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Geothermal TVD Log

COMPANY	Terra-Gen Operating Co.
WELL	BLM North 83-11
FIELD	Coso Geothermal
REGION	Coso Mountains
COORDINATES	NAD 1927 (N)= 258,671.7 (E)= 2,344,346.0
ELEVATION	GL: 4076.0 KB: 4098.0 (22')
COUNTY, STATE	Inyo, California
API INDEX	NA
SPUD DATE	6/13/2009
CONTRACTOR	Kenai Drilling, U.S.A
CO. REP.	Jeff Potter, Warren Ash
RIG/TYPE	Kenai 15A/Rotary Double
LOGGING UNIT	ML046
GEOLOGISTS	Marquel Mosebay Daniel Nagy
ADD. PERSONS	Josiah Failing Scot Clark
CO. GEOLOGIST	Jess McCulloch

LOG INTERVAL

DEPTHS: 92' **TO** 9480'
DATES: 6/14/2009 **TO** 8/12/2009
SCALE: 2" = 100'

CASING DATA

13 3/8" **AT** 92'
9 5/8" **AT** 701'
7" Liner **AT** 1995'
5 1/2" Liner **AT** 9480'

MUD TYPES

Spud Mud **TO** 630'
Gel/Polymer **TO** 9480'
TO
TO

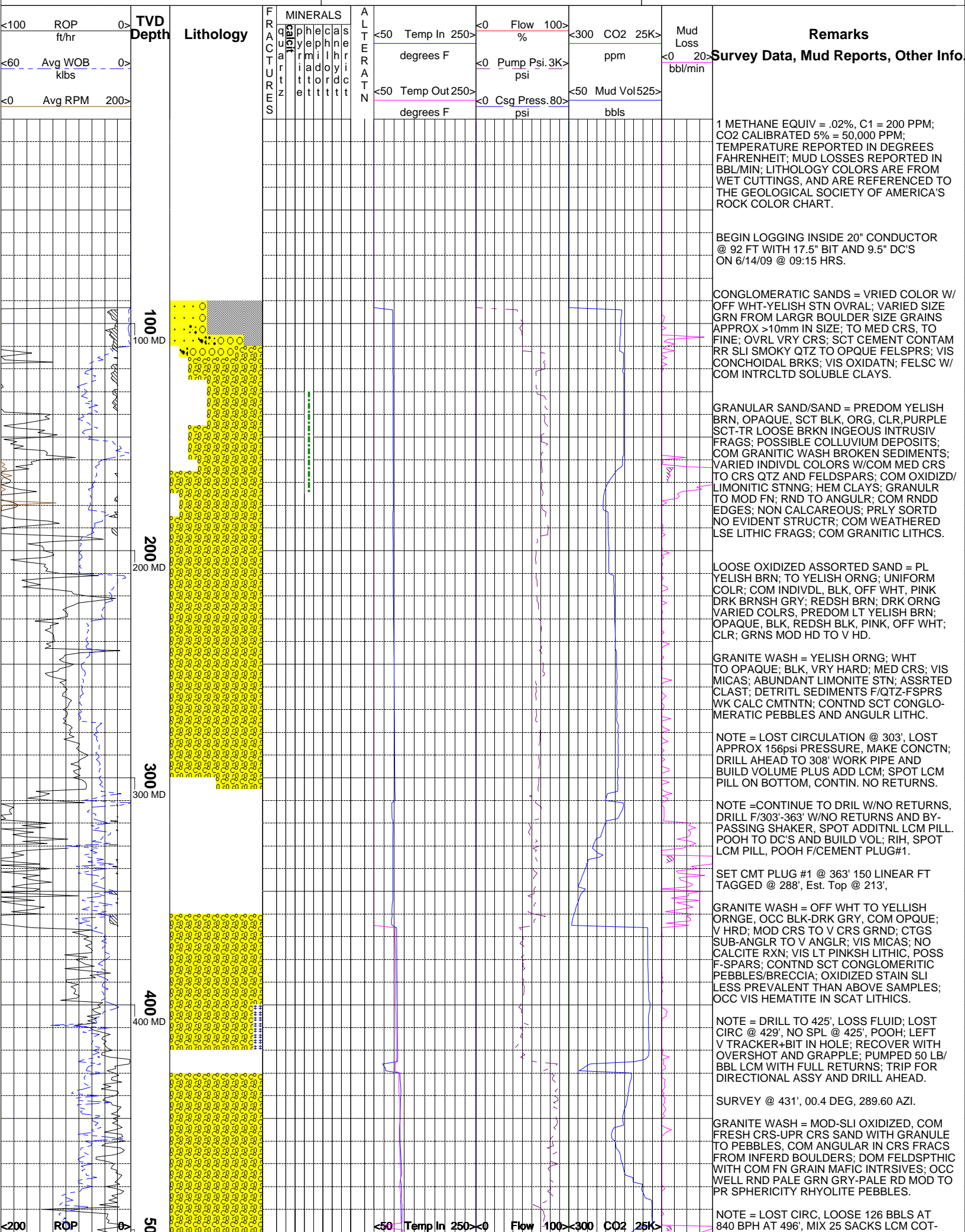
HOLE SIZE

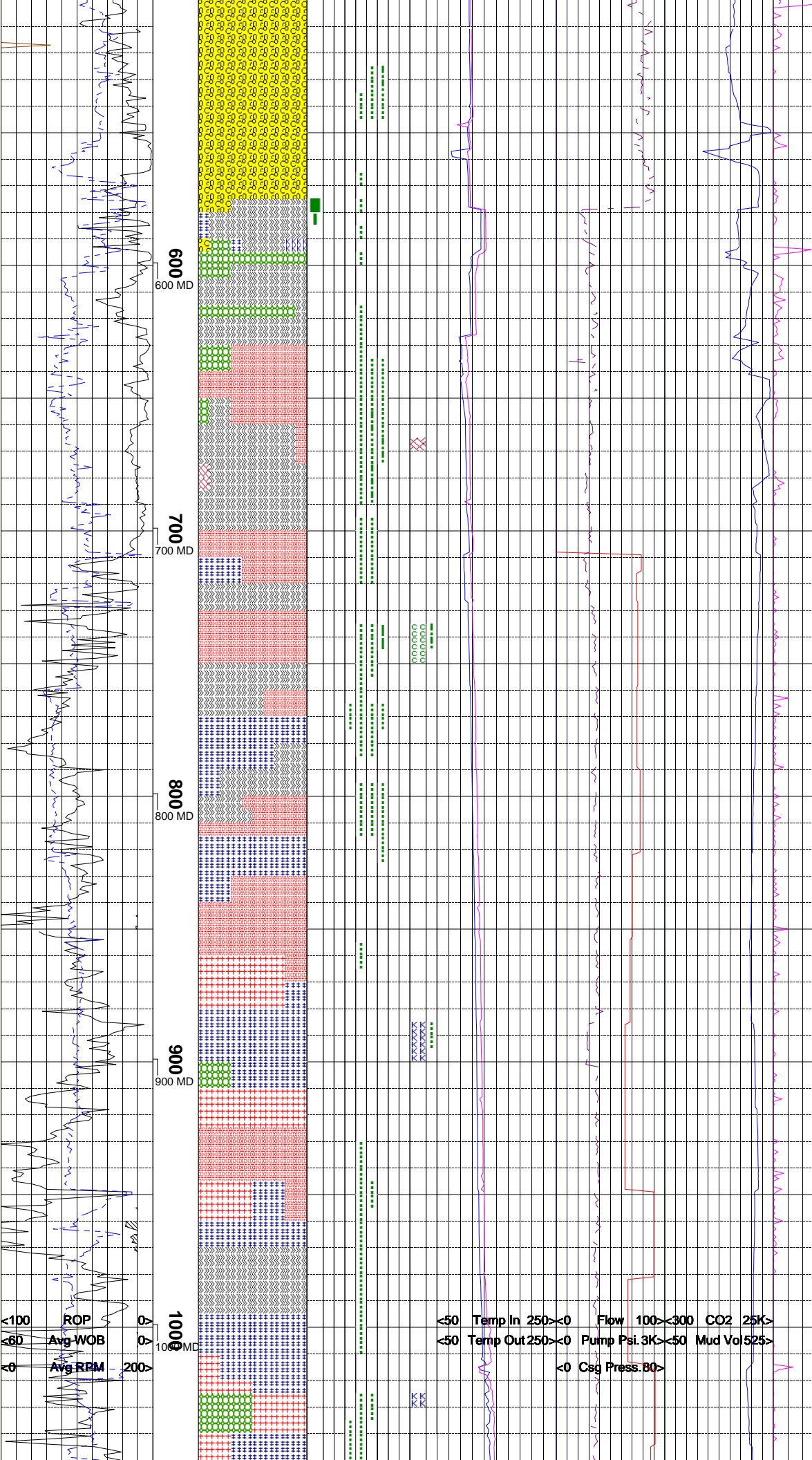
17 1/2" **TO** 708'
12 1/4" **TO** 2000'
8 3/4" **TO** 8500'
6 1/8" **TO** 9480'

ABBREVIATIONS

<i>NB</i> NEWBIT	<i>PV</i> PLASTIC VISCOSITY	<i>LC</i> LOST CIRCULATION
<i>RRB</i> RERUN BIT	<i>YP</i> YIELD POINT	<i>CO</i> CIRCULATE OUT
<i>CB</i> CORE BIT	<i>FL</i> FLUID LOSS	<i>NR</i> NO RETURNS
<i>WOB</i> WEIGHT ON BIT	<i>CL</i> PPM CLORIDE ION	<i>TG</i> TRIP GAS
<i>RPM</i> ROTARY REV/MIN	<i>Rm</i> MUD RESISTIVITY	<i>SG</i> SURVEY GAS
<i>PP</i> PUMP PRESSURE	<i>Rmf</i> FILTRATE RESISTIVITY	<i>WG</i> WIPER GAS
<i>SPM</i> STROKES/MIN	<i>PR</i> POOR RETURNS	<i>CG</i> CONNECTION GAS
<i>MW</i> MUD WEIGHT	<i>LAT</i> LOGGED AFTER TRIP	
<i>VIS</i> FUNNEL VISCOSITY	<i>LAS</i> LOGGED AFTER SURVEY	

ALTERED ZONE	CHERT - GLASSY	FELSIC SILIC DIKE	MARL - CALC	SANDSTONE
ANDESITE	CHERT - PORCEL	FOSSIL	METAMORPHICS	SANDSTONE-TUFFACEOUS
ANHYDRITE	CHERT - TIGER STRIPE	GABBRO	MUDSTONE	SERICITIZATION
BASALT	CHERT - UNDIFF	GLASSY TUFF	OBSIDIAN	SERPENTINE
BENTONITE	CLAY	GRANITE	PALEOSOL	SHALE
BIOTITIZATION	CLAY-MUDSTONE	GRANITE WASH	PHOSPHATE	SHALE TUFFACEOUS
BRECCIA	CLYST-TUFFACEOUS	GRANODIORITE	PORCELANITE	SHELL FRAGMENTS
CALCARENITE	CHLORITIZATION	GYPSUM	PORCELANEOUS CLYST	SIDERITE
CALCAREOUS TUFF	COAL	HALITE	PYRITE	SILICIFICATION
CALCILUTITE	CONGLOMERATE	HORNBL-QTZ-DIO	PYROCLASTICS	SILTSTONE
CARBONATES	CONGL. SAND	IGNEOUS (ACIDIC)	QUARTZ DIORITE	SILTST-TUFFACEOUS
CARBONACEOUS MAT	CONGL. SANDSTONE	IGNEOUS (BASIC)	QUARTZ LATITE	TUFF
CARBONACEOUS SH	COQUINA	INTRUSIVES	QUARTZ MONZONITE	VOLCANICLASTICS SEDS
CEMENT CONTAM.	DACITE	KAOLINITIC	RECRYSTALLIZED CALCITE	VOLCANICS
CHALK	DIATOMITE	LIMESTONE	RHYOLITE	
CRYSTALLINE TUFF	DIORITE	LITHIC TUFF	SALT	
CHERT - ARGILL	DOLOSTONE	MARL - DOLO	SAND	





TONSEED OVER SUCTION, HAVE RETURNS.

SURVEY @ 444', 00.25 DEG

NOTE = LOST CIRC, 103 BBLS AT 1030 BPH
OFF BTM REAMING AT CONNECTION, 547';
ADD 25 SACKS OF LCM, REGAIN RETURNS;
LOST CIRC, 75 BBLS AT 750 BPH AT 553',

MW 8.8 VIS 62 PV 7 YP 26 PH 10 CL 5500
GEL 17/25 SOL 2.93 Pf/Mf .3/.7 SD .01

PLUG#2 @ 579'/300LF,TAG 499', BASE XXX'
PLUG#3 @ 499'/300LF,TAG 199', BASE 499'
PLUG#4 @ 190'/150LF,TAG 127', BASE 297'
PLUG#5 @ 303'/300LF,TAG 270', BASE 292'
PLUG#6 @ 000'/300LF,TAG 070', BASE 300'
PLUG#7 @ 000'/300LF,TAG 053', BASE 303'

SURVEY @ 548', 2.4 DEG

Lost Fluid @ 594', 360 bbl/Hr to 596'

GRANITE = WHT TO OFF WHITE, TAN TO LT ORNGE; MOD HARD, HVLY OXIDZED; FN TO CRSE GRAINED; SUCROSIC TEX; WK RXN TO HCL; SCAT MASS HEM FROM OXIDATION; SCAT TO COM FELDIC DIKES.

DIORITE = BLK TO DK GRY, WHITE TO OFF-WHITE; HARD; SUCROSIC TO PORPH TEX; MED TO CRSE GRAINED; NO TO V WK RXN TO HCL; SCAT MASS HEM, R HEM VEINLETS; COM MASS EPID, V RR EUHED EPID; SCAT MASS CHLOR REPLACING PRIM MINERALS; MICAS, HORNBLLENDE PRESENT.

SURVEY @ 565', 2.17 DEG

NOTE: DRILL TO 708', CSG PT,RUN 13 3/8" CASING TO 701', INSTALL NEW BOPE, RIG UP BLOOIE LINE, FLOW SENSOR INSTLLD

DIORITE = BLK TO DK GRY, TRNSLCT WHT TO OFF-WHITE, BLUISH-GRY TO GRY; MOD HD TO V HD; PORPH TEXTURE; MED TO CRS GRAINED; SCAT MASS HEM, V RR HEM VEINLETS; SCAT TO COM MASS EPID; SCAT CHLOR ALT, WHERE PRES, ALT IS REPLCNG PRIM MINERALS WITH MASS CHLOR; V WK-NO RXN TO HCL.

QTZ DIORITE = GRNISH BLK TO BLK, CLR TO OFF WHITE, BLUISH; HD TO V HD; SLI BRRTL HYPIDIO TEXT; V RR FN EPID PHENOCRYSTS; MED TO CRSE GRAINED; MASS HEM; V RARE MASS CHLOR; V WK TO WK RXN TO HCL.

GRANODIORITE = WHITE TO OPQE, GRY-LT GRY, COM DRK GRY; HD TO V HD; V WK TO WK RXN TO HCL; HYPIDIO TEXTURE; MED TO CRSE GRAINED; ABDNT MAFICS; SCAT BIOT + MICAS; SPL TRANS-WHT GRANTIE, TRANS-OPQE TR PINK/ORNG HUES; RR EPID + CHLOR; SCAT MASS HEMATITE.

MW 8.8 VIS 62 PV 7 YP 26 PH 10 CL 5500
GEL 17/25 SOL 2.93 Pf/Mf .3/.7 SD .01

GRANITE = WHITE TO OPQE, PINK TO LT PNK, LT ORNG TO DK ORNGE, COM LT GRY; HD TO V HD; HYPIDIO TEXT, WITH SCAT SUCROSIC TEXT WHERE HEAVILY OXDZD; COM HEM STAINING, RR MASS HEM; WK TO NO RXN TO HCL; V RR MASS EPID.

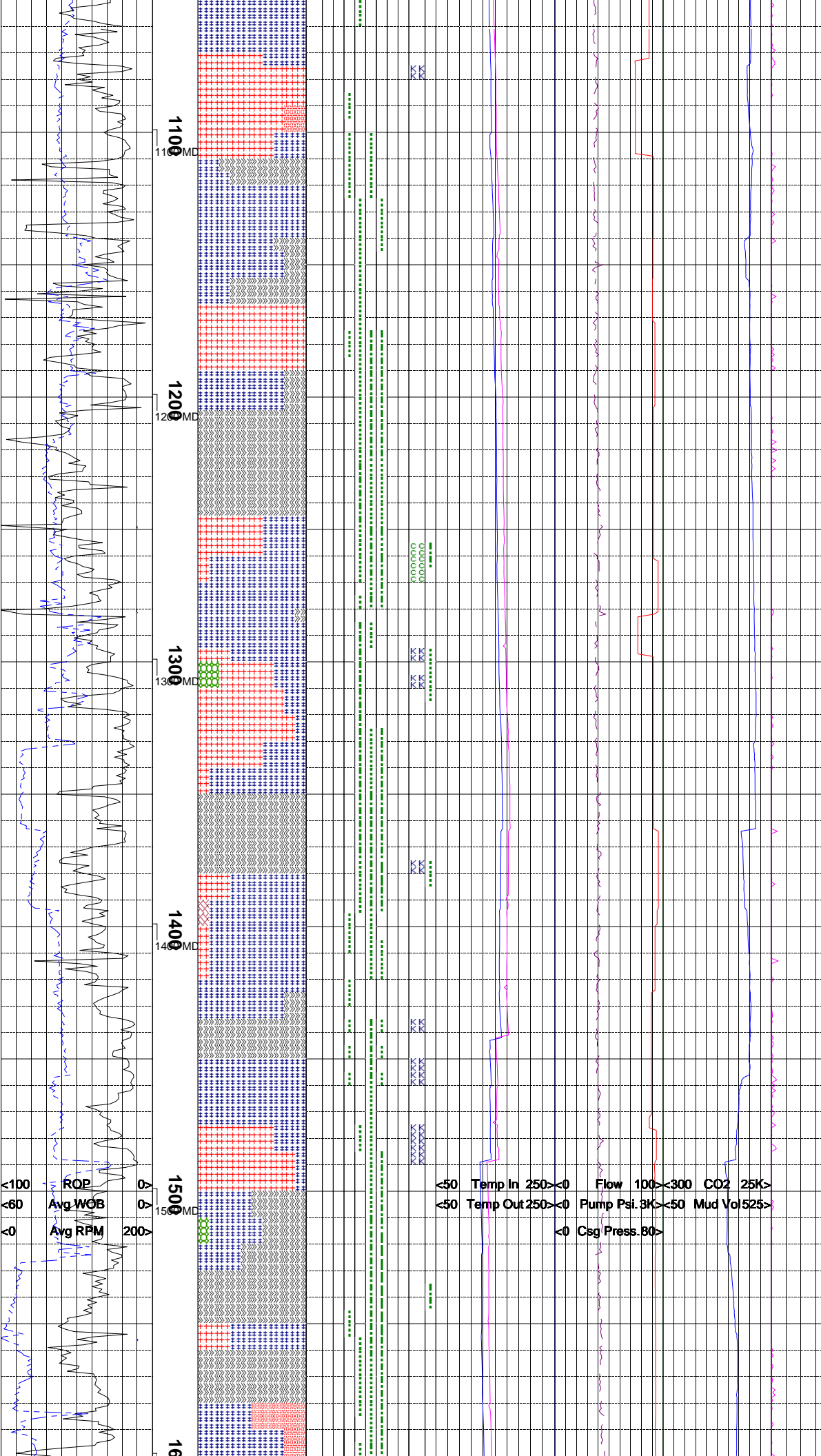
GRANITE = WHT, LT GRY, OPAQUE, SUBTLE PINK-V LT BRN HUES; VRY HRD; CRS TO MED CRS; FELSIC W/QTZ; SCT TO ABDNT ORTHO NON CALC; SCT KAOLIN CLAYS; V-TR INSITU BLK MAFICS; VRY FNT; PORPH TEX; LACKING ANY SIGNIFCNT STN OR ANY OTHER ALTRD INDICTR, CLEAN; NON ALTRD.

DIORITE = BLK, GRNISH BLK, LT GRY-PRDM BLK, VRY HARD; VRY CRS; OCC >10mm SIZE CTNGS; COM HRNBLD; COM PORPHYRY TEX; SBTLE MERGE ASSOC W/GABBRO INTRUSIV V HD; MED-OCC CRS OPHIR TEX GRAPHIC FSPR, QTZ+MED HNDBLD+MAFC; NON CALC; TR HEM STN, CLEAN, NON ALTRD; SLI INCR IN PLAG RICH GRANODRIT+WEATHERD/SIMI OXIDZD QTZ DIORITE.

LOST 52 BBLS @ 1015', PARTIAL RETURNS, REGAIN FULL RETRNS,BEGIN LCM SWEEPS

SURVEY @ 1000', 0.2 DEG, 63.8 AZI.

QUARTZ DIORITE = DRK GRY-WHT, SPECKLD W/DRK BLK MAFICS; PHAN W/COM PORPH TEX; VRY HRD-HRD; V CRS-CRS; COM-VRY



OPAQUE, SMOKEY GRAY FELSIC DIKE MAT;
VIS YELSH ORNG OXID STNS; FELSIC W/SCT
QTZ; HEM STRKS+HEM STRKS ON K-MAT;
LSE SCT FRIABLE, SLI ALTRD KAOLIN MAT;
NON CALC; DOM CLEAN, NON ALTRD.

GRANODIORITE = TRANSLU-TRANSPRT; LT
GRY, CLR-OPAQUE; SLI YELISH HUE; POSS
HEM STNS; V HRD; V CRS; LARGE >8mm
SIZE CUTTINGS; COM PLAG/FSPR, FELSIC
W/>15% QTZ; UNIFORM, APHANTC TEX; TR
SILIC DIKE FRAG; NON CALC, NON ALTRD.
TR DRK BLK DIORITE FRAG @ 1115'. OCC
GRANDORT FRAG W/OXIDTN STN.

QUARTZ DIORITE = DRK GRY-TRNSLU GRY;
BLK TO WHT-LT GRY; VRY HRD; CRS; NON
CALC; PORPHRTC TEX; HRNBLD; MICA; TR
KAOLIN; TR WEATHRD PYRIT; VIS HEM STN;
COM PLAG, FELSIC W/>20% QTZ; FNT GRN-
ISH HUE ON DIORITE; OVRL NON ALTRD.

QUARTZ DIORITE = V DRK GRY-BLK, TRNSLU
GRY-SLI OPQE; VRY HRD; MOD CRS; NO
CALC RXN; OCC VIS HRNBLD; ABUN MICA;
RR LOCALZD PYRITE; OCC VIS HEM STN;
COM EPID, OCC VIS VEIN-LIKE STRCTR; SLI
CHLORTZTN; FELSIC W/>20% QTZ; OCC VIS
YELISH-ORNGE STN, POSS OXIDATION.

SURVEY @ 1245', 0.28 DEG, 22.5 AZI.

GRANODIORITE = TRNSL-CLDY SLI PINKISH
WHT, OFF-WHT; HARD-SLI BRITTLE CTGS;
COM PLAG, FELDSPAR; APHANTIC TEX; NO
ALTRN; NO CALC RXN; TR FELSIC DIKE FRAG;
LITH ALTERNATING BETWEEN GRANO-
DIORITE AND QTZ DIORITE.

GRANODIORITE = DOM OPQE-CLDY WHT TO
OFF-WHT; HARD-BRITTLE; CTGS HABIT IS
BLADED, SHARP, V ANGLR; MICRO MICAS
VIS, OCC FOLIATED; MOD CRS GRND; COM
YELLISH-ORNGE STN, POSS OXIDZTN; TR
EPID, HEMA; POSS KAOLINITIC ALTRN,
RESULTING IN MOD SOFT-FRIABLE CTGS;
TR FELSIC DIKE FRAGMENTS.

NOTE: TEMP IN/OUT SENSOR MALFUNCTION
FROM 1200'-1440'; SENSORS RECALIBRATED.

QUARTZ DIORITE = DRK GRY-BLK, PEPPRD
W/DRK BLK MAFICS; PHAN W/COM PORPH
TEX; VRY HRD; V CRS-UPPR FN; >20% QTZ;
VIS ORNGE OXIDTN STAINS; FELSIC W/SCT
QTZ; HEM STRKS+HEM STRKS ON K-MAT;
SCAT FRIABLE, SLI ALTRD KAOLINTC MAT;
NON CALC; DOM CLEAN, NON ALTRD.

QUARTZ DIORITE = DOM BLK-V DRK GRY,
UNCOM WHT-OPQE SPECKS; V HRD; CRS
TO MOD FN GRNS; OCC VIS HRNBLNDE,
SLI FRIABLE PYRITE; SLI CHLOR ALTRN;
TR HEM+STRKS, EPID; OCC VIS YELLISH-
ORNGE STAIN, POSS OXIDTN; MAFICS W/
>20-10% QTZ.

DIORITE = DRK BLK, OCC DRK GRY W/VIS
V LT GRNISH HUE, OPAQUE-TRANSLU; SCT
LT GRY QTZ DIORITE GRADING; VRY HARD
CRS-FINE, SIMI EQUIGRNLR; OCC FSPAR
PHENO; HYPIDIOMRPHC-GRANULR TEX
LSE KAOLN, W/TR HEM STRK; V TR PYRT
V WK MNR CALC; VAG EPID, SLI CHLRD STN
W/VIS CHLRD VNG ON DIORITE FRAG.

SURVEY @ 1466', 0.53 DEG, 49.8 AZI.

POOH @ 1488', CHANGE BIT, ADD MWD TOOL.

GRANODIORITE = LT-MED DRK GRY, OPQE,
SLI TRNSL W/ OCC BLK SPECKS; HRD-SLI
BRITTLE; CRS-MED CRS GRND; SLI TR
YELLISH ORNGE HUE ON CTGS, POSS OXID;
SLI KAOLINITIC ALTRN, TR FRIABLE KAOL;
COM PLAG, FSPAR W/ ~40% QTZ; NO CALC.

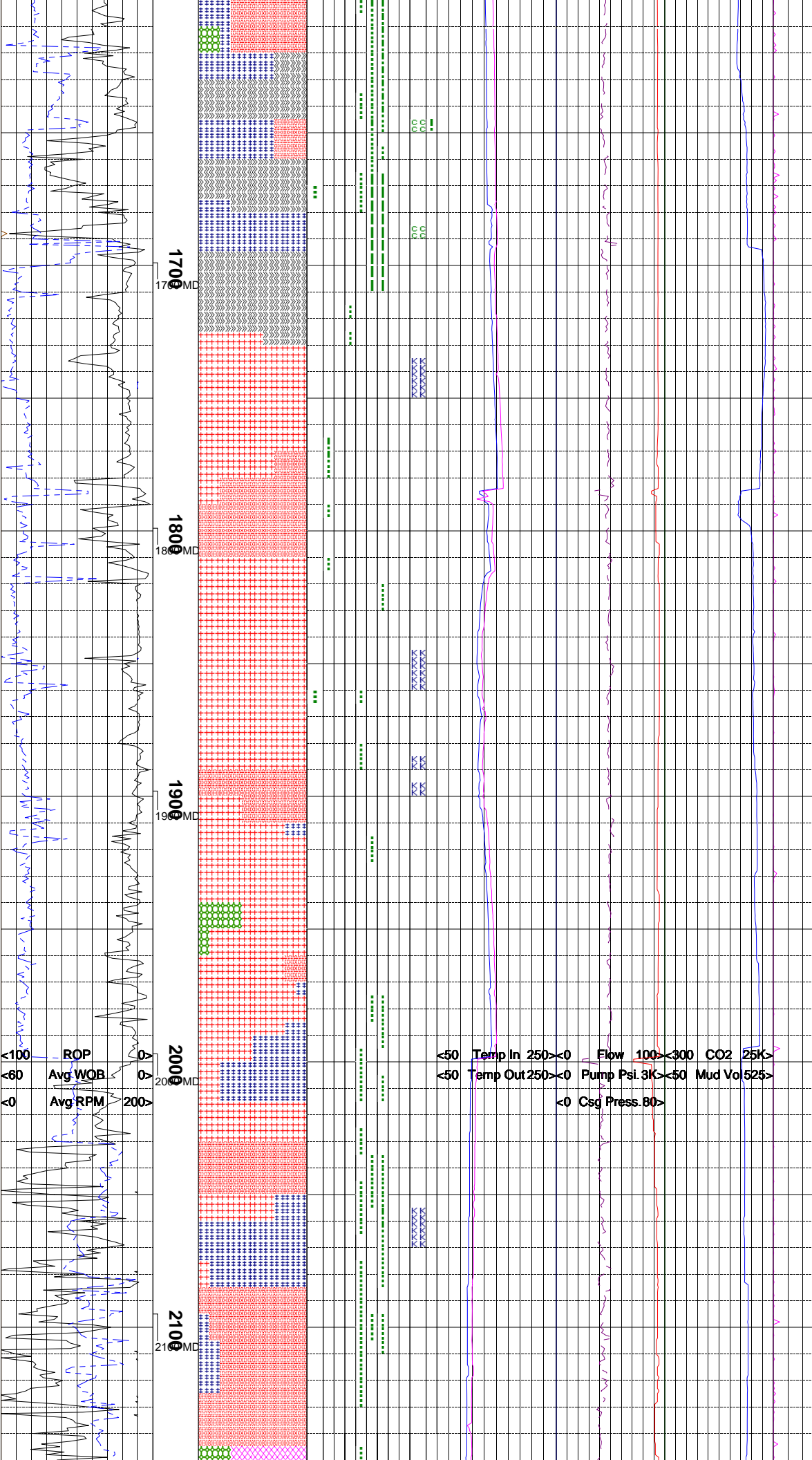
DIORITE = DOM BLK-V DRK GRY, OCC GRY
SMOKEY TRNSL; V HRD; MOD FN-SLI CRS
GRND; MAFIC+MICA; MOD ALTRN, LOCAL-
IZED GRNISH HUES; VIS EPID, OCC VIS
YELLISH ORNGE HUES ON CTGS SURFACE,
POSS OXID; NO CALC; NO VIS HEM+STRKS.

SURVEY @ 1562', 1.5 DEG, 85.5 AZI.

TVD 1561.91', 7.88' N, 6.5' W.

MW 8.7 VIS 48 PV 6 YP 22 PH 10 CL 5500
GEL 15/24 SOL 3.30 Pf/Mf .3/6 SD .10

GRANITE = DOM LT PINK, LT GRY-OFF WHT,
OCC DRK GRY SPECKS; V HRD; CRS TO MOD
CRS; PORPH TEXTRE; COM VIS ORTHO
TR KAOLINITE IN SAMPLE; V-TR INSITU BLK



MAFICS; NON CALC; NO CLEAR ALTRN; TR EPID, VIS ON FRAC SFCE; TR FELSIK DIKE.

DIORITE = DOM BLK-V DRK GRY, OCC GRY-SMOKY TRNSL-OPQE, V FAINT BLU/GRN HUE; V HRD; MED CRS-UPPER FN GRND; SLI-MOD ALTRN, CHLORTZN; TR VIS EPID; V WEAK CALC; NO VIS HEM+STRKS; MICAS+MAFICS W/>15% QUARTZ.

DIORITE = BLK, LT-DRK GRY, OPAQUE; SLI DRK GRNSH GRY; DOM DRK BLK; VRY HRD CRS; COM EQUIGRNLR; DOM HYPIDIO-MORPHIC TEX; VARIABLE GRANULR TEX VIS OPAQUE WHT FELDSPR; HRNBLND; <10% QTZ; COM SECNDRY EPIDOTE VEINS; COM GRNISH GRY TO DRK GRN CHLRTAZTN SCT LSE FRIABL KAOLN; NON CALCAREOUS POSS FRAC ZONE; OVRL WKLY ALTRD.

MW 8.7 VIS 52 PV 6 YP 20 PH 11 CL 5000
GEL 13/22 SOL 3.10 Pf/Mf .3/.6 SD .10

SURVEY @ 1721', 3.52 DEG, 102.9 AZI.
TVD 1720.76', 5.57' N, 0.58' E.

GRANODIORITE = WHT LT GRY, PURE WHT TRANSLU W/TRANSPRT EDGES; DOM OPAQUE; VRY HRD; HYPIDIO W/MASS STRUCTR; RR MICROPORPH; UNIFORM; TR MAFICS; RR ALLIED/ EUHDLR PYRITE OVRGWRTH; SIMILIAR WHT GRANITE APPRNC; NON CALC, CLEAN, NON ALTERED.

POOH @ 1785', CHECK TOOLS, P/U NEW MUDMOTOR, RE-RUN BIT#4.

QTZ RICH GRANITIC ROCK = DRK GRY TO LT GRY; SCT LSE WHT SECDRY KAOLIN MAT; VRY HRD, VRY CRS; SCT FSPR, SILICIC, QTZ INCLUSNS >25%; PLAG FSPAR W/MINR-TR LOC GRNSH CHLORTZD STN; RR POIKLTC APPRNC W/CYPTOXLN MICA INCLUSN+TR SECNDRY EPID DEPOS; NON CALC; VRY CLN UNALTERED.

SILICIC DIKE=WHT,CLR, TRANSLU-OPAQUE. V HRD; NON CALC, UNALTERED.

MW 8.8 VIS 62 PV 7 YP 30 PH 10 CL 5500
GEL 17/26 SOL 4.39 Pf/Mf .3/.5 SD .10

SURVEY @ 1847', 6.07 DEG, 098.2 AZI.
TVD 1846.3', 3.82' N, 11.03' E.

GRANODIORITE = WHT, LT GRY; TRANSLU-OPAQUE; V HRD; CRS-MED CRS XLN QTZ; SIMI HYPIDIO; DOM GRANULR W/DRK MAFIC INCLU; FELSIK, APPRS AS WHT GRANITE; NO CHLOR STN; NON CALC; RELC V-FNT INSITU HNBLD; LSE PURE WHT CLAY MINERAL; PREDOM CLEAN APPRNC; SPL UNALTERED.

GRANODIORITE = DOM LT-DRK GRY, OPQE-TRNSLU; V HRD; V CRS-CRS, XLN QTZ; HYPIDIO TEXTR; DRK MAFIC INCLU; DOM FELSIK, RR TR EPID; NON CALC; NO ALTRN; DOM OVERALL CRYPTO-MICROXTALLINE; LT GRY FELSIK DIKE FRAGS; VIS WHT CLAY MINRL.

QUARTZ DIORITE = DRK GRY-BLK, OPQE-TRNSLU; V HRD-HRD; CRS-MED CRS GRND; HYPIDIO TEXTR; BLK MAFICS; RR TR CHLOR, EPID; COM VIS WHT CLAY MINRL; NON CALC.

SURVEY @ 1943', 8.43 DEG, 096.4 AZI.
TVD 1941.53', 2.31' N, 23.03' E.

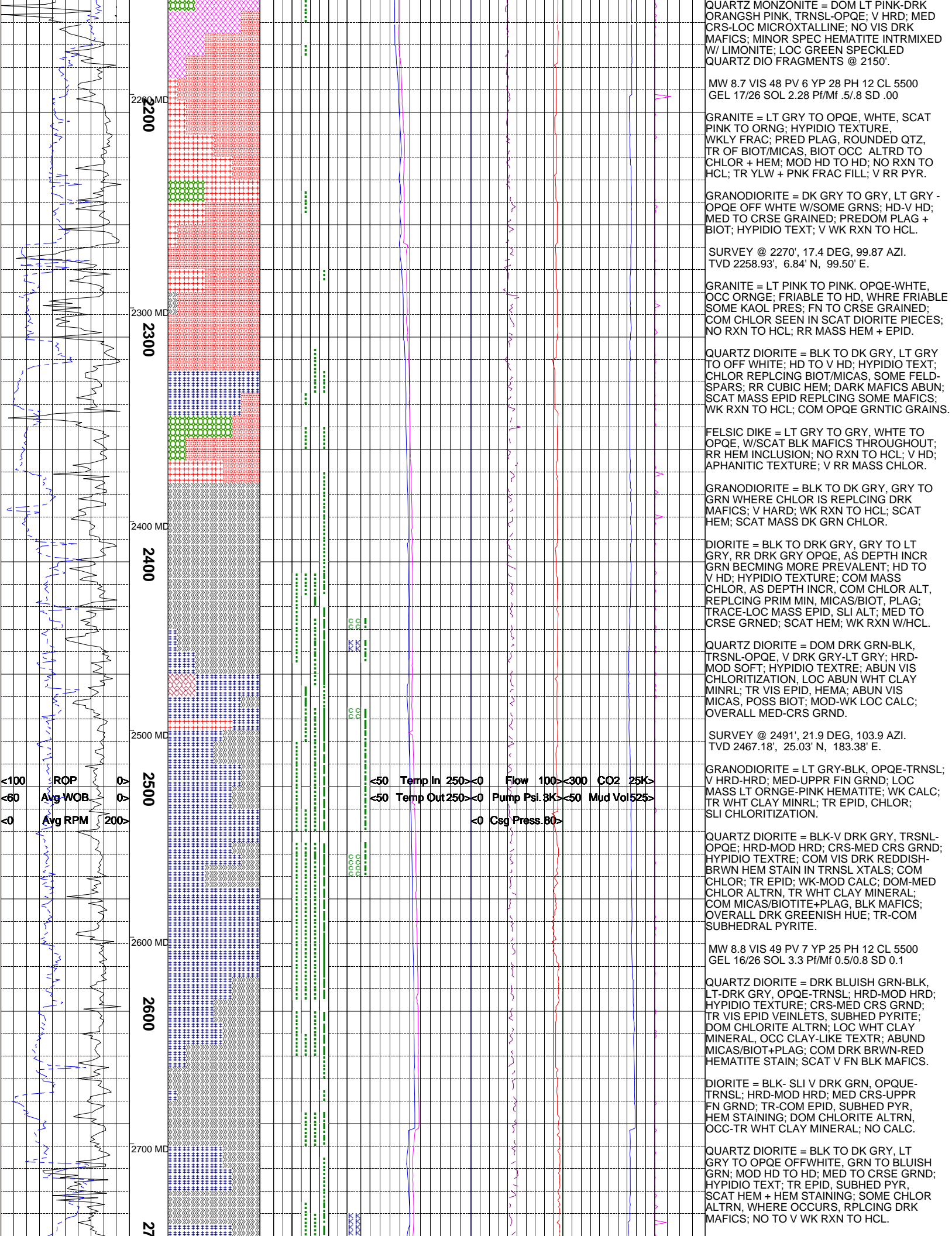
NOTE: DRILL TO 2000', SET 9 5/8" CASING @1995'. REVERSE CIRCULATE CEMENT. TOP OF CEMENT @ 1045'.

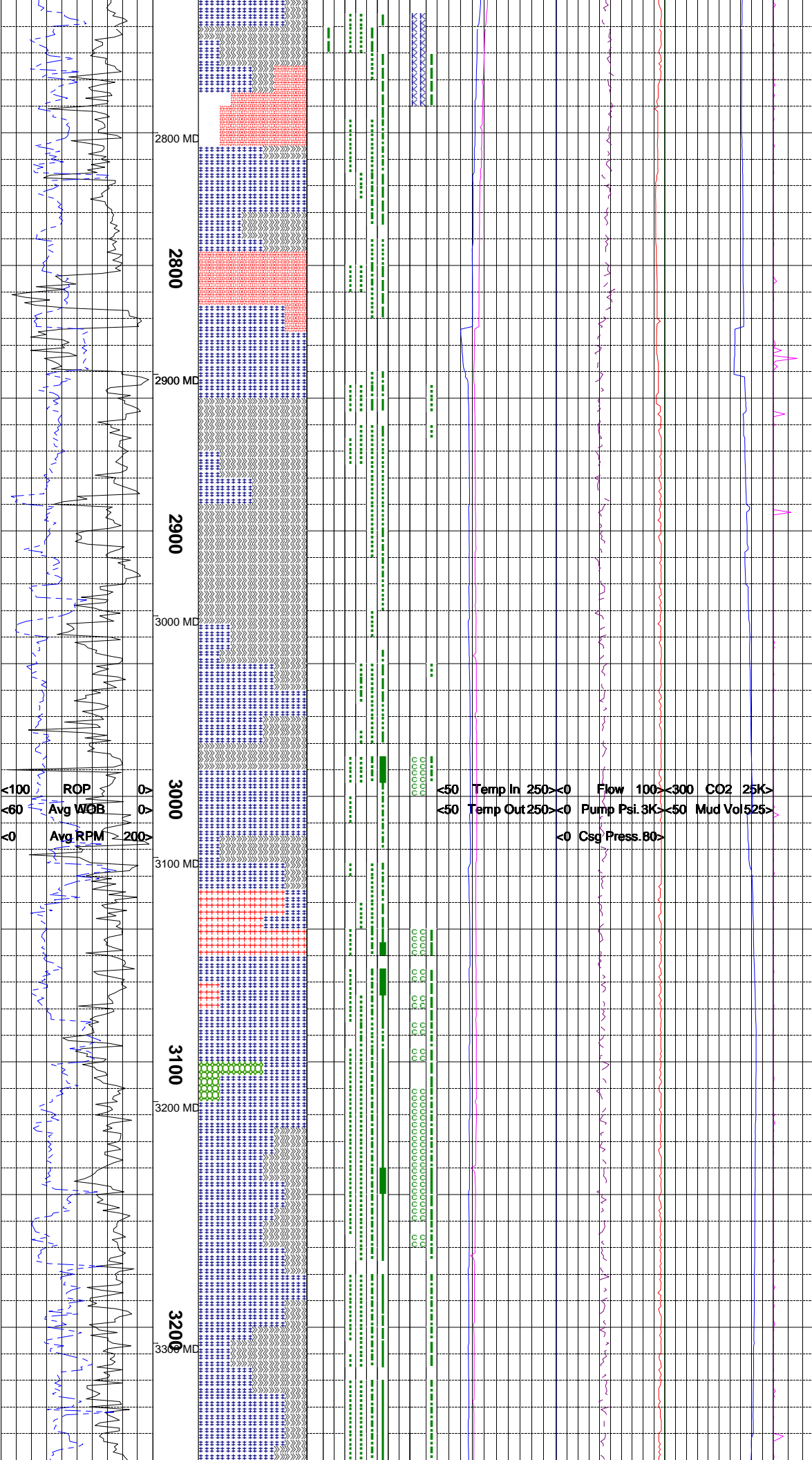
QUARTZ DIORITE = GRY TO LT GRY, BLK TO DRK GRY, OCC SLI GRNISH TINT; MOD HD TO HD; MED TO CRSE GRND; HYPIDIO TEXT; COM BLK MAFICS; V RR TR CALC W V WK RXNS TO HCL; SCAT MASS CHLOR; RR V WEATHRD EPID; RR VIS WHITE CLAY.

GRANITE = PINK TO LT PINK, ORNG TO LT ORNG, TRANSLCT TO WHITE, OCC GRAY; HD TO V HD; MOD TO CRSE GRAINED; HYPIDIO TEXT TO RR V WTHRED SUCR-OSIC TEXT; COM MASS HEM, SCAT HEM VEINLETS; RR YLW-LT GRN EPID; NO RXN TO HCL; SCAT CHLOR, RR ALTRIN PRIM MIN.

QTZ DIORITE = GRYISH BLK TO BLK, CLR TO OFF WHITE, GRYSH; HD TO V HD; SLI BRRTL HYPIDIO TEXT; V RR FN CUBIC HEM CLSTRS, SCAT MASS HEM; RR GRNISH KAOL CLAYS; MASS GRN-BLUE CHLOR; V WK TO NO RXN TO HCL; RR MASS YLW EPID.

GRANITE = DOM LT PINK, LT GRY-OPQE-TRNSLU; V HRD-HDR; CRS GRND; PORPHYRITIC TEXTURE; SCAT BLK MAFICS; TR-ABUNDNT EAS FRIABLE WHT CLAY MINRL; ABUN ORTHOCLASE; V WK CALC; NO ALTRN.





NOTE: BAKER TANK RIGGED UP, ADDING H2O FROM TANK TO LOWER MUD TEMPS.

SURVEY @ 2710', 24.4 DEG, 99.37 AZI.
TVD 2668.38', 42.73' N, 255.56' E.

DIORITE = BLK TO DK GRY, SOME GRAY, GRN TO DRK GRN; HD TO V HD; HYPIDIO TEXTURE; MED TO CRSE GRND; TR TO COM SUBHED/MASS EPID, IS COM WHERE MORE CHLOR ALTRN SEEN; SCAT TO COM CHLOR ALTRN, GRN TO LT GRN, IN SOME CASES REPLCING DARK MAFICS, IN OTHERS REPLCING ALL PRIM MINERALS; SUB EUHED TO MASS HEM COM TO SCAT; KAOL ALTRN OF DRK MAFICS BEGINNING @ 2755'; NO TO V WK RXN TO HCL.

QUARTZ DIORITE = DRK GRY-BLK, GRY-GRN, OPQE-OFF WHT; HRD-MOD HRD; HYPIDIO TEX; MED-CRS GRND; COM CHLOR ALTRN OF DRK MAFICS, GRN-LT GRN; SCAT TO COM MASS YELLOW-GRN EPID; TR TO SCAT SUBHED-EUHEDRAL PYR; MASS HEM+STAINING SCAT; MOD TO V STRONG RXN TO HCL.

GRANITE = LT GRY-OPQE, ORNGE-TAN, OCC OFF WHT; HD TO V HD; V CRS-CRS GRND; HYPIDIO TEXTRE; TR EPID; CHLOR; V WK RXN TO HCL.

NOTE: POOH @ 2875' TO REPLACE BIT.

QUARTZ DIORITE = DRK BLUISH GRN-BLK, OPQE-TRNSL, LT-DRK GRY; UPPR CRS-MED CRS GRND; HYPIDIO TEXTRE; HRD-MOD SOFT; LOC ABUND WHT CLAY MINRL; DOM CHLOR ALTRN, SCNDRY MINRLS REPLCD BY CHLOR; TR EPID, HEM STAIN; COM MICAS+BIOT; NO CALC.

DIORITE = BLK TO DRK GRY, GRY TO OPQE, GRN TO BLUISH GRN, YLW; MOD HD TO V HD; FRIABLE TO HYPIDIO TEXT DEPENDING ON CLAY CONTENT; MED TO CRSE GRND; COM GRNISH KAOL CLAYS ALTRING FRMTN; COM TO SCAT YLW/GRN CHLOR/EPID ALTRN REPLCING DRK MAFICS, SOME SUBHED EPID; OCC EUHED PYR, RR MASS PYR; SCAT MASS HEM; MOD TO V STRNG RXN W/HCL.

SURVEY @ 2940', 23.9 DEG, 105.3 AZI.
TVD 2878.05', 61.46' N, 348.21' E.

MW 8.7 VIS 52 PV 7 YP 26 PH 11 CL 5500
GEL 14/23 SOL 2.3 Pf/Mf 0.4/0.8 SD 0.1

DIORITE = BLK TO DRK GRY; HD TO V HD; HYPIDIO TEXT, FRIABLE WHERE CLAYS PRES; CRSE GRAINED; CHLOR ALTRN STRENGTH VARIES, SCAT TO COM RPLCING DRK MAFICS; WK TO STRNG RXN TO HCL, DEP ON CLAY CONT; SCAT EPID, HEM.

WHITE DIKE MATERIAL = WHITE, OCC VIS V FN DRK GREEN-BRWN SPECKS; FIRM-MOD SOFT, V FRIABLE; WK CALC; OCC VIS CLEAR MICROVEINS, POSS CALC; COM CLAY-LIKE TEXTURE; OCC VIS ALTRN, DRK-LT GREEN, POSS CHLORITIZATION.

SURVEY @ 3226', 24.3 DEG, 101.6 AZI.
TVD 3138.65', 83.76' N, 463.78' E.

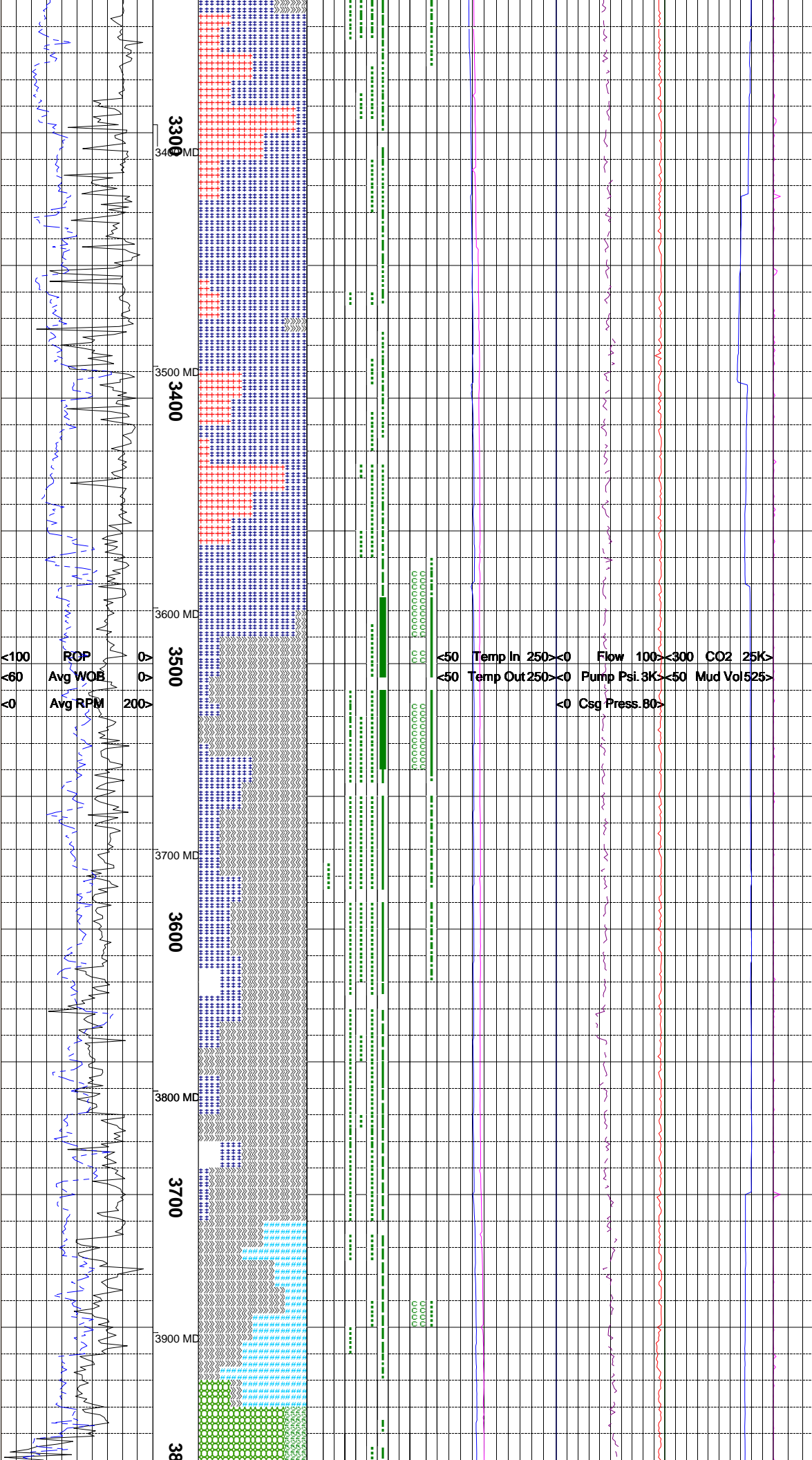
QUARTZ DIORITE = DOM DRK BLUISH GRN, BLK, OPQE-TRNSLU GRY, WHT; HRD-MOD SOFT; MINIML CLAY CONTENT; MED CRS-UPPR FN GRND; HYPIDIO-SLI PORPHYR TEXTRE; STRONG-MOD CALC, COM VIS WHT-TRNSL CALC XTALS, HRD-FRIABLE, VIS VEINLETS; STRONG-MOD CHLOR ALTRN; COM EPID, VIS EUHED XTALS, IN SITU ALONG PLANES; VIS TWINNING/FOLIATIONS IN CHLOR THROUGHOUT SAMPLE.

MW 9.0 VIS 46 PV 8 YP 26 PH 11 CL 5500
GEL 15/22 SOL 4.8 Pf/Mf 0.4/0.7 SD 0.1

QUARTZ DIORITE = DOM BLK, DRK BLUISH-GREEN, OPQE-SMOKY TRNSL; HRD TO MOD HRD; CRS-MED CRS GRND; HYPIDIO TEXTRE; COM EPID, VIS VEINLETS, EUHED-SUBHED; TR VIS CALC, DIMINISHES F/ 3340', STRNG-MOD RXN W/ HCL; STRONG-MOD CHLOR ALTRN, COM VIS TWINNING/FOLIATIONS IN CHLOR; TR PYR, HEM+STAINS, MICA/BIOT; TR-COM WHT MINERAL, FRIABLE, STRONG CALC RXN, MICROXTALLINE, POSS RHYOLITIC DIKE MAT'L.

GRANODIORITE = MED-LT GRY, OFF WHITE, OCC GRN; FIRM TO HD, FRIABLE WHERE WHT CLAY MINERAL PRES; HYPIDIO TEXT; HCL REACTS WELL W/PLAGS; SLI ALTRD BIOT/MICAS FROM CHLOR; MED TO CRSE GRND; SCAT EPID RPLCING DRK MAFICS; COM FOLIATIONS/SLICKENLINES IN CHLOR ALTRD PIECES; RR PYR, HEM + HEM STAINS.

QUARTZ DIORITE = DOM BLK TO DRK GRY,



LT GRY TO WHT, DRK BLUSH-GRN, OPQE-SMOKY; FIRM TO HD; CRSE GRNED; HYPIDIO TEXT; SCAT EPID REPLCING MICAS; SCAT FOLIATIONS, DOM ON PLAG/WHT MINERAL, MOST LIKELY CLAYS FROM RHYOLITIC DIKE; WK RXN TO HCL, EXCEPT WHERE WHT MIN PRES; V RR PYR, HEM + HEM STAINING.

SURVEY @ 3479', 24.2 DEG, 101.9 AZI.
TVD 3369.35', 106.1' N, 565.21' E.

GRANODIORITE = WHITE TO OFFWHITE/OPQE OCC LT GRY TO GRY; MOD HD TO HD, FRIABL WHERE WHT MIN/CLAYS PRES; FIN TO MED GRNED; HYPIDIO TEXT; WHT CLAY MIN STILL PRES, REPLCING DRK MAFICS + OTHR PRIMARY MINERALS AS WELL; FOLIATIONS MORE COM IN THE GRANODIORITE VS DIORITE/QTZ DIOR; RR HEM STAINING, MASS EPID; STRNG RXN TO HCL; CHLOR ALTRN STRNG-MOD, SCAT TO COM, GRN TO YLW.

QTZ DIORITE = LT GRY TO GRY, DRK GRY TO BLK, BLUISH TO SMOKEY OPQE; HD TO V HD; CRSE GRNED; HYPIDIO TEXT; SCAT SLICKENLINES/FOLIATIONS; RR HEM STAINING, MASS EPID; RR EUHED PYR; WK RXN W/HCL EXCPT WHR WHITE CLAYS ARE PRES; CHLOR ALTRN COM, WK TO MOD, GRN TO YLW.

QTZ DIORITE = GRN TO DRK GRN, BLK; MOD HD TO HD; HYPIDIO TEXT; COM TWINNING, SLICKENSIDES, FOLIATIONS, V STRNG CHLOR ALTRN; WK-NO CALC; MED TO CRSE GRND; TR EPID, SUBHED-ANHED PYR, MICA/BIOT.

DIORITE = DOM LT-DRK BLUISH GREEN, BLK, OCC OPQE-SMOKY TRNSL; HRD-MOD SOFT; HYPIDIO TO SLI PORHPYR TEXTRE; V STRONG CHLOR ALTRN, VIS TWINNING, SLICKENSIDES/FOLIATIONS; WK-NO CALC; CRS-MED CRS GRND; TR EPID, SUBHED-ANHED PYR, ALTRD HORNBLNDE; MOD SOFT-FRIABLE CLAY COMPOSITION, POSS RHYOLITIC DIKE MAT'L.

SURVEY @ 3669', 24.4 DEG, 103.5 AZI.
TVD 3542.31', 122.7' N, 642.05' E.

DIORITE = DOM BLK, DRK BLUISH-GREEN, OPQE-SMOKY TRNSL; HRD-MOD HRD; CRS-MOD CRS GRND; HYPIDIO TEXTRE; RR TR EUHED QUARTZ XTALS; TR EPID, VIS VEINLETS; TR-COM SUBHED-EUHED PYR; WK-MOD CALC; V STRONG-MOD CHLOR ALTRN, VIS TWINNING/SLICKENSIDES ON SURFACE OF CTGS; TR HORNBLNDE; WHT-LT GRN CLAY CONTENT INCRSNG W/ DPTH F/ 3720'.

CLAY/DIKE MINERAL = DOM LT GRYISH BLUE/GREEN, OFF WHT; CLAY-LIKE TEX-CONSISTENCY; MOD-STRONG CALC; SOFT-FRIABLE; OCC VIS WHT LAMINATIONS/VEINLETS, POSS CALCAREOUS; APPARENT IN SITU CHLOR, FN BLK MFICS.

MW 9.2 VIS 51 PV 9 YP 26 PH 11 CL 5500
GEL 16/22 SOL 6.3 P/Mf 0.4/0.7 SD 0.1

DIORITE = DOM BLK, DRK BLUISH-GREEN HUES, SMOKY TRNSL-OPQE; HRD-MOD SOFT; HYPIDIO TEXTRE; UPPR CRS-MOD CRS GRND; STRONG-MOD CHLOR ALTRN, VIS TWINNING/SLICKENSIDES, OCC LT-TEAL COLOR IN SAMPLE; STRNG-MOD CALC, OCC VIS SOFT CALC MARL, OCC VIS MOD-HRD WHT-TRNSL MICROXTALLINE CALC; TR-COM SUBHED-EUHED EPID, SUBHED-ANHED PYR; TR-RR HEM+STAIN; TR HORNBLNDE, MICA/BIOT; ABUND CLAY COMPOSITION UNTIL 3840'.

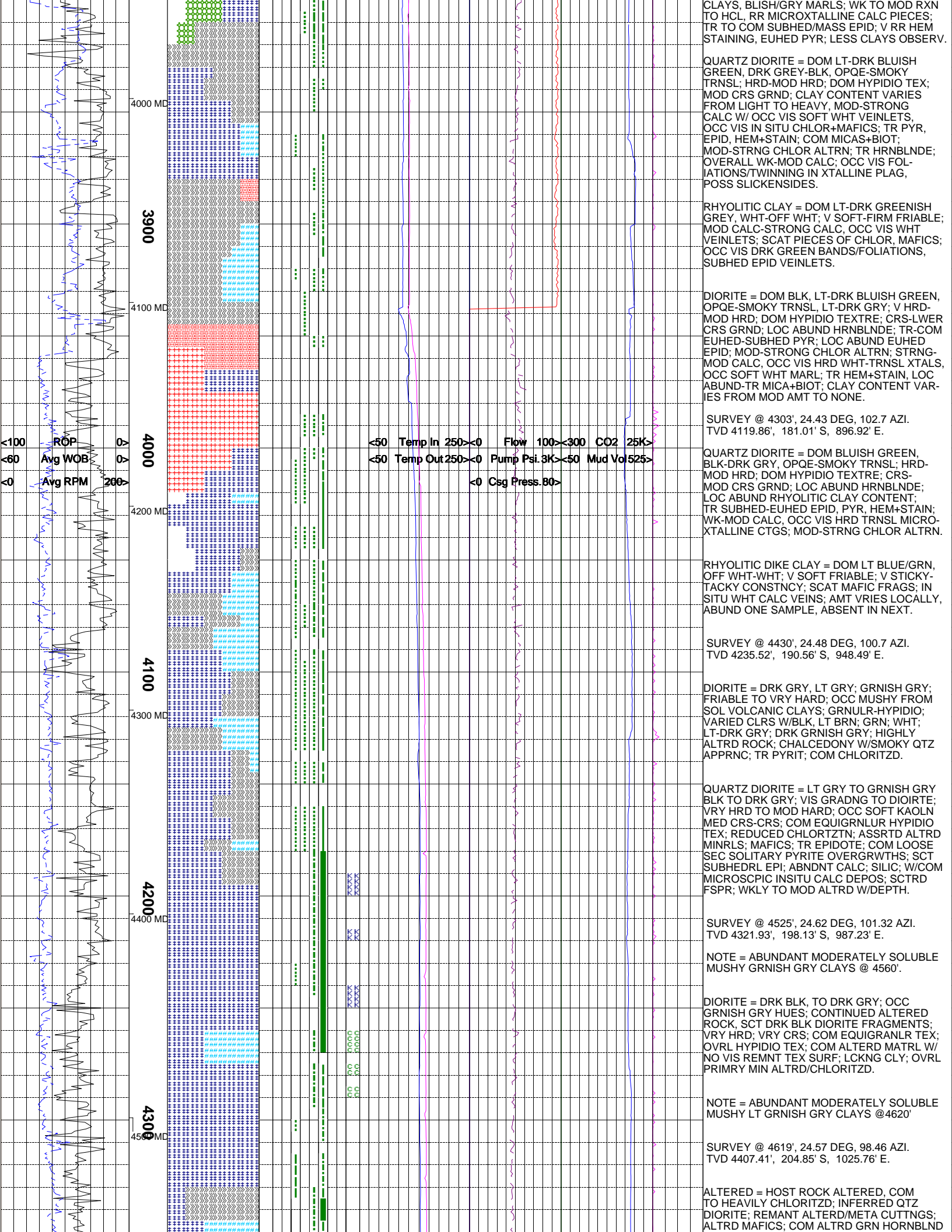
HORNBLNDE DIORITE = DOM BLK, DRK OCC DRK BLUISH GREEN, SMOKY TRNSL; HRD-MOD HRD; V CRS-MOD CRS; DOM HYPIDIO TEXTRE, OCC SLI PORHPYR; WK-MOD CALC, OCC VIS WHT XTALS/VEINLETS; TR EUHED EPID+VEINLETS, SUBHED PYR; V LITTLE TO NO CLAY COMPOSITION.

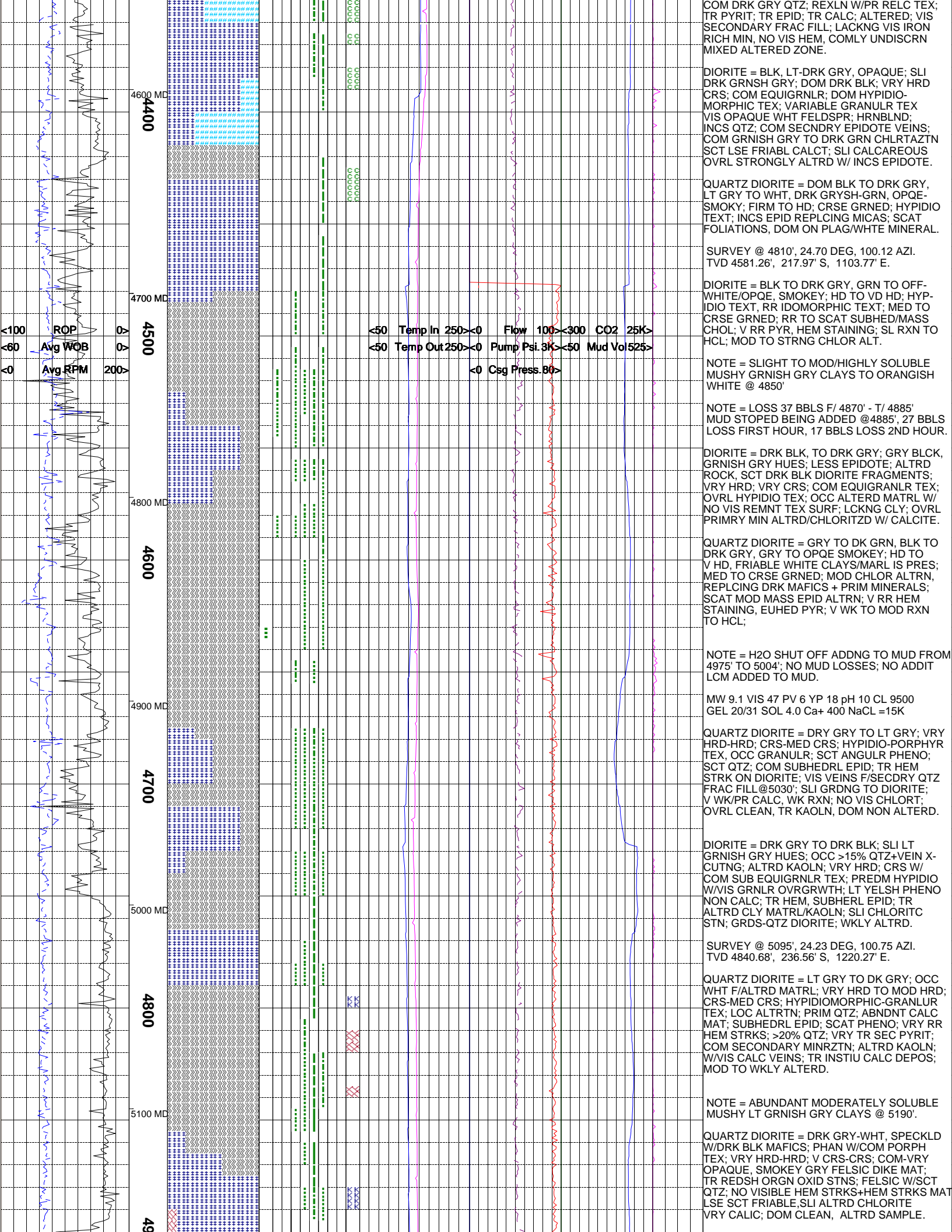
SURVEY @ 3859', 24.2 DEG, 103.6 AZI.
TVD 3715.44', 146.9' N, 743.01' E.

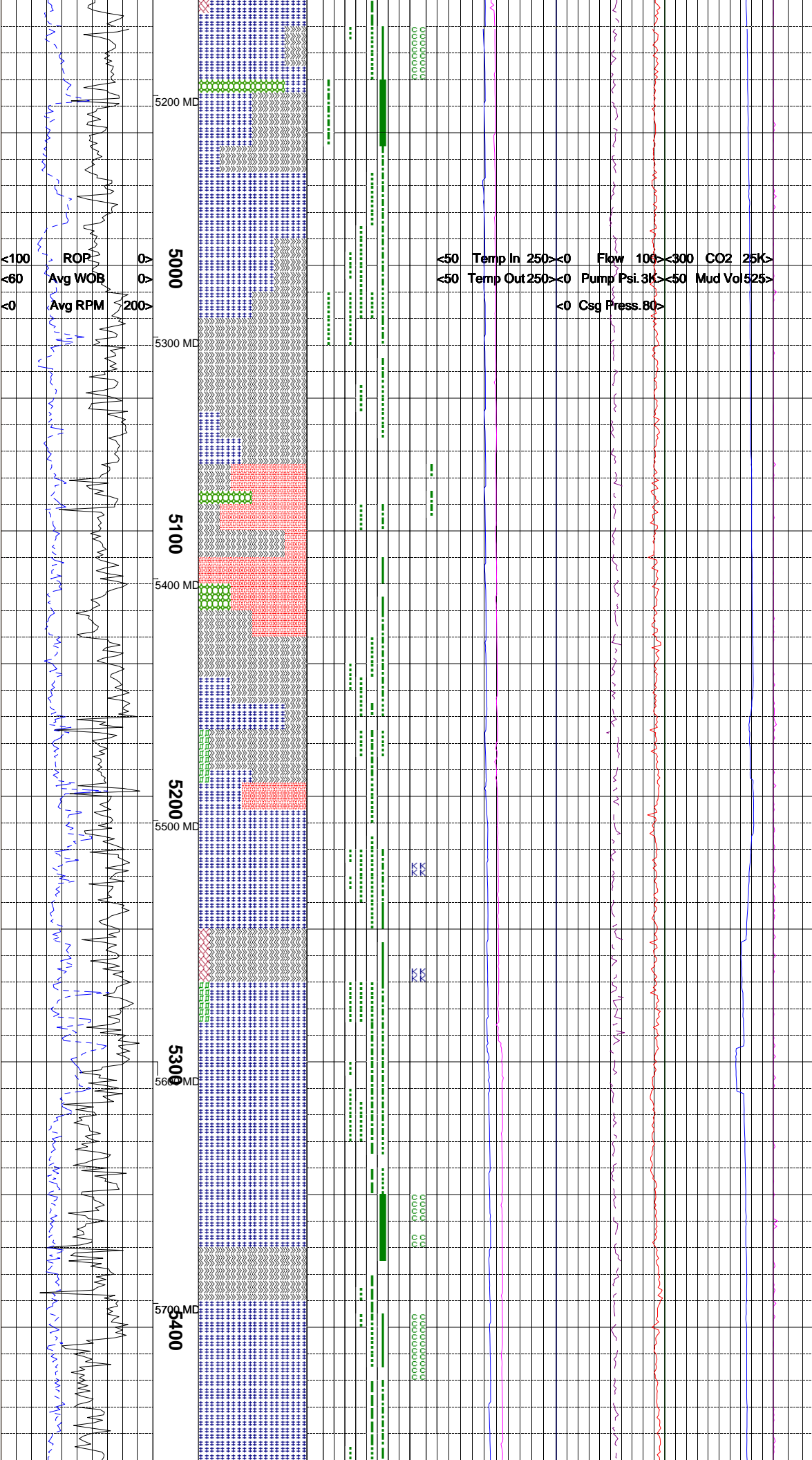
HORNBLNDE DIORITE = BLK TO DRK GRY; HD TO V HD; DOM HYPIDIO TEXT, SOME ALLOTRIO TEXT; MED TO CRSE GRNED; CHLOR ALTRN MOD TO STRNG, NOT AFFECTING HRNBLND AS MUCH AS DRK MAFICS; GRN/WHT CLAY MIN STILL PRES, LIKELY FROM RHYOLITIC DIKES; RR EPID, HEM, AND EUHED PYR; WK RXN TO HCL.

SIL DIKE = WHITE TO OPQE SMOKEY, TAN TO LT GRY; MOD HD TO HD; ALLOTRIO TEXT; FINE TO MED GRNED; NO CHLOR ALTRN, NO CLAYS; V WK RXN TO HCL.

DIORITE = BLK TO DRK GRY, GRN TO DK GRN OCC GRY, SMKEY TRANS/OPQE; MOD CHLOR ALTRN, OCC SLICKENLINES, ASSOC W/WHT







QUARTZ DIORITE = LT-MED DRK GRY; V HRD-MOD HARD; OCC FRIABLE F/SECDRNY KAOLN MINRLZATN; HYPIDIO TEX; GRANLR COM-TR EPID; VIS CALC DEPOS; TR HEM SIMI PORPHYRITIC F/FUSED FELSICS; >20% QTZ; REDUCD YELSH GRN PHENO; VARIED LT-HVY CALC RXN; WKLY ALTRD PREDOM CLEAN-UN ALTERD.

GRANITE = PINKISH-WHT; OPAQUE, LT VRY HRD; MED CRS-CRS, FELSIC W/ COM QTZ; UNIFORM TEX; TR REMNT POR PHY TEX; NON CALC; PR ACCES MIN ASSEMBLG; NON ALTERED; POSS TRANS F/INTERMED COUNTRY ROCK.

NOTE = LOST 25 BBLs F/5531'-5549' LOSS RATE APPROX 20+ BBLs/HR; TURN OFF WATER AND MONITOR ANY FURTHER LOSSES. "NO LOSSES"

QUARTZ DIORITE = LT GRY TO DRK BLK; VRY HRD; MED CRS-CRS; COM QTZ; VIS SECDRY RXLN CALCITE W/TR HEM; TR EPID; CHLRITC STNS; WKLY ALTRD.

POOH @ 5592', FOR NEW BIT.

QUARTZ DIORITE = DRK GRY TO LT GRY; COMLY SPECKLED W/DRK BLK MAFICS; SUBTLE GRNISH TINT; OFF WHT KAOLN; VRY HRD; CRS TO MED CRS; HYPIDIO-MORPHIC-GRANLUR TEX; CALC VEINS W/ HEM FILL; SCT SUBHEDRL PYRITE; OCC LSE SOLITARY EUHDLR PYRITE CHIP; SCT HORNBND; COM QTZ W/FSPRS; YLISH PHENO; SLI CHLORTZD STNS; WK-NON ALTERD.

SURVEY @ 5664', 24.22 DEG, 101.74 AZI. TVD 5358.76', 284.76' S, 1450.54' E.

QUARTZ DIORITE = DRK GRY TO LT GRY; BLK, SCT WHT KAOLN STRKS; UNIFRM; VRY HRD-HRD; MED CRS; EQUIGRNULR; QTZ+BIOT+HRNBND; DOM HYPIDIOMORPHIC TEX DECRS CHLORITC STN W/DEPTH; PHENO; COM SPECKLD W/DRK BLK MAFICS; COM QTZ, FELSIC; REMANT EPID VEINS W/HEM FILL; EUHED EPID; ANHED QTZ INCLU; DOM NON ALTERD; TR WKLY ALTRD FRAGMNTS.

QUARTZ DIORITE = REPEAT LITHOLGY; CONTINUED WKLY ATLTRD CUTTNGS; COMLY SPECKLED W/DRK BLK MAFICS; SUBTLE GRNISH TINT; OFF WHT KAOLN; VRY HRD; CRS TO MED CRS; HYPIDIO-MORPHIC-GRANLUR TEX; BIOT+QTZ+HRD-BLEND; SCT SUBHEDRL EPIDOTE; OCC LSE SOLITARY EUHDLR PYRITE CHIP; WK-NON ALTERD.

DIORITE = DRK BLK TO GRNISH BLK; OCC LT GRY-DRK GRY; ALTERD W/REMENT TEX; MOD HRD-FRIABLE; VRY HRD-HRD; FSPR PHENO; LOC META; REMANT TEX SURF; HVY CHLORTZD; TR FIBROUS APPRNC SURFS; GRDS TO QTZ DIORITE; COM QTZ+BIOT+HRNBND; TR HEM; TR PYRIT; V WK CALC; MOD-WKLY ALTERD.

SURVEY @ 5855', 24.43 DEG, 101.33 AZI. TVD 5532.60', 300.92' S, 1527.98' E.

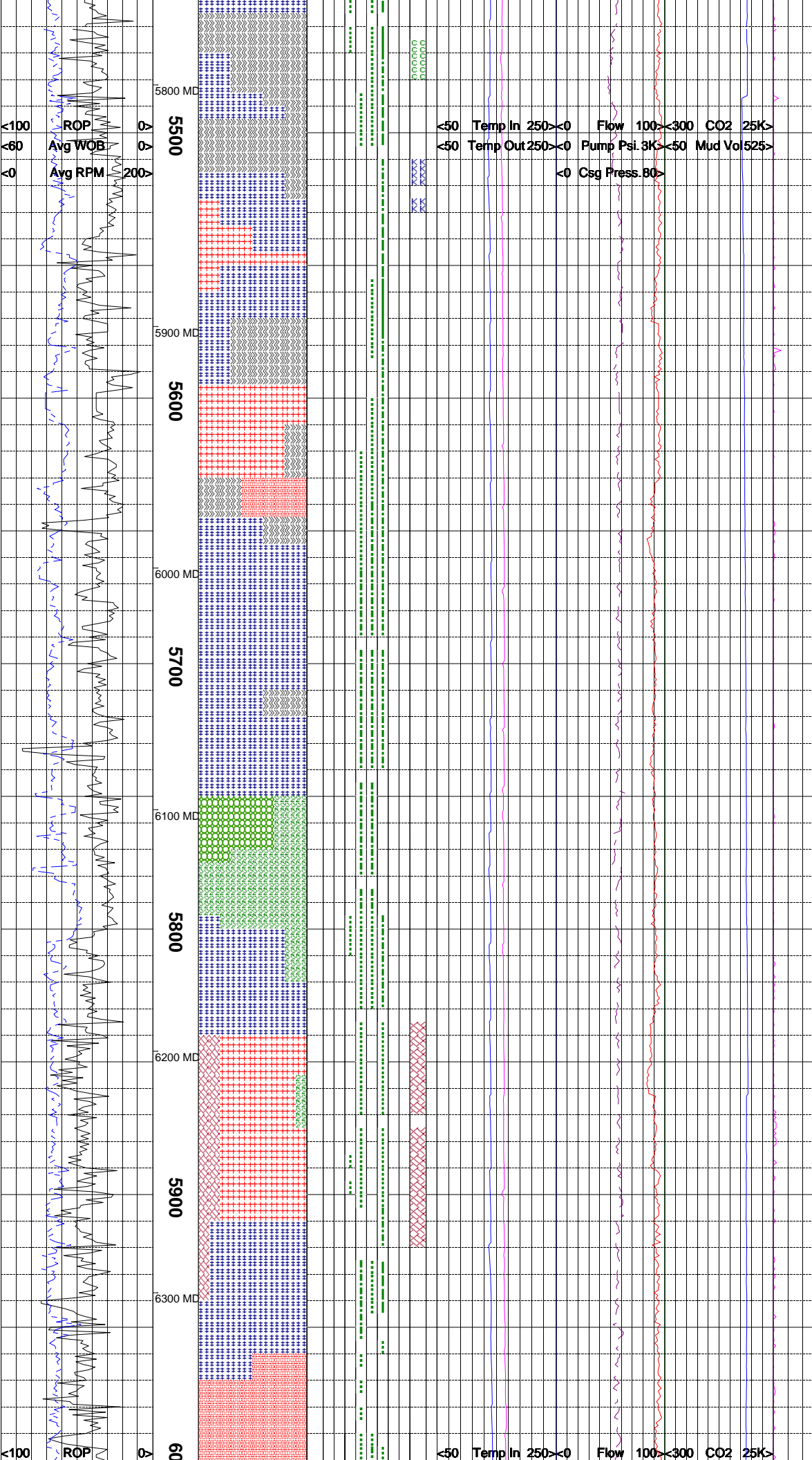
MW 9.0 FV 42 PV 5 YP 15 Gels 14/25 FC 2.0 Sol Sd .10 pH 10.2 CL-9500

GRANODIORITE = WHT-GRNSH GRY; OPAQUE-OFF WHT; COMLY SPECKLD W/BLK MFCS; HRD-VRY HRD; CRS; PORPHY; CHLORTZD ABUNDNT FRAC FILL CALCITE, BIOT+DECRS HRNBND, WKLY ALTERD.

DIORITE = BLACK TO LT-DRK BLUISH GREEN, OPQE-SMOKY TRNSL, LT-DRK GRY; V HRD-MOD HRD; DOM HYPIDIO TEXTRE; CRS-LWER CRS GRND; TRC ABUND HRNBND; TR-COM EUHED-SUBHED CHL; NO VIS ALTERATION EPID; MOD-STRONG CHLOR ALTRN; STRNG-MOD CALC, OCC VIS HRD WHT-TRNSL XTALS, OCC SOFT WHT MARL; TR CHL+STAIN, LOC ABUND-TR MICA+BIOT.

GRANODIORITE = WHT LT GRY, PURE WHT TRANSLU W/TRANSPRT EDGES; DOM OPAQUE; VRY HRD; HYPIDIO W/MASS STRUCTR; RR MICROPORPH; UNIFORM; TR MAFICS; RR ALLIED/ EUHDLR PYRITE OVRGWRTH; SIMILIAR WHT GRANITE APPRNC; VRY CALC.

GRANITE = WHT, LT GRY, OPAQUE, SUBTLE PINK-V LT ORNG HUES; V HRD; CRS TO MED CRS; FELSIC W/QTZ; SCT TO ABNDNT ORTHO SLI CALCAREOUS; TRC GRAY CLAYS; V-TR INSITU BLK MAFICS; VRY FNT; PORPH TEX; STRONG ALTRD INDICTR; COM ALTRD



EPID; TR HEM STNS INCLS.

SURVEY @ 5983', 24.70 DEG, 102.74 AZI.
TVD 5649.02', 312.02' S, 1580.02' E.

GRANODIORITE = WHITE TO OFFWHITE/OPQUE
OCC LT GRY TO GRY; MOD HD-HD, FRIABL
WHERE WHT MIN/CLAYS PRES; FIN TO MED
GRN; HYPIDIO TEXT; WHT TO PNK CLAY MIN
STILL PRES, LACK DRK MINERAL; TR HEM OR
OTHR PRIMARY MINERALS AS WELL; FOLIAT-
IONS; RR HEM STNING, SOL CLAY MINERLS;
OCC CHLOR; STRNG RXN TO HCL; CHLOR ALTR
STRNG-MOD, SCAT TO COM.

SURVEY @ 6238', 24.53 DEG, 101.66 AZI.
TVD 5881.23', 333.74' S, 1683.13' E.

GRANODIORITE = OVRAL REPEAT LITHOLGY;
CONT WKLY ATLTRD CUTTINGS; FRIABLE;
COMLY SPECKLED W/DRK BLK MAFICS; OCC
SUBTLE PINKSH TINT; OFF WHT KAOLN CLAYS;
TR TO RR HEM STAINING, SOL CLAY MINERLS;
OCC CHLOR; STRNG RXN W/HCL; CHLOR ALTR
STRNG-MOD, SCAT TO COM.

SURVEY @ 6238', 24.53 DEG, 101.66 AZI.
TVD 5881.23', 333.74' S, 1683.13' E.

GRANODIORITE = OVRAL REPEAT LITHOLGY;
CONT WKLY ATLTRD CUTTINGS; FRIABLE;
COMLY SPECKLED W/DRK BLK MAFICS; OCC
SUBTLE PINKSH TINT; OFF WHT KAOLN CLAYS;
TR TO RR HEM STAINING, SOL CLAY MINERLS;
OCC CHLOR; STRNG RXN W/HCL; CHLOR ALTR
STRNG-MOD, SCAT TO COM.

NOTE = ABUNDANT LT GRNISH GRY TO LT
GRY MUSHY, VRY SOLUBLE VOLCANIC ASH

ALTERD QTZ DIORITE = LT GRNISH GRY; LT
GRY, OPQUE; MARBLED-FOLIATED TEX; VRY
HRD; MED CRS; COM CALCITE VEINS; HVY
CHLORITE AND CALCITE ALTRATION OF QTZ
DIORITE ABUNDANT RXN CALCITE W/VAGUE
HEM VNG; MOD TO HIGHLY ALTERED.

PINK GRANITE = PINK-ORNGSH PINK; V LT
BRN HUE; V HRD; CRS; FELSIC W/QTZ; COM
CALCT VEINS/OVRGRWTH SCT MICAS WK ALTR
COM GRYISH WHT ALTRD WHT KAOLIN; COM
ORTHO; MICROPORPH; DOM NON ALTRD W/
FNT CHLORTIZD STND INCLUSNS; TR SOLI-
TARY PYRT; SCT LSE OFF WHT-GRYSH WHT
KAOLN MAT, TR HEM STRKS ON KAOLN

NOTE= TEMP INCR 3F, F/6310'-6394'

SURVEY @ 6366', 24.78 DEG, 102.23 AZI.
TVD 5997.56', 344.79' S, 1735.37' E.

QTZ DIORITE = MED-DK GRY W/ COM SCTRD
CLDY VC QTZ + FLDS NON ALTRD GR; COM
HRNBLND-BIOT; MOD-WKLY CALC; CRS-MD
CRS GN GRANULAR-HYPIDIOMORPHIC; SL TO
COM EUHDRL QTZ FILL W/VAGUE HEM VNG;
NON CHLORTIZD; COM-SCAT PRIM EPIDOTE
TR LSE SOLITRY PYRT; TR LOC ALTRTNS;
COM OFF WHT INSITU CALC DEPOSIT; SCT
GRYISH WHT KAOLN CLY; OVRL NONALTRD.

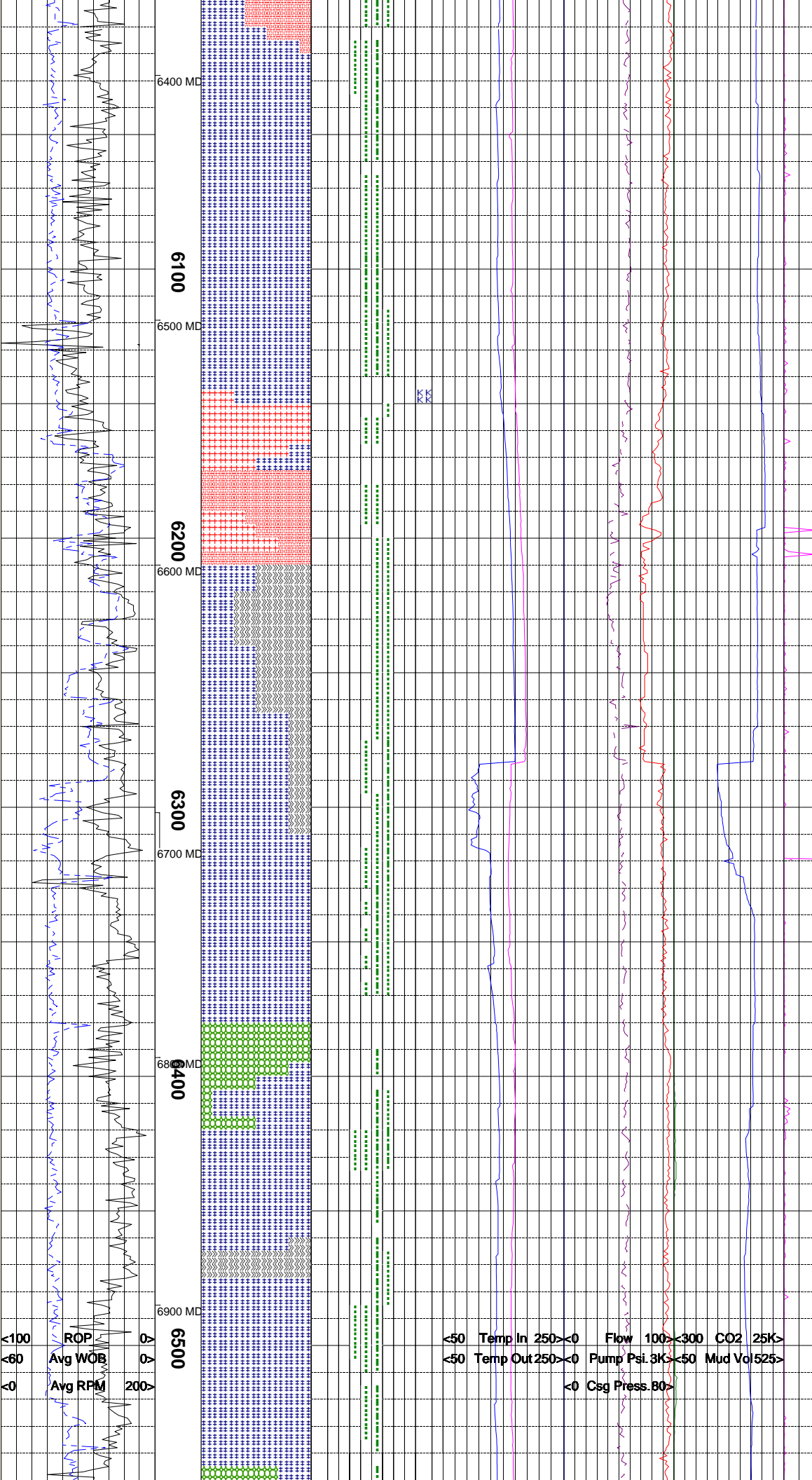
QUARTZ DIORITE = CLR, TRANSLU-TRNSPRT;
LT GRY TO DRK GRY; SPECKLD W/DRK BLK
MAFICS; HRD TO MOD HRD; CRS-MED CRS;
>20% QTZ; COM FSPP; HYPIDIOMORPHIC TO
PORPHY TEX; SCT LT GRN PHENO; SCT EPID
SCT CALC VNG; TR HEM, CLEAN-NON-ALTRD.

QTZ DIORITE = MED-DK GRY W/ COM SCTRD
CLDY VC QTZ + FLDS NON ALTRD GR; COM
HRNBLND-BIOT; MOD-WKLY CALC; CRS-MD
COM EUHDRL QTZ FILL W/VAGUE HEM VNG;
TR CHLORTIZD; COM-SCAT PRIM EPIDOTE W/
SCT KAOLN CLY, TR LOC ALTRD QTZ DIOR;
GRYISH WHT KAOLN CLY; OVRL NONALTRD.
SLI GRADNG TO GRANODIORITE; ABUNDNT
QTZ+FSPP; PREDOM NON ALTRD.

SURVEY @ 6618', 24.38 DEG, 103.11 AZI.
TVD 6226.86', 366.52' S, 1837.60' E.

GRANDODIORITE = WHT, OPAQUE, DRK INCL
LT GRY; WHT GRANITE APRNC; VRY HRD
CRS-MED CRS; FELSIC, COM QTZ; TR BIOT;
GRANULAR-HYPIDIOMORPHIC; COM PLAG;
POSS CALC FRAC FILL ZONE; NON ALTRD.

QTZ DIORITE = MED-DK GRY W/ COM SCTRD
CLDY VC QTZ + FLDS NON ALTRD GR; COM
HRNBLND-BIOT; MOD-WKLY CALC; CRS-MD
COM EUHDRL QTZ FILL W/VAGUE HEM VNG;
TR CHLORTIZD; COM-SCAT PRIM EPIDOTE W/
SCT KAOLN CLY, TR LOC ALTRD QTZ DIOR;
GRYISH WHT KAOLN CLY; OVRL NONALTRD.



DIORITE = BLACK TO LT-DRK BLUISH GREEN, OPQE-SMOKY TRNSL, LT-DRK GRY; V HRD-MOD HRD; DOM HYPIDIO TEXTRE; CRS-LWER CRS GRND; TRC ABUND HRNBLNDE; TR-COM EUHED-SUBHED CHL; NO VIS ALTERATION EPID; FAIR TO WK CHLOR ALTRN; STRNG-MOD CALC, OCC VIS HRD WHT-TRNSL XTALS.

POOH @ 6679', FOR NEW BIT+DIRECTNL AUTOTRAK ASSEMBLY;

NOTE = INSTALL NEW PIT PROBES.

NOTE = MUD VOL LOSS DRING TRIP; 24 HRS LOSS OF 100 BBLs; BUILDING MUD VOLUME TO CHK TRUE LOSS @ 4740'; TRUE LOSSES 6710'-6720' 110 BPH; 6720'-6730' 80 BPH 6730' - 6740' 40 BPH; 6740' NO LOSSES.

SURVEY @ 6741', 23.31 DEG, 102.07 AZI. TVD 6339.36', 377.37' S, 1886.12' E.

QUARTZ DIORITE = DRK GRY-BLK, OPQE-TRNSL; V HRD-HRD; CRS-MED CRS GRND; HYPIDIO TEXTR; BLK MAFICS; RR TR CHLOR, EPID; COM VIS WHT CLAY MINRL; MOD CALIC; CRS-MED CRS; FELSIK, COM QTZ; TR BIOT. PREDOM CLEAN UNALTRD.

NOTE = BEGIN LOSING FLUID F/6790' AT A RATE OF 2-6 BPH, SLI INCRD LOSSES W/ DEPTH; ADDING WATER AT 10 BPH. LOST 12 BBLs @ 6817' DURING CONNECTION.

FELSIK DIKE = LT-DRK GRY, TRNSLU, FNT ORNG HUE; WHT; V HRD; CRS; FNT FE STN; POSS K-SPR; W/TR BLK MICROLITES/MAFIC INCLUSIONS.

NOTE = INCRS MUD LOSS RATE TO 23 BPH F/6810', BEGIN ADDING WATER AT A RATE OF 20 BPH F/6833'.

QUARTZ DIORITE = DRK TO LT GRY; CLR-OPAQUE; TRNSLU; BLK; HRD-VRY HRD; MED CRS; HYPIDIOMORPH TEX; TR HEM COM BIOT+HRNBLND; TR HEM; TR PYRITE; SCT WHT KAOLN; GRADS-V HRD DIORITE; TR PYROXENE; V WK CALC; UNALTERED.

QUARTZ DIORITE = DRK TO LT GTY; CLR-OPAQUE; FELSIK W/COM QTZ; REPEAT LITH W/INCRS IN PYRIT OVRGRWTHS; VRY HRD TO HRD; CRS, HYPIDIOMORPHIC TEXTURE; TR PYRIT, TR HEM; VIS SEC/PRIM MINRLZTN VRY REACTIV TO HCL; VIS QTZ VEINS W/HEM STNS; COM SUB-EUHEDRL EPID,

QTZ DIORITE = DK-LT GRY; BLK, OPAQUE TO WHT-V LT GRY PLAG W/ABNT LSE MICAS SLI INCR OFF WHT CALC DEPOST; RR CHLOR STN W/RMNT CALCITE SEAMS; HYPIDIO TEX, V TR HEM, COM EPID; UNALTERD

QTZ DIORITE = MED GY; HD-V HD; HYPIDIO-MED GN GRANULAR TXT; V SLI CALC; EUHDLR EPID; QTZ FRAC FILL; ABUNDNT MED DRK GRY FELSICS; UNALTRD

QTZ DIORITE = MED-DK GRY W/ COM SCTRCD CLDY VC QTZ + FLDS NON ALTRD GR; COM HRNBLND-BIOT; STRG-MOD CALC; CRS-MD COM EUHDLR QTZ FILL W/VAGUE HEM VNG; TR CHLORTZD; COM-SCAT PRIM EPIDOTE W/ SCT KAOLN CLY, TR LOC ALTRD QTZ DIOR; GRISH WHT KAOLN CLY; OVRL NONALTRD. SLI GRADNG TO GRANODIORITE; ABUNDNT QTZ+FSR; PREDOM NON ALTRD EXCP CALIC TO FELIC POSS FRAC FILLING.

DIORITE = BLACK TO LT-DRK BLUISH GREEN, OPQE-SMOKY TRNSL, LT-DRK GRY; V HRD-MOD HRD; DOM HYPIDIO TEXTRE; CRS-LWER CRS GRND; LOC ABUND HRNBLNDE; TR-COM EUHED-SUBHED HEM; NO VIS ALTERATION EPID; MOD-STRONG CHLOR ALTRN; STRNG-MOD CALC, OCC VIS HRD WHT-TRNSL XTALS, OCC SOFT WHT MARL; TR HEM+STAIN, LOC ABUND-TR MICA+BIOT.

QTZ DIORITE = DK-LT GRY; BLK, OPAQUE TO WHT-V LT GRY PLAG W/ABNT LSE MICAS SLI INCR OFF WHT CALC DEPOST; RR CHLOR STN W/RMNT CALCITE SEAMS; HYPIDIO TEX, V TR HEM, COM EPID; MOD-SLI ALTERD.

POOH @ 7120', FOR RANGE CLOSURE.

SURVEY @ 7107', 23.47 DEG, 100.63 AZI. TVD 6674.86', 407.67' S, 2029.22' E.

QUARTZ DIORITE = DOM V DRK GRY-LT GRY, BLK, OPQE-SMOKY TRNSL; HRD-MOD HRD; DOM HYPIDIO TEXTRE; CRS-MOD CRS GRND; TR EUHED QUARTZ; SLI-MOD CHLOR ALTRN, OVERALL DRK GRN HUES, OCC LIGHT BLU-



GRN PATCHES; TR-COM SUB-EUHED PYR;
EUHED EPID+VEINLETS, HEM+STAINS;
ABUND MICA+BIOT; NO CLAY COMPOSITION;
WK-MOD CALC, OCC VIS TRNSL CALC VEINS;
RR VIS LT PINK XTALS, POSS DIKE FRAG.

NOTE= DRILL F/7180-7224', SLI P.P. FLUX
POOH @ 7224' TO SHOE, FOR SEVERAL
SCHEDULED RANGE CLOSURES; RUN
TEMP LOG on 7/23/09; RUN 2ND TEMP LOG
on 7/24/09; RUN 3RD TEMP LOG on 7/25/09;
TOOK 70bbls TO FILL HOLE, REAM F/6585'-
7224'

QUARTZ DIORITE = DRK GRY-LT GRY; CLR;
TRANSPRT-OPAQUE, WHT; MOD HRD-FRIABL
MED CRS; COM ALTRD SECDRNY KAOLN MAT;
COM BIOT+HRNBLND; SCT ALTRD MAFICS;
LT GRN HUE; COM SUBHED-EUHED EPID;
TR HEM, SCT EUHED PYRIT; HYPIDIO TEX;
WK CALC; >20% QTZ; WKLY ALTRD.

MW 9.1 FV 42 PV 5 YP 13 Gels 16/24
FC 2.0 Sol Sd .10 pH 10.1 CL-10500

QUARTZ DIORITE = LT GRY, CLR, OPAQ, FNT
GRN HUE; V HRD-HRD; MED CRS-CRS; COM
DRK GRY-BLK, COMLY SPECKLD W/ALTRD
MAFICS; BIOT+HRNBLND, WKLY CALC; INCRS
PLAG; ABUNDNT >20% FUSED QTZ; FNT-
PRLY CHLORITZD; EVIDNT LOC ALTRD MAT;
SCT FELSIC INTRUSIVS, LT GRY W/DRK BLK
MICROLITES; VRY HRD; PREDOM CLEAN TO
UNALTERED.

QTZ DIORITE = LT GRY TO DRK GRY; VRY
HRD; CRS; HYPIDIOMORPHIC TEXTURE;
FELSIC, ABUNDNT PLAG W/COM QTZ; RE-
DUCED BIOT+HRNBLND MINRL ASSEMBLG;
LCKNG CHLOR STN; UNALTERED.

QUARTZ DIORITE = DRK GRY-WHT, SPECKLD
W/DRK BLK MAFICS; PHAN W/COM PORPH
TEX; VRY HRD-HRD; V CRS-CRS; COM-VRY
OPAQUE, SMOKEY GRY FELSIC DIKE MAT;
TR REDSH ORGN OXID STNS; FELSIC W/SCT

FELSIC DIKE = DRK-LT GRY; TRANSPRT-
TRANSLU; OPAQUE; FNT ORGSH HUE; VRY
HRD; CRS-MED CRS; V-FNT IRON STNS; TR
HEM; FELSIC W/COM PLAG-FSPR, W/TR
CYPTOXLN BLK MICROLITES INCLSN; NON-
ALTRD, NO CHLOR STN, WKLY CALC.

SURVEY @ 7350', 23.20 DEG, 97.0 AZI.
TVD 6898.12.

QUARTZ DIORITE = DOM LT-V DRK GRY, BLK,
OPQE-SMOKY TRNSL; HRD-MOD HRD; DOM
HYPIDIO TEXTRE; MED CRS GRND; WK-MOD
CHLOR ALTRN, V FAINT BLUISH-GREEN HUE;
ABUND MICA+BIOT; POSS RR TR SERICITE,
LT GRY-BRWN; TR EUHED-SUBHED EPID,
PYR, HEM+STAINS; INTERMIT WHT CLAY
MINRL, POSS KAOL, NO CALC, MOD HRD-SLI
SOFT; OVERALL MOD-STRONG CALC.

MW 9.2 FV 40 PV 6 YP 11 Gels 20/28
FC 2.0 Sol Sd .10 pH 10 CL-9500.

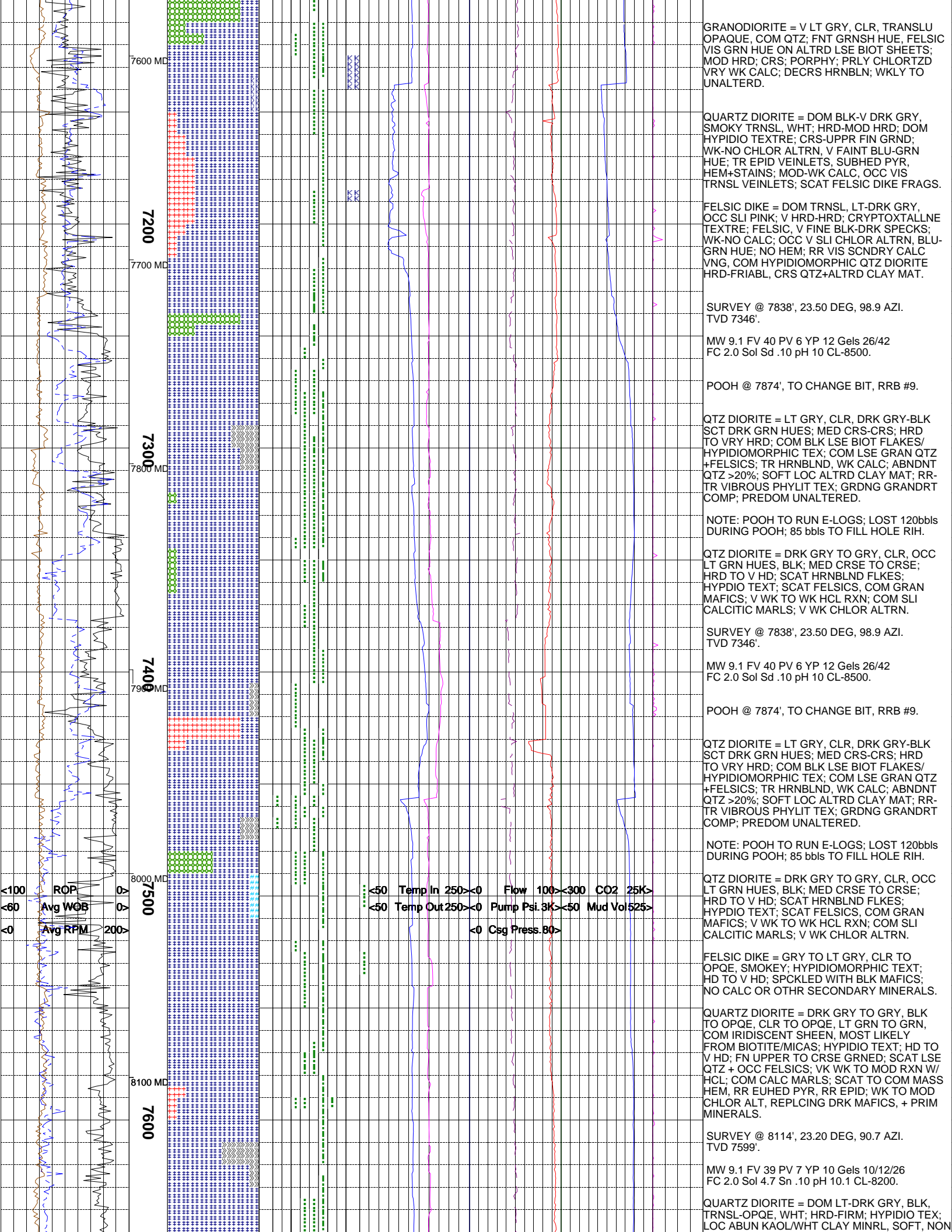
FELSIC DIKE = DOM LT-DRK GRY, OCC SLI
PINKISH HUE, SMOKY TRNSL; HRD-V HRD;
CRYPTOXTALLINE-LWR CRS; FELSIC, SPECK-
LED W/ VRY FINE BLK-DRK GRN MAFICS;
WK-NO CALC; NO VIS ALTRN; NO HEM
VIS SCNDRY CALCITE VNG.

QUARTZ DIORITE = DOM DRK GRY-BLK,
SMOKY TRNSL; HRD; HYPIDIO TEXTRE;
MED CRS GRND; COM-TR KAOL ALTRN;
SCAT FELSIC DIKE MATRL; MOD-STRNG
CALC; MOD CHLOR ALTRN; TR EPID, HEM+
STAINS; ABUND MICA+BIOT; RR HBLNDE.

POOH @ 7612' TO SHOE, FOR SCHEDULED
RANGE CLOSURE, LOST 156bbls DURING
TRIP, LOST APPRX 50 BBLS BEFORE TRIP.
DRILL AHEAD LOSING 30-40BPH F/7612'

QUARTZ DIORITE = VRY LT GRY; SCT DRK
INSITU DRK MAFICS; HRD-FRIABLE-SOFT;
COM ALTRD CLAYS; VIS HYPIDIOMORPHIC
TEX; ABUNDNT QTZ >30%, COM PLAG; SCT
EMBD/LSE BIOT FLKS+RR HORNBLND; COM
FELSICS, VIS GRDNG TO GRANODIORITE; WK
TO MOD CALC; TR SUBHED EPID; VIS QTZ
VEIN CONTACT; DRK GRY PLAG; MOD TO
WKLY ALTRD.

SURVEY @ 7593', 23.30 DEG, 98.2 AZI.
TVD 7121.0'.



GRANODIORITE = V LT GRY, CLR, TRANSLU OPAQUE, COM QTZ; FNT GRNSH HUE, FELSIC VIS GRN HUE ON ALTRD LSE BIOT SHEETS; MOD HRD; CRS; PORPHY; PRLY CHLORTZD VRY WK CALC; DECRS HRNBLN; WKLY TO UNALTERD.

QUARTZ DIORITE = DOM BLK-V DRK GRY, SMOKY TRNSL, WHT; HRD-MOD HRD; DOM HYPIDIO TEXTRE; CRS-UPPR FIN GRND; WK-NO CHLOR ALTRN, V FAINT BLU-GRN HUE; TR EPID VEINLETS, SUBHED PYR, HEM+STAINS; MOD-WK CALC, OCC VIS TRNSL VEINLETS; SCAT FELSIC DIKE FRAGS.

FELSIC DIKE = DOM TRNSL, LT-DRK GRY, OCC SLI PINK; V HRD-HRD; CRYPTOXTALLNE TEXTRE; FELSIC, V FINE BLK-DRK SPECKS; WK-NO CALC; OCC V SLI CHLOR ALTRN, BLU-GRN HUE; NO HEM; RR VIS SCNDRY CALC VNG, COM HYPIDIOMORPHIC QTZ DIORITE HRD-FRIABL, CRS QTZ+ALTRD CLAY MAT.

SURVEY @ 7838', 23.50 DEG, 98.9 AZI. TVD 7346'.

MW 9.1 FV 40 PV 6 YP 12 Gels 26/42 FC 2.0 Sol Sd .10 pH 10 CL-8500.

POOH @ 7874', TO CHANGE BIT, RRB #9.

QTZ DIORITE = LT GRY, CLR, DRK GRY-BLK SCT DRK GRN HUES; MED CRS-CRS; HRD TO VRY HRD; COM BLK LSE BIOT FLAKES/HYPIDIOMORPHIC TEX; COM LSE GRAN QTZ +FELSICS; TR HRNBLND, WK CALC; ABNDNT QTZ >20%; SOFT LOC ALTRD CLAY MAT; RR-TR VIBROUS PHYLIT TEX; GRDNG GRANDRT COMP; PREDOM UNALTERED.

NOTE: POOH TO RUN E-LOGS; LOST 120bbls DURING POOH; 85 bbls TO FILL HOLE RIH.

QTZ DIORITE = DRK GRY TO GRY, CLR, OCC LT GRN HUES, BLK; MED CRSE TO CRSE; HRD TO V HD; SCAT HRNBLND FLKES; HYPIDIO TEXT; SCAT FELSICS, COM GRAN MAFICS; V WK TO WK HCL RXN; COM SLI CALCITIC MARLS; V WK CHLOR ALTRN.

SURVEY @ 7838', 23.50 DEG, 98.9 AZI. TVD 7346'.

MW 9.1 FV 40 PV 6 YP 12 Gels 26/42 FC 2.0 Sol Sd .10 pH 10 CL-8500.

POOH @ 7874', TO CHANGE BIT, RRB #9.

QTZ DIORITE = LT GRY, CLR, DRK GRY-BLK SCT DRK GRN HUES; MED CRS-CRS; HRD TO VRY HRD; COM BLK LSE BIOT FLAKES/HYPIDIOMORPHIC TEX; COM LSE GRAN QTZ +FELSICS; TR HRNBLND, WK CALC; ABNDNT QTZ >20%; SOFT LOC ALTRD CLAY MAT; RR-TR VIBROUS PHYLIT TEX; GRDNG GRANDRT COMP; PREDOM UNALTERED.

NOTE: POOH TO RUN E-LOGS; LOST 120bbls DURING POOH; 85 bbls TO FILL HOLE RIH.

QTZ DIORITE = DRK GRY TO GRY, CLR, OCC LT GRN HUES, BLK; MED CRSE TO CRSE; HRD TO V HD; SCAT HRNBLND FLKES; HYPIDIO TEXT; SCAT FELSICS, COM GRAN MAFICS; V WK TO WK HCL RXN; COM SLI CALCITIC MARLS; V WK CHLOR ALTRN.

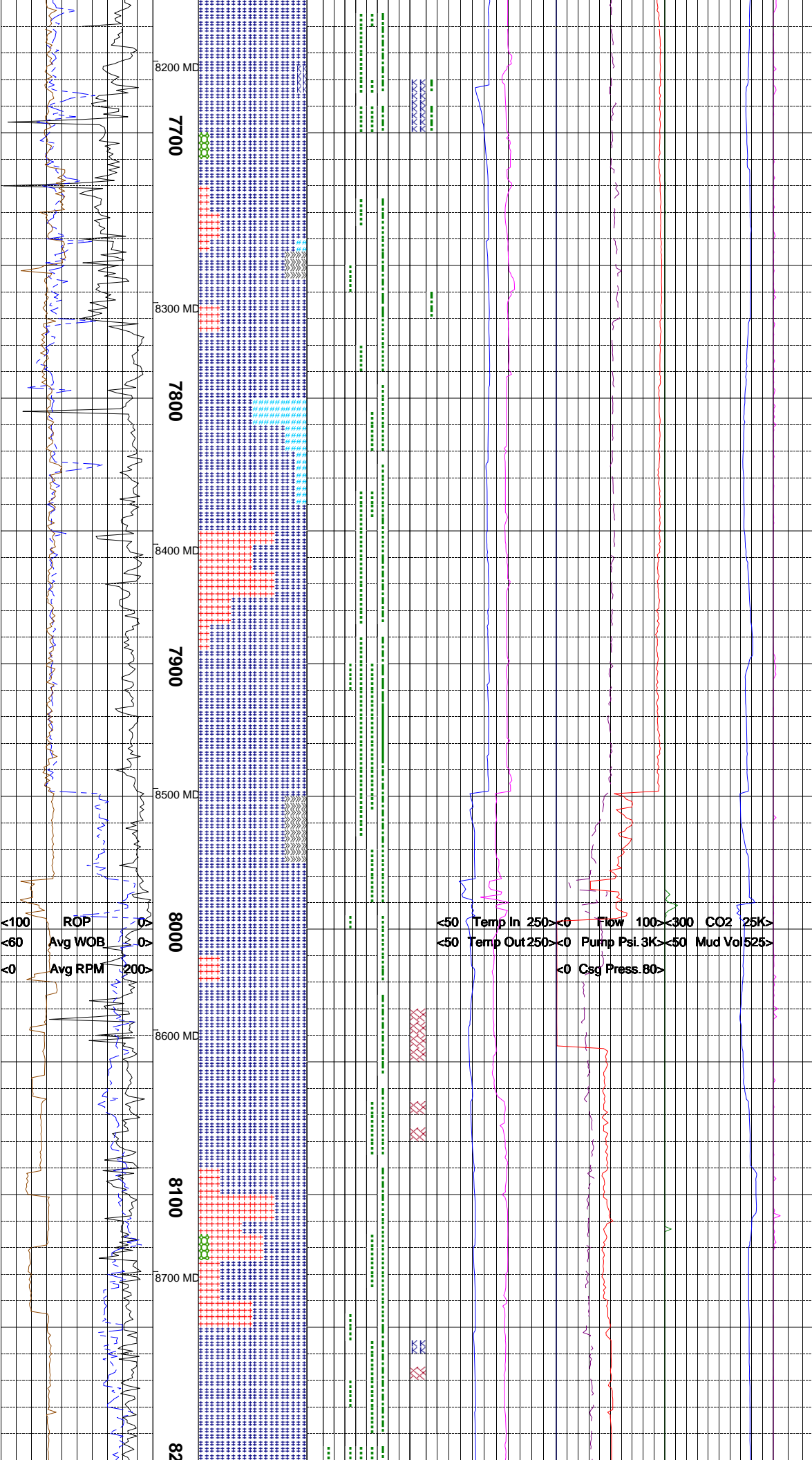
FELSIC DIKE = GRY TO LT GRY, CLR TO OPQE, SMOKEY; HYPIDIOMORPHIC TEXT; HD TO V HD; SPCKLED WITH BLK MAFICS; NO CALC OR OTHR SECONDARY MINERALS.

QUARTZ DIORITE = DRK GRY TO GRY, BLK TO OPQE, CLR TO OPQE, LT GRN TO GRN, COM IRIDISCENT SHEEN, MOST LIKELY FROM BIOTITE/MICAS; HYPIDIO TEXT; HD TO V HD; FN UPPER TO CRSE GRND; SCAT LSE QTZ + OCC FELSICS; VK WK TO MOD RXN W/ HCL; COM CALC MARLS; SCAT TO COM MASS HEM, RR EUHED PYR, RR EPID; WK TO MOD CHLOR ALT, REPLCING DRK MAFICS, + PRIM MINERALS.

SURVEY @ 8114', 23.20 DEG, 90.7 AZI. TVD 7599'.

MW 9.1 FV 39 PV 7 YP 10 Gels 10/12/26 FC 2.0 Sol 4.7 Sn .10 pH 10.1 CL-8200.

QUARTZ DIORITE = DOM LT-DRK GRY, BLK, TRNSL-OPQE, WHT; HRD-FIRM; HYPIDIO TEX; LOC ABUN KAOL/WHT CLAY MINRL, SOFT, NO



CALC; OVERALL LOC STRNG-MOD CALC; TR EPID, HEM+STAIN; ABUND MICA+BIOT; LOC TR MICROXTALLINE FELSIC DIKE; WK-MOD CHLOR ALTRN; QTZ >20%.

QUARTZ DIORITE = BLK TO DK GRY, GRY TO LT GRY, CLR TO OPQE, LT GRN TO DRK GRN; MOD HD TO HD; RR EUHD, DOM HYPIDIO TEXT; FN UPPER TO CRSE GRND; OCC WHT CLAY MIN, SOFT, NO RXN TO HCL, ASSOC W/ GRY/BLUE MARLS; V WK TO WK RXN TO HCL; TR MASS HEM + STAIN, V RR EUHD EPID; WK TO MOD LT GRN TO GRN CHLOR ALTRN; SCAT TO COM HORNBLLENDE, OCC MICAS.

GRANODIORITE = GRY TO LT GRY, WHITE TO OPQE, GRN TO BLUISH HUES; FINE UPPER TO MED GRND; MOD HD TO HD; HYPIDIO TEXTURE; SCAT WHT CLAYS PRES, WK CHLOR ALT; V WK-WK CALC.

HORNBLLENDE DIORITE = BLK TO DRK GRY, OCC GRY; HYPIDIOMORPHIC TEXT; HD TO V HD; MED TO CRSE GRND; OCC MARLS PRES; NO CALC, V RR HEM STAIN, OCC CHLOR.

QTZ DIORITE = DRK GRY TO BLK, GRY TO LT GRY, BLUISH GRY TO LT GRN; MOD HD TO V HD; HYPIDIO TEXT; FN UPPER TO CRSE GRND; OCC TO SCAT HEM STAINS, RR MASS EPID; V WK TO WK GRN TO DRK GRN CHLOR ALTRN; WK-MOD CALC; RR PYRITE.

GRANODIORITE = DOM TRNSL-OPQE, LT GRY, WHT; V HRD-HRD; DOM HYPIDIO TEXTRE; CRS-MED CRS GRND; MOD-STRNG CALC, OCC VIS TRNSL XTALS, SOFT WHT MARL; COM MICA+BIOT; V SLI CHLOR ALTRN; RR EPID, PYR, HEM+STAIN; TR BLK MAFICS; COM PLAG; QTZ >20%.

QUARTZ DIORITE = DOM DRK BLUISH-GRN, BLK, OPQE-SMOKY TRNSL; HRD-FIRM; HYPIDIO TEXTRE; CRS-MED CRS GRND; MOD-STRONG CHLOR ALTRN, ABUND CHLOR RPLCING MICAS; OVERALL LOC STRONG-MOD CALC, LOC ABUND CALC MARL; TR EPID, HEM+STAIN; RR PYR; QTZ <15%.

MW 9.1 FV 40 PV 7 YP 13 Gels 8/15/22 FC 2.0 Sol 4.8 Ca+100 pH 10.6 CL-6800.

NOTE: POOH @8500', RUN E-LOGS: STAR/ RESIS + CBIL/ACOUSTIC, RUN PERFORATED LINER; L/D 4.5" DRILL PIPE AND P/U 3.5" DRILL PIPE, SET LINER TO 8500' WITH TOP LAP @ 1839', PREPARE FOR DRILLING

POOH @ 8537', LOW PUMP RATES AND LOW PUMP PRESS; P/U NEW PDC BIT, CONTIN LOW FLOW+REDUCED CTTNGS OVR SHAKR.

POOH @ 8547', FOR NEW BIT, PR ROP W/ PDC, P/U INSERT BIT, DRILL T/8552', MUDMOTOR FAILURE, POOH, REPLACE MUDMOTOR, NEW BIT, CONT DRILLING.

NOTE: FLOW PADDLE NON-FUNCTION FROM 8554' ON, CONT. LOW PUMP PRESS/FLOW STILL LEADING TO REDUCED CUTTINGS.

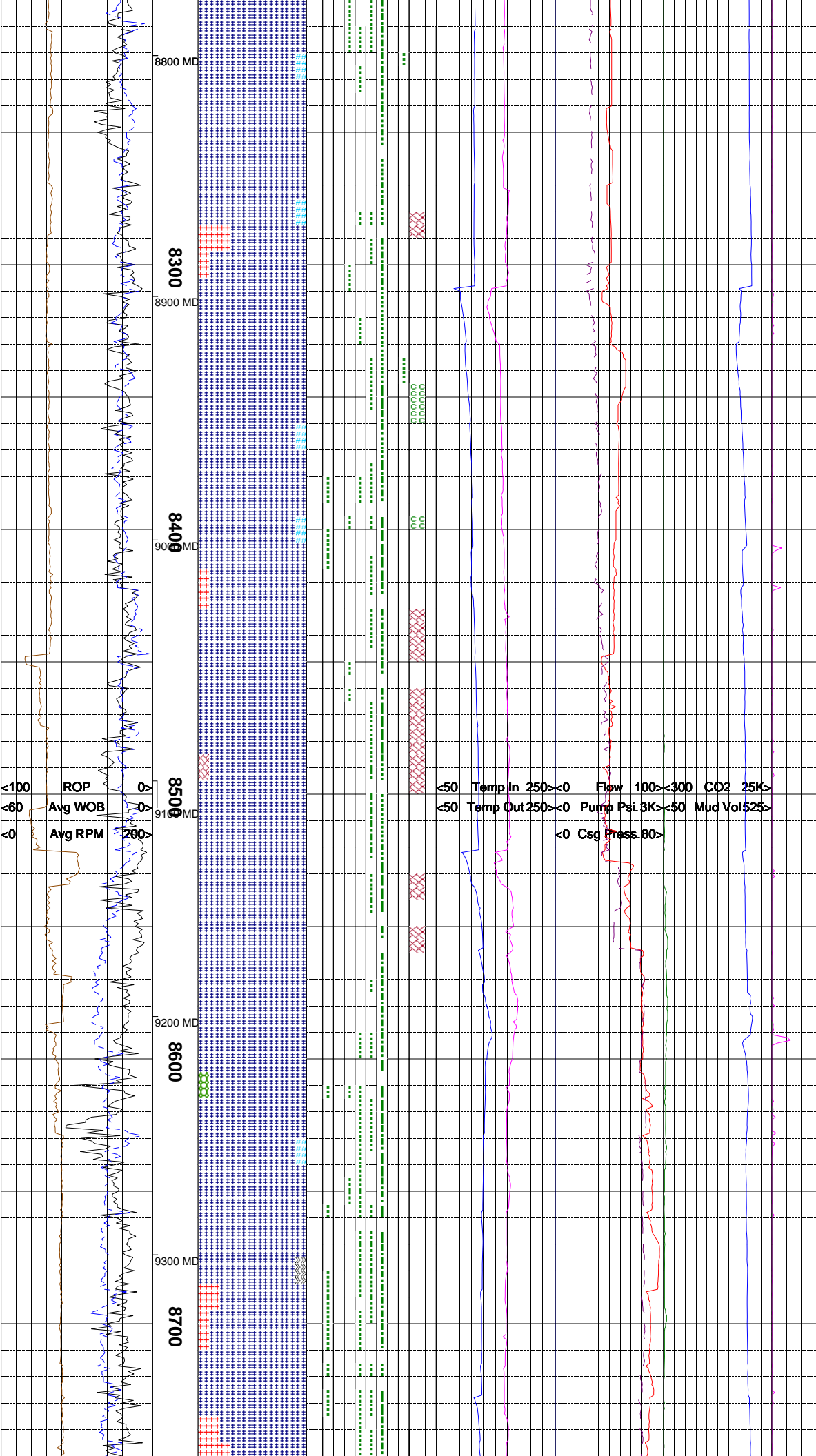
QUARTZ DIORITE = LT GRY-DRK GRY, CLR COM GRNISH HUES; HARD W/COM FRIABL FRAG; MED CRS; COM CTNG SHEETS; PR VIS TEXTR; SHEERD CUTTING SURFACES; WKLY CALC; COM QTZ >20%, ABUNDNT FSPR; COM DRK BLK MICA SHEETS; VIS QTZ VEINS; TR SUBHEDRL EPID; RR TO TR PYRITE; VIS HYPIDIO TEX ON CLN UNALTRD CTNGS; MOD TO WKLY ALTRD OVRL; W/FNT-MOD CHLOR STN.

GRANODIORITE = TRNS-CLR, DRK GRY, BLK LT GRY; WKLY-MOD ATLTRD CUTTNGS; FRIA TO VRY HRD; CRS-MED CRS; TR ALTRD KLN MAT; COM CHLR STNS; GRDNG F/QTZ DIORT TO GRNODIORT; FELSIC W/TR EPID; SUBTLE LOC MINRL ALTERATION PRESENT.

HRNBLED QTZ DIORITE = MED TO LT GRY; OCC DRK GRY, CLR, TRANSLU; MOD HARD-FRIA; MED CRS; GEN HYPIDIO TXT; WKLY CALC; ABD PRIMARY HNBLD/MICAS W/GD SHEET LIKE STRIATION/VIS CLVGE SURFS FELSIC W/ABUNDANT QUARTZ >30%; COM WKLY ALTRD-CLEAN; SLI DECRS IN CHLOR STN W/DEPTH.

QUARTZ DIORITE = LT GRY, CLR, TR BLK SPECKS; DRK GRY-TRANSLU; HRD-MOD HRD; CRS-MED CRS; COM ALTRD GRYSH-WHT KAOLN MAT; HYPIDIO TEX; WKLY CALC; TR SBHEDRL EPID, TR FUSED PYRITE; WKLY-MOD ALTRD; SCT CLEAN UNALTERED FRAGMNTS.

HORNBLLENDE DIORITE = BLK TO DRK GRY;



MOD HRD TO HRD, RR FRIABLE; FN UPPER TO CRSE; HYPIDIO + ACICLR TEXT; NO RXN TO CALC; WK LT GRN CHLOR ALTRN.

SINGLE SHOT SURVEY TOOL @ 9078', 17.8 DEG, 89.0 AZI, TEMP PROBE 370°F

POOH @ 9128', F/MUDMOTOR, L/D MM, P/U NEW BIT.

POOH @ 9143',T/SHOE, F/RNGE CLOSURE

QUARTZ DIORITE = LT GRY, CLR-DRK GRY BLK; COM DRK GRN ALTERATN HUES; VRY MOD HRD-FRIA; MED CRS; TR EPID; VARBL GRYISH WHT ALTRD KAOLN; HYPIDIO TEX; COM LSE CALCITE XLS; SLI INCRS CALC CONTENT OVR 150'; MOD-WKLY ALTRD.

QTZ DIORITE = MED GRY;BLK, GRNISH GRY GRYISH WHT; MOD HRD-GN HYPIDIO TXT; CRS-MED CRS; TR PRIMARY EPID; CHLOR STN;SCT MICA FLKS+TR HRBL; SIMI FIBROUS TEXT; SLT + VIS CLN UNALTRD FRAGS; COM CALCITE XLS;STRNG RXN TO HCL;TR PYR COM GRYISH WHT STRKS F/KAOLN MAT; OVRL MOD ALTERD.

FELSIC DIKE = LT GRY TO GRY, OPQE TO TRANSLCT GRY; HD TO VD HD; HYPIDIO TEXT, SLI GRAININESS; MED TO CRSE GRNED.

HORNBLLENDE DIORITE = BLK TO DRK GRY,

QUARTZ DIORITE = GRN TO LT GRN, DK GRN TO GRY, BLK TO DRK GRY, OPQE TO TRNSL; DOM MOD HD TO SCAT FRIABLE; HYPIDIO TEXT; FN UPPER TO CRSE GRNED; WK TO MOD CALC CONT; RR HEM STAINING; RR TO SCAT EUHED/MASS EPID; V RR CUBIC/EUHED PYR; OCC EUHED QTZ XTALS; WK TO MOD STRNG CHLOR ALTRN, LT GRN TO DK GRN; RR SERCITE FLAKES, MOSTLY ASSOC WITH CHLOR ALTERATION.

QUARTZ DIORITE = LT GRNSH GRY, LT GRY; DRK GRY, BLK, WHT, MOD HRD-FRIABL; MED CRS; VRLBLE HRDNS; INCRS ALTRATN EVID; COM HYPIDIO TEX-TR VIBROUS PHYLIT TEX; COM LSE MICA SHEETS; MOD TO WK CALC; TR EPID,TR-V RARE FUSED ANHEDRL PYRITE COM CHLORITZD STAINING; OFF WHT TO LT GRY ALTRD KAOLIN; OVERALL MOD TO WKLY

SINGLE SHOT SURVEY TOOL @ 9078', 17.8 DEG, 89.0 AZI, TEMP PROBE 370°F

POOH @ 9128', F/MUDMOTOR, L/D MM, P/U NEW BIT.

POOH @ 9143',T/SHOE, F/RNGE CLOSURE

QUARTZ DIORITE = LT GRY, CLR-DRK GRY BLK; COM DRK GRN ALTERATN HUES; VRY MOD HRD-FRIA; MED CRS; TR EPID; VARBL GRYISH WHT ALTRD KAOLN; HYPIDIO TEX;

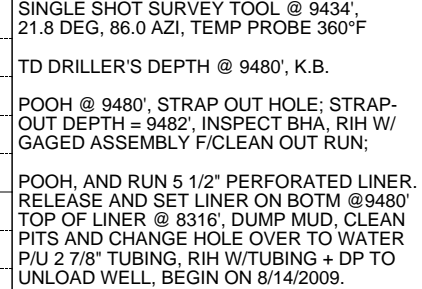
HORNBLLENDE DIORITE = BLK TO DRK GRY, GRN TO LT GRN; MOD HD TO HD; HYPIDIO TO ACICULAR TEXT; FN UPPER TO CRSE GRNED; MOD TO STRNG CHLOR ALTRN.

MW 9.1 FV 42 PV 12 YP 14 Gels 10/22/28 FC 2.0 Sol 4.98 Ca+XXX pH 10.2 CL-4800

GRANODIORITE = WHITE TO OFF WHITE, GRY TO LT GRY, OPQE TO LT GRN, GRN; MOD HD TO HD; HYPIDIO TEXT; MED TO CRSE GRND; WK CALC TO MOD CALC WHEN GRANODIOR PRES; WK TO MD CHLOR ALTRN.

QUARTZ DIORITE = BLK TO DRK GRY, GRY TO LT GRY, OFF WHITE TO OPQE, GRN TO LT GRN; MOD HD TO V HD; HYPIDIO TEXT, ACICULAR TEXT WHERE HORNBLLENDES PRES; SCAT HEM STAINING, MASS HEM, RR HEM VEINLETS; OCC TO SCAT MASS EPID, V RR EUHED EPID; SCAT TO COM EUHED QTZ; WK TO MOD RXNS TO HCL; V RR MASS PYR; MOD TO FAIRLY STRNG CHLOR ALTRN, REPLACING PRIM MIN, HORNBLLENDES.

GRANODIORITE = WHITE TO OFF WHITE, GRY TO LT GRY, GRN; MOD HD TO HD; HYPIDIO TEXT; FN UPPER TO CRSE GRNED; LOW TO MOD CALC CONT; LOC HEM STAINING, RR VEINLETS; RR MASS EPID; FELSIC DIKES OCC PRES; WK TO MOD CHLOR ALTRN; SCAT TO COM EUHED QTZ; V RR MASS PYR; DOM QTZ DIORITE W/HYPID TEX+CHLOR STN.



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