FOH #3 Deepening

Geothermal
MD Mudlog

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Abbreviations

CO	Circulate Out
LAT	Logged After Trip
CG	Connection Gas
WG	Wiper Gas
TG	Trip Gas
SG	Survey Gas
NR	No Returns
NB	New Bit
WR	Wiper Run
WOB	Weight On Bit
PP	Pump Pressure
SPM	Strokes Per Minute
POOH	Pull Out Of Hole
LC	Lost Circulation

Symbols

OBSIDIAN, TUFF-ASH, RHYOLITE, BASALT, ARGILLIC ALTERATION, VOLCANICS, QUARTZ LATITE, ANDESITE, DACITE, FELSIC/SILIC DIKE, TRACHYTE, PYROCLASTICS, TUFF-CRYSTAL, TUFF-LITHIC, MONZONITE, QUARTZ DIORITE, GRANODIORITE, DIORITE, GABBRO, VOLCANICLASTIC, PHYLLITE, SCHIST, SERPENTINE, MARBLE, METAMORPHICS, SLATE, GNEISS, QUARTZITE, CHERT, GLASSY CHERT, ARGILLACEOUS CHERT, PORCELANEOUS CHERT, LIMESTONE, DOLOSTONE, CARBONATES, MARL, COAL, PORCELANITE, DIATOMITE, SHALE, SALT, ANHYDRITE, PORCELANEOUS CLAY, CLAYSTONE, CLAY, SILTSTONE, CEMENT, SANDSTONE, SAND, SHELL FRAGMENTS, COQUINA, BRECCIA, CONGLOMERATE, GRANITE WASH, GRANITE, FELSITE, GREENSTONE

COMPANY	U.S. Navy
WELL	FOH #3 Deepening
LOCATION	Sec 36, T18N, R29E, MD B & M
ELEVATION	3930' GL 3954' KB
FIELD	N.A.S. Fallon
COUNTY	Churchill, Nevada
API No.	000-00000
SPUD DATE	2/19/2005
LOGGING DATES	2/19/2005-3/05/2005
LOGGING DEPTHS	6959' to 8959'
CO. GEOLOGIST	Steve Bjornstad
COMPANY MAN	Ken Bonin Sr., U.S. Navy Rep
CONTRACTOR	Welch & Howell Drilling
RIG	#17
MUD COMPANY	Geo Drilling Fluids
TYPE	Gel/Water
LOGGING GEOLOGISTS	Bill Gilmour, Fred Pulka, Doug Milham
BIT SIZE	17.5" to 70', 12.25" to 500' 8.5" to 2935' 6.125" to 8959'
CASING	13.375" at 67' 9.625" at 485' 7" at 2931' (=2938' new K.B.)

Drill Rate	Lithology	Fractures	Mud Loss	Minerals	Temperature	Gases	Descriptions
Drill Rate; Overscale; Weight On Bit — 40 30 20 10; 100k 75k 50k 25k				Quartz, Calcite, Pyrite, Hematite, Epidote, Chlorite, Anhydrite, Sericite	Temp. In; Temp. Out; Delta T — 50–250; 50–250; 0–200	CO2 Gas; CH4, H2S; Pit Volume — 0–4000; 0–2000; 0–1000	

Descriptions

NOTE: FOH#3 ORIGINALLY DRILLED AND TD IN SEPTEMBER OF 1993 TO A DEPTH OF 6952' WITH 7" LINER RUN TO 2931'. THE WELL WAS RE-ENTERED IN FEBRUARY 2005' AND WITH THE LINER PULLED WAS DEEPENED FROM 6952' ON 2/19/2005 WITH A 6.125" BIT.

MW 8.6 VIS 44 PV 15 YP 9
FL 7.8 PH 9.0 CL-460PPM

NOTE: DEPTHS BASED ON K.B. FROM DRILLER'S PIPE TALLY: RIG FOR DEEPENING 7' HIGHER K.B.; OLD 6952' = NEW 6959'.

PHYLLITE: BLACK; V FIRM TO HD; PHYLLITIC TO DULL EARTHY LSTR; OCC GRAINY; SCATTERED DISSEM PYR, OCC AS THIN VEINS; OCC AS SBRND CTGS WITH ASHY COATINGS, POSS F/OVERLYING ZONE, POSS AS LITHIC CLASTS W/I ASHY TUFF.

MARBLE: WHITE TO LT GRY OCC W/ BLACK ARGILT STREAKS; MOD HD; FINE TO COARSE XSTLN; V REACTIVE TO HCL: POSS AS MASSV VEIN FILL; TR QTZ/QTZT LAMS; OCC TO COM DISSEM PYR, OCC AS DISCONTINUOUS VEINS.

METATUFF: PL GRN TO WHT; MOD HD TO HD; SILIC; FN XSTLN; SPOTTY CALC; COM MOTTLED; VARIABLY CHLORITIC; OCC CALCT VEINS; OCC FN PYR; TR EPIDOTE; RR HEMTT.

GREENSTONE: PL TO DK GRN; OCC MOTTLED, COM SPECKLED; MOD HD; VARIABLY CALC; APRS AS ALTERED VOLCANICS; COM .5 MM PORPHRYBLASTS, IRREG SHAPED, POSS ALBITE; CHLORITIC; OCC EPIDOTE; TR HEMTT; TR PYR; GRDS TO METATUFF.

MW 8.6 VIS 40 PV 15 YP 6
FL 7.2 PH 8.5 CL- 440PPM
LOST 180 BBLS IN 24 HRS

VOLCANICS: DK GRY TO BLK, DK GRN; MOD HD; DENSE; FN TO MED XSTLN; NON TO SL CHLORITIC; SL TO MOD ALTERED; MAFIC RICH; DIFFERS F/ LIGHTER ALTERED TUFFS DUE TO DARKER APPRNC; OCC W/ CALCT VEINS ATTACHED.

METATUFF: PL GRN TO WHT, COM MOTTLING; HD; MICROXSTLN; DENSE; OCC SL CALC; OPAQUE; OCC P-P CUBIC PYR; TR W/ THIN QTZ VEINS; RR ASHY TUFF, POSS DUE TO BIT MECHANICS.

GREENSTONE: PL TO DK GRN, COM MOTTLED; V FIRM TO HD; COM GRANULAR APPRNC; PERVASIVELY CHLORITIC; OCC PYR SEAMS; CALC; OCC TO COM ISOLATED EPIDOTE; TR SPECULAR HEMTT; DECRSD .5MM PORPHRYBLASTS OF POSS ALBITE; RR 2MM QTZ VEINING.

NOTE: CONTINUED TR AMTS OF BLK CARBONACEOUS MTRL OBSERVED AS MICROLAM W/QTZ DISPLAYING A SCHISTOSE TEX @ 7240'

METAVOLCANICS: PL TO DK GRN TO WHT; VARING F/ GREENSTONE TO METATUFF; OCC SMECTITIC AMYGDULES W/ZONED CALCT; VARING DEGREES OF ALT; OCC TO COM MAGN

METACRYSTALTUFF: @ 7320'; PL ORG TO WHT MOTTLED; HD; HYPOCRYSTALLINE; CRYSTALS OF QTZ & FSPR; OCC HEMTT, TR CUBIC PYR.

MW 8.7 VIS 41 PV 15 YP 13
FL 7.2 PH 9.0 CL-410 PPM

GREENSTONE: PL TO MOD GRN, OCC DK GRN; MOD HD; HYPIDIOBLASTIC; CHLORITIC; MOD CALC; .2-.4MM ALBITE; ASSOC W/ DOM AMT OF EPIDOTE; TR PYR.

RHYOLITE: WHT TO PL GRN; FNTLY MOTTLED; HD; UNIFORM; CRYPTOXSTLN; OCC QTZ PHENOS; GRDS TO XSTL TUFF; DECRSD ALTS; POSS METATUFF; V SL CHLORITIC; DCRS IN AMT & SIZE OF PYR; OCC CALC.

GREENSTONE: MED LT TO MOD DK GRN; SPECKLED, OCC FRM TO DOM MOD HD; OCC BUT DCRSNG FN, OFF-WHT PORPHYOIDS OF POSS ALBITE; OCC EPIDOTE, CALC; RR PYR; SL TO OCC HI MAGNETT CONTENT.

RHYOLITE: LESSER WHT TO V PL GRN, OCC SL MOTTLED; MOD HD TO HD; DOM CRYPTOXSTLN; DECRSNG AMT TO OCC QTZ PHENOS; SL CALC; DCRSNG FN PYR CUBES; V SL CHLORITIC, RR HEMTT, DOM ALONG POSS PLANER FRAC SURFS.

NOTE: SURVEY @ 7465' NO GOOD MRT=276 F

CRYSTAL-LITHIC TUFF: WH SME ROSE & LT GRN; SPKLD CLR-GRN-BLK; COM CLR 0.5-2MM APHAN-EUHED TRIANG QTZ PHENO; MNR-15% CHLORTZD GRN MAF LITHS; APHAN DULL MTRX OR W/ MICXLN WH CALC REPL; COM DISSEM RED HEM & SME VNG; TR DISSEM/VN PYR; TR EP VNG

RHYODACITE: MOD RDSH BRN; MOD HD; PORPH; ABUN .5-1.5 MM WHT PLAG PHENOS, LATHS; RR BIOT; SCATTERED HEMTT; RR EPIDOTE; SPOTTY CALC.

RHYOLITE: WHT TO V PL GRN TR FNT BRN MOTTLING; HD TO MOD HD; DENSE; CRYPTOXSTLN; W SCATTERED SBHDRL TO EUHDRL QTZ & FSPR PHENOS; OCC FN CUBIC PYR; TR CALC VNG; TR FN DISSEM HEMTT; FNTLY CHLORTZD.

MW 8.7 VIS 43 PV 19 YP 16
FL 7.0 PH 9.0 CL-380 PPM

QUARTZ DIORITE: GRNGRY OVERALL; SPKLD GRN-LT GRY-BLK; F-M GR EQUIGRAN APR; APPROX 30-40% MAF & CHLORTZD MAF 40-60% FELD 10-20% QTZ; R 1-4 MM CLR ANHED QTZ PHENO; TR-1% BLK OPAQ; V ABNT MAS WH CALC VNG; TR DISSEM HEM & PYR; TR YEL-YELGRN EP VNG

LITHIC TUFF: LT GRN CAST; MOTT WH-LT GRN CRPTOXLN MTRX W/ SUCR LSTR; F-M LOC C GR FELSIC-MAFIC ANG LITH LPLI; COM EUTAXITIC TEX; DEVIT W/ CALC REPL OF GND-MASS; MAF MSLTLY ALT TO CHLOR & LOC EP; TR DISSEM PYR/HEM; LOC TR EUHED QTZ FF; LOC QTZ PHENO

RHYOLITE: WHT TO LT GRY TO PL GRN; HD TO MOD HD; DENSE; CRYPTOXSTLN; SILIC; UNIFORM; SL CALC; SL CHLORITIC; RR DRUSE QTZ; TR FN CUBIC PYR; TR DISSEM HEMTT.

MW 8.8 VIS 39 PV 14 YP 9
FL 6.8 PH 9.0 CL-380PPM

LITHIC TUFF: MULTICLRD; HD TO V HD; SILIC; WELDED, META; VAGUELY LINEATED; VITREOUS; CTGS CLEAVE ACROSS CLAST BOUNDRIES; CLASTS 1-3MM.

LITHIC TUFF: MARG ALT LT GRN; WHISH CRPTOXLN HD DEVIT MTRX; ANG ORNG-GRN-BLK-GRY LOC ROSE F-C GR LITH LPLI; LOC FELD/QTZ XLS; COM EUTAX TEX; ABNT CALC

SURVEY@ 7846' 13.5 DEG, 242 F

FELSITE: M GRN; SPKLD GRY CLR & GRN; EQUIGRAN F-M GR; APHYRIC; GEN EQNT XLN APR; LOC SL-MOD FOL; DOM QTZ+FELD W/ 20% CHLORTZD MAFICS; COM TR F DISSEM OPAQ INCL MAGN; DECR HEM

MW 8.8 VIS 41 PV 18 YP 10
FL 6.5 PH8.5 CL-410PPM

NOTE: POH @ 7921' FOR NB#4

RHYOLITE: WHT, LT GRY, PL GRN, FNTLY MOTTLED; MOD HD TO HD; DENSE; CRYPTOXSTLN; POSS WELDED, (META), TUFF; RR FN MAFIC INCLUSIONS; SL CHLORITIC; FELSIC; TR FN CUBIC PYR; CALC; TR ANHDRL QTZ VEINING; TR ANHDRL EPIDOTE.

LITHIC TUFF: WHT TO LT GRY, TR V PL GRN; HD; VITRIC; OPAQUE; SHARP, ANG CTGS; SL CALC; VARIABLE LITHICS; DOM CLEAVES ACROSS CLASTS; SCATTERD SBHDRL REPLACEMENT OF BIOTT TO CHLORITE; TR PYR; RR DISSEM PYR ALONG FRACS.

MW 8.8 VIS 40 PV 20 YP10
FL 6.7 PH 8.4 CL-800PPM

LITHIC TUFF: WH-MED GRY; CTGS SPKLD GRN-GRY-BLK-ORNG & WH W/ V ANG F-C GR LITH LPLI & R XLS; HD DEVIT CALC ALT WHISH MTRX; DISTINCT-FZY LPLI GR BD

FELSITE: M GRY-GRNGRY; WH-GRY-GRN-CLR & BLK GR; F-M OCC C GR SIZE; DOM ANHED W/ LOC SUB-EUHED FELD; APPROX 50% FELD 20-30% MAF & 10-30% QTZ; MAF MARG-PERV ALT TO CHLOR/EPID; YEL EP+QTZ VNG; HEM+CALC VNG; V COM VF BLK-BRN MAGN OPAQ; ASSOC WH-LT GRYGRN LITHIC TUFF W/ VARCOL F-C GR ANG LPLI IN A DEVIT SILICIFIED/CALC MTRX

ALTERED LITHIC TUFF: WHT TO LT GRY TO PL GRN; HD; DENSE; VITREOUS; TRANSL TO OPAQUE; HAS WELDED APPRNC; APPRNT GREENSCHIST ALTRD; FELSIC LAPILLI; CRYPTOXSTLN; OCC EPIDOTE; OCC BIOTT, OCC REPLACED BY CHLORITE, CALC W/TR THIN CALC VNG; TR PYR, OCC TINY WHT SPOTS, POSS REXSTLZD ALBITE; STRONG TR MAGNTT.

MW 8.8 VIS 40 PV 16 YP 9
FL 6.7 PH 9.1 CL-850PPM

ALTERED LITHIC TUFF: LT GRY-WH W/ A LT GRN CAST; GEN V HD ANG BRIT CTGS; INCR SILICIC & LOC CALC ALT; LPLI INCR BLENDS W/ MTRX & BARELY VIS; COM EQNT-ELONG CHLORTZD MAF/BIOT GR; LOC SOFT-FRI POWD WH CALC LENS; SME EQUIGRAN F-M GR FELSITE CTGS W/ 20-30% RELICT MAF; YEL EP VNG & LOC ALT; R TR DISSEM PYR & HEM VNG; TR CLR QTZ FF; OVERALL HIGHLY SILICIC APR W/ MOSTLY WHISH CTGS; INCR HOMOG APR

WELDED TUFF: DOM WHT TO TR V PL GRN; HD TO OCC SOFT & ASHY; DOM VITRIC; SILIC; CRYPTOXSTLN; DCRSD TO TR LAPILLI; CALC; TR EPIDOTE; V RR PYR; CALC; RR MAFICS; SL CHLORITIC @ 8300'.

NOTE: STRG TR CLR DRUSE QTZ @ 8300'.

CARBIDE @8314', 49 MN @ 82SPM 109% THEOR, 3 UNITS.

RHYOLITE: WHT TO V LT GRY; MOD HD TO HD; CRYPTOXSTLN; DENSE; HOMO; SIMILAR TO WELDED/ALTERD TUFF BUT W/ INCRS IN SILICA; RR PLAG PHENOS; OPAQUE; CALC; V RR PYR; OCC MAFIC/BIOTT INCLU; SCATTERED EPIDOTE, TR AS MICROVEIN; TR SL CHLORTZD.

MW 8.8 VIS 41 PV 17 YP 9
FL 6.5 PH 8.8 CL- 500PPM

RHYOLITE: WH-PALE LT GRN; V HD ANG CTGS; SL TRNSL @ EDGES; MAS HOMOG APR W/ NO BANDING OR RELICT TEX; COM TR F GR IRREG CHLORTZD MAF GR; R ANHED QTZ & FELD XLS; LOC XCUT DIKES OR LPLI OF EQUIGRAN F GR FELSITE & LOC DK BRN APHYRIC GEN UNALT ANDESITE; ABNT POWD WH FRI CALC ZNS; MOST CTGS CALC IN PT; DECR EP VNG; TR TRNSL BLUE OPAL

RHYOLITE: WHT, OCC LT GRY & V PL GRN; HD; DENSE; CRYPTOXSTLN; OPAQUE TO SEMI-TRANSL; HOMO; WELDED TUFF APPRNC; TR INDISTNCT LAPILLI; RR EPIDOTE; V SL CHLORTZD; RR PYR; SL CALC.

MW 8.9 VIS 42 PV 20 YP 10
FL 6.3 PH 8.6 CL- 550PPM

SURVEY @ 8464': 12.0 DEG MRT=254 DEG F.

FELSITE: PL TO DK GRN TO GRNSH GRY; MOD HD; MICROXSTLN TO APHANITIC; FN GRAINY TEX; MNR FSPR PHENOS; PERVASIVELY CHLORITIC; MNR MAFICS; MATRX COM W/ SML WHT, POSS ALBITE, PORPHRYBLASTS; POSS MTEASED DUE TO OCC RELIC, SBRND GRS; CALC; TR EPIDOTE, RR PYR.

RHYOLITE: WHT TO OCC LT GRY & PL GRN; HD; DENSE; CRYPTOXSTLN; V SILIC; UNIFORM; MASSV; SL CALC; RR CALC MICROVEINS; SL CHLORITIC; RR LAPILLI; MNR TR CUBIC PYR; V RR FSPR PHENOS.

MW 8.9 VIS 38 PV 14 YP 6
FL 6.4 PH 8.5 CL-400PPM

GREENSTONE: M-DK GRN OCC SPKLD LT-DK; WAXY LSTR; RELICT APHAN & F EQUIGRAN APR; PERV CHLORT-ZD; INTBD DK BRN-BLK OCC REDBRN BASALT W/ R CHLOR AMYDG & FLTG MAF XLS; DECR WH-LT GRYGRN CRPTOXLN RHYOLITE; DECR LT GRY SPKLD BLK F GR EQUIGRAN FELSITE ;TR YEL EP VNG & DISSEM PYR; INCR HEM ALT & VNG; ABNT CALC

RHYOLITE (8670-80'): M GRY SPKLD WH-LT GRY; DEVIT CRPTOXLN MTRX; ABNT 1-2 MM FLTG UNALT SUBHED-EUHED FELD PHENO; COM WH SHERUL SPOTS; GRADS TO FELSITE: GRYGRN; F GR EQUIGRAN APR; <30% BLK-PERV CHLORTZD MAF GR; TR YEL EP VNG; ABNT CALC VNG & ALT

ASH TUFF: WHT; SOFT TO FIRM; CRUMBLY; CHALKY LSTR; V CALC; POSS DERIVED F/ BIT MECHANICS; GRDS TO WELDED TUFF W/INCRSD INDUR; RR PYR.

MW 8.8 VIS 38 PV 14 YP 5
FL 6.2 PH 8.5 CL-380PPM

RHYOLITE: WHT; FIRM TO HD; SBVITREOUS; CRYPTOXSTLN; OPAQUE TO TRANSL ON THIN EDGES; HOMO; RR FN PHENOS; SL TO MOD CALC; RR CALC LINED FRAC SURFS; TR PYR.

RHYOLITE: LT-DK GRN; COM MOTT GRY-WH; VF-F GR GRAN RELICT APR; COM HALF FELD HALF ALT MAF; LOC CHLOR/CALC PHENO; MOST CTGS CALC IN PT DUE TO ALT; ASSOC WH-LT GRN FIRM-HD TUFF W/ R RELICT LAMS & XLS/LPLI; INCR CALC VNG; TR YEL EP VNG; TR DISSEM & VN PYR; R HEM VNG; MARG-PERV CHLORTZN OF MOST CTGS

NOTE: COM WHT MED XSTLN CALCITE VEINING F/8850-8880'.

RHYODACITE: WHT TO LT GRN, OFTN SPECKLED; SOFT & ASHY TO MOD HD @ MICROXSTLN; VARIABLE SILICA; APPRS FSPR RICH; POSS DEVITFD; CHLORITIC; COM .5-2MM WHT CALCT VEINING; RR PYR.

MW 8.9 VIS 43 PV 19 YP 11
FL 6.0 PH 9.0 CL-400PPM

RHYOLITE: DOM WHT TO OCC V PL GRN, MOD HD TO HD; CRYPTOXSTLN; 5% CHLOR AS ALT OF BIOTT; RR FN FSPR PHENOS; UNIFORM; TR CALC VNG; RR PYR.

TOTAL DEPTH: 8959' 11:30, 3/5/05