EPOCH WELL LOGGING, INC.

COMPANY	DY Oil
WELL	"Neverstill" 33-30
FIELD	Mist
LOCATION	307.4' South and 1255.21'E from the NE corner of Sec. 30, T6N, R5W WB&M
COUNTY, STATE	Columbia, Oregon
API WELL INDEX NO.	
ELEVATION	507.7' G.L., 519.1'K.B.
DATES	FROM 7-31-89 TO 8-3-89
DEPTHS	FROM 381'K.B. TO 2225'K.B.
SPUD DATE	7-30-89
DRILLING CONTRACTOR	Taylor Drilling, Rig #5
MUD COMPANY	Beaver Drilling Fluids Inc.
LOGGING GEOLOGISTS	Craig Anderson, Jim Eastes

ABBREVIATIONS

NB	BIT	MW	MUD WEIGHT
RRB	RERUN BIT	VIS	FUNNEL VISCOSITY
RTB	RE-TIP BIT	PV	PLASTIC VISCOSITY
CB	CORE BIT	YP	YIELD POINT
T.G.	TRIP GAS	FL	FLUID LOSS (cc/30 min)
S.G.	SURVEY GAS	CL	PPM CHLORIDE ION
W.G.	WIPER GAS	RM	MUD RESISTIVITY
C.G.	CONNECTION GAS	RMF	FILTRATE RESISTIVITY
WOB	WEIGHT ON BIT	LAT	LOGGED AFTER TRIP
RPM	ROTARY REV/MIN	NR	NO RETURNS
PP	PUMP PRESSURE	PR	POOR RETURNS
SPM	STROKES/MIN	MUD TYPE	Ligno-Sulfonate

CASING RECORD

8 5/8"	AT	381'K.B.
5 1/2"	AT	2206'K.B.
	AT	
	AT	

HOLE SIZE

12¼"	AT	385'
8 7/8"	AT	2225'K.B.
	AT	
	AT	

SAND/SANDSTONE	CLAY	LIMESTONE	T TUFF	LIGNITE
SHALE	DIATOMITE	Z DOLOMITE	F FOSSIL	G GLAUCONITE
SILTSTONE	CONGLOMERATE	V BASALT	M MICA	P PYRITE

OIL: BASED ON LIVE OIL IN UNWASHED CUTTINGS AND PERCENT STAINING AND FLUORESCENCE OF WASHED SAMPLES.

PENETRATION — ANALYSIS OF RETURNS — REMARKS

EPOCH WELL LOGGING, INC. DRILL RATE (FT/HR) drilling data | DEPTH | LITHOLOGY | OIL: TRACE, STRONG TRACE, SHOW, STRONG SHOW | GAS — UNITS: DITCH — TOTAL GAS; CUTTINGS GAS; CALIBRATION 100 units = 2% methane by volume | CHROMATOGRAPH — PPM: METHANE, C-1; ETHANE, C-2; PROPANE, C-3; BUTANES, C-4, 4; PENTANES, C-5, 5 | REMARKS: LITHOLOGIC DESCRIPTION, MUD PROPERTIES, SURVEYS, OTHER TEST DATA

Accessory Mineral Column

Example:
Occ....g
Com....G
Abund..G

Note: all colors are referenced to the GSA color chart.
All carbides are 400gms unless otherwise noted.
All connection and survey gases are reported as units above background; trip and carbide gases are reported as maximum gas units.

Siltstone: dk yelsh brn; soft; crumbly; erthy lstr; smth tex; v cly rich; locally aren; sli calc; mod micaceous; no bedding lineations.

Sandstone: wh-v lt gry, clr; fg-med grained; sbrnd-rnd; mod spher; prly sorted; well Ind w/calc cmt and com arg mtrx; comp of aprox 50% qtz grains and 50% fspr + lng RF + arg mtrx; mod mat; pr por and perm; NSOFC

Clay: mod-lt brn; frm-sft; erthy lstr; smth-v slty tex; v gd cohes; prly adhes; hydrophobic; v slty; hvly dism with fg-vfg sd; noncalc; noncarb.

Siltstone: med-dk gry; frm; erthy lstr; rough-abrsv tex; v mica and aren, grdg to slty sandstone; com faint foliation of micas; sli dism with carb flecks; no shell frags.

Shale: dk grnsh gry; frm-hd; erthy lstr; slty tex; comp of aprox 80% slt and 20% cly with com vfg micas; prevasive foliation of micas; lndst thick lams; sli aren and carb; noncalc; grdg to sltst; pr fiss.

Sandstone: wh-v lt gry; fg-vfg; rnd-sbrnd, com ang; mod-gd spher; frm-v frl; abndt arg cmt with tr calc; comp of aprox 40% clr-milky qtz and 20% arg mtrx + 40% fspr and lng RF; v pr por and perm; NSOFC.

Clay: mod-lt brnsh gry; frm-sft; dl erthy-sli rsn lstr; slty tex; v gd cohes, prec occurs as balls on shakers; prly adhes; prly soulb; v slty; com dism with vfg-med grained qtz sand; occ carb flecks; com vfg fspr frag altered to koalin.

Note: Ctgs dist clr chng to dk olv gry f/580'

Siltstone: dk olv gry; firm; sli tough, occ crumbly; dom blocky; rough grainy texture; earthy to sli waxy luster; non to sli calc; intermittent pr fissility w/v faint tr lams; com foram, mica.

Siltstone: med to dk olv gry; firm; sli brittle to occ tough; blocky to tab ctgs; dull sli waxy luster espc when scored; rough grainy tex; sli to mod calcareous f/pin-point sources; cecr mica and foram tests; gd tr in abraded shell frags; rare fiss; no vis lams.

Siltstone: med olv gry; firm; crumbly to sli tough; appears siliceous w/sli translucency in fn ctgs; dist incr gritty tex; appears less clay rich; no vis lams; tr fissility; tr shell frag.

Carbide Lag 3.6 min @ 712', 240u
SPM #2-67, 198% Theor, 2 min cur

Siltstone: dk olv gry, subtly bcmg dker; firm; sli tough, blocky; dist incr waxy lstr; fn to occ rough grainy tex; appears more clay rich than above; com crse silt-sized blk and org volc flecks; rare tr fiss; tr v fn shell frag.

Limestone/Calc Ash: pl gry-yel to wht; v firm; tough; sharp tab ctgs; smooth tex; variable rx w/acid; argillaceous; com crse silt-size inclusions; com leaves insoluble matrix - ash.

MW 9.2 VIS 41

Siltstone: dk olv gry; firm; crumbly to dom sli tough; com breaking w/a dull snap; blocky to tab; dull waxy lstr; fn to rough grainy texture; com incipient fissility w/select ctgs exhibiting fair fiss; non to sli calc f/pinpoint sources; tr mica; org volc frags and v fn framboidal pyrite; occ v fn abraded shell frag; con't intermit thin marl lams/interbeds

Clay: gryish brn to med olv gry; minor amts derived f/crushed siltstone; easily soluble; lo plasticity; pr adhesion.

Siltstone: dk olv gry w/com grnish hue; firm; crumbly to dom slight tough; blocky to tab ctgs; dull waxy lstr, espc when scored; rough grainy tex; sli calc; tr org and blk inclusions; occ wkly developed fissility; con't marly/calc ash lams and interbeds.

Siltstone: med to dk olv gry; firm; incr crumbly ctgs, dom sli tough; waxy latr; incr gritty tex w/sli translucent qualitycom foram.

Siltstone: med olv gry; firm; crumbly; v gritty tex w/v fn sand streaks; incr org volc frags; spotty mica; tr dissem glauc.

Note: Ctgs becmg subtly lter olv w/decr grnish hues.

Siltstone: med to dk olv gry; firm; crumbly to dom sli tough; blocky to tab ctgs; earthy to dom sli waxy lstr; gritty, abrasive texture; sli sandy in places; non to sli calc; tr mica, org volvs; infreq tr fissility; locally com foram; no dist bed lin;

Siltstone: med olv gry to gryish brn; firm; mod tenacity; dull, sli waxy lstr; con't gritty, abrasive texture; locally com fissility along sandy planes; non to slightly calc; fn ctgs exhbt sli translucency on edges; no vis lams-homogeneous w/subtle color chng.

Tuff: pl gry-yel and yelsh gry; hd and dns; dl-v sli rsn lstr; slty-abrsv tex; comp of ash and calc, boderline to limestone; sli-v arg; com occurs as mtrx in sltst; rr carb incl and vfg sd.

Siltstone: olv gry-brnsh olv gry; frm and crumbly; dl erthy lstr; rough abrsv-gran tex; sli-v aren; com dism with glauconite and carb frags; tr pyr; occ cly, grdg to sh; blky ctgs; massive; rr tuffaceous.

Shale: olv gry-brnsh olv gry; frm; erthy lstr; slty-occ smth tex; vari cly content, grdg from v slty-v cly; blky-splty ctgs; pred prly fiss; sli dism with glauconite and rr pyr; occurs as thn bds with thick bds of sltst.

Clay: med brn-pl brn; sft-occ frm; erthy lstr; sli slty tex; v slty, grdg to sltst; slicl; mod-pr cohes; pr adhes; mod soulb; v sli carb; sli dism with vfg sd; tr pl brn v fnly xln sparry limest frags.

Siltstone: olv gry-grysh brn, bcm sli lighter in color with depth; frm; crumbly; dl erthy lstr; abrsv-occ smth tex; bcm cly rich with depth; decr aren; sli dism with vfg carb frags; sli tr glauconite and pyr; blky ctgs; rr fiss bcm sh.

Survey @ 1115', 1½°

Shale: dk brnsh gry-olv gry, occ brnsh blk; frm-occ hd; dl erthy lstr; smth-sli slty tex; comp of aprox 60% cly and 40% slt with com v slty zns; sli carb in dk hues; sli micromica; plty-occ tab ctgs; gd fiss esp in cly rich frags; grdg to sltst.

Clay: olv gry-olv brnsh gry; sft-sli frm; erthy lstr; smth-sli slty tex; mod-gd cohes; pr adhes; mod-prly solub; v expandable in HCL; mod slty, slt content decr with depth; noncalc; noncarb.

Siltstone: olv gry-grysh olv brn; frm; crumbly; erthy lstr; abrsv tex; rr aren; noncalc; rr carb frags; tuffaceous in part with occ relic xal frags.

Clay: med brnsh olv gry; sft; sli chalky lstr; slty tex; sli calc; prob tuffaceous; sli dism with vfg sd and xal frags.

Note: sli color change @ 1370', colors bcm lighter in all hues.

Siltstone: med brnsh olv gry; frm to hd; erthy lstr; abrsv-slty, com sandy tex; mod tuffaceous w/com pl yel relic crystal frags; sli aren; sli calc; sli tr of carb frags and shell frags; blky ctgs; occ sh zn.

Clay: med brnsh olv gry; sft-com frm; sli chalky lstr; smth-slty tex; gd cohes; pr adhes; prly solub; noncalc and noncarb; mod tuffaceous with occ relic crystal frags.

Tuff: pl brn-pl yel, [illegible]; hd and dns; erthy-chalky lstr; abrsv tex; comp of pl brn ash mtrx with abndt crystal frags giving the appearance of vfg arg sandstone.

Shale: brnsh olv gry; frm-occ hd; erthy-sli rsn lstr; smth-suc tex; comp of aprox 70% cly and 30% slt; grdg to cly; plty-blky ctgs; gd fiss; v sli aren; noncalc; noncarb; massive.

Clay: med-occ lt brnsh olv gry; sft-com frm; erthy-v sli rsn lstr; smth-sli slty tex; mod-gd cohes; pr adhes; mod-prly solub; sli tuffaceous.

Shale: brnsh olv gry; frm, incr hd with depth; erthy lstr; sli slty tex; comp of aprox 60% cly and 40% slt with com tuffaceous zns; plty-occ tab ctgs; gd fiss, noncalc and carb; grdg to sh i/p.

Clay: med-lt brnsh olv gry; sft-frm, bcm incr frm with depth and grdg to sh; mod slty; sli tuffaceous; mod cohes; pr adhes, noncalc; noncarb; pervasive dism of vfg micas.

Shale: brnsh olv gry; frm-hd; erthy lstr; smth-slty tex; comp of aprox equal amts of slt and cly with sme frags grdg to sltst and sme grdg to cly; plty-blky, occ tab ctgs; pred gd fiss in cly rich frags, pred pr fiss in slt rich frags; v sli calc; noncarb; pervasive dism with vfg mica.

Clay: sli brnsh olv gry; sft-occ frm; erthy-sli rsn lstr; smth pastey tex; gd cohes; mod adhes; sli slty and micromica; rr carb frag; sli tuffaceous with rr pl brn, hd and dns, tf frag; mod-prly solub.

MW 9.2 VIS 46 PV 18 YP 18
pH 10 FL 6.5 Cl^- 2000ppm

Note: Wipe Hole @ 1667' - tight; wipe to shoe; RIH, intermit ream to bottom; Incr MW to 9.8

Mudstone: med olv gry; soft to firm crumbly to sli tough; blocky w/dom sli rndd edges; dull waxy lstr overall w/com v fn micaceous sparkle; smooth to fn grainy texture sli to mod calc w/occ foram inclusions and tr shell frags; locally com glauconite pellets; gen com dissem pyr; tr to infrequent prly developed fiss; no lams; variably silty.

Wipe Hole @ 1730'
MW 9.9+ VIS 46

Clay: med olv gry; soft; thin pasty consistency; easily soluble w/occ gummy nodules; lo plasticity; lo adhesion; v fn gritty tex; sli calc w/tr loose foram.

Tuffaceous Sandstone: lt gry, wht com translucent w/waxy matrix; fn to med; ang to sbrnd; matrix supported qtz; tuff/ash matrix; com v solu chalky ctgs; clr qtz, clr to milky calcite.

Siltstone: med olv gry; soft; crumbly, waxy lstr; smooth to incr gritty tex; incr micaceous; tr dissem pyr; rare foram.

Sand: lt to med gry; v fn to crse, dom fn to med; ang to sbrnd, dom sbang; mod sort; unconsol w/occ calc ss; qtz w/abund mica, pyr.

Sand: lt to med gry w/incr clr qrs; fn to crse, dom fn to med; ang to subrnd, com sbang; lo to mod sphericity; moderate sorting; com loose w/intermittent calc cmtd ss; com qtz w/scat fldsp; abund muscovite, occ chlorite; abund pyrite as sub to euhedral xtls in qtz/pyr nodules; tr pl grn lithic frags; tr yel-min fl f/ss.

Shale: tr amts; med yel brn; firm; crumbly; earthy lstr; fn gritty tex; sli calc; as thin stringers.

Sandstone: v lt gry-wh, s&p i/p; fg-vcg; sbrnd-ang; pr spher; cgl tex; vari ammt of calc cmt, ranging from no cmt to hvy cmt; tr pyr cmt; prly srtd; immat; comp of aprox 40% qtz and 60% biot/chlor + fspr, inc RF; tr pyr highly vari vis por and perm, pred fair to gd.

Clay: pl-med brn; sft; sbrsn lstr; sli slty-smth tex; pr cohes and adhes; mod-prly solub; com aren; occurs as thn bds with sandst; occ carb lam.

Sand: v lt gry-wh, v lt brn; vfg-med grained; sbrnd-ang; pr spher; prly srtd; uncons to sli cmtd with calc; com lt gry arg instal mtrx; comp of aprox 50% qtz and 50% nonqtz frags incl mica, fspr, polymnrl RF; fair-gd vis por and perm; occ carb frag.

Sandstone: v lt gry-wh, sli s&p; vfg-mg lower; mosaic tex in hd arg zns; prec cgl tex; sbrnd-ang; prly srtd; immat; com hvy calc cmt with com gry soft arg instal fil; comp of aprox [illegible] and 60% nonqtz-fspr, [illegible] mtrx; chlor, musc, biot; tr pyr; tr [illegible] frags; [illegible] perm.

Note: MW 10.0, VIS 60, due to formation clays in the drlg mud

Tuff/Clay: wh-v lt gry, occ med gry; sft-occ frm; chalky lstr; smth tex; tuff prec alt to cly; sli calc; com aren; occurs as thn bds and as instal mtrx within sd.

Clay: mod-lt brn, occ lt gry; v sft; erthy lstr; slty tex; pr cohes and adhes; v slty, grdg to sltst; sli dism with vfg lig frags; sli aren; v sli calc.

Lignite: brnsh blk-blk; frm-hd; occ brittle; rsn-vit lstr; slty tex; mod-v arg, ranges from carb sltst to coal; thnly lam; com pyr lams; com micromica.

Siltstone: dk-med brn; frm-sft; erthy lstr; rough abrsv tex; prevasive dism of vfg-occ large carb frags; thnly lam with cly; sli aren; com musc flakes esp along bd planes.

Sand: wh-clr; med-c grained; sbrnd to rnd; mod spher; mod w srtd; mod mat; uncons-sli cmtd with calc, occ hvy calc cmt, tr pyr cmt; abndt gry arg mtrx; comp of aprox 80% clr qtz and 20% fspr, mudstone frags, polymnrl RF; com pyr frags; pr vis por and perm; com occurs as dism within med-lt gry cly.

Survey @ 2000', 2°

Run Halliburton DIL/Sonic log.