

5200-0901073

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MIDLAND, TEXAS 79701



5 REFERENCE # c 1372A



R. F. SMITH CORP.

GEOTHERMAL DATA LOG

COMPANY Union Oil Company of California
WELL Cove Fort-Sulphurdale Unit #31-33
FIELD Wildcat COUNTY Millard
LOCATION SEC 33 T 25 S R 6 W
STATE Utah COUNTRY U.S.A.

LOGGING GEOLOGISTS Dale A. Johnson
James A. Hill John S. Dooley
PRESSURE INST TYPE Silicon Chip TEMP. TYPE J-Thermocouple

DEPTH LOGGED FROM 52' TO 5221'
DATE LOGGED FROM 5/24/78 TO 7/24/78
ELEVATION 6814.4' (GL)+20' KB DF GR

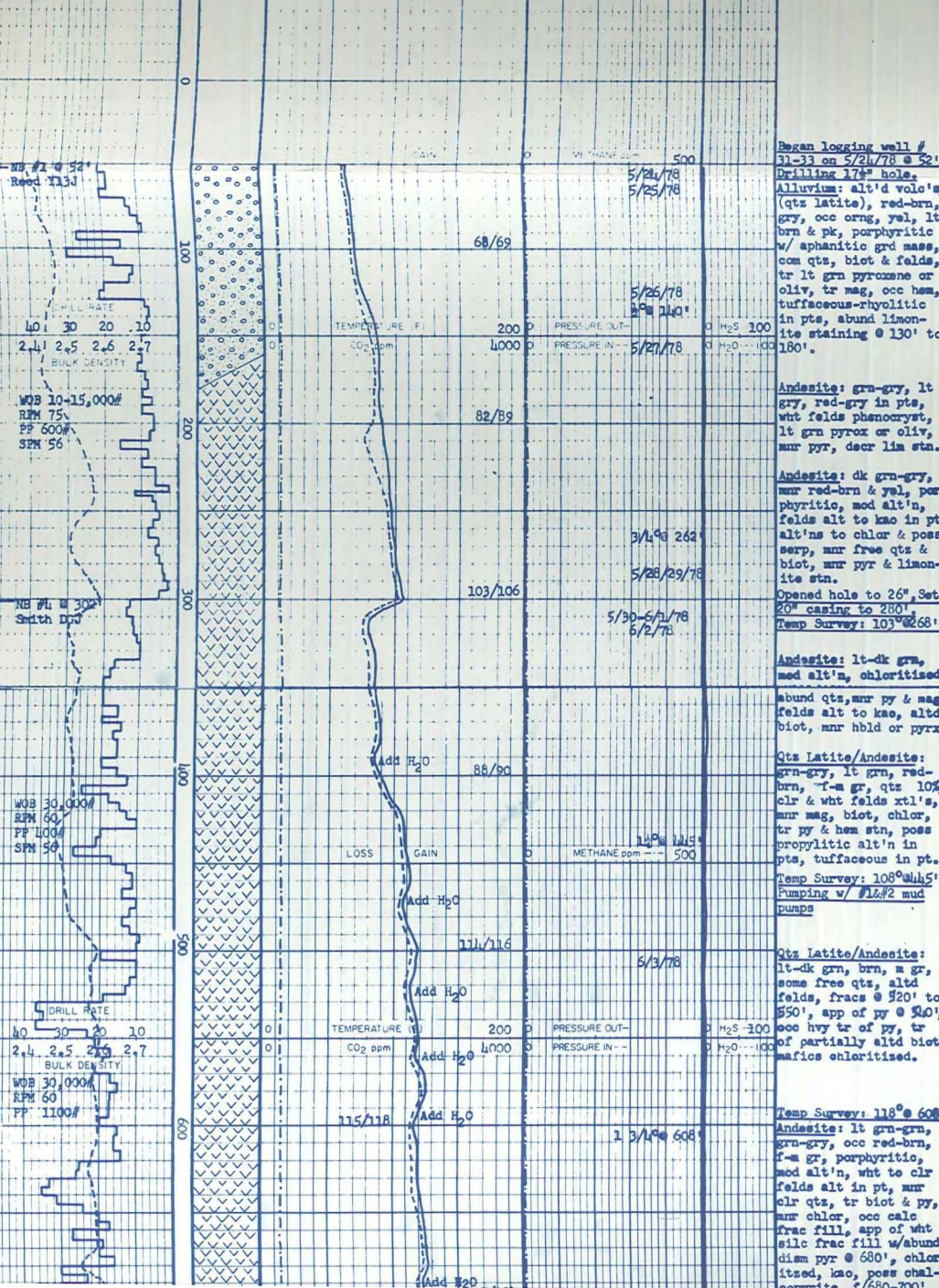
- LITHOLOGY -

| | | | | | | | | |
|-----------|--------------------|-------------------|-------------------|------------------|----------------------|---------------|------------|--------------------------|
| Sandstone | Siltstone | Graywacke Type #1 | Graywacke Type #4 | Solution Deposit | Basalt or Greenstone | Peridotite | Schist | Latite or Andesite |
| Breccia | Claystone | Graywacke Type #2 | Chert | Mineral Deposit | Other Volcanic | Igneous Rock | Quartzite | <input type="checkbox"/> |
| Conglom. | Shale or Argillite | Graywacke Type #3 | Limestone | MELANGE | Tuff or Tuff Breccia | Granitic Rock | Serpentine | <input type="checkbox"/> |

RETURN TO DENVER

ENGINEERING DATA AIR AND MUD DRILLING DATA REMARKS

| | | | | |
|---|--------------------|--|---|--|
| HOLE SIZE 17 1/2" to 1734.1' 12 1/2" to 5221' T.D. to CASING SIZE 20" to 280' 13 3/8" to 1734.1' to DRILLING RATE <input checked="" type="checkbox"/> FT/HR <input type="checkbox"/> MIN/FT ROCK DENSITY ----- | DEPTH LITHOLOGY | TEMPERATURE (°F) IN ----- OUT ----- CO ₂ ppm ----- on Air TOTAL MUD GAIN/LOSS ----- | PRESSURE PSIG IN ----- OUT ----- METHANE ppm ----- ETHANE ppm ----- | H ₂ S ppm % MOISTURE SURVEYS FORMATION TESTS MUD AGITATOR ELECTRIC <input type="checkbox"/> AIR <input checked="" type="checkbox"/> |
| | | DESCRIPTIONS CORE RESULTS SURVEYS FORMATION TESTS MUD AGITATOR ELECTRIC <input type="checkbox"/> AIR <input checked="" type="checkbox"/> | | |



Began logging well # 31-33 on 5/24/78 @ 52'.
Drilling 17 1/2" hole.
Alluvium: alt'd volc'm, (qtz latite), red-brn, gry, occ org, yel, lt brn & pk, porphyritic w/ aphanitic grd mass, com qtz, biot & felds, tr lt grn pyroxene or oliv, tr mag, occ hem, tuffaceous-rhyolitic in pts, abund limonite staining @ 130' to 180'.

Andesite: grn-gry, lt gry, red-gry in pts, wht felds phenocryst, lt grn pyrox or oliv, mnr pyr, decr lim stn.

Andesite: dk grn-gry, mnr red-brn & yel, porphyritic, mod alt'n, felds alt to kao in pt alt'n's to chlor & poss serp, mnr free qtz & biot, mnr pyr & limonite stn.
Opened hole to 26", Set 20" casing to 280'.
Temp Survey: 103° @ 268'.

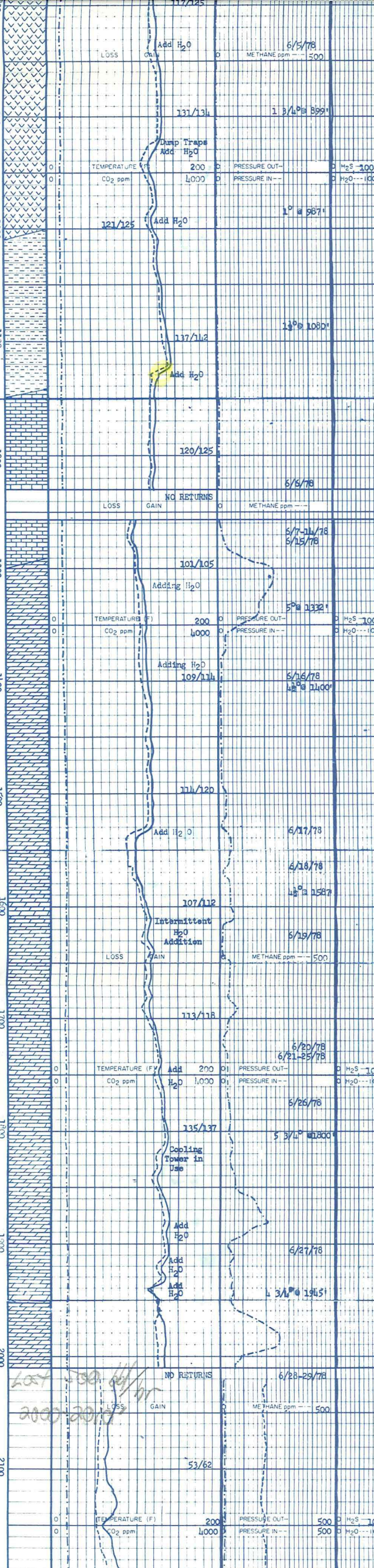
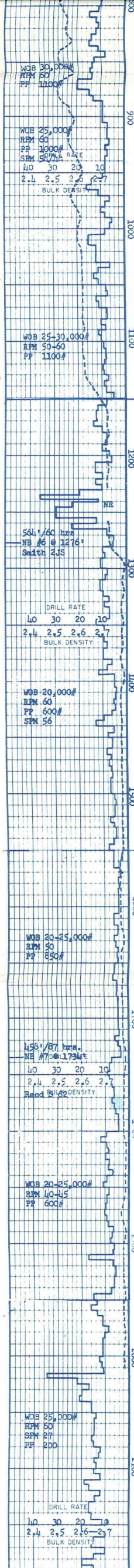
Andesite: lt-dk grn, mod alt'n, chloritised abund qtz, mnr py & mag, felds alt to kao, altd biot, mnr hbl'd or pyrx.

Qtz Latite/Andesite: grn-gry, lt grn, red-brn, f-a gr, qtz 10%, clr & wht felds xtl's, mnr mag, biot, chlor, tr py & hem stn, poss propylitic alt'n in pts, tuffaceous in pt.
Temp Survey: 108° @ 145'.
Pumping w/ #12 mud pumps

Qtz Latite/Andesite: lt-dk grn, brn, m gr, some free qtz, altd felds, frac @ 320' to 550', app of py @ 540', occ hvy tr of py, tr of partially altd biot, mafics chloritised.

Temp Survey: 118° @ 608'

Andesite: lt grn-grn, grn-gry, occ red-brn, f-a gr, porphyritic, mod alt'n, wht to clr felds alt in pt, mnr clr qtz, tr biot & py, mnr chlor, occ calc frac fill, app of wht silic frac fill w/abund diam pyr @ 680', chloritzed, kao, poss chalcovrite. f/680-700'



hem, mnr euhed calc xtals in pts, mnr qts, porphyritic, epidote & alt'd hblld, poss fracn.

Andesite: lt-dk grn, lt gry, m gr, occ f gr, mod alt'n, alt'd wht felds w/ mnr euhed clr xtals, rre tr alt'd biot, tr calc fill.

Temp Survey: 139° @ 899'

W 8.9 V 35 PV 9 YP 6
pH 10.5 F 21 FC 2
Cl 2100 Ca 100 Sd 4
Slds 44

Andesite: con't as above, but with incr calc & mag, tr biot.

Temp Survey: 138° @ 987'

Siltstone: red-brn, hd to frm, p strd, sdy to v sdy, vf-m sbord gr's, occ clr & smky qts granules, calc cnt & sugary calcite frac fill, grding in pt to vf gr sandstone, mnr limestone clasts.

Temp Survey: 150° @ 1080'

Siltstone: red-brn, gen'ly as above w/ sl incr in qtz granules, continued sdy in'pt & clay mtrx, calc cnt. Circulating mud through cooling tower.

Limestone: lt gry, f gr grding to lt bla-gry siltst w/ clasts of ang qtz & dolo in pts, mnr clr calc xtals, lt brn chrt, pyr, & euhed qtz xtals (vug filling), dolomitic in pts.

Lost Circulation @ 1233'

Detected 15,000 ppm CO₂ @ 10 ppm C₂, & high concentration H₂S. Set 18" plugs to regain circ @ 1257'. Lost circ @ 1279'. Set plug for circ'n.

Dolomite (calcareous): lt-dk gry, occ lt brn, f-m gr, suc, hd-frm, calc & silc veining, tr pyr, lam in pts.

Temp Survey: 122° @ 1332'

Dolomite: lt brn-lt gry, aphanitic, hd, massive, tr pyr.

Lost 30bbbl mud @ 1381'

Temp Survey: 118° @ 1400'

Dolomite: lt gry-brn, f gr, hd, silc & poss galena frac fill, app of pyr @ 1440' on frac surfaces, mnr calc frac fill, tr sphalerite.

W 8.5 V 36 PV 6 IP 12
pH 11.5 F 41 FC 2 Sd 4
Slds 1.28 Cl 1000

Lost 60bbbl mud @ 1513'

Lost 135bbbl @ 1532'

Dolomite: lt-dk gry, f-m gr, hd, calc free fill, tr pyr, sdy in pt wht. lt brn. gry chert.

Lost 250bbbl mud @ 1555' to 1564'. Lost circ @ 1564'. set plug.

Dolomite: brn to brn-gry, hd, crinoid frags @ 1560-70', occ abund silc fill, tr pyr, sl calc, rre tr galena, tr wht chert.

Lost 60bbbl mud @ 1620'

Lost 25bbbl mud @ 1647'

Dolomite: lt brn gry, f gr, massive, wht qtz veining, tr pyr.

Lost 150bbbl mud @ 1693'

Lost 300bbbl mud @ 1731'

Lost circ @ 1734'. Set plug to regain circ.

Set 13 3/8" casing to 1734'. Drig 12 1/2" hole.

Dolomite: brn-lt brn, f-m gr, hd, silc veining, sl calc in pt, tr pyr, tr drk brn chrt, tr calc vein filling.

W 8.5 V 30 PV 3 IP 3
pH 12.5 F 55 FC 2
Sd 3/4 Slds 14 Cl 650

Gained 50 bbl of mud at 1815'.

Dolomite: lt-dk brn, f-m gr, occ silc veins, tr pyr, mnr brecciated veins, occ calcite, form'n darker w/ depth.

Dolomite: con't as above, but with incr lt gry calc dolo @ 1920'.

Lost circ @ 1913, regained after 80bbbl mud.

Temp Survey: 132° @ 1945'

Dolomite: dk brn, dk gry @ 1980', m gr, silicic veining common, tr pyr, sl calc in pts, rre breccia veins.

Lost circ @ 2016', losing all mud in tanks.

Began drilling with aerated H₂O @ 2021'. No returns.

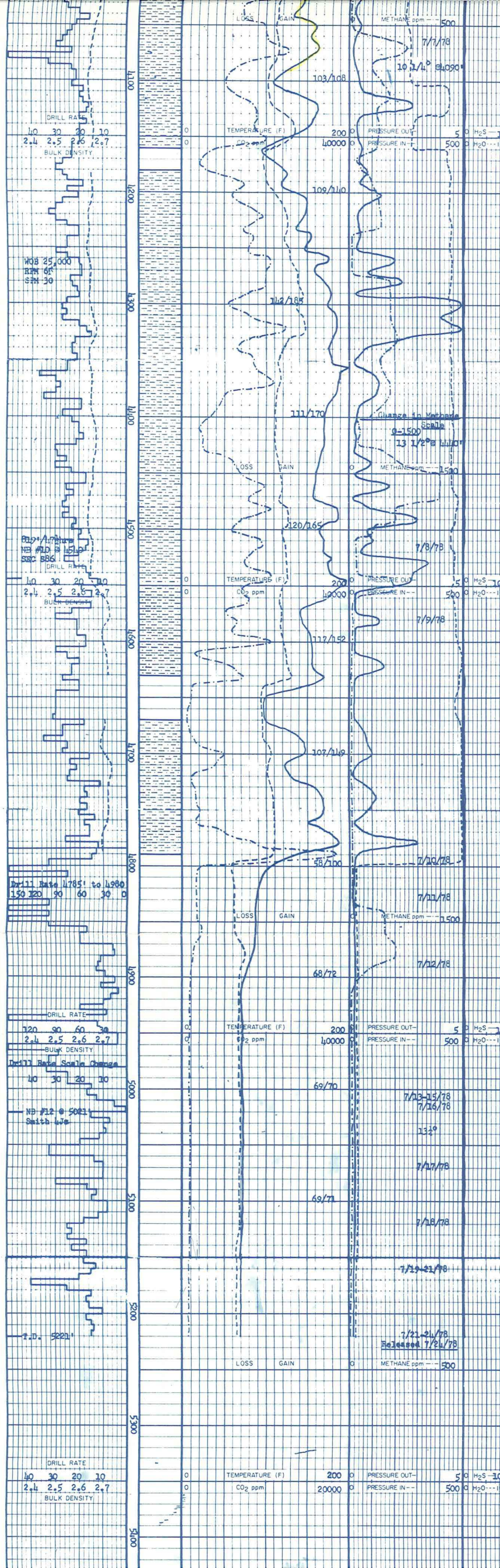
Injecting 27bbbl H₂O/hr mixed with unisteam.

Detected mnr amounts of H₂S @ 2080'.

No Returns

Intermittent water returns for a duration of 1-2 minutes, no formation returns.

Lost 500 bbl/hr
2000 2000



7/1/78
103/108
109/110
111/170
112/165
117/152
107/119
58/110
7/10/78
7/11/78
7/12/78
7/13-15/78
7/16/78
7/17/78
7/18/78
7/19-21/78
7/21-24/78
Released 7/24/78

Siltstone: red-brn as above in gen'l, tr gyp, w/ inc gry siltst & calc w/ depth.
Temp Survey: 285° @ 290'
325° @ 4090' 7/8/78
Added 2nd Compressor To Hole @ 4105' To clean cutting from bit.

Siltstone: gry to gry-grn, grading from red siltst above, mod srt'd, v calc lt gry to wht ss in pts.

Siltstone: lt-dk gry, tr lt grn, w srt'd, sl sdy in pts, gry siltst is v limy while grn siltst is rarely calc.

Siltstone: lt-dk gry, mnr grn, mnr red, w srt'd, v limy & poss grading to silty lime-stone

Siltstone: pred dk gry, w srt'd, sdy (f gr) in pts, v limy, tr oxidized pyrite.

Siltstone: dk-m gry, tr lt gry, w srt'd, v limy, rre tr silic frac fill, tr oxidized pyr, poss fossil frags @ 4410'.

Temp Survey: 283° @ 4410'

Siltstone: dk gry, tr lt gry & lt grn-gry, mod srt'd, sdy in pts, v limy w/ tr wht calc frac fill, tr oxidized pyrite, cont fossil fragments.

Siltstone: m-dk gry, mod srt'd, occ v sdy, common foss frags (mollusks & shell frags), tr gry limestone frags.

Siltstone: lt gry, calc cement, abund fossil frags & minute blk gastropods or forams, mnr ptz, mica, tr pyr, & gyp, inc calc w/ depth. Detected mnr H₂S @ 635'

Injecting 250bbl H₂O/hr mixed with ammonia

No Returns

Siltstone: red-brn-w/ lt-dk gry & lt grn, sl calc mtrix w/ mnr silic frac fill, mnr f gr lt gry ss, tr foss frags, tr oxidized pyr

Siltstone: red-brn, lt grn, gen'l'y as above.
2 Slugs of return after 4790', Dolomitic Siltstone.
Began drilling w/ H₂O only @ 4796'.
Temp Survey: 294° @ 672'
Temp Survey: 294° @ 700'
Temp Survey: 293° @ 727'
Temp Survey: 293° @ 735'

No Returns

No Returns

CR #1 from 5015 to 5018'
Dolomite: 8 inch recovery, dk gry, brecciated.
CR #2 From 5018 to 5021'
No recovery
Temp Survey: 249° @ 5035'

No Returns

Ran Schlumberger Log T.D. 5221'.
Plugged hole at various depths to end well.