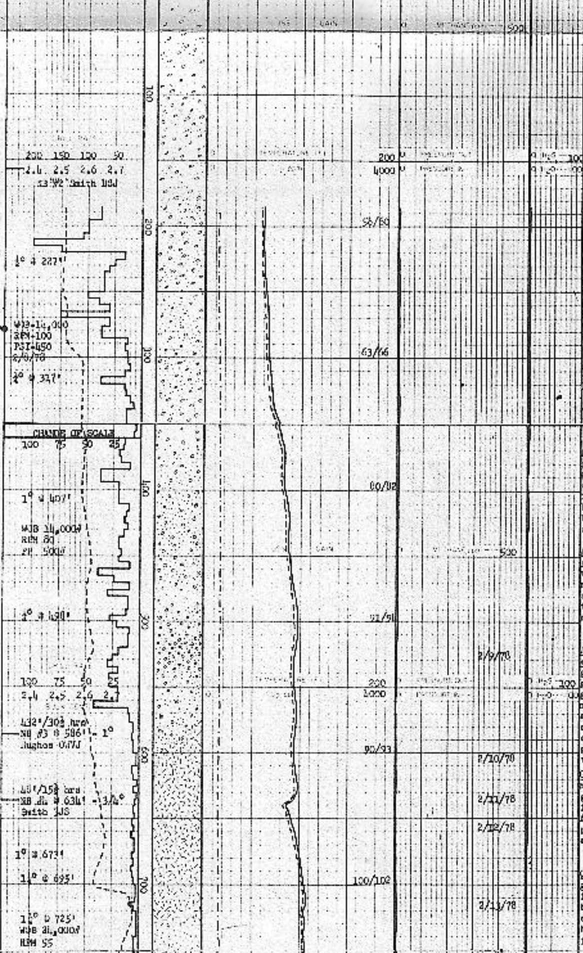
DESCRIPTIONS

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-med 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)

W 9.1 V 53

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.

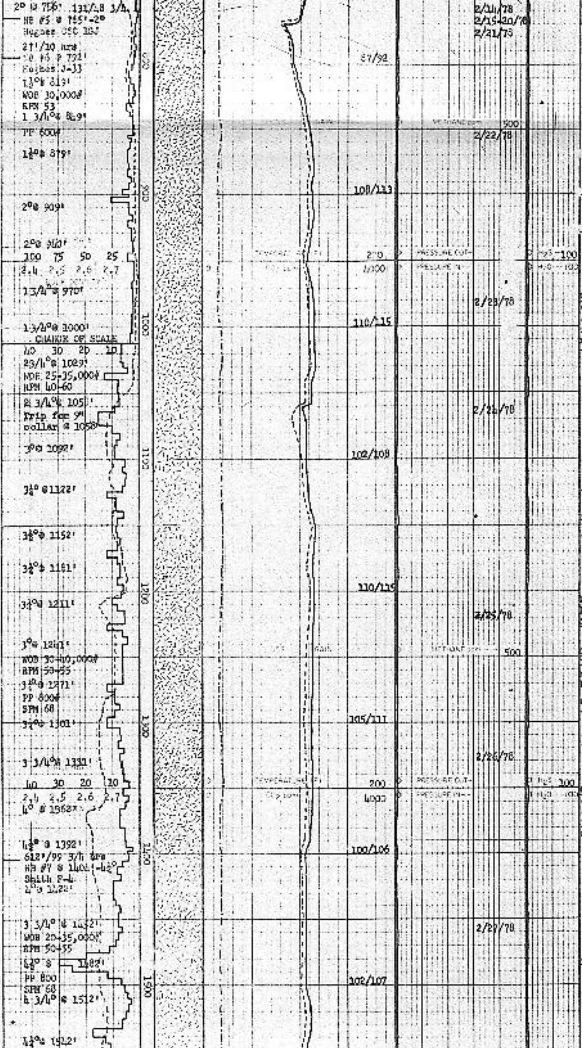
Alluvium(unconsolidated): buff, gry, wht, w/ incr in pink, crs-med gr, some gravel, sbang-sbrd, pred weathered granitics, incr mafic frags w/ depth.

Alluvium(unconsolidated): pred reworked granitics, blk, wht, grn, sbang-sbrd, f-crs gr sd, sm granules, minerals & altr ns 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', has mineralization on frac surfaces @ 710'.



Ran Schlumberger logs&
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 xtls(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 subhedral 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 Fe 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, dkgrn, 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 Fe 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.

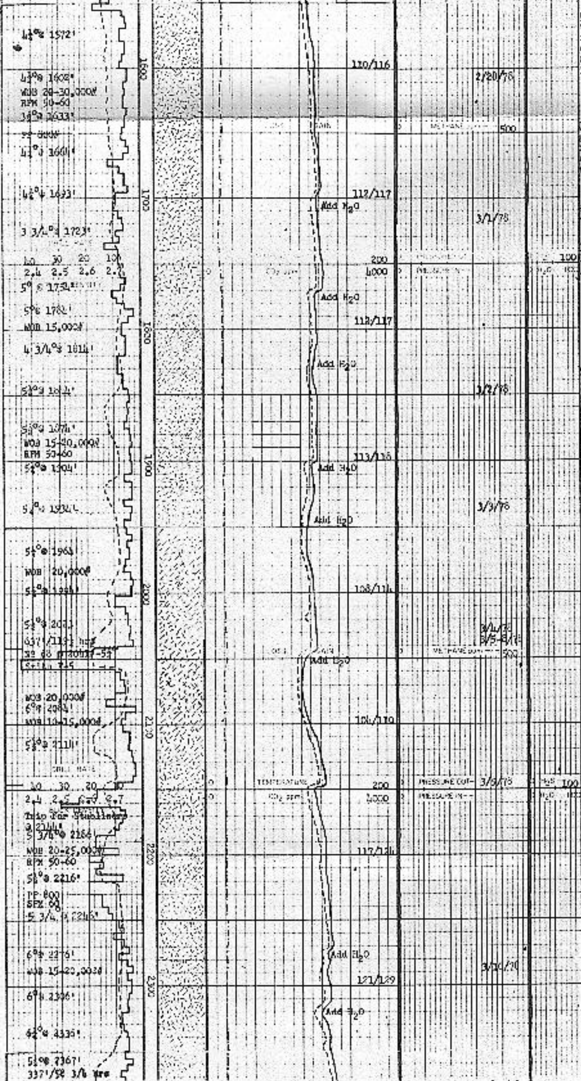
Granodiorite: pred dk, occ lt, f-m gr, qtz, subhedral felds, biot, ptly alt to chlor loc, mnr hbld & sphene.

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 bio hex xtl's, mnr chlorite, 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 65.0pcf V 27 pH 9.0
F 25+ Cl 1300 YP 1
PV 2 Slds 3% Ca 100 Pb 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, an S&P, m-crs gr, clr qtz w/ biot incl's, wht sbhedral felds, mnr free biot flakes, dk brn w/ mn 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, an pale grn sbhedral elong'd min xtls, @ 2020' poss alt'd zone: wht, lt gry, pink, qtz, kaolinized 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.

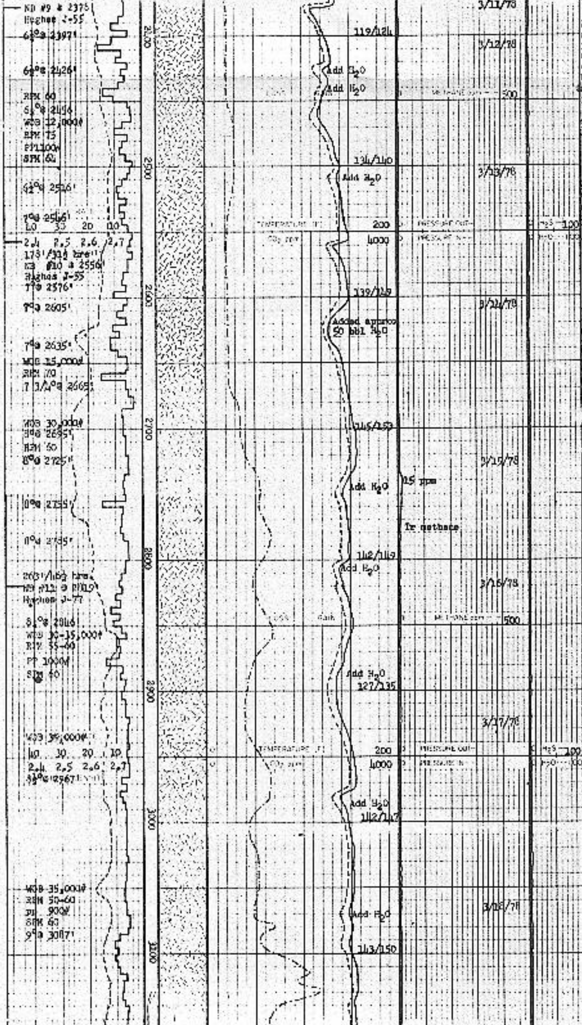
Granodiorite: wht, clr, mnr grn, felds, qtz, & biot as above, tr hbld, grding to qtz monzonite in pts.
W 62.5pcf V 26 pH 11.5
F 20+ Cl 1300 Ca 400

Granodiorite: 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, an 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 fels alt'ing to kao, biot, chlor, tr pk zirc, mnr hem stn & fill, qtz mons & rhyodacite in pts, poss serp on frac surf.

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, free brn-blk biot, wht felds, mnr chlor, schistose in pts.

W 60.8pcf 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, c gr, clr & wht felds(>70%), clr qtz (10%), mnr biot incl's, hd, massive, tr chlor, pyr, & poss magnetite.

Granodiorite: 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

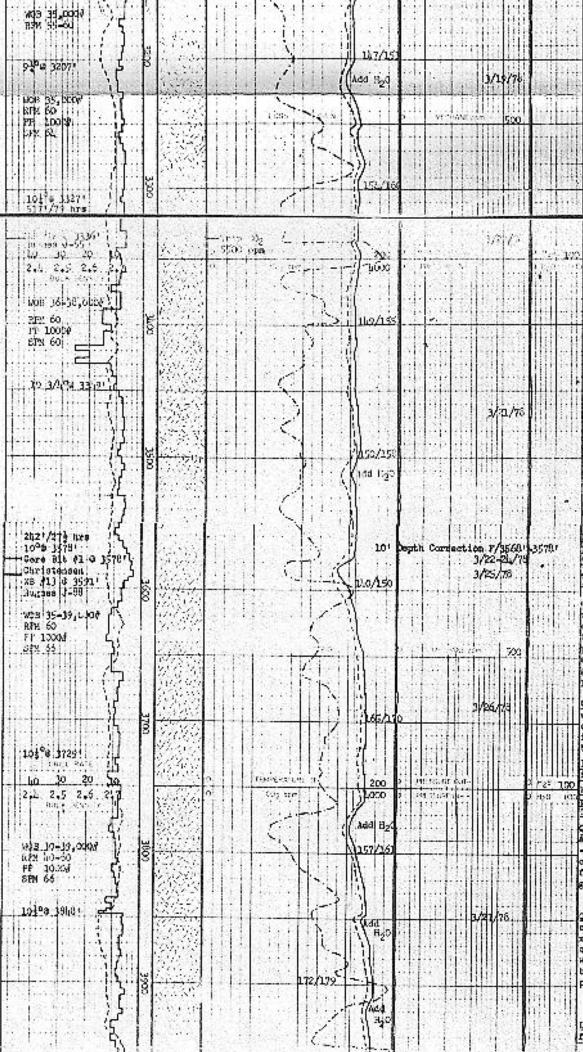
Qtz Monzonite: lt-gry-wht, mgr, clr & wht felds(70+%) w/biot incl's, clr qtz, mnr chlor, tr metallics.

Qtz Monzonite: lt, wht clr, v abund wht & clr felds w/ blk biot inclusions, tr mag, mnr chlor, biot% incrs w/ depth.

W 65.2pcf V 32 PV 6
YP 2 pH 8 F 10 FC 2 Sd
Cl 1100 Ca 100 Slds 2½

Qtz Monzonite: lt, wht clr, mnr S&P, clr feld w/ biot incl's, mnr alt to kao, clr qtz, mnr biot & chlor.

W 64.0pcf 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, schistose, dk grn w/ wht layers, mnr chlor, mnr red hem & calc frac fill, fracs in pts

Slowly adding water to mud system.

W 64.4pcf V 33 YP 6 PV 7 pH 8 F 16 FC 2 Cl 1300 Ca 170 Slds 2½

Qtz Monzonite: lt gry-wht, occ clr, wht & clr felds w/ biot incl's, biot abund in pts, mnr qtz & chlor; @ 3370' 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.

Ran Agnew&Sweet temp & press logs @ 3576'. Cut 12½' of 4" core f/ 3578½'-3591. Retrieved 12½' of core.

Qtz Monzonite: 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.

Losing approx. 6 bbl/hr fluid to hole.

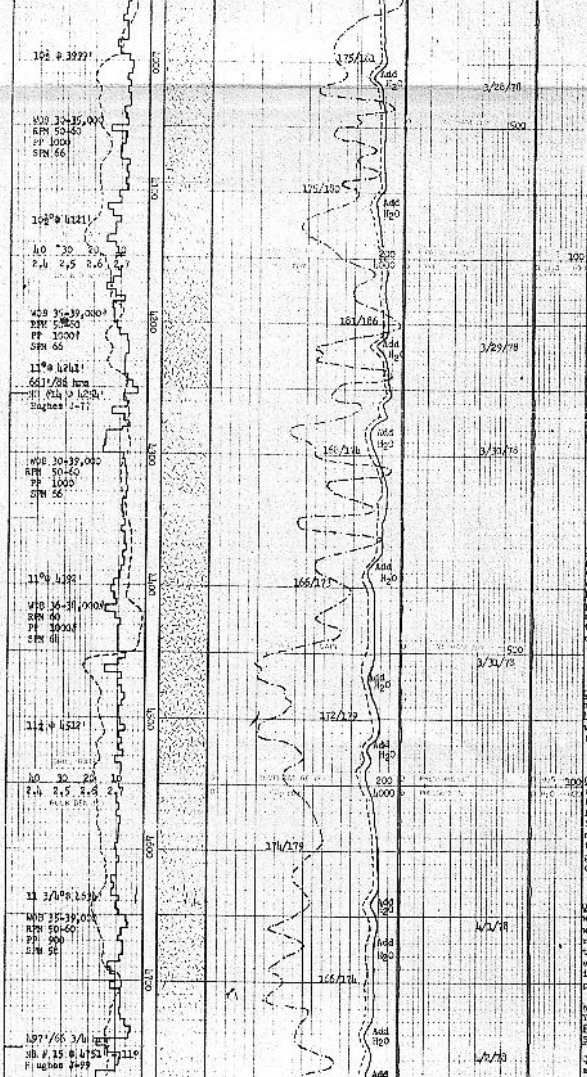
W 64pcf V 30 PV 3 YP 4 pH 8 F 20°C Cl 1300 Ca 80 Sd ½ Slds 1½

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 64.5pcf 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 64.3pcf V 33

Qtz Monzonite: lt gry, abund wht & clr felds, num biot incl's, grding to granodiorite in pts, felds alt to kaol, biot alt to chlor, grn & red alt of mafic rich sampl, 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, @ 4120-4140' pred wht w/tr-mnr biot

W 64.1pcf V 33 PV 6
YP 8 pH 8 F 28 FC 2
Cl 1300 Ca 1.0 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.

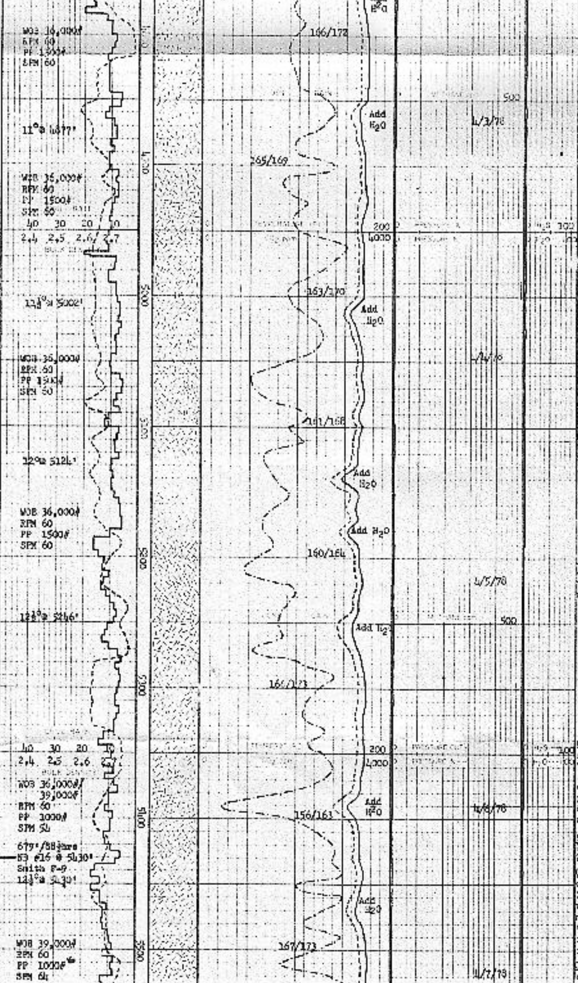
W 64.4pcf V 35

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, tr pyr & sphene, mnr 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 chlorite @ 4700', tr hem, poss frac @ 4745'.

W 64.4pcf V 32 PV 4
YP 8 pH 7.5 F 10.4
FC 3 Cl 1300 Ca 25
Sd 3/4 Slds 2½

Qtz Monzonite: cont'd as above, but w/ tr



yel grn, biot 5%.

Granodiorite: grad lt-dk gry, blk in pts, m-vcd 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 @ 4920'-4980'.

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

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 pyr mnr kao, biot 25-30%

W 64.4pcf V 29

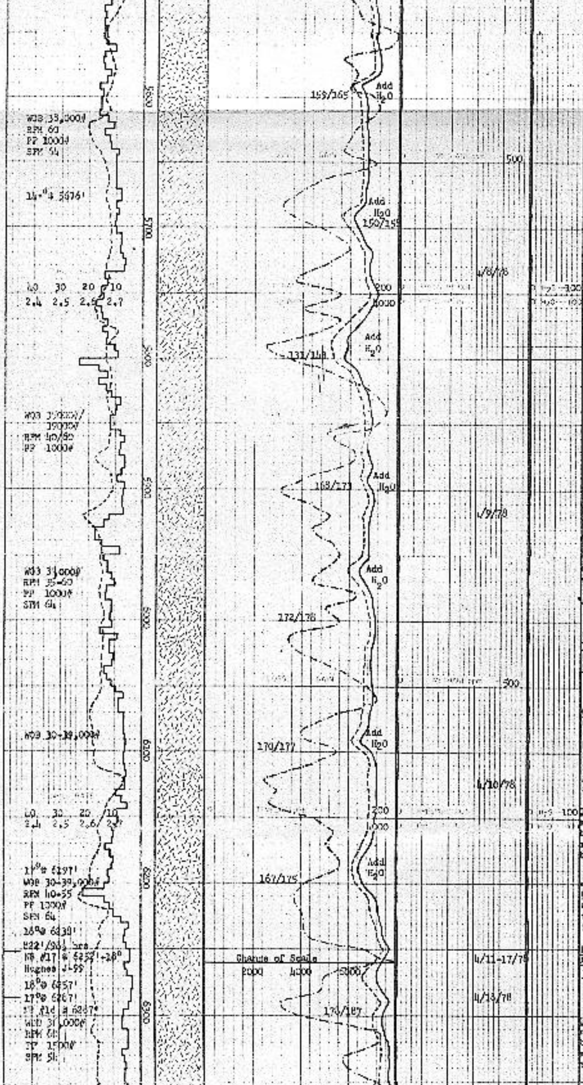
Qtz Monzonite: wht-clr occ lt gry, wht & clr felds w/biot(5%) incl's mnr qtz, tr chlor, mag & kao.

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 3
YP 4 pH 7 F 55 PC 2
Cl 1200 Ca 80 Slds 2

Granodiorite: blk, lt-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'n.

Granodiorite: lt-dk gry qtz & felds as above,



continued mixed 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 64.1pcf 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 altered mat, poss bex, 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 64.9 V 29

Granodiorite: cont'd as above, but dk gry-blk in pts, biot 10-15%, tr calc frac fill, 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 & bex, 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.

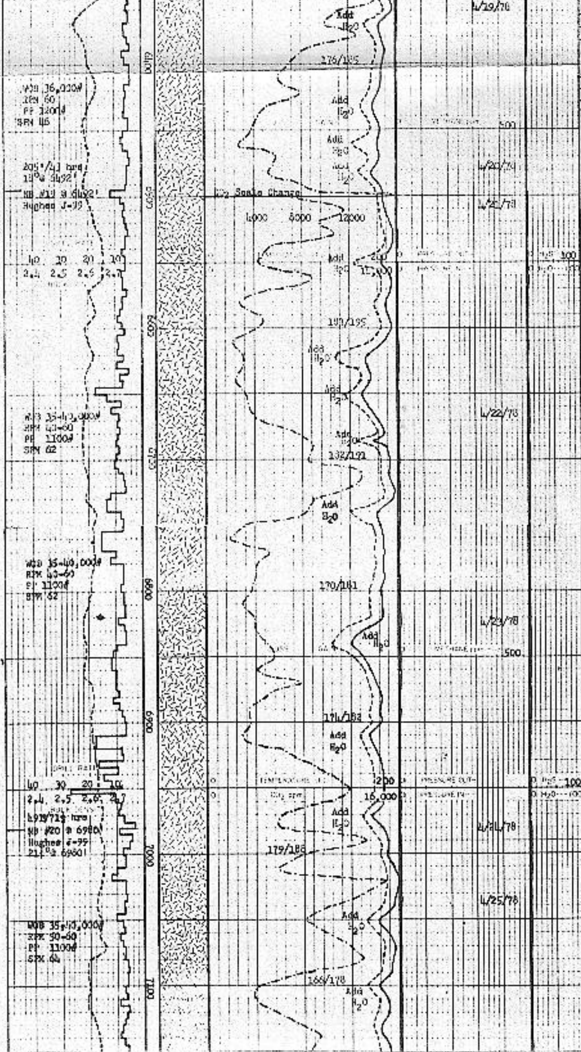
W 63.7 V 31

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

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

W 65 V 30

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 @ 6520', maintained diesel @ 4%.

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

W 63.7pcf V 29 PV 3 YP 3 pH 7 F 49 FC 1 Cl 1800 Ca 120 Slds 2 Sd tr

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%.

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, grading to lt gry granodiorite 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

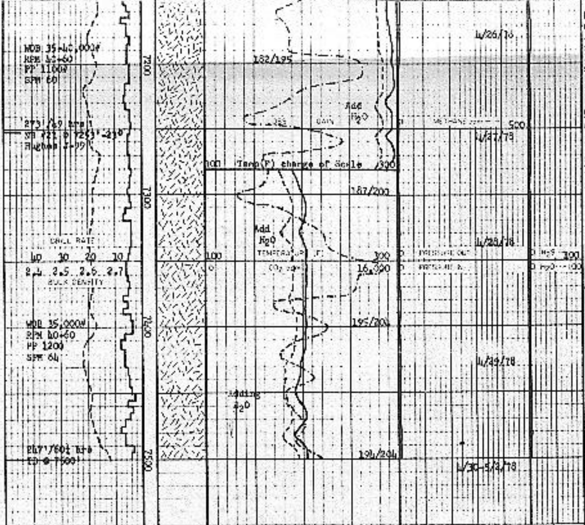
Granodiorite: lt gry, m gr, clr & wht felds /biot incl's (15%), mnr kaol, chlor & tr-mnr mag, tr sphene, mnr red hem & green frac fill mat, mod alt in pts.

Stopped adding diesel fuel and wht mica to mud system.

W 64.2pcf V 32 PV 6 YP 6 pH 7 F 46 FC 1 Cl 1500 Ca 50 Slds 2 Sd ½

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-wht, biot(5%) incl's, mnr kao & chlor.



Roosevelt Hot Springs
KGRA 52-21

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 & incr'g amts of chlor, calc, & grn alter'n.

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.

REMARKS