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DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

PUNA
GEOTHERMAL VENTURE
HAWAII

PY

May 15, 2003

Mr. Peter Young
Department of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

RE: KS-11 COMPLETION REPORT

Dear Mr. Young:

Pursuant to the Department of Land and Natural Resources (DLNR) Plan Of Operation, Puna Geothermal Venture (PGV) hereby submits the final completion report for Kapoho State 5 (KS-5) production well.

Should there be any questions, please do not hesitate to call me at (808) 965-6233.

Sincerely,

Michael Kaleikini
for

Barry T. Mizuno
Owner's Representative

Enclosure: KS-5 Completion Report 2003

C: Eric Tanaka, DLNR (w/attachment)
Bill Wiebe, PGV

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We certify that this document and all the attachments are true, accurate, and complete, pursuant to HAR11-60.1-4

Richmond Energy Services, Inc.
5221 CENTRAL AVENUE, SUITE 201
RICHMOND, CALIFORNIA 94804-5829

TELEPHONE: (510) 527-9876
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E-MAIL: mw@geothermex.com

WELL KS-5

COMPLETION REPORT

for

PUNA GEOTHERMAL VENTURE

Resource Recovery Project

Puna, Hawaii

by

Richmond Energy Services, Inc.
Richmond, California, USA

May, 2003

Richmond Energy Services, Inc.
5221 CENTRAL AVENUE, SUITE 201
RICHMOND, CALIFORNIA 94804-5829

TELEPHONE: (510) 527-9876
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1. Well Summary Report

Well Summary Report

Puna Geothermal Venture

Well ID: KS-05

Well Name: Production Well KS-05

Operator: Puna Geothermal Venture
Field:
API No:
Working Interest:
Spud Date: 23-Aug-02
Location: 14-3860 Kapoho-Pahoa Rd

Reports for 06:00 on date shown

17-Aug-02
Current Depth: 88 **Hole Drilled:** 88 **Ave ROP:** 14.7
Current Ops: open hole t/20"
Operations Summary:
Drill Pilot Hole T/88' (Cavitys @ 19' & 32') (6 hrs)
Open Hole T/ 20 " F/ 0 '- T/88 ft (4 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,000 **Well Costs:** $40,000
Drilling Days: 1 **Completion Days:**

18-Aug-02
Current Depth: **Hole Drilled:** **Ave ROP:**
Current Ops: P/u Tools & Drill Rat Hole
Operations Summary:
P/u Tools & Drill Rat Hole (10 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,000 **Well Costs:** $80,000
Drilling Days: 2 **Completion Days:**

19-Aug-02
Current Depth: 88 **Hole Drilled:** 88 **Ave ROP:**
Current Ops: Open Hole T/36"
Operations Summary:
P/U 36" hole Opener & strap Bit (3 hrs)
Open Hole t/36" T/21' (8 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,000 **Well Costs:** $120,000
Drilling Days: **Completion Days:**

20-Aug-02
Current Depth: 88 **Hole Drilled:** 88 **Ave ROP:**
Current Ops: Open Hole T/36"
Operations Summary:
Work On Hole Opener (2.383333 hrs)
Open Hole T/ 36" From 21' T/26' (2.5 hrs)
Work Stuck Hole Opener (2.5 hrs)
Clean Out Hole (1.5 hrs)
OPen Hole T/36' From26' t/29' (1 hrs)
Mud Data: None
Surveys: None

Daily Costs: $40,000 **Well Costs:** $160,000
Drilling Days: 3 **Completion Days:**

21-Aug-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: Open Hole T/36"
Operations Summary:
Open Hole t/36" F/29' T88' (11.5 hrs)
Clean Hole (0.5 hrs)
Lay DN BHA & Hole Opener (1 hrs)
Rig Floor T/ Run Conductor (1.5 hrs)
Run 30 " Conductor (0.5 hrs)
Center 30 " Conductor W/ Rotary Table (0.5 hrs)
Cmt 30" Conductor (1.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,000 **Well Costs:** $200,000
Drilling Days: 4 **Completion Days:**

22-Aug-02 **Current Depth:** 88 **Hole Drilled:** **Ave ROP:**
Current Ops: Drlg Cmt
Operations Summary:
Nipple Up Conductor (11 hrs)
Measure BHA (1 hrs)
Pick Up & Make Up 26" Bit & BHA (3 hrs)
Repack Swivel (1.5 hrs)
Drill Cmt F/83' (0.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,000 **Well Costs:** $240,000
Drilling Days: 5 **Completion Days:**

23-Aug-02 **Current Depth:** 163 **Hole Drilled:** 75 **Ave ROP:** 6.3
Current Ops: Drilling 26" hole
Operations Summary:
Drlg. 26" Hole F/85' T/99' [lost full returns @ 95' , tight hole @ 95 ft. pump high vis sweeps as needed (3 hrs)
Pick Up 10" monel (1.5 hrs)
Rig Maintaince & housekeeping While Addressing Rig Operating Safety (7.5 hrs)
Drill F/99' T/124' (7 hrs)
P/U 10" DC. & 26' Stb. (2.5 hrs)
Drill F/124' T/163' (2 hrs)
Service Rig (0.5 hrs)
Mud Data: MW: 8.5 Viscosity: 65 Filtrate: 20
Surveys: None
Daily Costs: $45,000 **Well Costs:** $285,000
Drilling Days: 6 **Completion Days:**

Well Summary Report

Puna Geothermal Venture

Well ID: KS-05

Well Name: Production Well KS-05

24-Aug-02

Current Depth: 273 **Hole Drilled:** 110 **Ave ROP:** 13.8

Current Ops: Drilling

Operations Summary:

Drlg. 26" Hole f/ 163' T/230' (4.5 hrs)
Work Tight Hole (1.5 hrs)
Work On Swivel (4 hrs)
Wash & ream T/Bottom @230' (1 hrs)
Drlg. F/230" T/239' (1.5 hrs)
Work Tight Hole (2 hrs)
Trip Out (1 hrs)
Change Bit & Strap Weld, Change Out BHA. (5.5 hrs)
Trip In Hole (1 hrs)
Drlg. F /238 T/273 (2 hrs)

Mud Data: MW: 8.5 Viscosity: 65 Filtrate: 20

Surveys: None

Daily Costs: $39,053 **Well Costs:** $324,053

Drilling Days: 7 **Completion Days:**

25-Aug-02

Current Depth: 422 **Hole Drilled:** 149 **Ave ROP:** 20.6

Current Ops: Wait On Water

Operations Summary:

Drlg. 26" Hole F/273" T/343' (4.25 hrs)
Trip Out Wait On Water [layed dn. 1 jt. hw. drill pipe (2.75 hrs)
Wait On Water [tie into city/county fire hydrant] (5 hrs)
Trip In 50' Fill [bridge@ 263] (0.5 hrs)
Wash & Ream t/ Bottom@343' (2 hrs)
Drill F/343' T/392' [no returns] (2.5 hrs)
Clean Hole F/ Survey [bridge or ledge @ 263'] (2 hrs)
Drill f/ 392' T 422' (0.5 hrs)
Pull 2 Stands Wait On Water (4.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $40,561 **Well Costs:** $364,613

Drilling Days: 8 **Completion Days:**

26-Aug-02

Current Depth: 599 **Hole Drilled:** 177 **Ave ROP:** 14.2

Current Ops: Working Stuck Pipe.

Operations Summary:

Wait On Water (4 hrs)
Trip In Hole (0.5 hrs)
Wash & Ream T/422' (1.5 hrs)
Drill F/422'T/510' [no returns] (7.5 hrs)
Survey @ 390' [1 Deg.] (0.5 hrs)
Drill T/599' (5 hrs)
Work Stuck Pipe @ 599' (5 hrs)

Mud Data: None

Surveys: None
Daily Costs: $43,137 **Well Costs:** $407,751
Drilling Days: 9 **Completion Days:**

27-Aug-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Jar & Pump Sweeps Attempting To Unstick Bha.
Operations Summary:
Work Stuck Pipe. [worked & moved string up hole 5' to593'] (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $47,198 **Well Costs:** $454,949
Drilling Days: 10 **Completion Days:**

28-Aug-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Prepare To Fish Drill String Using BH- Inteq Fishing Hand,
Operations Summary:
Work Stuck Pipe [Jarred pipe up hole t/536'] (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $52,596 **Well Costs:** $507,545
Drilling Days: 11 **Completion Days:**

29-Aug-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Work Stuck Pipe
Operations Summary:
Work Stuck Pipe (15 hrs)
Rig&Run Free Point {string free t/1st stb.] (2 hrs)
Mix High Vis. Pill & Pump Down Back Side (2 hrs)
Visualy Inspect Derrick, Replace Bolts On Standpipe & Ladder (3 hrs)
Prepair F/Backoff Shot (2 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,903 **Well Costs:** $546,448
Drilling Days: 12 **Completion Days:**

30-Aug-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Working Stuck Pipe,Waiting F/Arrival Of Explosives T/Back Off Drill String
Operations Summary:
Wait On Explosives T/Back Off Drill String (7 hrs)
Safety Meeting On Freepoint & Back Off W/ Explosives (1 hrs)
Freepoint & Backoff @ 403' (2.5 hrs)
Trip Out Lay Dn Bha (2 hrs)
P/U Fishing Bha {magnaflux jars,collers,subs] (10 hrs)
Jar & Work Fish (1.5 hrs)
Mud Data: None
Surveys: None

Daily Costs: $40,984 **Well Costs:** $587,432
Drilling Days: 13 **Completion Days:**

31-Aug-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Jarring on fish
Operations Summary:
Jar on fish (7 hrs)
Safety meeting on removeing goose neck from kelly. (0.5 hrs)
Remove kelly hose and goose neck (1 hrs)
Run Free Point Back Off @ 483' (4.5 hrs)
Trip Out Lay Dn. Fish (3.5 hrs)
Magnaflux Kelly,Saversub,Cross-over subs. (1 hrs)
Install Kelly Hose & Gooseneck (1 hrs)
Pick Up Fishing Tools & 9" drill collers (4 hrs)
Jar On Fish [top of fish @483' 49' of fish in hole] (1.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,754 **Well Costs:** $628,186
Drilling Days: 14 **Completion Days:**

01-Sep-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Jarring On Fish
Operations Summary:
Jar On Fish (7 hrs)
Pick Up Trimmie Pipe Run In T/482' (3 hrs)
Mix mud (0.5 hrs)
Pump 30 Bbl Hi-Vis Mud Down Back Side, Pump Down Jetting String While Reciprocating Trim Pipe (4.5 hrs)
Lay Down Trim Pipe (0.5 hrs)
Rig Up And Run Back Off Shot ,Couldn't Reach Back Off Depth,Pull And Lay Down Shot Tools (1 hrs)
Run 1" Trimmie Pipe Inside Drill String And Jet Down To Top Of Mud-motor Lay Down Trim Pipe. (4.5 hrs)
Safety Meeting, Run Backoff Shot And Attemt To Back Off,Shot Failed (3 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,575 **Well Costs:** $668,761
Drilling Days: 15 **Completion Days:**

02-Sep-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Running Free Point To Back Off
Operations Summary:
Pick Up And Run Trim Pipe Down Back Side (3 hrs)
Circ. Trim Pipe Down BacksideOf Drill String F/487' T522'
Pump High Vis. Pill. (4.5 hrs)
Lay Down Trim Pipe (0.5 hrs)
Pick Up Kelly Try To Pump Through Drillstring,Set Back Kelly

Pick Up Kelly Try To Pump Down Drillstring Set Back Kelly (1 hrs)
Jar On Fish. (2.5 hrs)
Pick Up Trim Pipe Pump Down BacksideTo 522' Lay Down Trim Pipe (2 hrs)
Jar On Fish (1 hrs)
Inspect Crown,Derrick, Ect, After Jarring (1 hrs)
Pick Up Trim Pipe Work Trim Pipe Down To 488' Lay Down Trim Pipe (5.5 hrs)
Rig And Run Back Off Shot (1.5 hrs)
Pick Up Kelly Try To Circ. (0.5 hrs)
Run Free Point Tools (1 hrs)
Mud Data: None
Surveys: None
Daily Costs: $47,316 **Well Costs:** $716,077
Drilling Days: 16 **Completion Days:**

03-Sep-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Jarring On Fish
Operations Summary:
Back Off Fish. (1.5 hrs)
Trip Out Lay Down Acelerators And 20" Stb. (2.5 hrs)
Wait On Orders (3 hrs)
Make Up Over Shot (1 hrs)
Slip And Cut 110' Drilling Line (2 hrs)
Trip In Hole (2.5 hrs)
Safety Meeting , Rig Up And Run Backoff Shot. [1st shot failed,run 2nd shot. (3 hrs)
Trip Out Lay Down Fish And Tools. (2 hrs)
Trip In P/U New Jars And Acc. (2.5 hrs)
Jar On Fish. (4 hrs)
Mud Data: None
Surveys: None
Daily Costs: $47,141 **Well Costs:** $763,219
Drilling Days: 17 **Completion Days:**

04-Sep-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Washing And Foaming Down Backside
Operations Summary:
Jar On Fish (2 hrs)
Wait on Orders (8 hrs)
Rig Up Air Compressor And Lines (4.5 hrs)
Wash And Cir. With Foam F/512' T/527' [foam returns to surface @ 1830 Hrs. (5.5 hrs)
Jar On Fish [up and down strokes] (1 hrs)
Wash And Foam Down Back side F491' T/522' [foam to surface @ 2345 (3 hrs)
Mud Data: None
Surveys: None
Daily Costs: $41,660 **Well Costs:** $804,878
Drilling Days: 18 **Completion Days:**

05-Sep-02

Current Depth: 599 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Foaming Down Backside

Operations Summary:

Jar On Fish (1 hrs)
Wash And Foam Down Backside (2 hrs)
Jar On Fish (1.5 hrs)
Wash And Foam F/522' T/527' (2 hrs)
Jar On Fish (0.5 hrs)
Pull 2 3/8 Tubing (1 hrs)
Jar On Fish (1.5 hrs)
Run In free Point Tools (stopped @ 480') (0.5 hrs)
Work Stuck Pipe (2 hrs)
Run 1 1/8" Tubing Inside Drillpipe Circ 10' T/ Top Of Fish (2 hrs)
Lay Down 1 1/8" Tubing (1 hrs)
Run In Freepoint Tools (1 hrs)
Jar On Fish (4 hrs)
Rig Pump Truck Attempt To Circ. (1 hrs)
Pick Up Tubing (2 hrs)
Foam Down Backside (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $41,782 **Well Costs:** $846,661

Drilling Days: 19 **Completion Days:**

06-Sep-02

Current Depth: 599 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Wait On Cement

Operations Summary:

Wash And Foam (5.5 hrs)
Jar On Fish (2.5 hrs)
Mix Pipe Lax Rig Haliburton And Pump Down Back Side (2.5 hrs)
Stand Back Tubing (1 hrs)
Wait On Pipe Lax (4 hrs)
Jar On Fish And Rotate (1.5 hrs)
Run In Tubing (0.5 hrs)
Wait On Cementers (1.5 hrs)
Pump Cement Plug @ 521' (1 hrs)
Wait On Cement (2 hrs)
R.I. Tag Cement @ 506' (0.5 hrs)
Wait on Cement (1.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $40,874 **Well Costs:** $887,534

Drilling Days: 20 **Completion Days:**

07-Sep-02

Current Depth: 599 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Waiting On Orders
Operations Summary:
Wait On Cement (12 hrs)
Run Freepoint Back Off Fishing String (2 hrs)
Lay Down Fishing Tools,Drill Collers , HWDP. (9 hrs)
Wait On Orders (1 hrs)
Mud Data: None
Surveys: None
Daily Costs: $43,762 **Well Costs:** $931,296
Drilling Days: 21 **Completion Days:**

08-Sep-02
Current Depth: **Hole Drilled:** **Ave ROP:**
Current Ops: Working On Wash Pipe
Operations Summary:
Wait On Orders (9 hrs)
Pick Up Overshot And Fishing String (5 hrs)
Try To Work Over Top Of Fish (2 hrs)
Trip Out Change Overshot Trip In (5.5 hrs)
Work Over Fish (0.5 hrs)
Jar On Fish (2 hrs)
Mud Data: None
Surveys: None
Daily Costs: $40,575 **Well Costs:** $971,871
Drilling Days: 22 **Completion Days:**

09-Sep-02
Current Depth: 599 **Hole Drilled:** **Ave ROP:**
Current Ops: Washing Over Fish
Operations Summary:
Trip Out Lay Down Fishing Tools (3.5 hrs)
Work On Washpipe (3.5 hrs)
Trip In With Wash Pipe (3 hrs)
Wash Over Fish T/527' (6 hrs)
Trip Out With Wash Pipe (2 hrs)
Weld Ears On Wash Pipe & Lay Down (1 hrs)
Safety Meeting (0.5 hrs)
Trip In Hole (2.5 hrs)
Jar On Fish (1.5 hrs)
Trip Out (0.5 hrs)
Mud Data: MW: 8.4 Viscosity: 27 Filtrate:
Surveys: None
Daily Costs: $40,575 **Well Costs:** $1,012,446
Drilling Days: 23 **Completion Days:**

10-Sep-02
Current Depth: **Hole Drilled:** **Ave ROP:**
Current Ops: Washing Over Fish
Operations Summary:

Trip Out Lay Dn Tools (2 hrs)
Pick Up Washover Pipe And Trip In Hole (3.5 hrs)
Wash Over Fish (3 hrs)
Trip Out With Washover Pipe Weld Same Trip In (9.5 hrs)
Mill On Stab @527' (6 hrs)
Mud Data: None
Surveys: None
Daily Costs: $42,155 **Well Costs:** $1,054,601
Drilling Days: 24 **Completion Days:**

11-Sep-02 **Current Depth:** 599 **Hole Drilled:** 599 **Ave ROP:**
Current Ops: Milling Off Stab Blades And washing over to bit.
Operations Summary:
Mill on stab. blade (1.5 hrs)
Trip (1.5 hrs)
Wait on welder,weld ears on wash pipe and lay downpipe,weld on guide shoe. (6 hrs)
Trip in hole (2 hrs)
Screw in fish,Jar on fish (3 hrs)
Trip out lay dn. guide shoe. (2 hrs)
Weld on washover mill (8 hrs)
Mud Data: MW: 8.5 Viscosity: 55 Filtrate:
Surveys: None
Daily Costs: $46,799 **Well Costs:** $1,101,400
Drilling Days: 25 **Completion Days:**

12-Sep-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: Jarring on fish
Operations Summary:
Weld on washover mill (2 hrs)
Pick up washover pipe, Trip in hole (2 hrs)
Mill on stab. (3 hrs)
Trip out with washover pipe [washover pipe left in hole] (1 hrs)
Wait on orders (2.5 hrs)
Pick up 16 jts. hwdp. stand back in derrick (1.5 hrs)
Weld on spear for washover pipe (6 hrs)
Trip in with spear (0.5 hrs)
Stab in washover pipe @479', Work stuck pipe free (3.5 hrs)
Trip out , Lay down washover pipe (2 hrs)
Mud Data: MW: 8.5 Viscosity: 50 Filtrate: 20
Surveys: None
Daily Costs: $42,825 **Well Costs:** $1,144,226
Drilling Days: 26 **Completion Days:**

13-Sep-02 **Current Depth:** 599 **Hole Drilled:** 599 **Ave ROP:**
Current Ops: Welding On Washover Pipe
Operations Summary:

Lay down washover pipe (0.5 hrs)
Pick up jars trip in hole (2 hrs)
Jar on fish (7.5 hrs)
Rig up run free point (3.5 hrs)
trip out with fishing tools (1.5 hrs)
Weld on washover pipe, Let welds cool (9 hrs)

Mud Data: None

Surveys: None

Daily Costs: $41,082 **Well Costs:** $1,185,308

Drilling Days: 27 **Completion Days:**

14-Sep-02

Current Depth: 599 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Fishing For bit,motor,stab

Operations Summary:

Wait on mill tooth shoe to cool (Carbide matrix) (0.5 hrs)
Pick up and make up wash over pipe. RIH to 526' (1.5 hrs)
Attempt to mill on fish,Pulled threads on 9" DC.Lost all but 1 DC in hole,pooh (1 hrs)
Make up over shot on one stand of HWDP Acquire fish. pooh lay down fishing tools. pooh with wash over pipe,Lay down same for repairs. (4 hrs)
Rebuild mill tooth shoe on wash over pipe. wait on crushed carbide and nickle silver matrix. (17 hrs)

Mud Data: None

Surveys: None

Daily Costs: $40,575 **Well Costs:** $1,225,883

Drilling Days: 28 **Completion Days:**

15-Sep-02

Current Depth: **Hole Drilled:** **Ave ROP:**

Current Ops: Fishing f/ bit,motor stab

Operations Summary:

Redress mill tooth wash over shoe. Wait on mill tooth shoe to cool (6.5 hrs)
Pick up and make up wash over pipe, RIH (2.5 hrs)
Wash over and tag at 529' (4 hrs)
Pooh, Lay down mill tooth wash over pipe. Rebuild mill tooth shoe on wash over pipe. (2 hrs)
RIH with screw in sub, Acquire and jar on fish. Low drum clutch spider broke. Perform manual back off at screw in sub, pooh. (7.5 hrs)
Work on drawworks, Remove low clutch spider. (1.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $39,538 **Well Costs:** $1,265,421

Drilling Days: 29 **Completion Days:**

16-Sep-02

Current Depth: 599 **Hole Drilled:** 599 **Ave ROP:**

Current Ops: Fishing for BHA

Operations Summary:

Remove low drum clutch spider (1.5 hrs)
Pick up and make up wash over pipe. RIH to 528' (2 hrs)
Mill on stabilizer blades from 528' to 531' (5 hrs)

Pooh with wash over pipe. Left 10.49' of 24" wash over pipe in hole. Lay down wash over pipe. (2.5 hrs)
Wait on orders. (2 hrs)
Pick up and make up screw in fishing assembly. (1 hrs)
Jar on fish (10 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,303,996
Drilling Days: 30 **Completion Days:**

17-Sep-02
Current Depth: 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Fishing for BHA
Operations Summary:
Jar on fish. Wait on low drum clutch soider. (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,342,571
Drilling Days: 31 **Completion Days:**

18-Sep-02
Current Depth: 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Fishing for BHA.
Operations Summary:
Install new spider on low drum clutch. (3 hrs)
Jar on fish, Fabricate spear out of 20" casing to retrieve 24" mill tooth wash over pipe (7 hrs)
Perform manual back off at screw in sub, Pooh (1.5 hrs)
Fabricate spear (9 hrs)
Pick up and make up 20" spear,Rih to top of 24" wash pipee (1 hrs)
Attempt to spear 24" wash over pipe (no good) (1 hrs)
Pooh, Reshape spear, RIH to top of 24" wash pipe (1 hrs)
Attempt to spear 24" wash pipe. (0.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,381,146
Drilling Days: 32 **Completion Days:**

19-Sep-02
Current Depth: 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Fishing for BHA
Operations Summary:
Pooh with 20" spear (0.5 hrs)
Reshape cut outs on spear (1.5 hrs)
RIH with 20" spear, Attempt to spear fish.(no good) pooh,Lay down spear (3 hrs)
Reshape cut outs on spear. (3 hrs)
Pick up and make up 20" spear, RIH with 20" spear, Spear fish.Pooh lay down fish, (24" mill shoe) Lay down spear. (3 hrs)
Make up screw in sub RIH Screw in fish. (5 hrs)
HSM with Baker Atlas and all personnel on location, Perform shot in hole. (1 hrs)

Jar on fish (3 hrs)
Perform shot in hole (1 hrs)
Jar on fish. (1 hrs)
Perform shot in hole (1 hrs)
Jar on fish (0.5 hrs)
Perform shot in hole (0.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,419,721
Drilling Days: 33 **Completion Days:**

20-Sep-02 **Current Depth:** 599 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Fishing for BHA
Operations Summary:
Jar on fish (6 hrs)
Pooh. Lay down HWDP,9"DCs,10"DCs and Kelly. (6 hrs)
Prepair to skid rig. Placed 20 cu. yards. ready mix cement on top of fish. (6 hrs)
Rig idle. (6 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,458,296
Drilling Days: 34 **Completion Days:**

21-Sep-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: Prepairing to skid rig
Operations Summary:
Rig idle (6 hrs)
Skid rig (note: Tagged top of cementplug at 412', 77' CEMENT on top of plug. (12 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,496,871
Drilling Days: 35 **Completion Days:**

22-Sep-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: P/U & strap BHA
Operations Summary:
Rig Idle (6 hrs)
Rig up on ks-5 surface side track. (15 hrs)
Cover celler, Secure 30" conductor to sub bases (1.5 hrs)
Pick up, make up and strap 26" BHA (1.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,535,446
Drilling Days: 36 **Completion Days:**

23-Sep-02 **Current Depth:** 136 **Hole Drilled:** 136 **Ave ROP:** 10.5

Current Ops: Drilling 26" hole

Operations Summary:

Pick up, make up and strap 26" BHA (5 hrs)
Drill out cement from 77' to 85'. Drilling 26" hole on KS-5 surface side track from 85' to 97' (5.5 hrs)
Lay Down rotary BHA, Pick up and make up 14.5" bit and mud motor. (1.5 hrs)
Drill rat hole for kelly shuck. (4.5 hrs)
Drilling 26" hole from 97' to 136' (7.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $42,003 **Well Costs:** $1,577,449

Drilling Days: 37 **Completion Days:**

24-Sep-02 **Current Depth:** 240 **Hole Drilled:** 104 **Ave ROP:** 8.3

Current Ops: Drilling26" hole

Operations Summary:

Drill 26" hole from 136' to 216' (8.5 hrs)
Circulate hole. Pump 30 bbl high vis, gel sweep (0.5 hrs)
Pooh. Pick up jars, single in with 9" drill collars (2.5 hrs)
Wash and ream from 200' to 216' (1.25 hrs)
Survey at 167' (.5 degree) (0.25 hrs)
Drill from 216' to 240' Pooh to shoe (4 hrs)
Work on mud pumps (3.5 hrs)
Pooh, Lay down jars and drill collar,Wait on cross over sub. (2 hrs)
Pick up 26' string stabilizer,RIH to 119'. Ream from 119' to 196' (1.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $83,903 **Well Costs:** $1,661,351

Drilling Days: 38 **Completion Days:**

25-Sep-02 **Current Depth:** 341 **Hole Drilled:** 101 **Ave ROP:** 9.2

Current Ops: Drilling 26" hole

Operations Summary:

Ream from 196' to 240' (4 hrs)
Drill 26" hole from 240' to 341' (11 hrs)
Pooh, Remove Kelly bushings. (1 hrs)
Load out kelly bushings, Repair rig. (1 hrs)
Slip and cut drilling line (120') Repair rig. (1 hrs)
HSM with PGV and daylight ? afternoon crews. Repair rig. (0.5 hrs)
Repair rig (5.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $39,476 **Well Costs:** $1,700,828

Drilling Days: 39 **Completion Days:**

26-Sep-02 **Current Depth:** 365 **Hole Drilled:** 24 **Ave ROP:** 8.0

Current Ops: Drill 26" hole
Operations Summary:
Repair rig (5 hrs)
Install Kelly drive bushings (1 hrs)
Wait on 10" drill collers (4 hrs)
Pick up and make up new 26" BHA (5 hrs)
Ream from 85' to 341' (5 hrs)
Drill from 341' to 365' (3 hrs)
Pooh to shoe. (1 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,575 **Well Costs:** $1,739,403
Drilling Days: 40 **Completion Days:**

27-Sep-02 **Current Depth:** 400 **Hole Drilled:** 35 **Ave ROP:** 5.8
Current Ops: Wait on welder
Operations Summary:
Work on mud pumps (1.5 hrs)
RIH to 344' (0.5 hrs)
Ream from 34' to 365' (1.5 hrs)
Drill from 365' to 373' (1.5 hrs)
Back ream from from 373' to 313' ream from 313' to 373' (3 hrs)
Drill 26" hole from 373' to 382' (1 hrs)
Pooh to shoe, Repair Kelly Drive bushings, RIH to 352' (5 hrs)
Ream from 352' to 382' (0.5 hrs)
Drill 26" hole from 382' to 400', Lost 500 PSI. (3.5 hrs)
Pooh look for wash out,Check mud pumps, Rih to 374' (2.5 hrs)
Wash and reamfrom 374' to 383', Losing pump pressure (1 hrs)
Work through tight spot at 383' (1 hrs)
Pooh check for wash out, center jet washed out (1 hrs)
Wait on welder to un strap bit. (0.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $39,425 **Well Costs:** $1,778,828
Drilling Days: 41 **Completion Days:**

28-Sep-02 **Current Depth:** 496 **Hole Drilled:** 96 **Ave ROP:** 5.5
Current Ops: Drill 26" hole
Operations Summary:
Wait on welder, Strap BHA. (4 hrs)
RIH to 373' (1 hrs)
Ream from 373' to 400' (1 hrs)
Drill 26" hole from 400' to 403' (1 hrs)
Circ and survey at 358' (1 degree) (0.5 hrs)
Drill 26" hole from 403' to 496' (16.5 hrs)
Mud Data: None

Surveys: None
Daily Costs: $40,153 **Well Costs:** $1,818,981
Drilling Days: 42 **Completion Days:**

29-Sep-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: @ 06:00: Rig up to bail for water sample
Operations Summary:
Drill 26" hole from 496 to 504' (3 hrs)
Pooh to 411', Tighten Kelly, RIH to 504' (1.5 hrs)
Drilling 26" hole from 504' 690' (19.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $44,474 **Well Costs:** $1,863,454
Drilling Days: 43 **Completion Days:**

30-Sep-02 **Current Depth:** 769 **Hole Drilled:** **Ave ROP:**
Current Ops: Drilling 26" hole
Operations Summary:
Drill 26" hole from 690' to700' (2 hrs)
Wipe hole, Pooh to shoe. Rih to 620' (2 hrs)
Wash and ream from 620' to 700'. (1 hrs)
Pooh. Lay down bit, shock sub. (2 hrs)
Rig and run bailer, Bail well for water sample, Rig down bailer. (3.5 hrs)
RIH to 556'. (1.5 hrs)
Wash and ream from 556' to700'. (3 hrs)
Drill 26' hole from 700' to 769'. (9 hrs)
Mud Data: None
Surveys: None
Daily Costs: $41,124 **Well Costs:** $1,904,579
Drilling Days: 44 **Completion Days:**

01-Oct-02 **Current Depth:** 890 **Hole Drilled:** 121 **Ave ROP:** 6.9
Current Ops: Drillilg 26" hole
Operations Summary:
Drill 26" hole from 769' to 805'. (13.5 hrs)
Pooh to shoe. (1 hrs)
Repair mud pump. (0.5 hrs)
Change out stab. RIH to 550' (1 hrs)
Wash and ream from 550' to 858' (4 hrs)
Drill 26" hole from 858 to 890'. (4 hrs)
Mud Data: None
Surveys: None
Daily Costs: $47,883 **Well Costs:** $1,952,462
Drilling Days: 45 **Completion Days:**

02-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 115 **Ave ROP:** 8.8

Current Ops: Reaming 26" hole

Operations Summary:

Drill 26" hole from 890' to1,005' (13 hrs)
Circulate and work pipe for survey (0.5 hrs)
Run survey at 958' - no good (0.5 hrs)
Pooh for reaming assembly. (1 hrs)
Hold safety meeting with PGV supervisor. (1 hrs)
Cut straps on drilling assembly, Lay down shock sub, Pick up and make up bit,n/b stab,shock sub and strap reaming BHA, let cool l/d 3x10" dc. (7 hrs)
Wash and ream from 138'. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $40,892 **Well Costs:** $1,993,354

Drilling Days: 46 **Completion Days:**

03-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Reaming 26" hole to 1005' for 22' casing

Operations Summary:

Wash and ream from 138' to442'. (6 hrs)
Pooh (0.5 hrs)
Repair Kelly bushing drive pins (2 hrs)
RIH to 442'. (0.5 hrs)
Wash and ream from 442' to 1005'. (15 hrs)

Mud Data: MW: 8.4 Viscosity: 27 Filtrate:

Surveys: None

Daily Costs: $41,356 **Well Costs:** $2,034,711

Drilling Days: 47 **Completion Days:**

04-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Rigging to run 22" casing.

Operations Summary:

Circulate and sweep hole (0.5 hrs)
Pooh (0.5 hrs)
Kelly up. Work tight hole from 486' to 463'. Lay down 3 jts. drill pipe (4 hrs)
Pooh. Inspect BHA. (1.5 hrs)
RIH. to 845' (1 hrs)
Wash and ream from 845' to 1,005'. Pump sweep and LCM pill at 1,005'. (3 hrs)
Pooh. Lay down 26" tools. (2 hrs)
Pick up and stand back 27 jts. 5" drill pipe (2 hrs)
HSM with crews, Rig up and run 22" Butt weld casing. (9.5 hrs)

Mud Data: MW: 8.4 Viscosity: 27 Filtrate:

Surveys: None

Daily Costs: $39,636 **Well Costs:** $2,074,347

Drilling Days: 48 **Completion Days:**

05-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Rigging to cement top job on 22" casing

Operations Summary:

Run 22" butt weld casing to 900'. (7 hrs)

Weld casing supports, Land casing at 900' (1.5 hrs)

RIH with stab in sub on 5" drill pipe (1 hrs)

Rig up Halliburton, Circulate casing with no returns, Hold safety meeting. (3.5 hrs)

Test lines to 2,500 psi.. Pump 20 bbls fresh water-20 bbls 10% CaCl2 water-2 bbls fresh water-20 bbls Flo-Check-2 bbls fresh water-20 bbls 10% CaCl2 water-2 bbls fresh water-20 bbls neat Flo-check-2 bbls fresh water. Mix & pump 148 bbls (831 cu.ft) Portland type1-2 Lead cement slurry @ 12.5 ppg, 2.77 yield , mix water 13.65 gals./sk-Pump 43.3 bbls (243 cu.ft.) Portland type 1-2 tail slurry @ 15.6 ppg, yield point 1.62 mix water 6.69 gals/sk. Drop latch down plug, Displace drill pipe with 16 bbls fresh water. Unsting stab in sub. C>I>P> @ 14:30 HRS 10-5-02 (1.5 hrs)

Pooh with cementing string. Wait on cement. (0.5 hrs)

Wait on cement (7 hrs)

Run trimmie pipe to tag cement, Would not go below 90'. Attemt to tag cement with wire line, no good. (2 hrs)

Mud Data: None

Surveys: None

Daily Costs: $38,575 **Well Costs:** $2,112,922

Drilling Days: 49 **Completion Days:**

06-Oct-02

Current Depth: 1005 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Wait on cement

Operations Summary:

Rig up pipe for top job. (9.5 hrs)

Run 1" pipe down annulas. Tag cement at 500' (2 hrs)

HSM. Rig up Halliburton for top job. Pump 224 cu.ft. Type I-II cement down annulus at 15.6 ppg with 25% neet Flo-Check down 1" pipe. (2.5 hrs)

Wait on cement. (2 hrs)

Run 1" pipe and tag cement @ 460'. Pull 1" pipe to 186' for second top job. (1.5 hrs)

Rig Halliburton, Pump 224 cu. ft. Type I-II cement at 15.6 ppg with 25% neat Flo-Check (0.5 hrs)

Wait on cement (4 hrs)

Run 1" pipe tag cement @ 186'. Pull 1" pipe to 126'. Rig Haliburton, Pump 390 cu.ft. Type I-II cement @ 15.6 Ppg with 25% Neat Flo-Check. (0.5 hrs)

Wait on cement. (1.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $139,575 **Well Costs:** $2,252,497

Drilling Days: 50 **Completion Days:**

07-Oct-02

Current Depth: 1005 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Test 21.25 B.O.P.E.

Operations Summary:

Run 1" pipe tag cement @ 186', Pull pipe to 76', Rig Haliburton Pump 106 cu.ft. Type I-II cement @ 15.6 ppg wit 25% Flo-Check. Cement to surface. C.I.P. @ 0030Hrs. (0.5 hrs)

Wait on cement (8 hrs)

Cut off conductorAnd 22" casing. Weld on Flange & Nipple up 21.25" BOPE. (15.5 hrs)

Mud Data: None
Surveys: None
Daily Costs: $53,650 **Well Costs:** $2,306,147
Drilling Days: 51 **Completion Days:**

08-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: RIH wit open ended drill pipe to shoe for cement plug.
Operations Summary:
Nipple up BOPE. (4 hrs)
Pick up BHA. (1.5 hrs)
Test Hydril. (0.5 hrs)
Work on Koomey. Charge Nitrogen Bottles. (6 hrs)
Test BOPE to 300 psi for 15 min-600 psi for 15 min.and 1000 psi for 30 min. Witnesed and approved by Eric Tanaka- DLNR. (1 hrs)
RIH tag cement @ 894' (1 hrs)
Clean out cement and shoe at 900'. Clean out to 1005'.(lost 125 Bbls mud.) (3 hrs)
Pull to 965' Run wire line survey-.75 Deg. (1 hrs)
Pooh. (1 hrs)
Run in and lay down 8" drill collers (1 hrs)
RIH wit open end drill pipe to 979' (1 hrs)
Rig up Haliburton, Pump 440 cu.ft. Type I-II cement @ 15.6 ppg. CIP @ 2200 Hr. (1 hrs)
Pull 5 stands, Squeeze 30 bbls away over a 2 hr. period. (2 hrs)
Mud Data: None
Surveys: None
Daily Costs: $69,620 **Well Costs:** $2,375,767
Drilling Days: 52 **Completion Days:**

09-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: RIH wit open end drill pipe to shoe to set cement plug.
Operations Summary:
Wait on cement (3.5 hrs)
RIH wit open end drill pipe tag cement @ 964' (0.5 hrs)
Circ. and check for mud loss. (0.5 hrs)
Pooh make up BHA, Service rig. (2 hrs)
RIH to 604', Pooh, RIH with open end drill pipe to 852 (1 hrs)
Wait on Haliburton to load bulk truck (3 hrs)
RIH to 946' Rig haliburton, Pump 251 cu.ft. Type I-II cement @ 15.6 ppg. CIP @ 1100 Hrs. Pooh 5 Stands. (0.5 hrs)
Wait on cement (1 hrs)
Squeeze 7.5 bbls cement away over a 3 hour period (3 hrs)
RIH tag cement @ 941' Pooh to 852' Circ hole clean (1 hrs)
Wait on haliburton to load cement (2 hrs)
RIH tagged hard cement @ 910' Rigged Haliburton, pumped 300 cu.ft. Type I-II cement @ 15.6 ppg C.I.P. @ 1830 hrs. Pull 5 Stands (0.5 hrs)
Wait on cement. (5.5 hrs)
Mud Data: MW: 8.6 Viscosity: 50 Filtrate:
Surveys: None

Daily Costs: $72,575 **Well Costs:** $2,448,342
Drilling Days: 53 **Completion Days:**

10-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: RIH open ended for cement plug

Operations Summary:

Wait on cement, Rih to 745, Circ. (2 hrs)
RIH Tag cement @ 775' (0.5 hrs)
Clean out cement from 775 to 810 (2 hrs)
Circ. out contaminated mud. (1.5 hrs)
Clean out cement from 810' to 905' (4 hrs)
Test shoe to 130 psi. Shoe would not test. (1 hrs)
Pooh stand back BHA, RIH open ended to 900', clean out fill to 905' (2 hrs)
Rig up Haliburton, Pump 301 cu.ft. Type I-II cement, Displaced with 10 bbls water, Pulled 300', clear drill pipe. (1 hrs)
Squeezed 10 bbls cement away over a 2 hour period (2 hrs)
Wait on cement. Pooh with open ended drill pipe, RIH with clean out BHA (Note: Retest casing and BOPE to 1000 psi) (6 hrs)
Clean out cement from 809' to 867' (2 hrs)

Mud Data: MW: 8.6 Viscosity: 56 Filtrate:
Surveys: None
Daily Costs: $75,382 **Well Costs:** $2,523,724
Drilling Days: 54 **Completion Days:**

11-Oct-02 **Current Depth:** 1005 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: RIH with 20" drilling Assembley

Operations Summary:

Clean out cement from 867' to 903'. Test shoe to 130 psi. test no good. (2 hrs)
Clean out cement from 903' to 905. (1 hrs)
Pull to shoe, work on #1 pump (2 hrs)
Clean out cement from 905' to 915' Circ clean (1.5 hrs)
Isolate mud pumps, test lap, no good (0.5 hrs)
Pooh stand back BHA, RIH open ended to 913' (1 hrs)
Mix and spot 35# per bbl lcm pill at 913', Squeeze LCM into formation. (3 hrs)
Rig Haliburton and pump 258 cu.ft. Type I-II cement displaced with 14 bbls water, Pull 190". Squeeze away 5 bbls cement over 1 hour at 440 psi. (1 hrs)
Wait on cement, Pooh ,Make up and strap 20" bit to mud motor (6 hrs)
RIH tag cement @ 813' (0.5 hrs)
Clean out cement from 813' to 903', Circ hole clean (3 hrs)
Test shoe to 120 psi (11.1 mud wt. eqv.) For 15 min, Test passed on verbal ok from Eric Tanaka-DLNR (0.5 hrs)
Pooh, Lay down clean out assembly (0.5 hrs)
Pick up and make up 20" drilling assembley (1.5 hrs)

Mud Data: MW: 8.6 Viscosity: 45 Filtrate:
Surveys: None
Daily Costs: $184,173 **Well Costs:** $2,707,897
Drilling Days: 55 **Completion Days:**

12-Oct-02 **Current Depth:** 1196 **Hole Drilled:** 191 **Ave ROP:** 19.1

Current Ops: Repair wash out on #1 pump module

Operations Summary:

Make up 20" BHA, Rih wit 5" drill pipe & lay down same,Pick up 9" drill collers RIH to 903' (10.5 hrs)

Clean out cement from 903' to 1005' (3 hrs)

Circ out cement, check for mud losses. (0.5 hrs)

Drill 20" hole from 1005 to 1196' (10 hrs)

Mud Data: None

Surveys: None

Daily Costs: $55,129 **Well Costs:** $2,763,026

Drilling Days: 56 **Completion Days:**

13-Oct-02 **Current Depth:** 1303 **Hole Drilled:** 107 **Ave ROP:** 7.6

Current Ops: Drilling 20" Hole

Operations Summary:

Drilling 20" hole from1,196 to 1206 (3.5 hrs)

Pooh to shoe (0.5 hrs)

Work on #1 mud pump (3 hrs)

Pooh lay down mudmotor, Strap bit to bit sub (4.5 hrs)

RIH to 1176' Ream from 1176 to 1206 (1.5 hrs)

Drill 20" hole from 1206 to 1236' (3.5 hrs)

Survey @ 1171' (0.5 hrs)

Drill from 1236' to 1303' (7 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,034 **Well Costs:** $2,819,060

Drilling Days: 57 **Completion Days:**

14-Oct-02 **Current Depth:** 1467 **Hole Drilled:** 164 **Ave ROP:** 8.4

Current Ops: RIH with magnent to retrieve stabolizer blade

Operations Summary:

Drill 20" hole from 1303 to 1394 (11.5 hrs)

Circ and survey at 1329'. 2.25 Deg. (0.5 hrs)

Drill 20" hole from 1394 to 1460' (6.5 hrs)

Pooh to 900' (0.5 hrs)

Work on #2 Mud pump. (3 hrs)

RIH to 1445,Wash to 1460 (0.5 hrs)

Drill 20" hole from 1460' to 1467'. (1.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,883 **Well Costs:** $2,875,943

Drilling Days: 58 **Completion Days:**

15-Oct-02 **Current Depth:** 1480 **Hole Drilled:** 13 **Ave ROP:** 2.0

Current Ops: Pooh for drilling ass.
Operations Summary:
Drill 20" hole fro 1467 to 1474'. (2 hrs)
Work tight hole (1.5 hrs)
Pooh, cut straps, Lay down bit,Monel and shock sub. (lost 1 blade off 20" stabolizer) (3.5 hrs)
Make 4 round trips with 12" magnent to 1457' (10 hrs)
Make up and strap BHA, RIH to 1457' (3.5 hrs)
Wash and ream from 1457 to 1474 (0.5 hrs)
Drill 20" hole from 1474 to 1480 (3 hrs)
Mud Data: None
Surveys: None
Daily Costs: $61,282 **Well Costs:** $2,937,225
Drilling Days: 59 **Completion Days:**

16-Oct-02 **Current Depth:** 1515 **Hole Drilled:** 35 **Ave ROP:** 5.0
Current Ops: Drilling 20" hole
Operations Summary:
(3.5 hrs)
Circ and sweep hole (0.5 hrs)
Pooh, Lay down 21 jts drill pipe (2 hrs)
Make up and strap BHA, RIH to 1312' (4.5 hrs)
Ream from 1312 to 1491 (9 hrs)
Drill 20" hole from 1491 to 1497 (0.5 hrs)
Clean trash out of pump (1 hrs)
Drill 20" hole from 1497 to 1515 (3 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,696 **Well Costs:** $2,993,921
Drilling Days: 60 **Completion Days:**

17-Oct-02 **Current Depth:** 1595 **Hole Drilled:** 80 **Ave ROP:** 8.0
Current Ops: Drilling
Operations Summary:
Drill 20" hole from 1515 to 1552 (3.5 hrs)
Survey @ 1547 (1 hrs)
Drill 20" hole from 1552 to 1567 (3 hrs)
Pooh, check BHA, Lay down 10" shock sub, Make up mudmotor strap bit rih to 900' (9.5 hrs)
Work on #1 mud pump (3 hrs)
Rih to 1543, wash and ream to 1567' (0.5 hrs)
Drill 20" hole from 1567 to 1595 (3.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $58,053 **Well Costs:** $3,051,974
Drilling Days: 61 **Completion Days:**

18-Oct-02 **Current Depth:** 1841 **Hole Drilled:** 246 **Ave ROP:** 13.7

Current Ops: Makeing magnent run to check for junk

Operations Summary:

Drill 20" hole from 1595 to 1808 (16.5 hrs)
Work on mud pump #1 (0.5 hrs)
Drill 20" hole from 1808 to 1841 (1.5 hrs)
Survey at 1730' (0.5 hrs)
Kelly up, twisted off when on bottom (1 hrs)
POOH, Lay down drilling tools, Make up fishing tools. (4 hrs)

Mud Data: None

Surveys: None

Daily Costs: $62,037 **Well Costs:** $3,114,011

Drilling Days: 62 **Completion Days:**

19-Oct-02 **Current Depth:** 1996 **Hole Drilled:** 155 **Ave ROP:** 12.9

Current Ops: Pooh to check BHA

Operations Summary:

RIH with grapple (1 hrs)
Chain out hole with fish (3.5 hrs)
RIH with 12" magnet, Work magnet @ 1841' Pooh lay down magnet. (5 hrs)
Make up BHA, RIH to 900' check mud-motor, RI to 1801, Wash from 1801 to 1841 (2 hrs)
Drill 20" hole from 1841 to 1996' (Held BOP drill) (12 hrs)
Circ for survey. (0.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $59,401 **Well Costs:** $3,173,412

Drilling Days: 63 **Completion Days:**

20-Oct-02 **Current Depth:** 2064 **Hole Drilled:** 68 **Ave ROP:** 7.2

Current Ops: Run in hole to 2,064'

Operations Summary:

Run wire line survey at 1,886'. (0.5 hrs)
Drilling 20" hole from 1,886' to 2,011'. (3.5 hrs)
Pull out of hole and check BHA, Run in hole to 1,961'. (4.5 hrs)
Wash and ream from 1,961' to 2,011'. (0.5 hrs)
Drilling 20" hole from 2,011' to 2,064'. (Twisted off, lost 26K in weight). (6 hrs)
Pull out of hole. Twisted box off 10" DC. (1 hrs)
Make up overshot. Run in hole to top of fish at 2,064'. Work over fish. Circ with fish. Pull fish free. POOH, chain out of hole with fish. Lay down fish and fishing tools. (7 hrs)
Pick up and make up two new 10" DC's. Start running in hole. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $65,267 **Well Costs:** $3,238,679

Drilling Days: 64 **Completion Days:**

21-Oct-02 **Current Depth:** 2232 **Hole Drilled:** 168 **Ave ROP:** 168.0

Current Ops: Reaming 20" hole for 16" casing.

Operations Summary:

Ran in the hole to 2064'. Plugged bit. (2 hrs)
Pulled out of the hole and unplugged bit. (3 hrs)
Ran in the hole to 2014'. Washed from 2014' to 2064'. (2 hrs)
Drilled 20" hole from 2064' to 2089'. (1 hrs)
Serviced rig. (Held BOP drill) (0.5 hrs)
Circulated and cleaned hole fro survey. (11.5 hrs)
Surveyed at 2137'. (0.5 hrs)
Pulled out of the hole and laid down mud motor , monel, shock sub. Strapped bit. (3.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $58,535 **Well Costs:** $3,297,214

Drilling Days: 65 **Completion Days:**

22-Oct-02

Current Depth: 2232 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Reaming 20" hole for 16" casing.

Operations Summary:

Strap bit & bit sub (3 hrs)
RIH to 900' (2.5 hrs)
Ream 20" hole from 900' (0.5 hrs)
Ream 20" hole from 900' to 2232 (16 hrs)
Circ hole clean. (1.5 hrs)
Pooh (0.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $52,443 **Well Costs:** $3,349,657

Drilling Days: 66 **Completion Days:**

23-Oct-02

Current Depth: 2232 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Nipple down 20" Hydril and diverter.

Operations Summary:

Pull out of hole. Lay down 20" Rotary tools for reaming. (2.5 hrs)

Rig up Bill's pick up machine. Ran 51 joints (2,205,29') 16", 97#,L-80,SLB threads. Float @ 2,154.', Shoe @ 2,205.29'. Rig down Bill's casing tongs and lay down machine. (8.5 hrs)

Run in hole with stab-in-sub on drill pipe to stab-in float collar. (2 hrs)

Rig up Halliburton surface lines. Circ and cond hole for 16" casing at 2,205'. (2 hrs)

Held safety meeting with all personnel on location. Test Halliburton surface lines to 2,000 psi. (Ok) Mixed and pumped 20 bbls water+10 bbls Superflush. Lead: 389 bbls Hawaiian type II+35% SSA-1+5% Silicate+10 lbs/skSpherelite+.75% Halad-9+.2% FWCA+.5%USC. Slurry wt. 12.5ppg, yield, 2,66. Tail: 90 bbls Hawaiian type II+35% SSA-1+5%Silicate+.65% CFR-3+.5% Halad-9+.5% USC. Slurry wt 15.5ppg, Yield 1.64. Dropped ball and displace drill pipe with 35 bbls fresh water. Float held. Unsting C.I.P. @ 16:44 hrs. Had 90 bbls cement slurry returns to surface. Rig down Halliburton. (3 hrs)

Pull out of hole. Chain out of hole. (1.5 hrs)

WOC (4.5 hrs)

Comments: Had very good cement returns to surface.

Mud Data: None
Surveys: None
Daily Costs: $209,451 **Well Costs:** $3,559,108
Drilling Days: 67 **Completion Days:**

24-Oct-02 **Current Depth:** 2232 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: WOC.
Operations Summary:
WOC. Dumped and clean all mud tanks while standing cement. (6 hrs)
Cut 22" cond and land the 16" casing. (5 hrs)
Install and weld 16" well head to 16" L-80 casing. Test welds on well head. No test. Welds all cracked. (10 hrs)
Reweld 16" well head. (3 hrs)
Comments: Welders did not preheat and keep hot wellhead.
Mud Data: None
Surveys: None
Daily Costs: $92,300 **Well Costs:** $3,651,407
Drilling Days: 68 **Completion Days:**

25-Oct-02 **Current Depth:** 2232 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Rewelding and Stress relieving 16" well head.
Operations Summary:
Rig up welders to head and maintain 450 deg on well head. (3 hrs)
Weld stressed weld on 16" well head. Stress test well head. (21 hrs)
Comments: Nee to keep a good eye on welders.
Mud Data: None
Surveys: None
Daily Costs: $49,500 **Well Costs:** $3,700,908
Drilling Days: 69 **Completion Days:**

26-Oct-02 **Current Depth:** 2232 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Nippling up 16" BOPE.
Operations Summary:
Stress relieve 16" well head. (15.5 hrs)
Pressure test 16" well head weld. Tested tp 1,500 psi. Test witnessed and approved by DLNR Inspector Eric Tanaka. (2.5 hrs)
Set in 16" BOPE. Nipple up BOPE. (6 hrs)
Comments: Two welders would be better next time.
Mud Data: None
Surveys: None
Daily Costs: $51,200 **Well Costs:** $3,752,108
Drilling Days: 70 **Completion Days:**

27-Oct-02 **Current Depth:** 2233 **Hole Drilled:** 1 **Ave ROP:**
Current Ops: Working on #1 mud pump.
Operations Summary:

Cont nipple up BOPE. Weld on 6" blooie line and nipple up same. (7 hrs)

Run in hole with 10" DC's and Jars. Lay down 10" DC's and jars. (2.5 hrs)

Test 16" casing and BOPE. Test Casing , CSO rams (upper) HCR valve and surface valves to 2,100 psi/30 mins. Lower CSO rams to 2,000 psi/30 mins. Tested Pipe and Hydril to 1,000 psi/30 mins. Test witnessed and approved by Eric Tanaka D.L.N.R. (7.5 hrs)

Run in hole to TOC (Top of Cement) at 2,155'. (1.5 hrs)

Clean out cement from 2,155' to 2,233'. Drilled 1' of new hole. (3 hrs)

Circ hole clean at 2,233'. (0.5 hrs)

Repair Rig. (Work on mud pump). (1.5 hrs)

Circ hole clean at 2,233'. (0.5 hrs)

Comments: Need to go through both pumps and replace all liners, swabs, valves and valve seats.

Mud Data: None

Surveys: None

Daily Costs: $45,500 **Well Costs:** $3,797,608

Drilling Days: 71 **Completion Days:**

28-Oct-02 **Current Depth:** 2333 **Hole Drilled:** 100 **Ave ROP:** 33.3

Current Ops: Run in hole and inspect BHA with Bill's Pipe Service.

Operations Summary:

Perform Equivalent mud leak off test. Well bore would not hold 11,5# mud. Pumped several attempts, well bore would not hold 11.5# mud. (0.5 hrs)

Pull out of hole and inspect BHA. (Drill collars) (5.5 hrs)

Run in hole to 2,148'. (1 hrs)

Safety ream from 2,148' 2,233'. (0.5 hrs)

Service Rig. (0.5 hrs)

Rotary drilling 14.75" hole from 2,233' to 2,333'. (3 hrs)

Circ hole clean at 2,333' (0.25 hrs)

Perform leak off test. Well bore wil not hold 11.5ppg mud weight. (0.25 hrs)

Pull out of hole to 400'. (0.5 hrs)

BOP and H2S drill with all personnel on location. (0.5 hrs)

Cont pulling out of hole, stand back BHA. (2 hrs)

Run in hole with open ended dill pipe to 2,329'. (2 hrs)

Circ and cool well down at 2,329' for cement job. (0.5 hrs)

Rig up Halliburton. Test surface lines to 2,000 psi. Ok. Mixed and pumped 200', 243c/f, 150 sk Hawaiian cement+40%SSA+.65%CFR+.5% U.C.S. at 15.5ppg, Yield: 1.62 c/f, water: 6.8 gal/sk. CIP @ 17:35 hrs. Pull up 500'. Squeezed 18 bbls away @ max 540 psi. (1.5 hrs)

Pull out of hole to wait on cement and inspect BHA. (1 hrs)

Make up BHA and inspect 9" DC's on way in hole. (4.5 hrs)

Comments: Well bore not wanting to support 11.5ppg mud.

Mud Data: None

Surveys: None

Daily Costs: $41,500 **Well Costs:** $3,839,108

Drilling Days: 72 **Completion Days:**

29-Oct-02 **Current Depth:** 2333 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Circ and cond hole clean at 2,333'.

Operations Summary:

Run in hole to TOC at 2,225', twenty foot below the shoe. (1 hrs)
Circ hole clean at 2,225'. (0.5 hrs)
Perform equivalent mud wt leak off test. Well bore would not hold 11.5# mud. (0.5 hrs)
Clean out cement from 2,225 to 2,260'. (0.5 hrs)
Circ hole clean at 2,260'. (1 hrs)
Pull out of hole and stand back BHA. (1.5 hrs)
Run in hole with open ended 5" drill pipe to 2,249'. (1 hrs)
Rig up Howco. Test lines to 2,000 psi. Mixed and pumped 200', 243c/f, 150 sks Hawaiian cement+40% SSA+.65% CFR+.5%U.C.S. at 15.6ppg, Yield: 1.62 c/f, water: 6.8 gal/sk. Displace with 35 bbls fresh water. POOH 500'. Squeeze 8 bbls cement away at 800 psi. CIP @ 07:00 hrs. (2 hrs)
Pull out of hole. (1.25 hrs)
Make up Rotary BHA and run in hole to 2,132' TOC. (1.25 hrs)
Wait on Cement at 2,132'. (3.5 hrs)
Clean out cement from 2,132' to 2,206'. (2 hrs)
Perform Equivalent mud wt leak off test. Well bore held to 10ppg mud weight. Test had a verbal Ok by Eric Tanaka, DLNR. (3 hrs)
Clean out firm cement from 2,206' to 2,333 (5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $53,500 **Well Costs:** $3,892,608

Drilling Days: 73 **Completion Days:**

30-Oct-02

Current Depth: 2485 **Hole Drilled:** 152 **Ave ROP:** 15.2

Current Ops: Directionally drilling 14.75" hole to 2,485 at Report time.

Operations Summary:

Circ hole clean at 2,333'. (0.5 hrs)
Pull out of hole and lay down rotary BHA. (1.5 hrs)
Pick up and make up 14.75" Directional BHA. Orient MWD. Shallow test MWD. (6.5 hrs)
Run in hole to 2,210'. (1 hrs)
Install rotating head and rubber. (1.5 hrs)
Safety ream from 2,110' to 2,333'. (2.5 hrs)
Directionally drilling 14.75" hole from 2,333' to 2,380'. (3 hrs)
Service Rig. (0.5 hrs)
Directionally drilling 14.75" hole from 2,380' to 2,485' at Report time. (7 hrs)

Mud Data: None

Surveys: None

Daily Costs: $57,885 **Well Costs:** $3,950,493

Drilling Days: 74 **Completion Days:**

31-Oct-02

Current Depth: 2832 **Hole Drilled:** 347 **Ave ROP:** 14.6

Current Ops: Directionally drilling 14.75" hole to 2,832' at Report time.

Operations Summary:

Directionally drilling 14.75" hole from 2,485' to 2,631'. (8 hrs)
Service Rig. (0.25 hrs)

Directionally drilling 14.75" hole from 2,631' to 2,832' at Report Time. (15.75 hrs)
Comments: Day went real well.
Mud Data: None
Surveys: None
Daily Costs: $44,850 **Well Costs:** $3,995,343
Drilling Days: 75 **Completion Days:**

01-Nov-02 **Current Depth:** 3067 **Hole Drilled:** 235 **Ave ROP:**
Current Ops: Running in hole with new 14.75" bit at Report Time.
Operations Summary:
Directionally drilling 14.75" hole from 2,832' to 2,948'. (7 hrs)
Service Rig. (0.5 hrs)
Directionally drilling 14.75" hole from 2,948' to 3,019'. (4 hrs)
Safety drill: BOP and H2S Drill. (0.5 hrs)
Directionally drilling 14.75" hole from 3,019' to 3,067'. (4 hrs)
Pull out of hole. Lay down bad jars, bad shock sub. Pick up new 14.75" bit and up fishing jars.. (7.5 hrs)
Run in hole to shoe. Shallow test MWD at Report Time. (0.5 hrs)
Comments: Lost Daily jars and Bowen shock sub. Both bad.
Mud Data: None
Surveys: None
Daily Costs: $47,941 **Well Costs:** $4,043,284
Drilling Days: 76 **Completion Days:**

02-Nov-02 **Current Depth:** 3448 **Hole Drilled:** 381 **Ave ROP:** 17.3
Current Ops: Directionally drilling 14.75" hole to 3448'
Operations Summary:
RIH to 2995' (0.5 hrs)
Safety ream from 2995' to3,067' (1 hrs)
Directionally drilling 14.75" hole from 3,067 to 3,253 (13.5 hrs)
Service Rig (0.5 hrs)
Directionally drilling 14.75" hole from 3,250' to 3448' (8.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $60,609 **Well Costs:** $4,103,893
Drilling Days: 77 **Completion Days:**

03-Nov-02 **Current Depth:** 4018 **Hole Drilled:** 570 **Ave ROP:** 24.3
Current Ops: Directionally drilling 14.75" hole to 4,018 at report time
Operations Summary:
Directionally drill 14.75" hole from 3,448 to 3,733' (13 hrs)
Service rig (0.5 hrs)
Directionally drill 14.75" hole from 3,733 to 4,018 at report time (10.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,784 **Well Costs:** $4,160,677

Drilling Days: 78 **Completion Days:**

04-Nov-02 **Current Depth:** 4500 **Hole Drilled:** 482 **Ave ROP:** 20.5

Current Ops: Directionally drilling 14.75" hole to 4,500' at report time

Operations Summary:

Directionally drilling 14.75" hole from 4,018 to 4,359' (16.5 hrs)
Service rig. (0.5 hrs)
Directionally Drill 14.75" hole from 4,359' to 4,500' at report time (7 hrs)

Mud Data: None

Surveys: None

Daily Costs: $57,022 **Well Costs:** $4,217,700

Drilling Days: 79 **Completion Days:**

05-Nov-02 **Current Depth:** 4958 **Hole Drilled:** 458 **Ave ROP:**

Current Ops: Directionally drilling 14.75" hole to 4,958' at Report Time.

Operations Summary:

Directionally drilling 14.75" hole from 4,500' to 4,736'. (9 hrs)
Service Rig. (0.5 hrs)
Directionally drilling 14.75" hole from 4,736 to 4,832'. (4.5 hrs)
Circ bottoms up at 4,832'. Management decision to drill 30' and circ bottoms up to check on formation and temp for casing point. (1 hrs)
Directionally drilling 14.75" hole from 4,832' to 4,847'. (1.5 hrs)
Circ bottoms up at 4,847'. (1 hrs)
Directionally drilling 14.75" hole from 4,847' to 4,896'. (1.5 hrs)
Circ bottoms up at 4,896'. (1 hrs)
Directionally drilling 14.75" hole from 4,896' to 4,928'. (1 hrs)
Cicr bottoms up at 4,928'. (1 hrs)
Directionally drilling 14.75" hole from 4,928' to 4,958'. (1 hrs)
Circ bottoms up at 4,958' at Report Time. (1 hrs)

Comments: Had no rig repairs this day.

Mud Data: None

Surveys: None

Daily Costs: $54,740 **Well Costs:** $4,272,440

Drilling Days: 80 **Completion Days:**

06-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 142 **Ave ROP:** 23.7

Current Ops: Reaming 14.75" hole

Operations Summary:

Drictional drill 14.75" hole from 4958' to 4,990' (1.5 hrs)
Circ. bottoms up (1 hrs)
Directional drill 14.75" hole from 4,990 to 5,022 (1 hrs)
Circ. bottoms up. (1 hrs)
Directional drill 14.75" hole from 5,022 to 5,054" (1.5 hrs)
Circ. bottoms up (1 hrs)
Directional drill 14.75" hole from 5,054' to 5,086' (1.5 hrs)
Circ. bottoms up. (1 hrs)
Directional drill 14.75" hole from 5,086 to 5,100' casing depth. (0.5 hrs)

Circ. hole clean at 5,100' (2 hrs)
POOH lay down directional tools, Pick up reaming BHA, RIH to 2,337' (8.5 hrs)
Ream 14.75" hole from 2,337' to 2,602' at report time (3.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $51,400 **Well Costs:** $4,323,839
Drilling Days: 81 **Completion Days:**

07-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Wipe hole to shoe.
Operations Summary:
Ream 14.75" hole from 2,620' to 5,100', Had 32' fill on bottom (17 hrs)
Circ and cond. mud for 11.75" casing (5 hrs)
Wipe hole to shoe at 2,205' (2 hrs)
Mud Data: None
Surveys: None
Daily Costs: $55,500 **Well Costs:** $4,379,340
Drilling Days: 82 **Completion Days:**

08-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Circ. and cool wellbore for casing.
Operations Summary:
Circ. and cond. wellbore for 14.75" casing at 5,100' (15.5 hrs)
Wipe hole to shoe at 2205'. (2 hrs)
Circ and cond. hole at 5,100' (6.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $58,891 **Well Costs:** $4,438,231
Drilling Days: 83 **Completion Days:**

09-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Circ. and cond. mud for casing
Operations Summary:
Cir. and cond. well for 11.75" casing (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $39,035 **Well Costs:** $4,477,266
Drilling Days: 84 **Completion Days:**

10-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Start running 11.75" casing to 1,000' at Report Time.
Operations Summary:
Circ and cond hole for 11.75" casing at 5,100'. Waiting for Halliburton shoe and float collar. (13 hrs)
Pull out of hole. (4 hrs)
Rig up Bill's casing tongs and lay down machine. Lay down 14.75" BHA. (2.5 hrs)

Running 11.75", 65# T-95, SLHC thread casing to 1,000' at Report Time. (4.5 hrs)

Comments: Had to wait on Halliburton Shoe and float collar that missed the boat in California. (Weatherford).

Mud Data: None

Surveys: None

Daily Costs: $59,400 **Well Costs:** $4,536,666

Drilling Days: 85 **Completion Days:**

11-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Circ, cond and cool mud down after first stage cement job on 11.75" casing job, shoe @ 5,077'.

Operations Summary:

Ran 124 jts. (5,077') 11.75", 65#, T-95, SLHC threads with shoe at 5,077'. ACP @ Top 1,956' bottom 1,996', ACP landing collar at 4,948'. Port collar at 1,954'. (6 hrs)

Circ and cool hole down for 11.75" casing cement job. (12.5 hrs)

Held safety meeting with all personnel on location. (0.5 hrs)

Test Howco surface lines to 5,000 psi. (Good). Pumped 100 bbls fresh water ahead. Mixed and pumped 430 bbls lead slurry mixed at 13.84 ppg. Tail 59 bbls 15.5#. Dropped wiper plug with 5 bbls tail cement @ 15.5ppg of top of plug. Displace with 311 bbls fresh wate, mixed and pumped 30 bbls packer slurry cement at 15.5 ppg follow with 196 bbls frsh wate. Landed wiper plug with 1,500 psi. Inflated packer to 1,900 psi with 4,5 bbls of cement. Bleed pressure to 1,000 psi. pressured up to 2,900 psi and opwned circ ports in packer. Pumped 40 bbls fresh water. Circ 150 bbls cement slurry to surface. CIP 22:00 hrs. Great job! (3 hrs)

Circ and cond mud through port collar at 1,954'. Will have to circ and give cement time to set up due to low well bore temp. (2 hrs)

Comments: Cement job and casing went very well.

Mud Data: None

Surveys: None

Daily Costs: $790,950 **Well Costs:** $5,327,616

Drilling Days: 86 **Completion Days:**

12-Nov-02 **Current Depth:** 5100 **Hole Drilled:** **Ave ROP:**

Current Ops: Wait on Cement

Operations Summary:

Circ and cond hole clean at 1,950' through ACE circ ports. (8 hrs)

Wait on Cement. (16 hrs)

Comments: Rigs running pretty good.

Mud Data: None

Surveys: None

Daily Costs: $52,300 **Well Costs:** $5,379,916

Drilling Days: 87 **Completion Days:**

13-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: WOC

Operations Summary:

WOC. (13.5 hrs)

Slack off 11.75" casing, Lift BOP's. Install Expansion spool and packoff. Reset BOP's (4 hrs)

Safety meeting with all personal (0.5 hrs)

Mixed and pumped 214 bbls Hawaiian cement at 15.5 ppg, Dropped plug pumped 8 bbls cement on top of plug. Displaced cement with 210 bbls fresh water, Landed plug with 1,750 psi. Closed DV. ports. Bleed pressure to 0 psi. CIP @ 19:15 hrs. (1.5 hrs)

WOC (4.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $52,875 **Well Costs:** $5,432,791

Drilling Days: 88 **Completion Days:**

14-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Nipple Up 13.375" BOP's

Operations Summary:

WOC. (3 hrs)

Slack off 11.75" casing, Remove Howco cement head. Nipple down 16" BOPE. Set out rotating head, Hydril,Cameron Double gate, Flow tee, Cameron double gate,Mud cross (6 hrs)

Land 11.75" casing. Make final cut, Per Cameron. Instal Cameron expansion spool, Test expansion spool, Will not test. Repack Expansion spool pack off, Retest expansion spool to 5,000 psi/15 min. Good test. (13 hrs)

Set in 12"x1500 WKM valve and DSA, Torque bolts up at report time (2 hrs)

Mud Data: None

Surveys: None

Daily Costs: $152,875 **Well Costs:** $5,585,666

Drilling Days: 89 **Completion Days:**

15-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Nipple up BOPE

Operations Summary:

Set in and nipple up 13.625" BOPE (24 hrs)

Mud Data: None

Surveys: None

Daily Costs: $42,875 **Well Costs:** $5,628,541

Drilling Days: 90 **Completion Days:**

16-Nov-02 **Current Depth:** 5100 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Run in hole to 4,788', cleaning out strings fro 2,458' to 4,788'.

Operations Summary:

Cont nipple up BOPE. Install flow line, 6" blooie line and 2" kill line. (3.5 hrs)

Test 11.75" casing and upper Blind rams to 2,000 psi for 15 min. (0.5 hrs)

Slip and cut 120' drilling line. (1 hrs)

Make up 10.625" with bit on HWDP and RIH to 1,700'. POOH and pick up 3-8" DC's. Run in hole to 1,200'. Pull out of hole to retest BOP's (4.5 hrs)

Test 11.75" casing, lower steel blind and upper blind rams to 2,500 psi. Test witnessed and approved by DLNR Engineer Eric Tanaka. (1.5 hrs)

Cont run in hole to TOC at 1,885'. (1 hrs)

Test Hydril to 1,000 spi 30 min, upper and lower pipe rams to 2,500 spi. 30 min each. Test upper and lower Kelly valves to 1,000 psi. 30 min. Test check vakve. Ok. BOP test witnessed and approved by DLNR Engineer Eric Tanaka. (4 hrs)

Clean our cement from 1,855', (drill out Weatherford stage collar at 1,954') to 2,015'. (5 hrs)
Test Weatherford's port collar to 2,500 psi. Test witnessed and approved by DLNR Engineer Eric Tanaka. (1 hrs)
Run in hole to 4,788'. Having to clean out cement stringers at 2,458' and 4,788' at Report Time. (2 hrs)

Comments: Had to test casing and blind rams two times. Mr Tanaka did not witnessed first test.

Mud Data: None

Surveys: None

Daily Costs: $61,350 **Well Costs:** $5,689,891

Drilling Days: 91 **Completion Days:**

17-Nov-02

Current Depth: 5100 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Wait on choke manifold

Operations Summary:

Clean out cement stringers from 4,788' to 5,075'. (9 hrs)
Circ hole clean (1 hrs)
Pooh. (2 hrs)
Service rig. (0.5 hrs)
Install rotating heah. (6.5 hrs)
RIH to 5,075' (1.5 hrs)
Wait on choke manifold. (3.5 hrs)

Comments: Choke manifold got lost on non union barge for two weeks!!!

Mud Data: None

Surveys: None

Daily Costs: $61,350 **Well Costs:** $5,751,241

Drilling Days: 92 **Completion Days:**

18-Nov-02

Current Depth: 5100 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Waiting on choke manifold.

Operations Summary:

Wait on choke manifold. (24 hrs)

Mud Data: None

Surveys: None

Daily Costs: $49,805 **Well Costs:** $5,801,046

Drilling Days: 93 **Completion Days:**

19-Nov-02

Current Depth: 5128 **Hole Drilled:** 28 **Ave ROP:** 9.3

Current Ops: POOH

Operations Summary:

Wait on choke manifold. (6 hrs)
Nipple up 15,000 psi choke, Hard line into 6" blooie line. (2 hrs)
Stage out of hole to 3,184'. Stage in hole to 5,075', Circ and cool down wellbore (5.5 hrs)
Test choke manifold to 2,500 psi. Test witnessed and approved by Eric Tanaka of DLNR. (1 hrs)
Circ and cool well bore at 5,075' , Cont. to hard line choke into 6" blooie line. (2.5 hrs)
Clean out cement and shoe at 5,077' (0.5 hrs)

Test shoe to 10.3# mud wt. equivalent. Test good. Test witnessed and approved by Eric Tanaka of DLNR. (0.5 hrs)
Clean out cement from 5,077' to 5,100' (0.5 hrs)
Drill 10.625" hole from 5,100' to 5,128' (3 hrs)
Circ hole clean at 5,128' (0.5 hrs)
POOH for directional tools. (2 hrs)
Mud Data: None
Surveys: None
Daily Costs: $49,805 **Well Costs:** $5,850,851
Drilling Days: 94 **Completion Days:**

20-Nov-02 **Current Depth:** 5386 **Hole Drilled:** 258 **Ave ROP:**
Current Ops: Directionally drilling ahead to 5,386' at Report Time.
Operations Summary:
Cont pull of of hole for Baker Directional tool failure. (0.05 hrs)
Install new rotating housing on mud motor. Install new rupture plate in 6" blooie line. (1.45 hrs)
Pick up and make up 10.625" Directional BHA. Orient MWD. Surface test MWD. Good Test. (6.5 hrs)
Run in hole staging at 2,077', 2,300', 4,150' and 5,128'. (3.5 hrs)
Directionally drilling 10.625" Production hole from 5,128' to 5,185'. Dropped MWD probe @ 5,140'. (2.5 hrs)
Attempting to communicate with MWD. Tool not wanting to talk. Not asking the right questions. Will have to pull to shoe to retrieve MWD Probe. (0.5 hrs)
Pull out of hole to shoe. Retrieve MWD probe with slick line. Work on probe. Dropped probe. Probe is taking to operator. (3 hrs)
Directionally drilling from 5,217' to 5,386' at Report Time. (6.5 hrs)
Comments: Baker MWD not working very good.
Mud Data: None
Surveys: None
Daily Costs: $49,654 **Well Costs:** $5,900,506
Drilling Days: 95 **Completion Days:**

21-Nov-02 **Current Depth:** 5943 **Hole Drilled:** 557 **Ave ROP:**
Current Ops: Directional drilling 10.625" hole at report time
Operations Summary:
Directional drill 10.625" hole from 5,386' to 5,868' (18 hrs)
Circ. with pump #1, Change out head on pump #2. (1 hrs)
Directional drill from 5,868' to 5,943' (5 hrs)
Comments: Mud pumps wore out, need repairs very bad.
Mud Data: None
Surveys: None
Daily Costs: $51,943 **Well Costs:** $5,952,448
Drilling Days: 96 **Completion Days:**

22-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 432 **Ave ROP:** 29.8
Current Ops: POOH for flow test.
Operations Summary:

Directional drill from 5,943' to 5,152' (8.5 hrs)
Service rig. (0.5 hrs)
Directional drill from 5,152' to 6,230' (Some small loss of mud. 5 bbls.) (2.5 hrs)
Circ and work on mud pumps. (3 hrs)
Directional drill from 6,230' to 6,279' (1.5 hrs)
Circ and work on mud pumps (3.5 hrs)
Directional drill from 6,279' to 6,310' . (0.5 hrs)
Circ and repair 6" water line to rig. (0.5 hrs)
Directional drill from 6,310' to 6,375', Lost circ at 6,356', Drilled into fracture at 6,363' to 6,375'., Didn't touch bottom of fracture. (1.5 hrs)
Circ, pump 10 bbl min. down back side with Haliburton. (0.5 hrs)
POOH to shoe, Retrieve MWD probe (0.5 hrs)
POOH for flow test. (1 hrs)

Mud Data: None
Surveys: None
Daily Costs: $47,652 **Well Costs:** $6,000,100
Drilling Days: 97 **Completion Days:**

23-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Nipple up flow equipment.
Operations Summary:
POOH lay down directional tools. (2.5 hrs)
Install .50" vent lines between 16" and 20" casing and filling with .75" gravel. (5.5 hrs)
Nipple down BOPE control lines, Move Accumulator house, Cat walk and V-Door. Nipple down BOPE and set out, Nipple up flow equipment. (16 hrs)
Mud Data: None
Surveys: None
Daily Costs: $37,037 **Well Costs:** $6,037,137
Drilling Days: 98 **Completion Days:**

24-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Nipple up flow equipment
Operations Summary:
Nipple up flow equipment, Install vent lines, Rigged Haliburton surface lines to wellhead and pumped 66 bbls water at 5 bbl/ min to fill casing, Pumped 100 bbls water at 10 bbls min with no pressure, Shut down pumping and let well heat up. (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $34,037 **Well Costs:** $6,071,174
Drilling Days: 99 **Completion Days:**

25-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Run Haliburton Temperature and pressure survey
Operations Summary:
Nipple up flow equipment. (9 hrs)
Flowed 14,ooo gal hot water down well. (1 hrs)
Cont. rigging up for flow test, Working on muffler and blooie line. (8 hrs)

Rig and run temperature and pressure survey. (6 hrs)
Mud Data: None
Surveys: None
Daily Costs: $39,037 **Well Costs:** $6,110,211
Drilling Days: 100 **Completion Days:**

26-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Rig up to flow test.
Operations Summary:
Run temp/psi. survey #2 (5 hrs)
Cont. rig up to flow test well. (19 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,825 **Well Costs:** $6,149,036
Drilling Days: 101 **Completion Days:**

27-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Rig up to flow test.
Operations Summary:
Cont. rigging up for flow test, Run Haliburton temp/psi. survey. Bottom hole temp. 634 Deg./1983 Psi., Rig up and pressure well with Nitrogen. (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,825 **Well Costs:** $6,187,861
Drilling Days: 102 **Completion Days:**

28-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Rig up to flow test.
Operations Summary:
Rigging up for flow test. Run t/p survey,Bottom hole temp 638.8 Deg/2,022 psi. (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,825 **Well Costs:** $6,226,686
Drilling Days: 103 **Completion Days:**

29-Nov-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Let well bore heat up for flow test.
Operations Summary:
Ran T&P survey #5. Hole temp at 3,000' 322 Deg. ? 913 psi., Flowed well, After 3.5 hrs. wellhead psi. down to 190 psi. temp 395 Deg., Ran T/P log #6 Tagged up at 1,946', Rig up mud pits to take on water. (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $38,825 **Well Costs:** $6,265,511
Drilling Days: 104 **Completion Days:**

30-Nov-02

Current Depth: 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Nipple up BOPE to clean out well bore.

Operations Summary:

Monitor shut in well. (8 hrs)

Nipple down and remove flow testing valves and blooie line. (3 hrs)

Set in all BOPE, set cat walk and accumulator house, nipple up BOPE. (13 hrs)

Mud Data: None

Surveys: None

Daily Costs: $38,825 **Well Costs:** $6,304,336

Drilling Days: 105 **Completion Days:**

01-Dec-02

Current Depth: 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: POOH

Operations Summary:

Nipple up all BOPE and function test. (14.5 hrs)

Make up Haliburton RTTS test packer and RIH to 500', Set packer to test BOP. (1 hrs)

Test Hydrill to 1,000 psi, Both sets of pipe rams and choke manifold to 2,500 psi. Test witnesed and approved by Eric Tanaka DLNR. (3.5 hrs)

Pooh, Lay down packer. (1 hrs)

Make up BHA, RIH to 1,975' tag up on obstruction in well bore, Can't drill out with bit. (2.5 hrs)

POOH. (1.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $54,925 **Well Costs:** $6,359,261

Drilling Days: 106 **Completion Days:**

02-Dec-02

Current Depth: 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Waiting on Mills and fishing tool hand.

Operations Summary:

POOH,Measure drill pipe out of hole. (1 hrs)

Monitor well,Pumping 7 bbls Water a min. (11 hrs)

Rig up Wai'eli's down hole camera, RIH to 1,981' observed collapsed casing , Rig down camera. (5.5 hrs)

Monitor well while pumping 7 bbls min of water. (6.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $54,925 **Well Costs:** $6,414,186

Drilling Days: 107 **Completion Days:**

03-Dec-02

Current Depth: 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Waiting on mills and fishing tool hand.

Operations Summary:

Monitor well, Waiting on milling tools and fishing tool hand. (24 hrs)

Mud Data: None

Surveys: None

Daily Costs: $54,925 **Well Costs:** $6,469,111

Drilling Days: 108 **Completion Days:**

04-Dec-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Waiting on Baker skirted Mills.
Operations Summary:
Monitor well, Waiting on skirted milling tools from Baker Oil Tools. (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $50,575 **Well Costs:** $6,519,686
Drilling Days: 109 **Completion Days:**

05-Dec-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Waiting on skirted mill.
Operations Summary:
Monitor well. (11 hrs)
Make up concaved mill, RIH to 1,960', Milled 6" on casing, POOH. (4.5 hrs)
Rig up and run downhole camera, Evaluate milling operation. (3.5 hrs)
Monitor well, Waiting on skirted mill. (5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $50,575 **Well Costs:** $6,570,261
Drilling Days: 110 **Completion Days:**

06-Dec-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Milling on colapsed casing at 1,960'.
Operations Summary:
Monitor well. (11 hrs)
Make up skirted mill, RIH to 1,960',Milled 9" , POOH I/D skirted mill. (5.5 hrs)
Rig and run downhole camera to evaluate milling Operation. (3 hrs)
Make up round nose mill, RIH to 1,960' (1.5 hrs)
Mill on casing from 1,960' to 1,963' (3 hrs)
Mud Data: None
Surveys: None
Daily Costs: $60,575 **Well Costs:** $6,630,836
Drilling Days: 111 **Completion Days:**

07-Dec-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: POOH with string mills.
Operations Summary:
POOH lay down mills. (1.5 hrs)
Rig and run down hole camera, evaluate milling. (3.5 hrs)
RIH to 1'962' wit round nose mill. (3 hrs)
Mill on casing from 1,962' to 1,963' (1.5 hrs)
POOH (1.5 hrs)
Rig and run downhole camera,Casing looks very good. (2.5 hrs)
RIH with round nose mill. (1.5 hrs)

Milled on casing from 1,962 to 1'963', Dropped out of colapsed casing. (1 hrs)
POOH (1.5 hrs)
Rig and run downhole camera, Casing cut looks good. (2.5 hrs)
RIH wit watermelon mill to 1,960' (2 hrs)
Ream through bad spot in casing from 1,960' to 1965', Reamed through 20 times. (1 hrs)
POOH. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $72,575 **Well Costs:** $6,703,411

Drilling Days: 112 **Completion Days:**

08-Dec-02

Current Depth: 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Attempting to test collapsed casing w/ Halliburton RTTS packer.

Operations Summary:

POOH lay down milling tools. (1 hrs)
Rig and run downhole camera, Mills made good clean cut from 1,960' to 1,965'. (3 hrs)
RIH with bit to shoe at 5,077',POOH lay down jars. (4.5 hrs)
Make up Haliburton RTTS packer RIH to 2,350', Set packer Attemt to test casing, Test no good, Move packer to 1,742', Packer would not hold pressure, POOH lay down circ. sub RIH to 800', Test packer, Held 2,500 psi. RIH to 2,350' Attempted to test at 3 diffrent depyhs,Wouldn't hold, Pull packer to 1'668 Packer held 2'500 psi,Run packer back to 2'133' Attemp to test casing. (15.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $59,575 **Well Costs:** $6,762,986

Drilling Days: 113 **Completion Days:**

09-Dec-02

Current Depth: 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Attempting to test collapsed casing w/Haliburton RTTS packer.

Operations Summary:

Cont. attempting to test repaired spot in 11.75" casing, Casing will not test. Unset packer POOH ,Lay down RTTS packer. (1.5 hrs)
Monitor well (Slip and cut 100' drilling line.) (5.5 hrs)
Make up new rotating rubber, pick up jars. RIH to 6,124', tag up. POOH (5 hrs)
Monitor well with steel blind rams closed. (12 hrs)

Mud Data: None

Surveys: None

Daily Costs: $59,575 **Well Costs:** $6,822,561

Drilling Days: **Completion Days:**

10-Dec-02

Current Depth: 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Monitor well, Waiting on micro-cement.

Operations Summary:

Monitor well with steel blind rams closed, Waiting on micro-cement. (24 hrs)

Mud Data: None

Surveys: None

Daily Costs: $59,575 **Well Costs:** $6,882,136

Drilling Days: 114 **Completion Days:**

11-Dec-02 **Current Depth:** 6375 **Hole Drilled:** 0 **Ave ROP:**

Current Ops: Monitor well, Squeezing micro-cement away.

Operations Summary:

Monitor well, Pumoing water from 0600 hrs to 0930 hrs. (6.5 bbls min.) (9.5 hrs)

Rig up and run P/T survey at 2,000' , 1,900' , and 1,800'. Temp at 2,000' was 90 deg. (1 hrs)

Make up Halliburton cast iron bridge plug, RIH set plug at 1,987', Fill hole with water. (4.5 hrs)

Test Haliburton surface lines to 3,500 psi, Mixed and pumped 8 bbls, 48 c/f, 28 sks. of howco 50/50 Micro-Matrix cement/Micro Poz. with 60% BWOB (Micro sand) ,1% Halad 322, Yield 1.68 at 12.4 ppg, Displaced with 33 bbls water. (2 hrs)

Squeeze cement w/ 2,500 psi Pumped away .60 bbls. (2 hrs)

Woc holding 2,000 psi pressure on casing. (5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $81,575 **Well Costs:** $6,963,711

Drilling Days: 115 **Completion Days:**

12-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Milled on 10 5/8" bridge plug. Ran in hole to 6,125'. Started out of hole.

Operations Summary:

Waited on cement . Monitored well with pipe rams closed. Holding 2,000 psi pressure on casing. (6 hrs)

Pulled out of hole. Laid down bridge plug setting tool. Made up bottom hole assemby. with 10 5/8" used bit. Ran in hole and tagged cement at 1,924'. (11 hrs)

Continued to wait on cement. (1 hrs)

Cleaned out cement from 1,960' to 1,975'. (0.5 hrs)

Tested casing to 2,500 psi. Test witnessed and verbally approved by Eric Tanaka Engineering inspector, DLNR. (2.5 hrs)

Cleaned out cement from 1,975' to 1,987', top of cast iron bridge plug. (0.5 hrs)

Circulated hole clean at 1,987'. (0.5 hrs)

Pulled out of hole and laid down bit. Made up 10 5/8" Baker mill. Ran in hole to 1,987'. (2 hrs)

Mud Data: None

Surveys: None

Daily Costs: $81,575 **Well Costs:** $7,045,286

Drilling Days: 116 **Completion Days:**

13-Dec-02 **Current Depth:** 6386 **Hole Drilled:** **Ave ROP:**

Current Ops: Continued to rig up lubricator to run temp./press. survey.

Operations Summary:

Continued to mill on 10 5/8" cast iron bridge plug. (3 hrs)

Ran in hole to 6,125'. Tagged up 20,00 lb with mill. (2 hrs)

Pulled out of hole from 6,125' and laid down mill. (3.5 hrs)

Made up bit on bottom hole assembly ran in holeto 6,125'. (4 hrs)

Reamed from 6,125 ' to 6,373', original T.D.. (7 hrs)

Wiped hole up to 5,077'. Ran in hole to 6,386', new T.D. (1 hrs)

Pulled out of hole with reaming assembly . (2 hrs)

Rigged down rotating head. rigged up lubricator to run temp./press. survey. (1.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $81,575 **Well Costs:** $7,126,861

Drilling Days: 117 **Completion Days:**

14-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Reamed and washed from 6165' to 6386'. Pulled out of hole to 4000'. Monitor well while pumping water at 515 gal per min..

Operations Summary:

Continued to rig down rotating bowl. Installed crossover flange for PGV slick line lubricator. Rigged up slick line lubricator. (4 hrs)

Ran wireline with temp/press tool and tagged up at 6108'. Ran survey from 6108'up. Pulled out of hole with tool. rigged down. lubricator. (4.5 hrs)

Rigged down luricator flange. Rigged rotating head back up. (3.5 hrs)

Made up 10 5/8" bottom hole assembly with bit and ran in hole , tagged bridge at 6144'. (3.5 hrs)

Cleaned out bridge from 6144' to 6180'. (1 hrs)

Washed hole from 6180' to 6386'.Tagged nothing in hole after bridge. (1 hrs)

Pull out of hole to 4000'. (0.5 hrs)

Pumped 765 gal. per min of water down the hole. total water pumped was 137000 gal. (4.5 hrs)

Ran in hole and tagged bridge at 6151'. (1 hrs)

Started reaming bridge at 6151' to 6165'. (0.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $81,575 **Well Costs:** $7,208,436

Drilling Days: 118 **Completion Days:**

15-Dec-02 **Current Depth:** 6386 **Hole Drilled:** **Ave ROP:**

Current Ops: Ran in hole and tagged fill at 6164'. Reamed from 6164' to 6418'. Hole was very tight and hard to ream. Pulled out of hole to 4200'.

Operations Summary:

Contiued to ream from 6165' to 6214'. (1.5 hrs)

Washed from 6214' to 6386'. (0.5 hrs)

Pulled out of hole with reaming assembly to 4200'. (1 hrs)

Monitored well while pumping 515 GPM of water. (3.5 hrs)

Ran in hole with reaming assembly and tagged up at 6136'. (1 hrs)

Reamed from 6136' to 6153'. (0.5 hrs)

Ran in hole from 6153' to 6386'. (0.5 hrs)

Pull out of hole to 4200'. (0.5 hrs)

Monitored well, no water was pumped. (3.5 hrs)

Ran in hole to 6386'. No bridge was tagged. (0.5 hrs)

Drilled 10 5/8" hole from 6386' to 6418'. (0.5 hrs)

Worked tight hole and circulated at 6418'. (1 hrs)

Pulled out of hole to 4200'. (1 hrs)

Monitored well, no water was pumped. (2.5 hrs)

Ran in hole and tagged bridge at 6164'. (1 hrs)

Reamed and worked tight hole from 6164' to 6418'. Had to back ream up out of hole. (2 hrs)

Pulled out of hole to 4200. (1 hrs)
Monitored well, no water was pumped. (2 hrs)
Mud Data: None
Surveys: None
Daily Costs: $81,575 **Well Costs:** $7,290,011
Drilling Days: 119 **Completion Days:**

16-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Spotted cement plug at 6091'. Pulled out of hole. Made up bottom hole assembly, ran in hole and tagged top of cement at 6119'.

Operations Summary:

Monitored well, no water was pumped. (0.5 hrs)
Ran in hole and tagged bridge at 6164' (0.5 hrs)
Reamed and circulated tight hole from 6164' to 6418' . (3.5 hrs)
Pulled out of hole to 3920'. (1 hrs)
Monitored well. No water was pumped. (3.5 hrs)
Ran in hole and tagged fill at 6120'. (1 hrs)
Reamed tight hole from 6120' to 6153'. (2.5 hrs)
Pulled out of hole to 3920'. (1 hrs)
Monitored well, no water was pumped. (3.5 hrs)
Ran in hole and tagged fill at 6120'. (0.5 hrs)
Pulled out of hole and stood bottom hole assembly back in derrick. (3 hrs)
Ran in hole with open ended drill pipe to 6110'. (2 hrs)
Mixed and pumped 50 bbls of 50# per bbls of LCM pill and displaced to top of bridge. (1 hrs)
Rigged up Halliburton to pump cement plug. (0.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $81,575 **Well Costs:** $7,371,586
Drilling Days: 120 **Completion Days:**

17-Dec-02 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Ran in hole with open ended drill pipe and spotted cement plug #2. Pulled out of hole.

Operations Summary:

Mixed and spotted cement plug at 6091' of 51 sacks of Hawaiian cement with 1to1 perlite, 30% SSA-1, .10% Microlite, .25% Halad 322, .5%UCS mixed at 12.4# per gal. Tolal of 22 barrels of slurry,. Displaced with 70 barrels of water. (1 hrs)
Pulled out of hole with open ended drill pipe. (1.5 hrs)
Made up bit and bottom hole assembly and ran in hole and tagged plug at 6119'. (3 hrs)
Drilled and cleaned out cement from 6119' to 6228'. (2.5 hrs)
Worked tight hole and 6338'. (1 hrs)
Reamed from 6145' to 6343' (1 hrs)
Back reamed from 6343' up to 6300'. (1.5 hrs)
Pulled out of hole to 3920'. (1 hrs)
Monitor well, no water was pumped. (1.5 hrs)
Ran in hole and tagged fill at 6119'. (1 hrs)
Reamed from 6119' to 6290'. Worked out of very tight hole. (3.5 hrs)

Pulled out of hole to 3920'. (1 hrs)
Monitored well, no water was pumped. (1.5 hrs)
Ran in hole and tagged fill at 6106'. (0.5 hrs)
Pullled out of hole and stood back bottom hole assembly. (2 hrs)
Started running in hole with open ended drill pipe. (0.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $81,575 **Well Costs:** $7,453,161

Drilling Days: 121 **Completion Days:**

18-Dec-02

Current Depth: **Hole Drilled:** **Ave ROP:**

Current Ops: Ran in hole with open ended drill pipe and spotted cement plug #3.

Operations Summary:

Ran in hole with open ended drill pipe to 6093'. (2 hrs)
Spotted cement plug #2 at 6093'. Mixed and pumped 121 sacks of Hawiian cement with 1to1 perlite, 30% SSA-1, .10% Microlite, .25%Halad-322 and .5%UCS Mixed at 12.4 lbs per gal. 54 barrel slurry. Displaced with 70 barrels of water. (1.5 hrs)
Pulled out of hole with open ended drill pipe. (2 hrs)
Ran in hole with bottom hole assembly and tagged up at 6118'. (2.5 hrs)
Pulled out of hole with bottom hole assembly. (2 hrs)
Repaired rig. (Changed out brake blocks) (13 hrs)
Ran in hole with open ended drill pipe. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $81,575 **Well Costs:** $7,534,736

Drilling Days: 122 **Completion Days:**

19-Dec-02

Current Depth: 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Wait on Cement.

Operations Summary:

Run in hole with open ended 5" drill pipe to 5,077' (0.5 hrs)
Mix 50 bbls LCM @ 50#/bbl. (0.5 hrs)
Cont run in hole to 6,033'. Tag up on bridge. (1 hrs)
Pumped 50 bbls LCM pill and left on bottom at 6,033'. Pull up to 5,943'. Spot 54 bbl cement plug at 5,943'. Plug #3: Mixed and pumped 500', 127 sks, 54 bbs, 307 c/f of Hawaiian cement+1:1 Perlite+30% SSA-1+.10%microlite+.25% Halad 322+.5% UCS+2% Gel @ 12.4ppg, 2.41 Yield, 8.17 gal/sk water. Displaced with 70.5 bbls water. CIP @ 02:55 Hrs. (1 hrs)
Pull out of hole. Make up rotary BHA and run in hole to 4,900'. (3 hrs)
Adust rig brakes. (1 hrs)
Cont run in hole to 5,891' tag up on cement. (2.5 hrs)
Clean out cement from 5,891' to 5,909'. Very green cement. (0.5 hrs)
Circ hole clean at 5,909'. Will lay another plug on top of this plug. (1 hrs)
Pull out of hole and stand back DC's. Run in hole with open ended 5" drill pipe to 5,900'. Circ 15 min. (4.5 hrs)
Spot cement plug #4 at 5,909'. Mixed and pumped 300', 184 c/f, 33 bbls, 76 sks Hawaiian cement+1:1 Perlite+30%SSA-1+.10%Microlite+.25% Halad-332+.5% UCS+2% Gel @ 12.4 ppg, 2.41 Yield, 8.17 gal/sk water. Displace with 99 bbls water. CIP @ 16:30 hrs. (1 hrs)

Pull out of hole. Make up rotary BHA and run in hole to 4,025'. Circ with 100% retruns. (4 hrs)
Cont run in hole to TOC @ 5,730'. Cement very soft. Can circ cement out with out rotating drill string. (1.5 hrs)
Wait on cement at 4,785'. Circ with good returns. (2 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,591,236

Drilling Days: 123 **Completion Days:**

20-Dec-02

Current Depth: **Hole Drilled:** **Ave ROP:**

Current Ops: Ran in hole from shoe and tagged cement at 6386'. Pulled up to shoe at 4472'. Monitored well. Ran in hole to 6386'.

Operations Summary:

Waited on cement. (1 hrs)
Ran in hole with 10 5/8" bit and bottom hole assembly and tagged cement 5778'. (0.5 hrs)
Cleaned out soft cement from 5778' to 5802'. (0.5 hrs)
Circulated and waited on cement at 5802'. Cleaned out soft cement from 5802' to 5833'. Continued to clean out cement to 5843'. (7 hrs)
Pulled up and waited on cement. (2.5 hrs)
Ran in hole to 5843'. (0.5 hrs)
Cleaned out cement from 5843' to 6386' (9 hrs)
Pulled out of hole to shoe. (0.5 hrs)
Monitored well. (2.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,647,736

Drilling Days: 124 **Completion Days:**

21-Dec-02

Current Depth: 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Ran temp/press survey.

Operations Summary:

Ran in hole and tagged top of fill at 6386'. Pulled out of the hole to the shoe. (1 hrs)
Monitored well. (2 hrs)
Ran in hole and tagged fill at 6386'. Pullled out of hole to run pipe. (4 hrs)
Rigged up Bill's power Tongs and ran 36 joints (1460') of 8 5/8" 36# ABHDL thread (flush joint) T-95 liner. Ran blank liner from 4925' to 6365' and perforated liner from 6365' to 6385'. Rigged down casers. (5 hrs)
Ran in hole with 1460' of 8 5/8" liner on 5" drill pipe and hung with Schumberger double slip hanger at 4925'. Bottom of liner at 6385'. (2.5 hrs)
Pulled out of hole and laid down setting tool. Ran in hole rabbiting drill pipe , laid down 24 joints of drill pipe with cement in them. Ran in hole with 5" drill pipe to 6379'. (8.5 hrs)
Rigged up Welaco to run press/temp survey. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,704,236

Drilling Days: 125 **Completion Days:**

22-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Nippled down blowout preventers.

Operations Summary:

Ran Welaco press/temp survey through drill pipe. Run #1Tagged up at 6235'. Pulled tool out of hole and retrieved data. Made run #2 , tool also stopped at 6235'. (6 hrs)

With press/temp tool at 6235 preformed injection test. Pumped :463 GPM for 15 min. 897 GPM for 15 min., 1030 GPM for 15 min. Sat on bottom for 2 hours. Pulled wireline with press/temp tool out of hole and retrieved data. (1 hrs)

Ran press/temp log #3 to 6235' for temp. build up. Pulled out of hole with tool and recovered data. Rigged down lubricator. (8 hrs)

Pulled out of hole with drill pipe, found last four joints of drill pipe cemented up. (3 hrs)

Rigged lubricator back up. Made press/temp survey run #4, tool quite working at 6329', hole was to hot. (5 hrs)

Nippled down blowout preventer. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,760,736

Drilling Days: 126 **Completion Days:**

23-Dec-02 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Continued to pressure up with nitrogen.

Operations Summary:

Nippled down and set out 13 5/8" blowout preventers. (7 hrs)

Rigged up to test KS-5. Nippled up flow tee and throttle valve. Nipple up blooie line to muffler. (12 hrs)

Depressed wellbore with Nitrogen. At report time had 280 psi pressure. (5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,817,236

Drilling Days: 127 **Completion Days:**

24-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Monitored well.

Operations Summary:

Pressure up well bore witn Nitrogen to 584'. (11 hrs)

Held safety meeting with all personnel on flow test. (1 hrs)

Opened KS-5 to muffler. Bled nitrogen cap off well. Well did not flow. Shut well back in. (1 hrs)

Rigged up slick line lubricator and ran Welaco press/temp survey to 6414'. (6 hrs)

Vented KS-4 into KS-5 to heat up wellbore. (5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,873,736

Drilling Days: 128 **Completion Days:**

25-Dec-02 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Monitored well.

Operations Summary:

Monitored well. Vented KS-4 into KS-5. stopped venting into KS-5 at 1600 hours (24 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,930,236

Drilling Days: 129 **Completion Days:**

26-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Rigged up and ran press/temp surveys.

Operations Summary:

Monitored well. (19 hrs)

Rigged up PGV's slick line and run Halliburton-Pruett press/temp survey. While closing lubricator valve, slick line operator did not have tools in lubricator and cut slick line and dropped tools in well bore. (4 hrs)

Monitored well. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $7,986,736

Drilling Days: 130 **Completion Days:**

27-Dec-02 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Monitored well

Operations Summary:

Made up repaired slick line tool. Run#1= ran 2 MRT's to 6365. Both MRT broke. Run #2=ran 3 MRT's to 6365', two MRT broke, one was good but was broken while being read. Run #4= ran one MRTto 5900' , good run, temp was 608 degrees. (19.5 hrs)

Monitored well (4.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,043,236

Drilling Days: 131 **Completion Days:**

28-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Monitored shut in well.

Operations Summary:

Monitored shut in well. (6 hrs)

Ran Halliburton-Pruett press/temp survey. Run #2 Temp. 635 degrees at 6365'. (4 hrs)

Monitored shut in well. (7 hrs)

Ran Haliburton-Pruett press/temp survey. Run#3 Temp. 633 degrees at 6370'. (3 hrs)

Monitored shut in well. (4 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,099,736

Drilling Days: 132 **Completion Days:**

29-Dec-02 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Monitored shut in well.

Operations Summary:

Monitored shut in well. (7 hrs)
Ran Halliburton-Pruett press/temp survey. Run #4 Temp. 636 degrees at 6370'. (3 hrs)
Monitored shut in well. (14 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,156,236
Drilling Days: 133 **Completion Days:**

30-Dec-02 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: Monitored shut in well.
Operations Summary:
Monitored shut in well. (7 hrs)
Ran Halliburton-Pruett press/temp survey. Run #5 Temp. 610 degrees at 6370 (3 hrs)
Monitored shut in well. Pumped 385 psi air cap on well with Water Resources air compressor. (14 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,212,736
Drilling Days: 134 **Completion Days:**

31-Dec-02 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**
Current Ops: Monitored shut in well.
Operations Summary:
Monitored shut in well. (11 hrs)
Ran Halliburton-Pruitt survey Run #6 temp. 618 degrees at 6200'. (4 hrs)
Monitored shut in well maintaining a 350 psi air cap. (9 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,269,236
Drilling Days: 135 **Completion Days:**

01-Jan-03 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: Compressed well bore with Nitrogen to 1340 psi.
Operations Summary:
Monitored shut in well. (Waiting on Nitrogen) (15 hrs)
Rigged up BOC liquid 3000 gal Nitrogen tank. Compressed well bore with Nitrogen. (9 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,325,736
Drilling Days: 136 **Completion Days:**

02-Jan-03 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**
Current Ops: Monitoered shut in well.
Operations Summary:
Compressed well bore with Nitrogen to 1340 psi. (16 hrs)
Monitored well. (8 hrs)

Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,382,236
Drilling Days: 137 **Completion Days:**

03-Jan-03 **Current Depth:** 6418 **Hole Drilled:** 0 **Ave ROP:**
Current Ops: Monitored shut in well while hotventing into KS-4.
Operations Summary:
Monitored shut in well. (10.5 hrs)
Flow tested KS-5 (4 hrs)
Monitored well. Hot vent KS-5 into KS-4 to maintain well head temp. and press.. Ran Halliburton-Pruett press/temp to 6375' , temp. was 617' (9.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,438,736
Drilling Days: 138 **Completion Days:**

04-Jan-03 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: Monitored well. Hot vented KS-5 into KS-4 to maintain well head temp. and press..
Operations Summary:
Monitored well. Hot vented KS-5 to KS-4 to maintain wel head temp. and press. (10.5 hrs)
Flow tested KS-5. Max temp. 507 degrees. Max press 831 psi.. (4 hrs)
Monitored well. Hot vented KS-5 into KS-4 to maintain well head temp. and pressure. Hot vent temp, 406 degrees. Well head pressure, 469 psi. Ran Halliburton-Pruett press/temp survey #9 to 6385'. Max temp 618 degrees. Note: Max well head growth 20". (9.5 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,495,236
Drilling Days: 139 **Completion Days:**

05-Jan-03 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**
Current Ops: Monitored well while hot venting it to KS-4.
Operations Summary:
Monitored well. Hot vented KS-5 into KS-4 to maintain well head temp. and press.. Well head press. was 512 psi and temp. was 414 degrees at 0500 hours. Ran Halliburton Pruett press/temp survey #10 to 6385'. Max temp. was 612 degreees at 6200'. (24 hrs)
Mud Data: None
Surveys: None
Daily Costs: $56,500 **Well Costs:** $8,551,736
Drilling Days: 140 **Completion Days:**

06-Jan-03 **Current Depth:** **Hole Drilled:** **Ave ROP:**
Current Ops: Monitored well. Hot vented well in to KS-4.
Operations Summary:
Monitored well. Hot vented KS-5 into KS-4 to maintain well head temp. and press. (8.5 hrs)
Flow tested well. Reduced flow rate due to wind conditions. (4 hrs)

Monitored well. Vented KS-5 into KS-4 to maintain well head temp. and press. Well head press. was 542 and temp. was 421 degrees at 0500 hours (11.5 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,608,236

Drilling Days: 141 **Completion Days:**

07-Jan-03 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Monitored well and hot vented into KS-4.

Operations Summary:

Monitored well. Vented KS-5 into KS-4 to maintain well head press. and temp. (8 hrs)

Flow tested well, reduced flow due to wind conditions. (4 hrs)

Monitored well. Hot vented KS-5 into KS-4 to maintain well head press. and temp.. Rigged up and ran Halliburton-Pruett press/temp survey. Bottom hole temp. was 618 degrees at 6385'. Hot vented well head press. was 421 degrees and press. was 542 psi. at 0500 hours. Well head growth was 22.5" during flow test. (12 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,664,736

Drilling Days: 142 **Completion Days:**

08-Jan-03 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Killed and cool well.

Operations Summary:

Monitored well. Vented KS-5 into KS-4 to maintain well head press. and temp. Continued to run Halliburton-Pruett press/temp survey. Max temp. was 625 degrees at 6100'. Max. press. was 1955 psi at 6385'. (7 hrs)

Shut well in. Let well statically kill itself. Run Halliburton-Pruett press/temp survey #11. Bottom hole temp. was 634 degrees at 6370'. Press. at 6385' was 1983'. (17 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,721,236

Drilling Days: 143 **Completion Days:**

09-Jan-03 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Nippled up blowout preventers.

Operations Summary:

Pumping one barrel a minute killed and cooled well. (8 hrs)

Ran Halliburton-Pruett press/temp survey #12 to 6313'. Stopped pumping for 10 min. to let tool become static. (1 hrs)

Performed injection flow test . Injected 400 GPM of water for 30 min. Injected 1100 GPMtor 30 min. Let survey tool set at 6313'. (4.5 hrs)

Pull press/temp survey out of hole and collected data. Monitored well. (1.5 hrs)

Ran Halliburton/Pruett press/temp survey #13 with well static. Rigged down lubricator and wireline unit. (5.5 hrs)

Nippled down flow tee and flow equipment. (2.5 hrs)

Set 13 5/8" blowout preventers back on. (1 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,777,736

Drilling Days: 144 **Completion Days:**

10-Jan-03 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Ran in hole to 2258' with watermeon mill. Pulled out of hole and laid down mill. Made up RTTS and ran in hole and set packer at 2256'. Tested casing to 2000 psi.

Operations Summary:

Nippled up 13 5/8" blowout prevented and function tested.. (15 hrs)

Made up Halliburton RTTS and ran in hole to 600' and set. (0.5 hrs)

Tested blowout preventers. Hydrill to 1000 psi, upper and lower pipe rams to 2000 psi. Test witnessed by Eric Tanaka DLNR. (4 hrs)

Pulled out of hole and laid down RTTS packer. (0.5 hrs)

Rigged up and ran down hole camera to 1980'. (4 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,834,236

Drilling Days: 145 **Completion Days:**

11-Jan-03 **Current Depth:** 6418 **Hole Drilled:** **Ave ROP:**

Current Ops: Laid down drill pipe.

Operations Summary:

Made up watermelon mill and ran in hole to 2258', no problem. (1.5 hrs)

Pulled out of hole and laid down watermelon mill. (1 hrs)

Ran in hole with RTTS packer and set packer at 2256'. (1.5 hrs)

Tested casing to 2000 psi. (2 hrs)

Ran in the hole to and set packer at 1780'. Tested casing to 1800 psi. (1 hrs)

Ran in hole and set packer at 2349'. Tested casing to 1300 psi. witnessed by and approved by Eric Tanaka DLNR. (3.5 hrs)

Pulled out of hole and laid down RTTS packer. (1 hrs)

Rigged up casing crew. Ran 4 joints of 8 5/8" casing with liner hanger. Ran in hole and hung liner at 1882'. Bottom of liner at 2058'. (5.5 hrs)

Laid down drill pipe. (7 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,890,736

Drilling Days: 146 **Completion Days:**

12-Jan-03 **Current Depth:** **Hole Drilled:** **Ave ROP:**

Current Ops: Rig released from KS-5

Operations Summary:

Laid down drill pipe and bottom hole assemby. Laid out kelly. (4 hrs)

Rigged down lay down machine. (1 hrs)

Nippled down blowout preventers. (6 hrs)

Rigged down for rig move. (13 hrs)

Mud Data: None

Surveys: None

Daily Costs: $56,500 **Well Costs:** $8,947,236

Drilling Days: 147 **Completion Days:**

Richmond Energy Services, Inc.
5221 CENTRAL AVENUE, SUITE 201
RICHMOND, CALIFORNIA 94804-5829

TELEPHONE: (510) 527-9876
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E-MAIL: mw@geothermex.com

2. Casing Report

Casing Report

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

Run Date/Time: 20-Aug-02 21:30

Well Section:	SURF	**String Type:**	FULL
String Top MD:	0 ft	**String Top TVD:**	ft
Casing Shoe MD:	88 ft	**Casing Shoe TVD:**	88 ft
String Nominal OD:	30.000 in	**String Nominal ID:**	in
Bit Diameter:	in	**Avg. Open Hole Diam.:**	in
Centralizers: No:	0 **Manufacturer:**	**Type:**	
Depths:			
Hanger: Type:		**Manufacturer:**	

Comments:

Transferred from Casing Tally Detail on 07-Nov-02 00:21

String Component Details

Joints	Item	Length	O.D.	I.D.	Weight	Grade	Connection	Torque
2	JOINT	88.00	30.000	29.000			WELD	
Joints: 2	**Length:**	88.00						

Printed: 16:26 28-Apr-03

End of Report

Casing Schematic

Puna Geothermal Venture

Well ID: KS-05

Well Name: Production Well KS-05

String Nominal OD: 30 Type: FULL

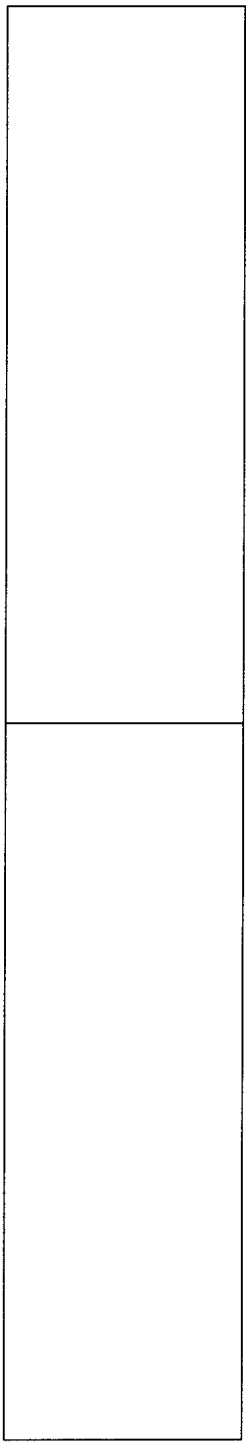
Depths relative to Original RKB Elevation at 27 above Ground Level

String Schematic from 0 to 88

Casing Top at 0, Bottom at 88, String Length 88

Total Depth 6418, Open Hole from 88 to 6418

Ground Level



JOINT No 1, 30 OD x 29 ID
Conn. WELD
Top 0.00 Bottom 44.00

JOINT No 2, 30 OD x 29 ID
Conn. WELD
Top 44.00 Bottom 88.00

Printed 16:28 28-Apr-03

Casing Tally Run Report Summary

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

OD: 30.000 **Type:** FULL **Top:** 0 **Btm:** 88 **Joints: Run:** 2 **Excluded:** 0

Length: Run Joints 88.00 **Other Items:** **Cut Off:** 0.00 **Total Length:** 88.00

Run#	Jnt#	Len.	Bottom	Run#	Jnt#	Len.	Bottom	Run#	Jnt#	Len.	Bottom	Run#	Jnt#	Len.	Bottom
1	2	44.00	88.00												
2	1	44.00	44.00												

Casing Tally Joint List

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 30.000 in

No.	Length	O.D.	Weight	Grade	Connection	Comments	Exclude	Total
1	44.00	30.000			WELD			
2	44.00	30.000			WELD			88.00

Joints: Used: 2 **Excluded:** 0 **Total:** 2 **Length Used:** 88.00

Printed: 16:27 28-Apr-03

End of Report

Casing Report

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

Run Date/Time: 10-Oct-02 0:30

Well Section:	SURF		**String Type:**	FULL	
String Top MD:	0	ft	**String Top TVD:**		ft
Casing Shoe MD:	900	ft	**Casing Shoe TVD:**		ft
String Nominal OD:	22.000	in	**String Nominal ID:**		in
Bit Diameter:		in	**Avg. Open Hole Diam.:**		in
Centralizers: No:	0	**Manufacturer:**	**Type:**		
Depths:					
Hanger: Type:			**Manufacturer:**		

Comments:

Transferred from Casing Tally Detail on 30-Nov-02 03:48

String Component Details

Joints	Item	Length	O.D.	I.D.	Weight	Grade	Connection	Torque
2	JOINT	900.00	22.000	21.000		E	WELD	
Joints: 2	**Length:**	900.00						

Printed: 16:40 28-Apr-03

End of Report

Casing Schematic

Puna Geothermal Venture

Well ID: KS-05

Well Name: Production Well KS-05

String Nominal OD: 22 Type: FULL

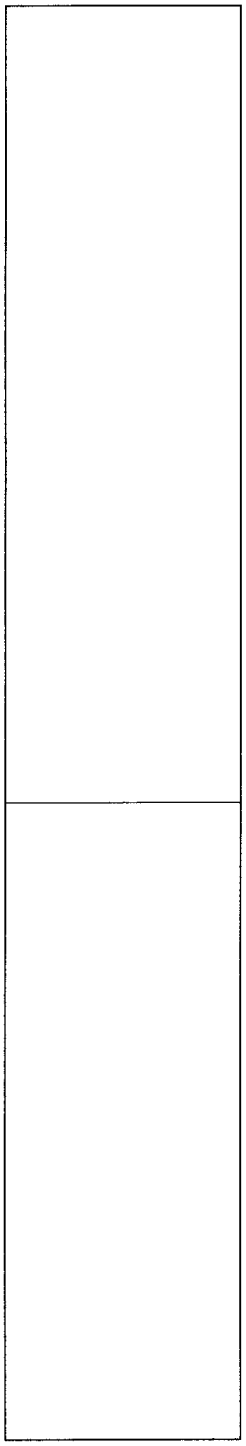
Depths relative to Original RKB Elevation at 27 above Ground Level

String Schematic from 0 to 900

Casing Top at 0, Bottom at 900, String Length 900

Total Depth 6418, Open Hole from 900 to 6418

Ground Level



JOINT No 1, 22 OD x 21 ID
Grade E, Conn. WELD
Top 0.00 Bottom 500.00

JOINT No 2, 22 OD x 21 ID
Grade E, Conn. WELD
Top 500.00 Bottom 900.00

Printed 16:38 28-Apr-03

Casing Tally Joint List

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 22.000 in

No.	Length	O.D.	Weight	Grade	Connection	Comments	Exclude	Total
1	500.00	22.000		E	WELD			
2	400.00	22.000		E	WELD			900.00

Joints: Used: 2 **Excluded:** 0 **Total:** 2 **Length Used:** 900.00

Printed: 16:36 28-Apr-03

End of Report

Casing Tally Run Report

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 22.000 **Type:** FULL

Top Depth: 0 **Bottom:** 900 **Cut Off Length:** 0.00

Comments: Casing string run 10-05-02

Good Joints: 2 **Excluded Joints:** 0 **Total Joints:** 2

Total Length Good Joints: 900.00 **Other Items:** **Total Length:** 900.00

Run No.	Joint No	Item	Length	Top	Bottom	Description	Comments	Cnt Scr
1	2	JOINT	400.00	500.00	900.00	22 x 21, E WELD		
2	1	JOINT	500.00	0.00	500.00	22 x 21, E WELD		

Printed: 16:38 28-Apr-03

End of Report

Casing Report

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

Run Date/Time:	12-Oct-02 9:00		
Well Section:	INT1	**String Type:**	FULL
String Top MD:	0 ft	**String Top TVD:**	0 ft
Casing Shoe MD:	5200 ft	**Casing Shoe TVD:**	5230 ft
String Nominal OD:	16.000 in	**String Nominal ID:**	15.250 in
Bit Diameter:	14.750 in	**Avg. Open Hole Diam.:**	17.500 in
Centralizers: No:	0 **Manufacturer:**	**Type:**	
Depths:			
Hanger: Type:		**Manufacturer:**	
Comments:			
	Waiting on data		

Casing Report

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

Run Date/Time: 11-Nov-02 3:25

Well Section: **String Type:** FULL

String Top MD: -25 ft **String Top TVD:** ft

Casing Shoe MD: 5078 ft **Casing Shoe TVD:** ft

String Nominal OD: 11.750 in **String Nominal ID:** in

Bit Diameter: in **Avg. Open Hole Diam.:** in

Centralizers: No: 0 **Manufacturer:** **Type:**

Depths:

Hanger: Type: **Manufacturer:**

Comments:

Transferred from Casing Tally Detail on 30-Dec-02 03:25

String Component Details

Joints	Item	Length	O.D.	I.D.	Weight	Grade	Connection	Torque
127	JOINT	5102.92	11.750	10.820	65.00	C-95		
Joints: 127	**Length:**	5102.92						

Printed: 16:52 28-Apr-03 *End of Report*

Casing Schematic

Puna Geothermal Venture

Well ID: KS-05

Well Name: Production Well KS-05

String Nominal OD: 11.75 Type: FULL

Depths relative to Original RKB Elevation at 27 above Ground Level

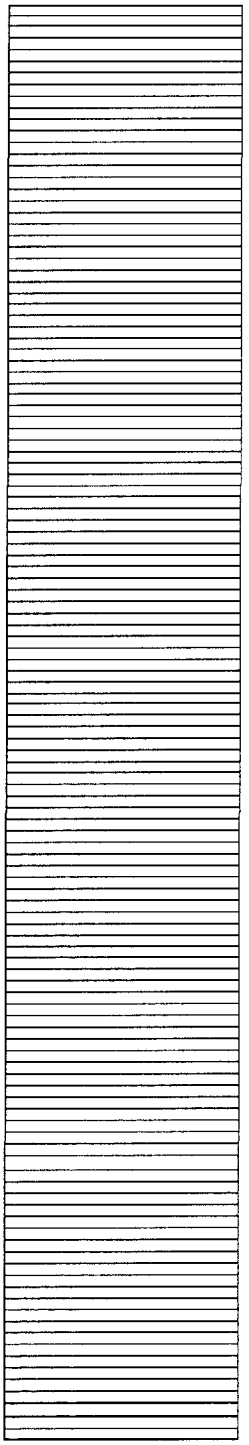
String Schematic from -25.09063 to 5077.831

Casing Top at -25.09063, Bottom at 5077.831, String Length 5102.92

Total Depth 6418, Open Hole from 5077.831 to 6418

Open Hole Diameter 20.

Ground Level



Printed 16:57 28-Apr-03

Casing Tally Joint List

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 11.750 in

No.	Length	O.D.	Weight	Grade	Connection	Comments	Exclude	Total
1	3.00	11.750	65	C-95		Float shoe		
2	36.00	11.750	65	C-95				
3	43.52	11.750	65	C-95				
4	3.00	11.750	65	C-95		Float sub		
5	44.10	11.750	65	C-95				129.62
6	1.20	11.750	65	C-95		Landing collar		
7	42.31	11.750	65	C-95				
8	42.37	11.750	65	C-95				
9	41.41	11.750	65	C-95				
244	40.53	11.750	65	C-95				167.82
245	42.19	11.750	65	C-95				
246	42.58	11.750	65	C-95				
247	39.53	11.750	65	C-95				
248	41.44	11.750	65	C-95				
249	38.80	11.750	65	C-95				204.54
250	42.65	11.750	65	C-95				
251	41.36	11.750	65	C-95				
252	42.10	11.750	65	C-95				
253	41.04	11.750	65	C-95				
254	42.16	11.750	65	C-95				209.31
255	42.92	11.750	65	C-95				
256	41.60	11.750	65	C-95				
257	42.12	11.750	65	C-95				
258	40.24	11.750	65	C-95				
259	42.10	11.750	65	C-95				208.98
260	41.38	11.750	65	C-95				
261	52.25	11.750	65	C-95				
262	41.74	11.750	65	C-95				
263	42.17	11.750	65	C-95				
264	41.18	11.750	65	C-95				218.72
265	41.70	11.750	65	C-95				
266	41.70	11.750	65	C-95				
267	40.55	11.750	65	C-95				
268	42.11	11.750	65	C-95				
269	41.84	11.750	65	C-95				207.90

Casing Tally Joint List — Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 11.750

No.	Length	O.D.	Weight	Grade	Connection	Comments	Exclude	Total
270	40.17	11.750	65	C-95				
271	42.40	11.750	65	C-95				
272	41.10	11.750	65	C-95				
273	41.58	11.750	65	C-95				
274	40.83	11.750	65	C-95				206.08
275	42.12	11.750	65	C-95				
276	41.77	11.750	65	C-95				
277	40.93	11.750	65	C-95				
278	41.06	11.750	65	C-95				
279	38.78	11.750	65	C-95				204.66
280	38.35	11.750	65	C-95				
281	41.12	11.750	65	C-95				
282	42.20	11.750	65	C-95				
283	41.19	11.750	65	C-95				
284	41.23	11.750	65	C-95				204.09
285	42.39	11.750	65	C-95				
286	39.83	11.750	65	C-95				
287	41.00	11.750	65	C-95				
288	42.10	11.750	65	C-95				
289	41.86	11.750	65	C-95				207.18
290	41.10	11.750	65	C-95				
291	41.74	11.750	65	C-95				
292	40.09	11.750	65	C-95				
293	42.60	11.750	65	C-95				
294	41.38	11.750	65	C-95				206.91
295	37.56	11.750	65	C-95				
296	41.45	11.750	65	C-95				
297	41.44	11.750	65	C-95				
298	43.38	11.750	65	C-95				
299	41.15	11.750	65	C-95				204.98
300	40.10	11.750	65	C-95				
301	36.12	11.750	65	C-95				
302	40.74	11.750	65	C-95				
303	38.23	11.750	65	C-95				
304	40.17	11.750	65	C-95				195.36

Casing Tally Joint List — Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 11.750

No.	Length	O.D.	Weight	Grade	Connection	Comments	Exclude	Total
305	41.11	11.750	65	C-95				
306	41.85	11.750	65	C-95				
307	38.46	11.750	65	C-95				
308	41.87	11.750	65	C-95				
309	42.24	11.750	65	C-95				205.53
310	41.90	11.750	65	C-95				
311	40.95	11.750	65	C-95				
312	42.30	11.750	65	C-95				
313	39.22	11.750	65	C-95		Annular casing packer		
314	41.40	11.750	65	C-95				205.77
315	42.30	11.750	65	C-95				
316	40.59	11.750	65	C-95				
317	42.40	11.750	65	C-95				
318	41.38	11.750	65	C-95				
319	38.39	11.750	65	C-95				205.06
320	41.70	11.750	65	C-95				
321	41.68	11.750	65	C-95				
322	39.03	11.750	65	C-95				
323	41.00	11.750	65	C-95				
324	41.60	11.750	65	C-95				205.01
325	42.71	11.750	65	C-95				
326	39.90	11.750	65	C-95				
327	41.07	11.750	65	C-95				
328	36.41	11.750	65	C-95				
329	42.25	11.750	65	C-95				202.34
330	40.81	11.750	65	C-95				
331	41.68	11.750	65	C-95				
332	36.33	11.750	65	C-95				
333	41.70	11.750	65	C-95				
334	40.84	11.750	65	C-95				201.36
335	41.43	11.750	65	C-95				
336	36.34	11.750	65	C-95				
337	40.08	11.750	65	C-95				
338	42.08	11.750	65	C-95				
339	41.93	11.750	65	C-95				201.86

Casing Tally Joint List — Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 11.750

No.	Length	O.D.	Weight	Grade	Connection	Comments	Exclude	Total
340	40.98	11.750	65	C-95				
341	40.63	11.750	65	C-95				
342	41.21	11.750	65	C-95				
343	40.53	11.750	65	C-95				
344	41.33	11.750	65	C-95				204.68
345	41.82	11.750	65	C-95				
346	42.33	11.750	65	C-95				
347	42.43	11.750	65	C-95				
348	41.48	11.750	65	C-95				
349	41.50	11.750	65	C-95				209.56
350	41.40	11.750	65	C-95				
351	42.00	11.750	65	C-95				
352	39.00	11.750	65	C-95				
353	41.73	11.750	65	C-95				
354	41.63	11.750	65	C-95				205.76
355	42.85	11.750	65	C-95				
356	39.87	11.750	65	C-95				
357	41.40	11.750	65	C-95				
358	42.35	11.750	65	C-95				
359	42.37	11.750	65	C-95				208.84
360	36.00	11.750	65	C-95				
361	35.00	11.750	65	C-95				
362	41.20	11.750	65	C-95			x	
363	39.30	11.750	65	C-95			x	
364	41.80	11.750	65	C-95			x	193.30
365	41.74	11.750	65	C-95			x	
366	40.67	11.750	65	C-95			x	
367	40.34	11.750	65	C-95			x	
368	35.00	11.750	65	C-95			x	
369	38.90	11.750	65	C-95			x	196.65

Joints: Used: 127 **Excluded:** 8 **Total:** 135 **Length Used:** 5102.92

Printed: 16:54 28-Apr-03 *End of Report*

Casing Tally Run Report

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

String Nominal OD: 11.750 **Type:** FULL

Top Depth: -25 **Bottom:** 5078 **Cut Off Length:** 0.00

Good Joints: 127 **Excluded Joints:** 8 **Total Joints:** 135

Total Length Good Joints: 5102.92 **Other Items:** **Total Length:** 5102.92

Run No.	Joint No	Item	Length	Top	Bottom	Description	Comments	Cnt Scr
1	1	JOINT	3.00	5074.83	5077.83	11.75 x 10.82, 65 C-95	Float shoe	
2	2	JOINT	36.00	5038.83	5074.83	11.75 x 10.82, 65 C-95		
3	3	JOINT	43.52	4995.31	5038.83	11.75 x 10.82, 65 C-95		
4	4	JOINT	3.00	4992.31	4995.31	11.75 x 10.82, 65 C-95	Float sub	
5	5	JOINT	44.10	4948.21	4992.31	11.75 x 10.82, 65 C-95		
6	6	JOINT	1.20	4947.01	4948.21	11.75 x 10.82, 65 C-95	Landing coller	
7	7	JOINT	42.31	4904.70	4947.01	11.75 x 10.82, 65 C-95		
8	8	JOINT	42.37	4862.33	4904.70	11.75 x 10.82, 65 C-95		
9	9	JOINT	41.41	4820.92	4862.33	11.75 x 10.82, 65 C-95		
10	244	JOINT	40.53	4780.39	4820.92	11.75 x 10.82, 65 C-95		
11	245	JOINT	42.19	4738.20	4780.39	11.75 x 10.82, 65 C-95		
12	246	JOINT	42.58	4695.62	4738.20	11.75 x 10.82, 65 C-95		
13	247	JOINT	39.53	4656.09	4695.62	11.75 x 10.82, 65 C-95		
14	248	JOINT	41.44	4614.65	4656.09	11.75 x 10.82, 65 C-95		
15	249	JOINT	38.80	4575.85	4614.65	11.75 x 10.82, 65 C-95		
16	250	JOINT	42.65	4533.20	4575.85	11.75 x 10.82, 65 C-95		
17	251	JOINT	41.36	4491.84	4533.20	11.75 x 10.82, 65 C-95		
18	252	JOINT	42.10	4449.74	4491.84	11.75 x 10.82, 65 C-95		
19	253	JOINT	41.04	4408.70	4449.74	11.75 x 10.82, 65 C-95		
20	254	JOINT	42.16	4366.54	4408.70	11.75 x 10.82, 65 C-95		
21	255	JOINT	42.92	4323.62	4366.54	11.75 x 10.82, 65 C-95		
22	256	JOINT	41.60	4282.02	4323.62	11.75 x 10.82, 65 C-95		
23	257	JOINT	42.12	4239.90	4282.02	11.75 x 10.82, 65 C-95		
24	258	JOINT	40.24	4199.66	4239.90	11.75 x 10.82, 65 C-95		
25	259	JOINT	42.10	4157.56	4199.66	11.75 x 10.82, 65 C-95		
26	260	JOINT	41.38	4116.18	4157.56	11.75 x 10.82, 65 C-95		
27	261	JOINT	52.25	4063.93	4116.18	11.75 x 10.82, 65 C-95		
28	262	JOINT	41.74	4022.19	4063.93	11.75 x 10.82, 65 C-95		
29	263	JOINT	42.17	3980.02	4022.19	11.75 x 10.82, 65 C-95		
30	264	JOINT	41.18	3938.84	3980.02	11.75 x 10.82, 65 C-95		

Joint Details - (Cont)

Run No.	Joint No	Item	Length	Top	Bottom	Description	Comments	Cnt Scr
31	265	JOINT	41.70	3897.14	3938.84	11.75 x 10.82, 65 C-95		
32	266	JOINT	41.70	3855.44	3897.14	11.75 x 10.82, 65 C-95		
33	267	JOINT	40.55	3814.89	3855.44	11.75 x 10.82, 65 C-95		
34	268	JOINT	42.11	3772.78	3814.89	11.75 x 10.82, 65 C-95		
35	269	JOINT	41.84	3730.94	3772.78	11.75 x 10.82, 65 C-95		
36	270	JOINT	40.17	3690.77	3730.94	11.75 x 10.82, 65 C-95		
37	271	JOINT	42.40	3648.37	3690.77	11.75 x 10.82, 65 C-95		
38	272	JOINT	41.10	3607.27	3648.37	11.75 x 10.82, 65 C-95		
39	273	JOINT	41.58	3565.69	3607.27	11.75 x 10.82, 65 C-95		
40	274	JOINT	40.83	3524.86	3565.69	11.75 x 10.82, 65 C-95		
41	275	JOINT	42.12	3482.74	3524.86	11.75 x 10.82, 65 C-95		
42	276	JOINT	41.77	3440.97	3482.74	11.75 x 10.82, 65 C-95		
43	277	JOINT	40.93	3400.04	3440.97	11.75 x 10.82, 65 C-95		
44	278	JOINT	41.06	3358.98	3400.04	11.75 x 10.82, 65 C-95		
45	279	JOINT	38.78	3320.20	3358.98	11.75 x 10.82, 65 C-95		
46	280	JOINT	38.35	3281.85	3320.20	11.75 x 10.82, 65 C-95		
47	281	JOINT	41.12	3240.73	3281.85	11.75 x 10.82, 65 C-95		
48	282	JOINT	42.20	3198.53	3240.73	11.75 x 10.82, 65 C-95		
49	283	JOINT	41.19	3157.34	3198.53	11.75 x 10.82, 65 C-95		
50	284	JOINT	41.23	3116.11	3157.34	11.75 x 10.82, 65 C-95		
51	285	JOINT	42.39	3073.72	3116.11	11.75 x 10.82, 65 C-95		
52	286	JOINT	39.83	3033.89	3073.72	11.75 x 10.82, 65 C-95		
53	287	JOINT	41.00	2992.89	3033.89	11.75 x 10.82, 65 C-95		
54	288	JOINT	42.10	2950.79	2992.89	11.75 x 10.82, 65 C-95		
55	289	JOINT	41.86	2908.93	2950.79	11.75 x 10.82, 65 C-95		
56	290	JOINT	41.10	2867.83	2908.93	11.75 x 10.82, 65 C-95		
57	291	JOINT	41.74	2826.09	2867.83	11.75 x 10.82, 65 C-95		
58	292	JOINT	40.09	2786.00	2826.09	11.75 x 10.82, 65 C-95		
59	293	JOINT	42.60	2743.40	2786.00	11.75 x 10.82, 65 C-95		
60	294	JOINT	41.38	2702.02	2743.40	11.75 x 10.82, 65 C-95		
61	295	JOINT	37.56	2664.46	2702.02	11.75 x 10.82, 65 C-95		
62	296	JOINT	41.45	2623.01	2664.46	11.75 x 10.82, 65 C-95		
63	297	JOINT	41.44	2581.57	2623.01	11.75 x 10.82, 65 C-95		
64	298	JOINT	43.38	2538.19	2581.57	11.75 x 10.82, 65 C-95		
65	299	JOINT	41.15	2497.04	2538.19	11.75 x 10.82, 65 C-95		

Joint Details - (Cont)

Run No.	Joint No	Item	Length	Top	Bottom	Description	Comments	Cnt Scr
66	300	JOINT	40.10	2456.94	2497.04	11.75 x 10.82, 65 C-95		
67	301	JOINT	36.12	2420.82	2456.94	11.75 x 10.82, 65 C-95		
68	302	JOINT	40.74	2380.08	2420.82	11.75 x 10.82, 65 C-95		
69	303	JOINT	38.23	2341.85	2380.08	11.75 x 10.82, 65 C-95		
70	304	JOINT	40.17	2301.68	2341.85	11.75 x 10.82, 65 C-95		
71	305	JOINT	41.11	2260.57	2301.68	11.75 x 10.82, 65 C-95		
72	306	JOINT	41.85	2218.72	2260.57	11.75 x 10.82, 65 C-95		
73	307	JOINT	38.46	2180.26	2218.72	11.75 x 10.82, 65 C-95		
74	308	JOINT	41.87	2138.39	2180.26	11.75 x 10.82, 65 C-95		
75	309	JOINT	42.24	2096.15	2138.39	11.75 x 10.82, 65 C-95		
76	310	JOINT	41.90	2054.25	2096.15	11.75 x 10.82, 65 C-95		
77	311	JOINT	40.95	2013.30	2054.25	11.75 x 10.82, 65 C-95		
78	312	JOINT	42.30	1971.00	2013.30	11.75 x 10.82, 65 C-95		
79	313	JOINT	39.22	1931.78	1971.00	11.75 x 10.82, 65 C-95	Annular casing packe	
80	314	JOINT	41.40	1890.38	1931.78	11.75 x 10.82, 65 C-95		
81	315	JOINT	42.30	1848.08	1890.38	11.75 x 10.82, 65 C-95		
82	316	JOINT	40.59	1807.49	1848.08	11.75 x 10.82, 65 C-95		
83	317	JOINT	42.40	1765.09	1807.49	11.75 x 10.82, 65 C-95		
84	318	JOINT	41.38	1723.71	1765.09	11.75 x 10.82, 65 C-95		
85	319	JOINT	38.39	1685.32	1723.71	11.75 x 10.82, 65 C-95		
86	320	JOINT	41.70	1643.62	1685.32	11.75 x 10.82, 65 C-95		
87	321	JOINT	41.68	1601.94	1643.62	11.75 x 10.82, 65 C-95		
88	322	JOINT	39.03	1562.91	1601.94	11.75 x 10.82, 65 C-95		
89	323	JOINT	41.00	1521.91	1562.91	11.75 x 10.82, 65 C-95		
90	324	JOINT	41.60	1480.31	1521.91	11.75 x 10.82, 65 C-95		
91	325	JOINT	42.71	1437.60	1480.31	11.75 x 10.82, 65 C-95		
92	326	JOINT	39.90	1397.70	1437.60	11.75 x 10.82, 65 C-95		
93	327	JOINT	41.07	1356.63	1397.70	11.75 x 10.82, 65 C-95		
94	328	JOINT	36.41	1320.22	1356.63	11.75 x 10.82, 65 C-95		
95	329	JOINT	42.25	1277.97	1320.22	11.75 x 10.82, 65 C-95		
96	330	JOINT	40.81	1237.16	1277.97	11.75 x 10.82, 65 C-95		
97	331	JOINT	41.68	1195.48	1237.16	11.75 x 10.82, 65 C-95		
98	332	JOINT	36.33	1159.15	1195.48	11.75 x 10.82, 65 C-95		
99	333	JOINT	41.70	1117.45	1159.15	11.75 x 10.82, 65 C-95		
100	334	JOINT	40.84	1076.61	1117.45	11.75 x 10.82, 65 C-95		

Joint Details - (Cont)

Run No.	Joint No	Item	Length	Top	Bottom	Description	Comments	Cnt Scr
101	335	JOINT	41.43	1035.18	1076.61	11.75 x 10.82, 65 C-95		
102	336	JOINT	36.34	998.84	1035.18	11.75 x 10.82, 65 C-95		
103	337	JOINT	40.08	958.76	998.84	11.75 x 10.82, 65 C-95		
104	338	JOINT	42.08	916.68	958.76	11.75 x 10.82, 65 C-95		
105	339	JOINT	41.93	874.75	916.68	11.75 x 10.82, 65 C-95		
106	340	JOINT	40.98	833.77	874.75	11.75 x 10.82, 65 C-95		
107	341	JOINT	40.63	793.14	833.77	11.75 x 10.82, 65 C-95		
108	342	JOINT	41.21	751.93	793.14	11.75 x 10.82, 65 C-95		
109	343	JOINT	40.53	711.40	751.93	11.75 x 10.82, 65 C-95		
110	344	JOINT	41.33	670.07	711.40	11.75 x 10.82, 65 C-95		
111	345	JOINT	41.82	628.25	670.07	11.75 x 10.82, 65 C-95		
112	346	JOINT	42.33	585.92	628.25	11.75 x 10.82, 65 C-95		
113	347	JOINT	42.43	543.49	585.92	11.75 x 10.82, 65 C-95		
114	348	JOINT	41.48	502.01	543.49	11.75 x 10.82, 65 C-95		
115	349	JOINT	41.50	460.51	502.01	11.75 x 10.82, 65 C-95		
116	350	JOINT	41.40	419.11	460.51	11.75 x 10.82, 65 C-95		
117	351	JOINT	42.00	377.11	419.11	11.75 x 10.82, 65 C-95		
118	352	JOINT	39.00	338.11	377.11	11.75 x 10.82, 65 C-95		
119	353	JOINT	41.73	296.38	338.11	11.75 x 10.82, 65 C-95		
120	354	JOINT	41.63	254.75	296.38	11.75 x 10.82, 65 C-95		
121	355	JOINT	42.85	211.90	254.75	11.75 x 10.82, 65 C-95		
122	356	JOINT	39.87	172.03	211.90	11.75 x 10.82, 65 C-95		
123	357	JOINT	41.40	130.63	172.03	11.75 x 10.82, 65 C-95		
124	358	JOINT	42.35	88.28	130.63	11.75 x 10.82, 65 C-95		
125	359	JOINT	42.37	45.91	88.28	11.75 x 10.82, 65 C-95		
126	360	JOINT	36.00	9.91	45.91	11.75 x 10.82, 65 C-95		
127	361	JOINT	35.00	-25.09	9.91	11.75 x 10.82, 65 C-95		
Excluded Joints:								
128	362	JOINT	41.20			11.75 x 10.82, 65 C-95		
129	363	JOINT	39.30			11.75 x 10.82, 65 C-95		
130	364	JOINT	41.80			11.75 x 10.82, 65 C-95		
131	365	JOINT	41.74			11.75 x 10.82, 65 C-95		
132	366	JOINT	40.67			11.75 x 10.82, 65 C-95		
133	367	JOINT	40.34			11.75 x 10.82, 65 C-95		
134	368	JOINT	35.00			11.75 x 10.82, 65 C-95		

Joint Details - (Cont)

Run No.	Joint No	Item	Length	Top	Bottom	Description	Comments	Cnt Scr
135	369	JOINT	38.90			11.75 x 10.82, 65 C-95		

Casing Report

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

Run Date/Time:	22-Nov-02 6:00		
Well Section:	PROD	**String Type:**	LINER
String Top MD:	5000 ft	**String Top TVD:**	4950 ft
Casing Shoe MD:	7200 ft	**Casing Shoe TVD:**	7230 ft
String Nominal OD:	8.626 in	**String Nominal ID:**	7.750 in
Bit Diameter:	6.250 in	**Avg. Open Hole Diam.:**	8.500 in
Centralizers: No:	0 **Manufacturer:**	**Type:**	
Depths:			
Hanger: Type:	Double Slip	**Manufacturer:**	BAKER

Comments:

Waiting on data

Richmond Energy Services, Inc.
5221 CENTRAL AVENUE, SUITE 201
RICHMOND, CALIFORNIA 94804-5829

TELEPHONE: (510) 527-9876
FAX: (510) 527-8164
E-MAIL: mw@geothermex.com

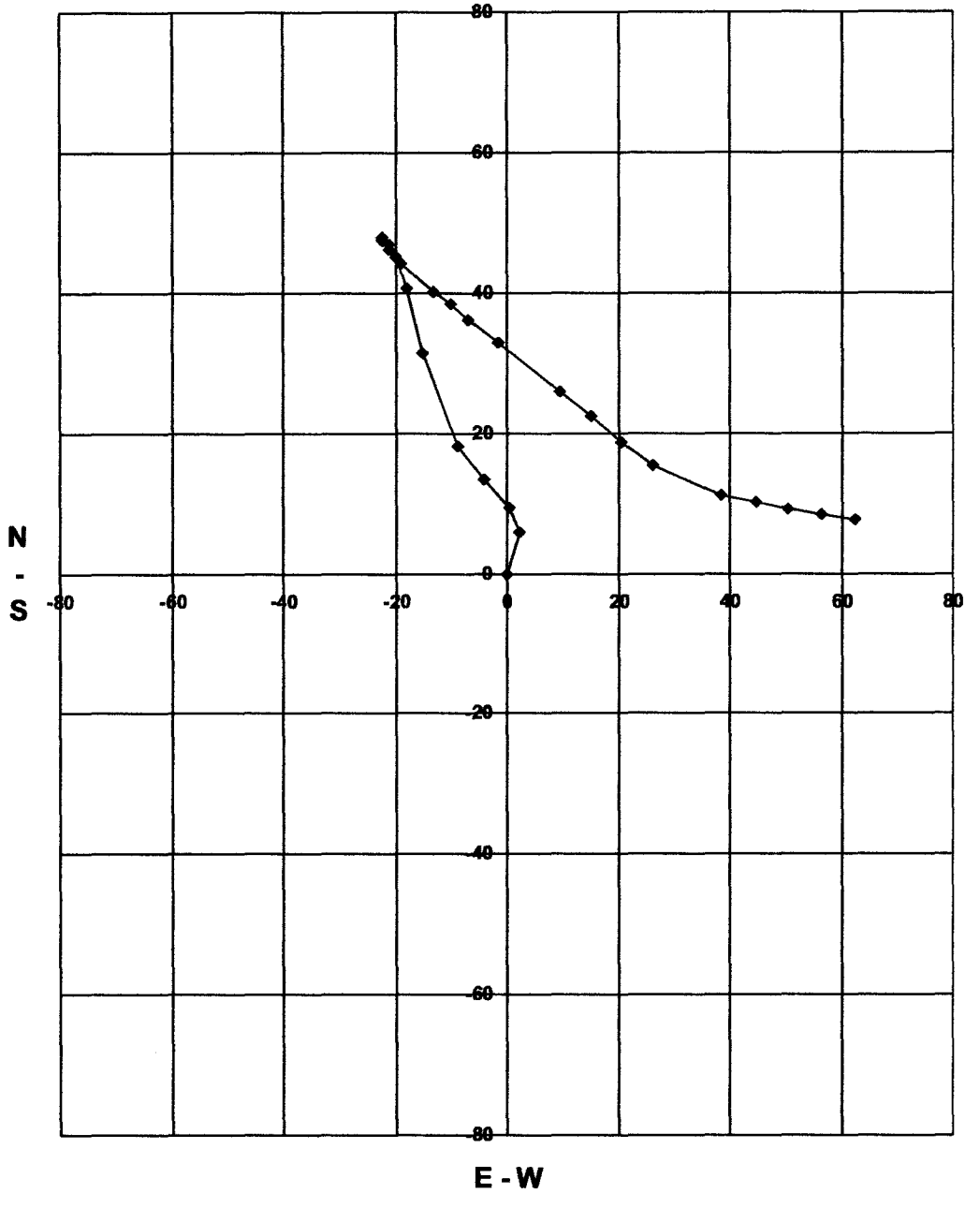
3. Well Plan View

Well Plan View

Well ID: KS-05

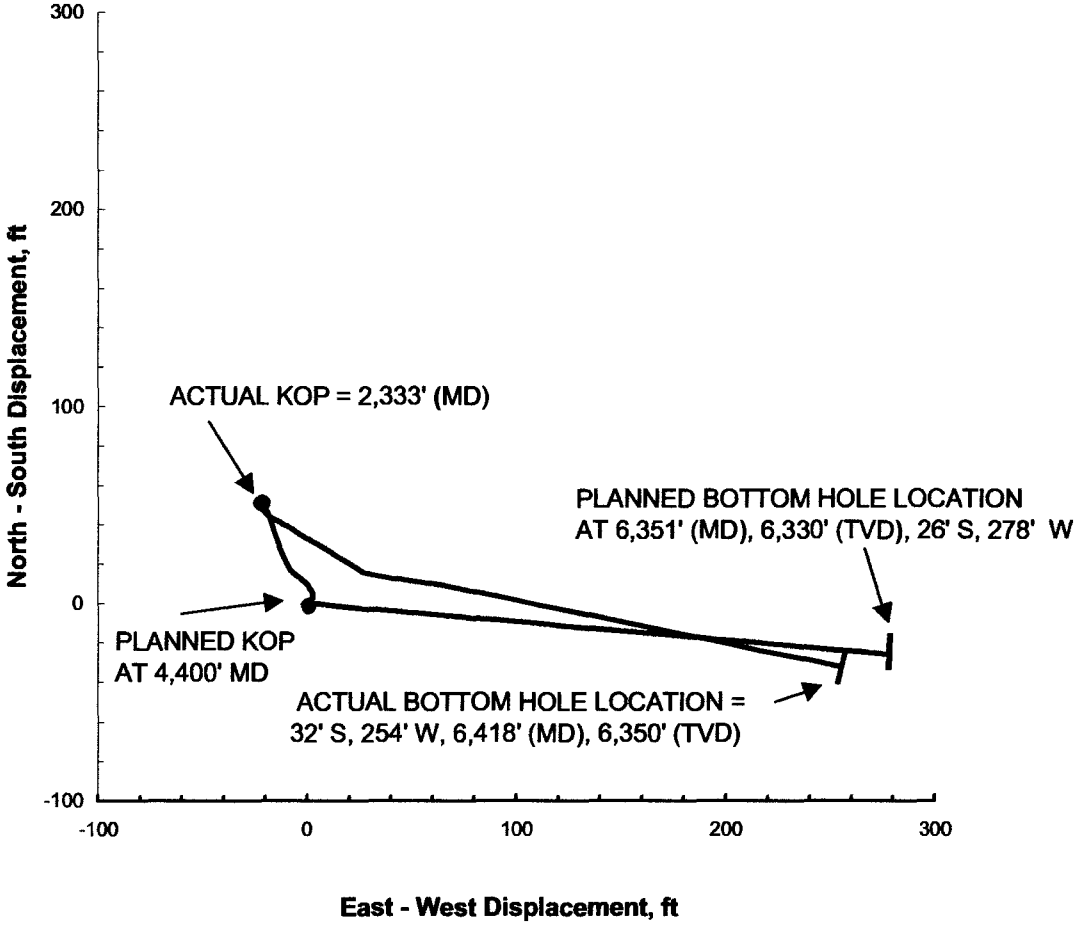
Puna Geothermal Venture

Well Name: Production Well KS-05



Printed: 14:17 25-Apr-03

PUNA GEOTHERMAL VENTURE
WELL KS-5 - DIRECTIONAL PLAN



Richmond Energy Services, Inc.
5221 CENTRAL AVENUE, SUITE 201
RICHMOND, CALIFORNIA 94804-5829

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E-MAIL: mw@geothermex.com

4. Well Elevation View

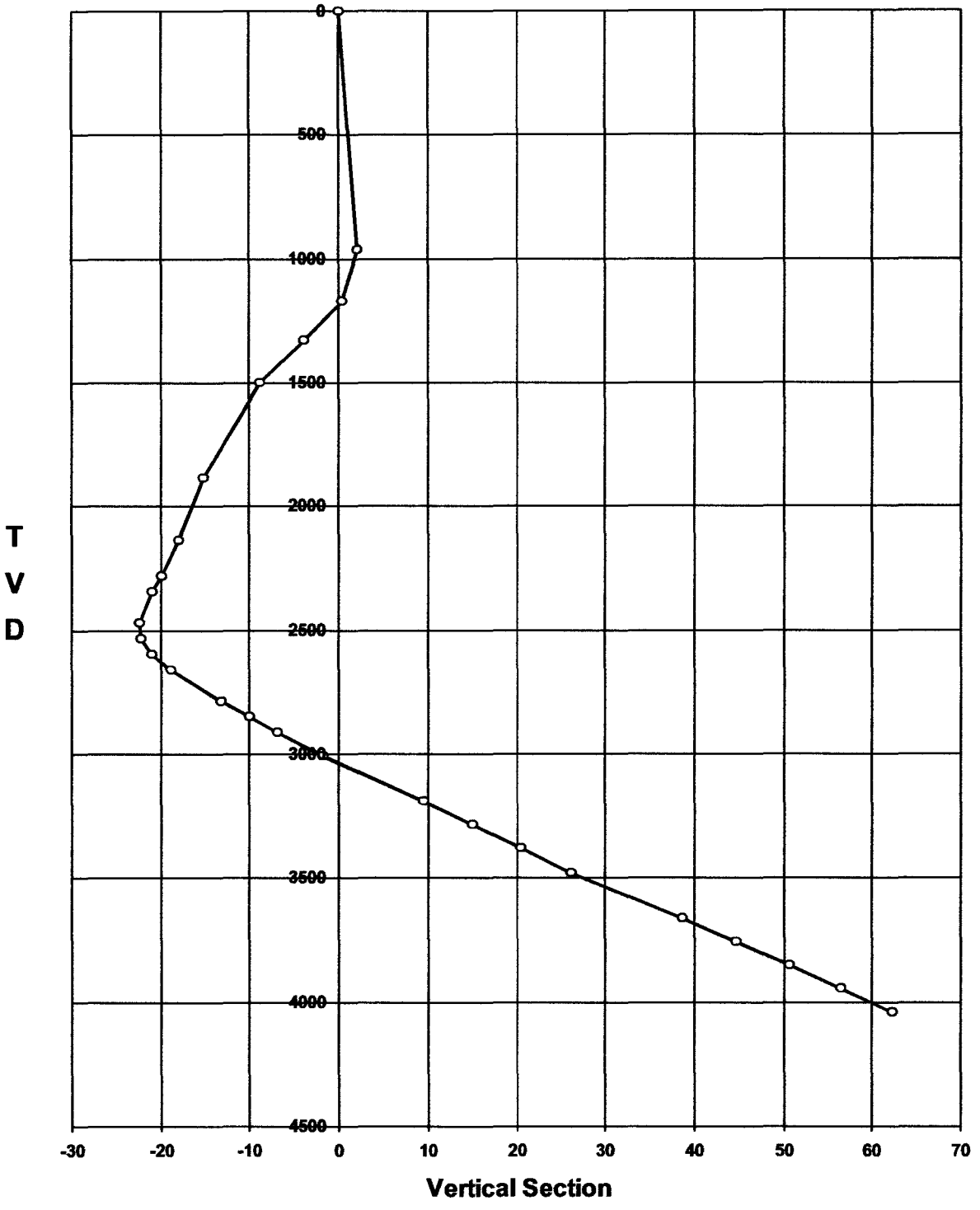
Well Elevation View

Well ID: KS-05

Puna Geothermal Venture

Well Name: Production Well KS-05

Plane of Vertical Section: 0.0 degrees



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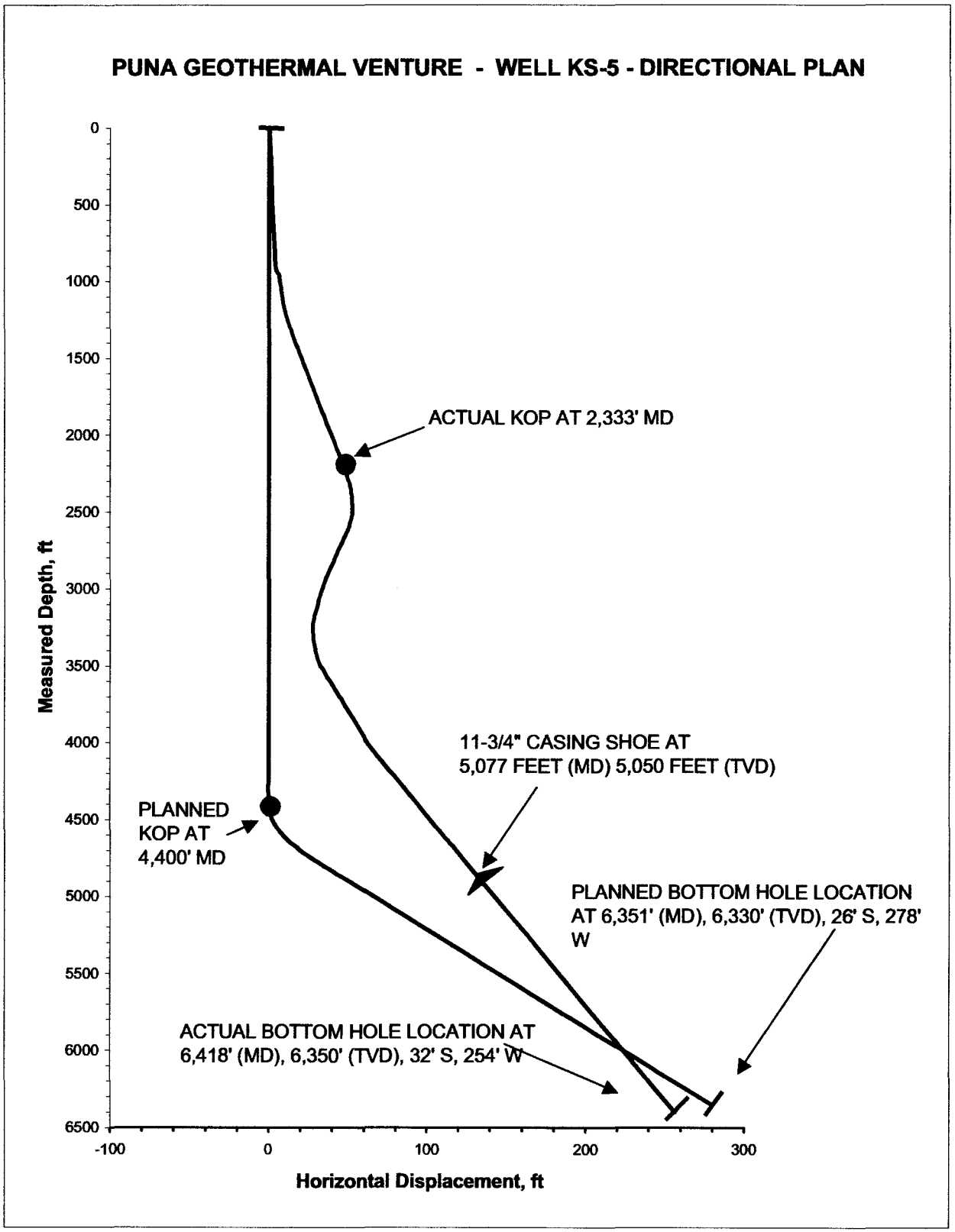
PUNA GEOTHERMAL VENTURE - WELL KS-5 - DIRECTIONAL PLAN
Measured Depth, ft
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
-100
0
100
200
300
Horizontal Displacement, ft
ACTUAL KOP AT 2,333' MD
11-3/4" CASING SHOE AT
5,077 FEET (MD) 5,050 FEET (TVD)
PLANNED
KOP AT
4,400' MD
PLANNED BOTTOM HOLE LOCATION
AT 6,351' (MD), 6,330' (TVD), 26' S, 278'
W
ACTUAL BOTTOM HOLE LOCATION AT
6,418' (MD), 6,350' (TVD), 32' S, 254' W

Richmond Energy Services, Inc.
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5. Operations Time Analysis

Operations Time Analysis

Puna Geothermal Venture

Well ID: KS-05 **Well Name: Production Well KS-05**

	Total Hrs	% of Total
Drill		
Drilling Ahead w/ Connections	368.75	10.5
Reaming/Underreaming	157.00	4.5
Circulate/Condition Mud	140.25	4.0
Directional Work	65.50	1.9
Well Repairs	60.00	1.7
Drilling - Rotating	44.25	1.3
Opening Hole	27.00	0.8
Running Survey Tools	15.25	0.4
Pipe and Tubing Handling	14.50	0.4
Washing Down	13.75	0.4
Milling	13.50	0.4
Drilling - Sliding	7.00	0.2
Mud Mixing	5.50	0.2
Magna Flux Pipe	1.00	0.0
Total for Drill:	933.25	26.7
Evaluate		
Testing Operations, Flow, DST etc	564.00	16.1
Wireline Logging	60.50	1.7
Leak Off Test	6.75	0.2
Well Evaluation	6.00	0.2
Total for Evaluate:	637.25	18.2
Problem Time		
Fishing Operations	282.00	8.1
Waiting on Equipment	112.50	3.2
Rig Repairs	100.50	2.9
Stuck Pipe Operations	74.00	2.1
Waiting on Orders	27.50	0.8
Well Kill Operations	8.00	0.2
Losing Circ./Pumping LCM	3.50	0.1
Service Company Repairs	3.50	0.1
Total for Problem Time:	611.50	17.5
Trip		
Tripping Out	268.50	7.7
Tripping in	162.75	4.6
BHA Operations	109.88	3.1
Wiper Trip	4.00	0.1
Total for Trip:	545.13	15.6
Cementing		

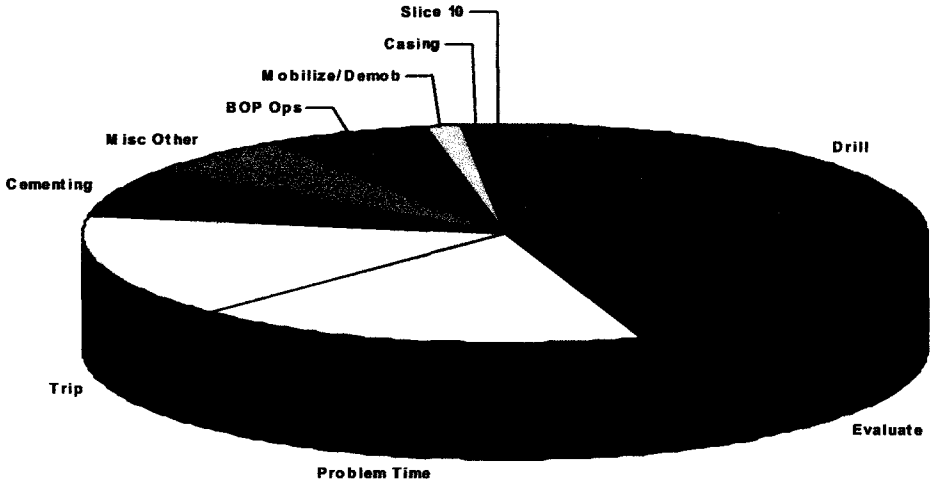
	Total Hrs	% of Total
Waiting On Cement	142.00	4.1
Secondary Cement Operations	57.00	1.6
Drilling Cement/Shoe	23.00	0.7
Primary Cement Operations	11.50	0.3
Cement Plug Operations	7.50	0.2
Total for Cementing:	241.00	6.9
Misc Other		
Welding and Fabrication Operations	116.50	3.3
Other Activity	39.50	1.1
Stand by	25.50	0.7
Rig Service	15.75	0.4
Safety Meeting	6.50	0.2
Rig Move	6.00	0.2
Cut and Slip Drill Line	4.00	0.1
Total for Misc Other:	213.75	6.1
BOP Ops		
Other BOP Operations	88.50	2.5
BOP Nipple Up	74.00	2.1
BOP Testing	25.00	0.7
BOP Nipple Down	22.00	0.6
Total for BOP Ops:	209.50	6.0
Mobilize/Demob		
Rigging Down	38.00	1.1
Rigging Up	15.00	0.4
Total for Mobilize/Demob:	53.00	1.5
Casing		
Running Casing	50.50	1.4
Total for Casing:	50.50	1.4
Total for :	6.00	0.2
Total Elapsed Time for Well:	3500.88 hrs.	
Total Non-Productive Time for Well:	617.00 hrs.	17.6%
Total Productive Time for Well:	2883.88 hrs.	82.4%

Operations Time Graph

Puna Geothermal Venture

Well ID: KS-05

Analysis by Operations Group



Description	Time - hrs	%
Drill	933.25	26.66%
Evaluate	637.25	18.20%
Problem Time	611.50	17.47%
Trip	545.13	15.57%
Cementing	241.00	6.88%
Misc Other	213.75	6.11%
BOP Ops	209.50	5.98%
Mobilize/Demob	53.00	1.51%
Casing	50.50	1.44%
Slice 10 (unaccounted)	6.00	0.17%
Total Time:	3,500.88 hrs.	

Printed 06 May 03 15:57

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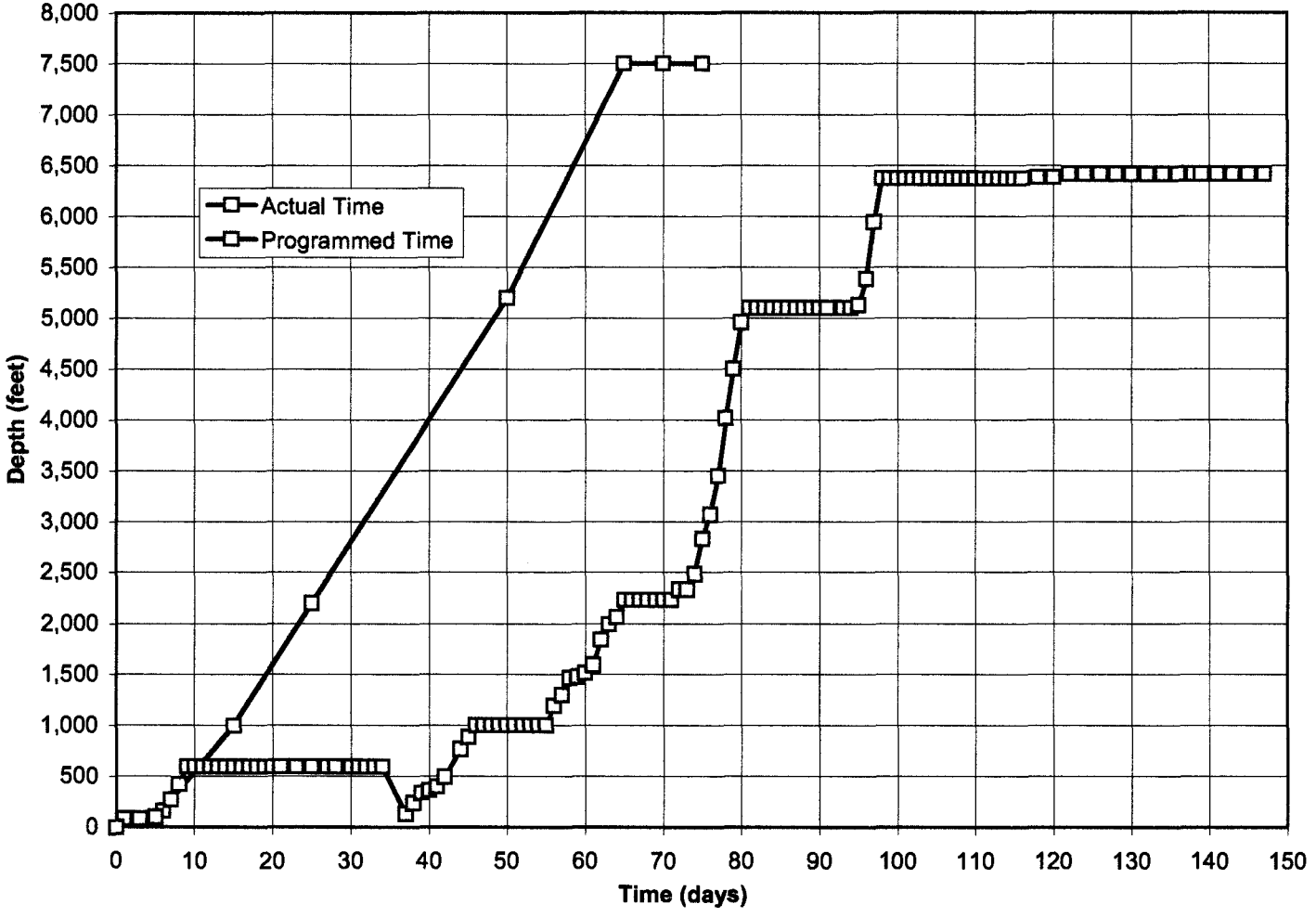
6. Days Vs. Depth Graph

Puna Geothermal Venture - Well KS-5: Programmed and Actual Time Vs. Depth

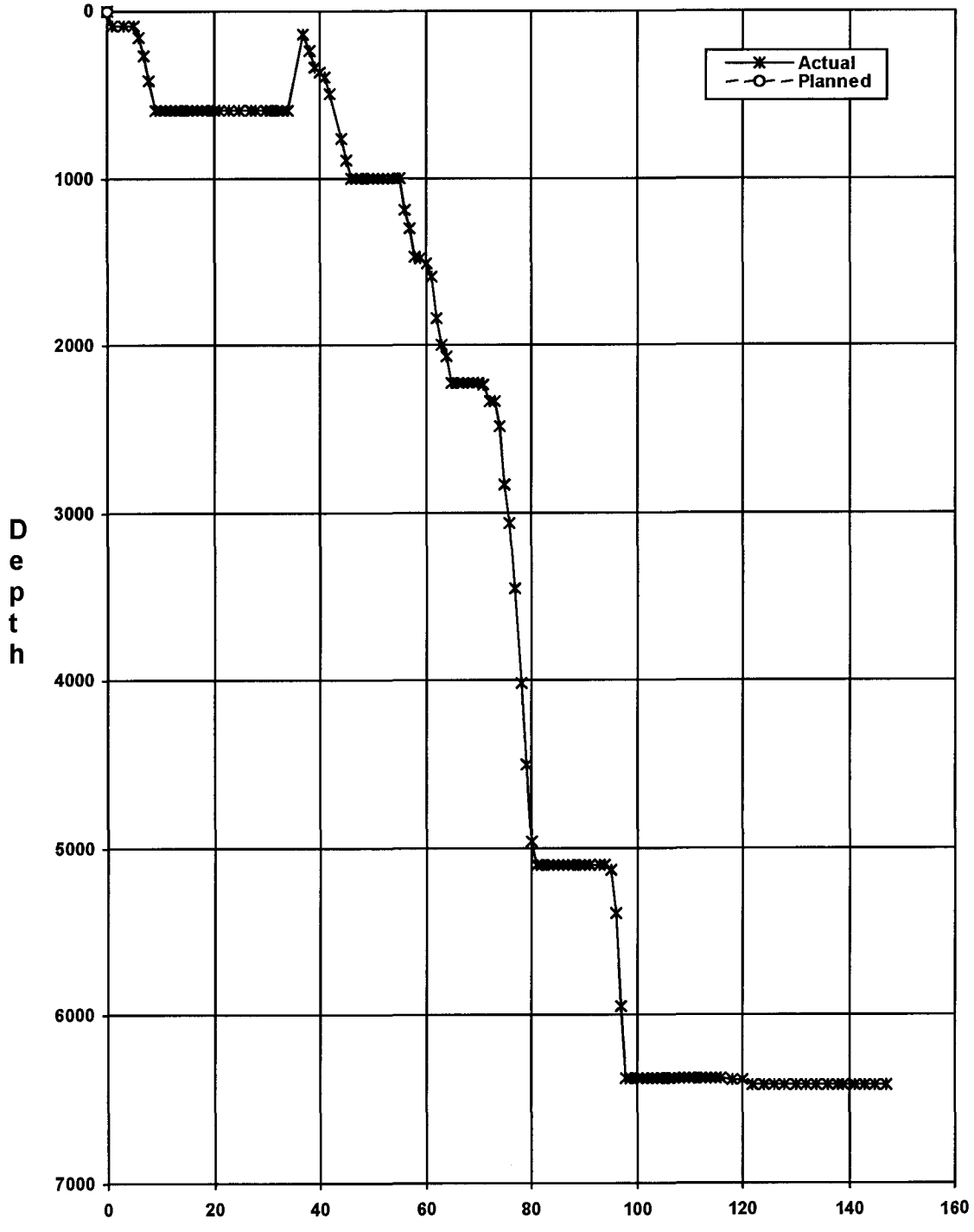


Days Vs Depth Graph

KS-05

Puna Geothermal Venture

Well Name: Production Well KS-05



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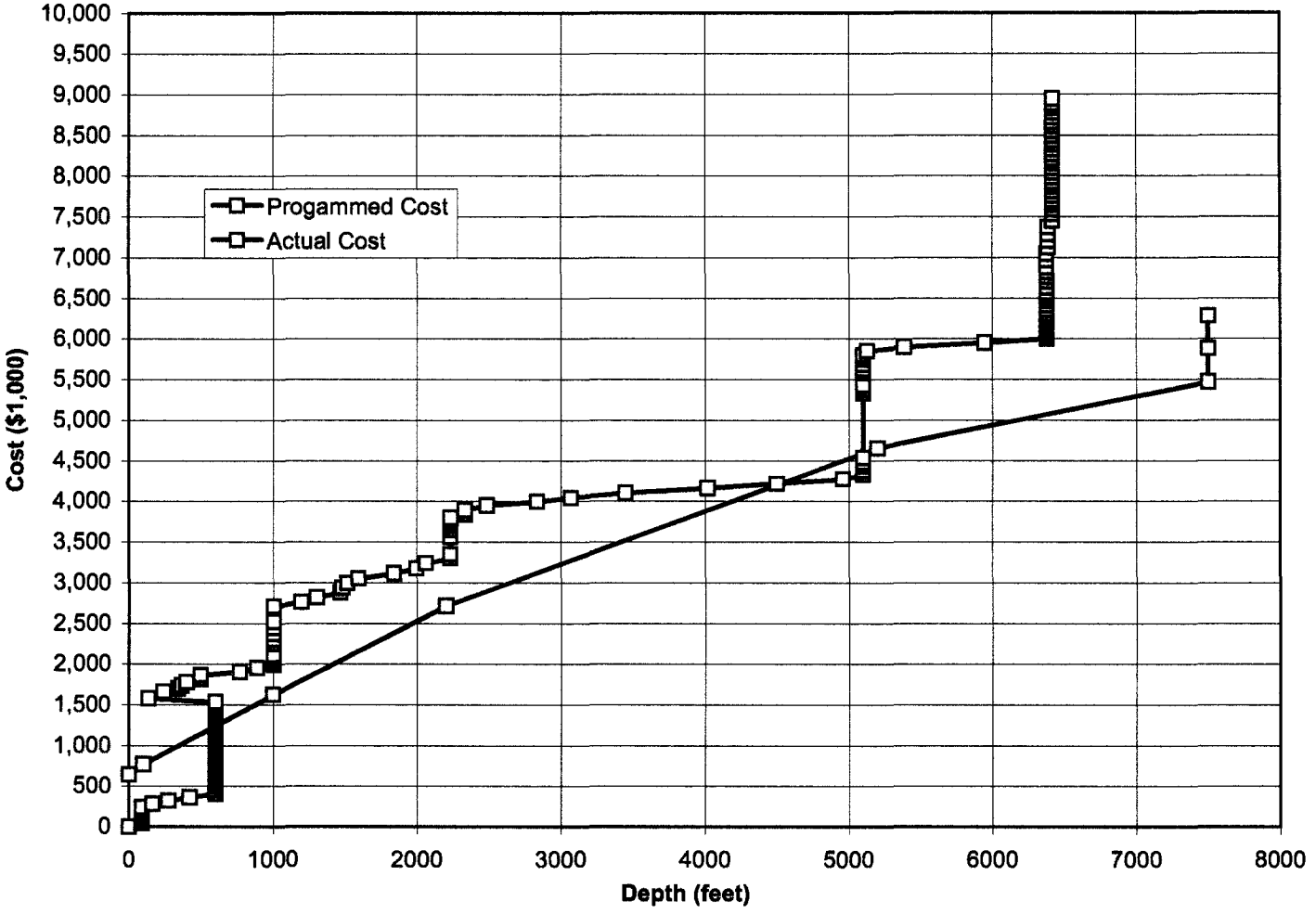
7. Cost Vs. Depth Graph

Puna Geothermal Venture - Well KS-5: Programmed and Actual Cost Vs. Depth

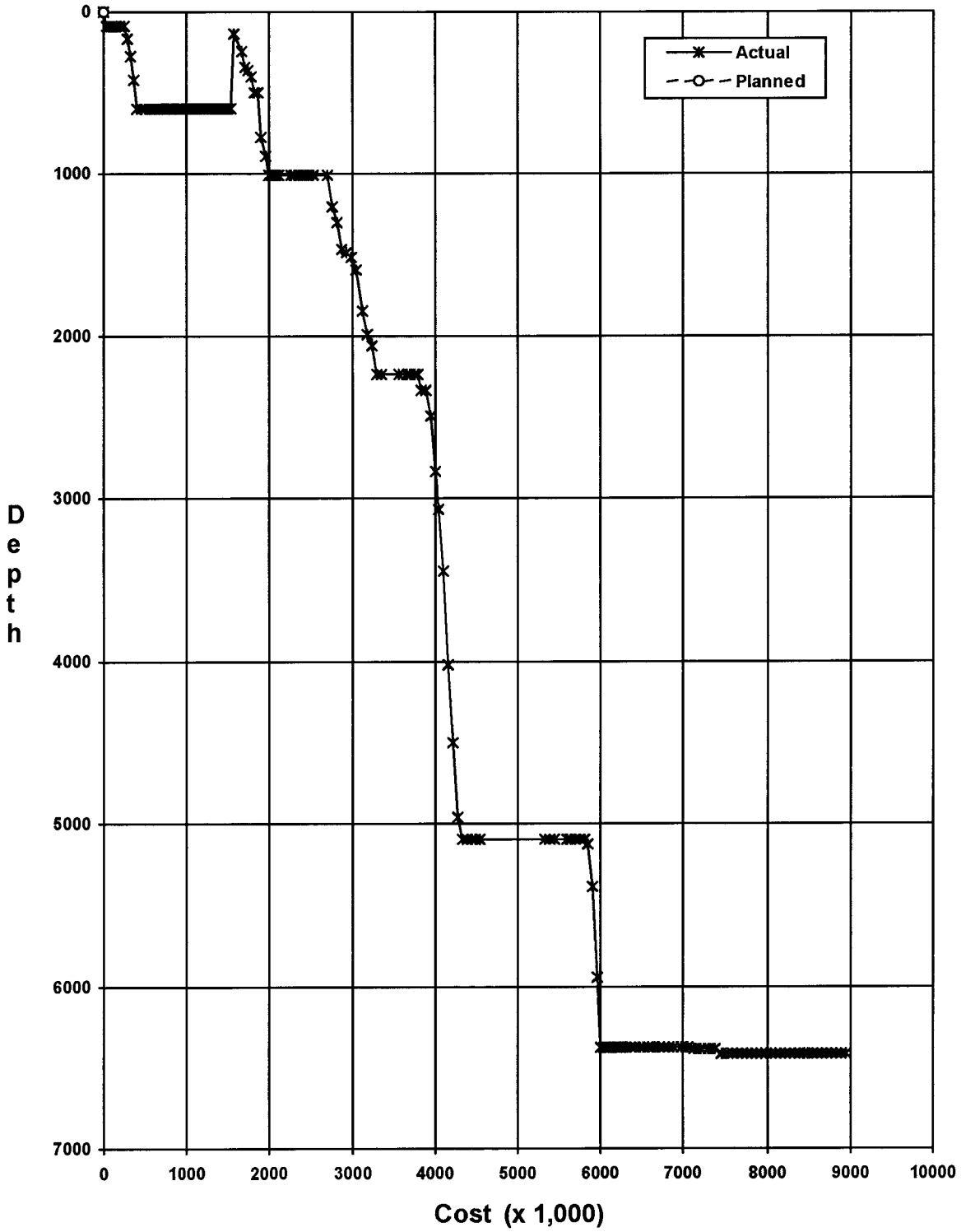


Cost Vs Depth Graph

Well ID: KS-05

Puna Geothermal Venture

Well Name: Production Well KS-05



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8. Directional Survey Data

Directional Survey Report

Well ID: KS-05

Well Bore: Original Well Bore

Puna Geothermal Venture

Well Name: Production Well KS-05

Plane of Vertical Section: 0.0 degrees

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates N-S	Coordinates E-W	Closure	Vertical Section	Dog Leg Severity
** TieIn	0.0	0.00	0.0	0.0				0.0	
MSS	965.0	0.75	20.0	965.0	N 5.9	E 2.2	6.3	5.9	0.078
MSS	1171.0	1.75	315.0	1170.9	N 9.4	E 0.4	9.4	9.4	0.770
MWD	1329.0	2.50	310.0	1328.8	N 13.3	W 3.9	13.9	13.3	0.489
MWD	1502.0	2.00	320.0	1501.7	N 18.1	W 8.8	20.1	18.1	0.366
MWD	1886.0	2.50	345.0	1885.4	N 31.3	W 15.3	34.8	31.3	0.284
MWD	2137.0	2.00	343.0	2136.2	N 40.8	W 18.0	44.6	40.8	0.202
MWD	2283.0	1.90	329.0	2282.1	N 45.3	W 19.9	49.5	45.3	0.333
MWD	2347.0	1.50	320.0	2346.1	N 46.8	W 21.0	51.3	46.8	0.750
MWD	2473.0	0.30	241.9	2472.1	N 48.0	W 22.4	52.9	48.0	1.165
MWD	2537.0	1.00	147.1	2536.1	N 47.4	W 22.2	52.4	47.4	1.668
MWD	2598.0	2.30	135.5	2597.0	N 46.1	W 21.1	50.7	46.1	2.190
MWD	2661.0	2.90	129.2	2660.0	N 44.2	W 19.0	48.1	44.2	1.054
MWD	2787.0	3.40	119.9	2785.8	N 40.3	W 13.2	42.4	40.3	0.566
MWD	2851.0	3.30	123.6	2849.7	N 38.3	W 10.1	39.6	38.3	0.372
MWD	2914.0	3.60	122.4	2912.6	N 36.3	W 6.9	36.9	36.3	0.490
MWD	3005.0	4.10	122.4	3003.4	N 33.0	W 1.7	33.0	33.0	0.549
MWD	3193.0	4.00	122.6	3190.9	N 25.9	E 9.5	27.5	25.9	0.054
MWD	3288.0	3.90	123.0	3285.7	N 22.3	E 15.0	26.9	22.3	0.109
MWD	3383.0	4.00	124.3	3380.4	N 18.7	E 20.4	27.7	18.7	0.141
MWD	3479.0	4.00	117.0	3476.2	N 15.3	E 26.2	30.3	15.3	0.530
MWD	3668.0	4.00	100.5	3664.8	N 11.1	E 38.5	40.1	11.1	0.607
MWD	3761.0	3.70	99.1	3757.5	N 10.0	E 44.7	45.8	10.0	0.338
MWD	3853.0	3.70	97.9	3849.4	N 9.1	E 50.5	51.4	9.1	0.084
MWD	3947.0	3.60	97.9	3943.2	N 8.3	E 56.5	57.1	8.3	0.106
MWD	4042.0	3.40	93.5	4038.0	N 7.7	E 62.2	62.7	7.7	0.352
EST.	6400.0	3.40		6350.0	S 32.0	E 254.0	256.0		

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9. TECTON Lithology Log

Santa Rosa, CA 707-571-1700

COMPANY PUNA GEOTHERMAL VENTURE
WELL KAPOHO STATE #5 ST
FIELD Kapoho
COUNTY/STATE Hawaii
WELL HEAD COORDINATES
9360.93' E 8289.03' N 643.92' AMSL KB
ELEVATION 616.75'+27.17'KB = 643.92'KB el
SPUD DATE 9/23/02
TD DATE 12/15/02
TOTAL DEPTH 6418'
TRUE VERTICAL DEPTH 6405'
TD LOCATION 260' E, 37' S
CONTRACTOR/RIG PGV Rig Ikai Imena #1
COMPANY REPRESENTATIVE Ream,Atkinson,Sheehan

LOG INTERVAL

DATE LOGGED	9/23/02	TO	1/12/03
DEPTH LOGGED	85'	TO	6418'
MUD DRILLING	85'	TO	6418'
AIR DRILLING	NA	TO	NA
LOG SCALE	1:600	UNIT NO.	334

LOGGING GEOLOGISTS
Mike McLaughlin Roy Ismay
Dick Dunlap

HOLE

36	TO	85
26	TO	1005
20	TO	2232
14.75	TO	5100
10.625	TO	6418

CASING

30	AT	85
22	AT	900
16	AT	2208
11.75	AT	5077
8.625	AT	6385

ABBREVIATIONS

NB New Bit
RRB Re-run Bit
CB Core Bit
WOB Weight On Bit
SPM Strokes per Minute
PP Pump Pressure
RPM Revolutions per Min
BHT Bottom Hole Temp
C Carbide Test
NR No Returns
LAT Logged After Trip
CFM Cubic Feet per Min
BUT Bottoms Up Temp

SYMBOLS

Wireline Log
Casing Shoe
Steam/Water Entry
Flow Test
Deviation Survey
Cored Interval
No Recovery

LITHOLOGY

Vesicular Basalt
Porphyritic Basalt
Highly Altered
Aphanitic Basalt
Black Aphanitic Basalt
Hyaloclastite
Limestone
Clay
Scoria

REMARKS

KB=27.17'
8.625" Hanger @ 4925'
Flow Test on 11/29/02, 1/3/03, 1/4/03
1/6/03, 1/7/03
8.625" Scab Liner Top of Hanger @ 1882'
Shoe @ 2058'

SECONDARY MINERALS

Q = Quartz
C = Calcite
P = Pyrite
E = Epidote
Ch = Chlorite
Py = Pyrrhotite
A = Anhydrite
Cl = Clay
Z = Zeolite

Rare	<< 1%
Trace	< 1%
Minor	1% to 4%
Common	4% to 7%
Abundant	7% to 10%
	> 10%

Tecton Geologic | PGV KS-5 | Scale 1: 600

Drilling Data
ROP
200 ft/hr 0
Weight on Bit
0 k lbs 80

Depth

Lithology

Minerals
Quartz
Calcite
Pyrite
Epidote
Chlorite
Pyrrhotite
Anhydrite
Clay
Zeolite
Hematite

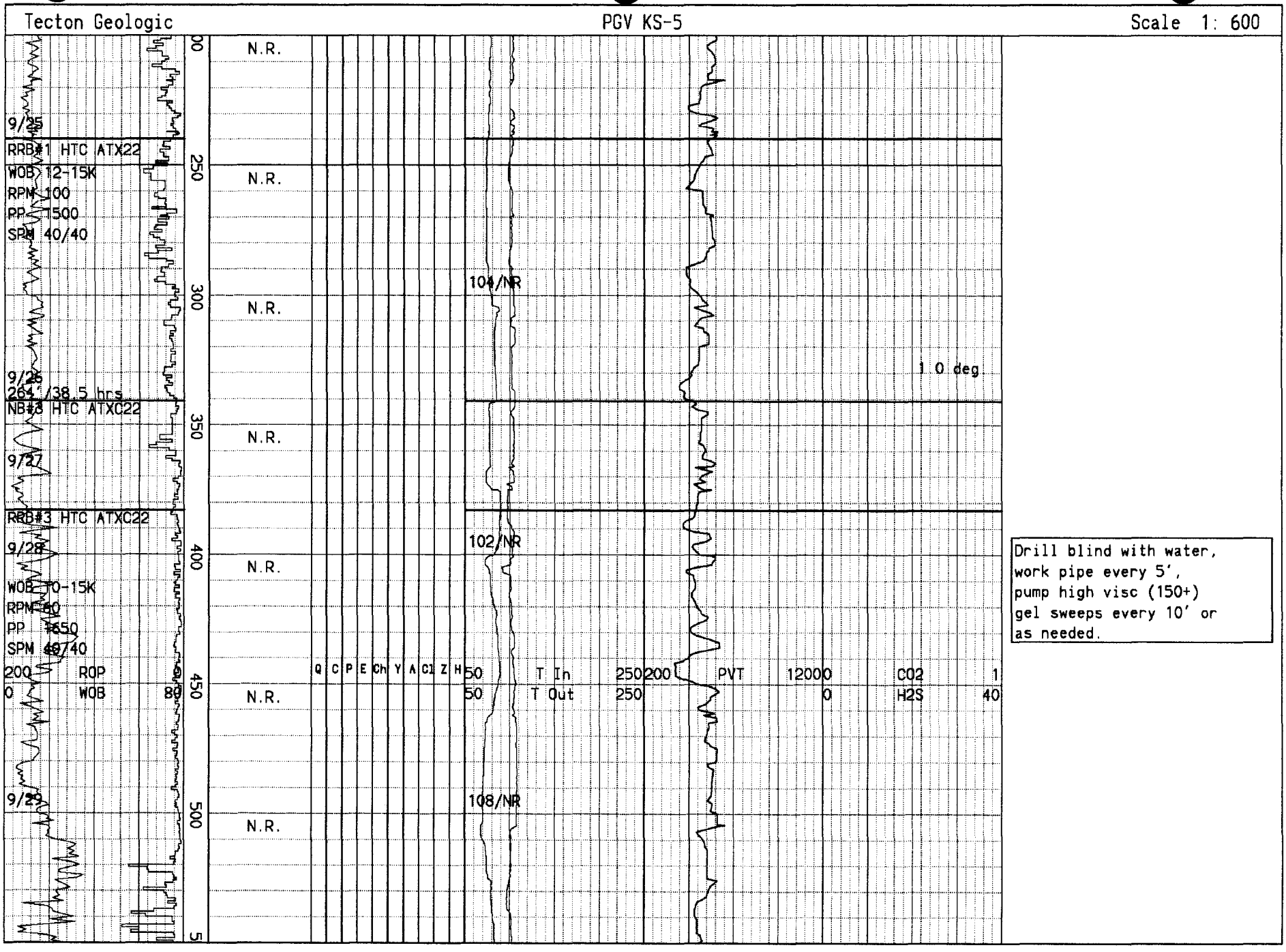
Temperatures
Temperature In
Temperature Out
50 deg F 250

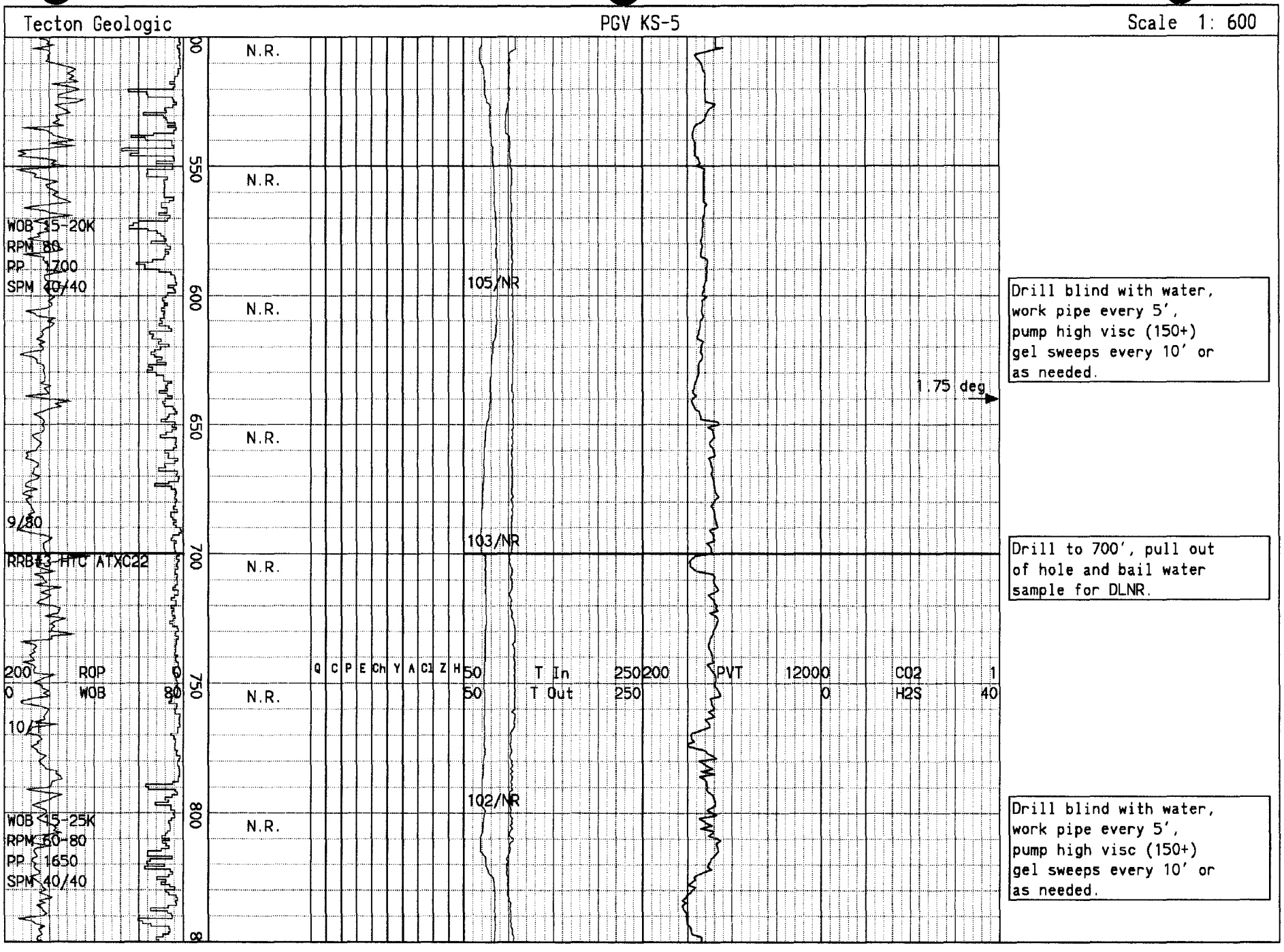
Circulation
Pit Total
200 bbls 1200

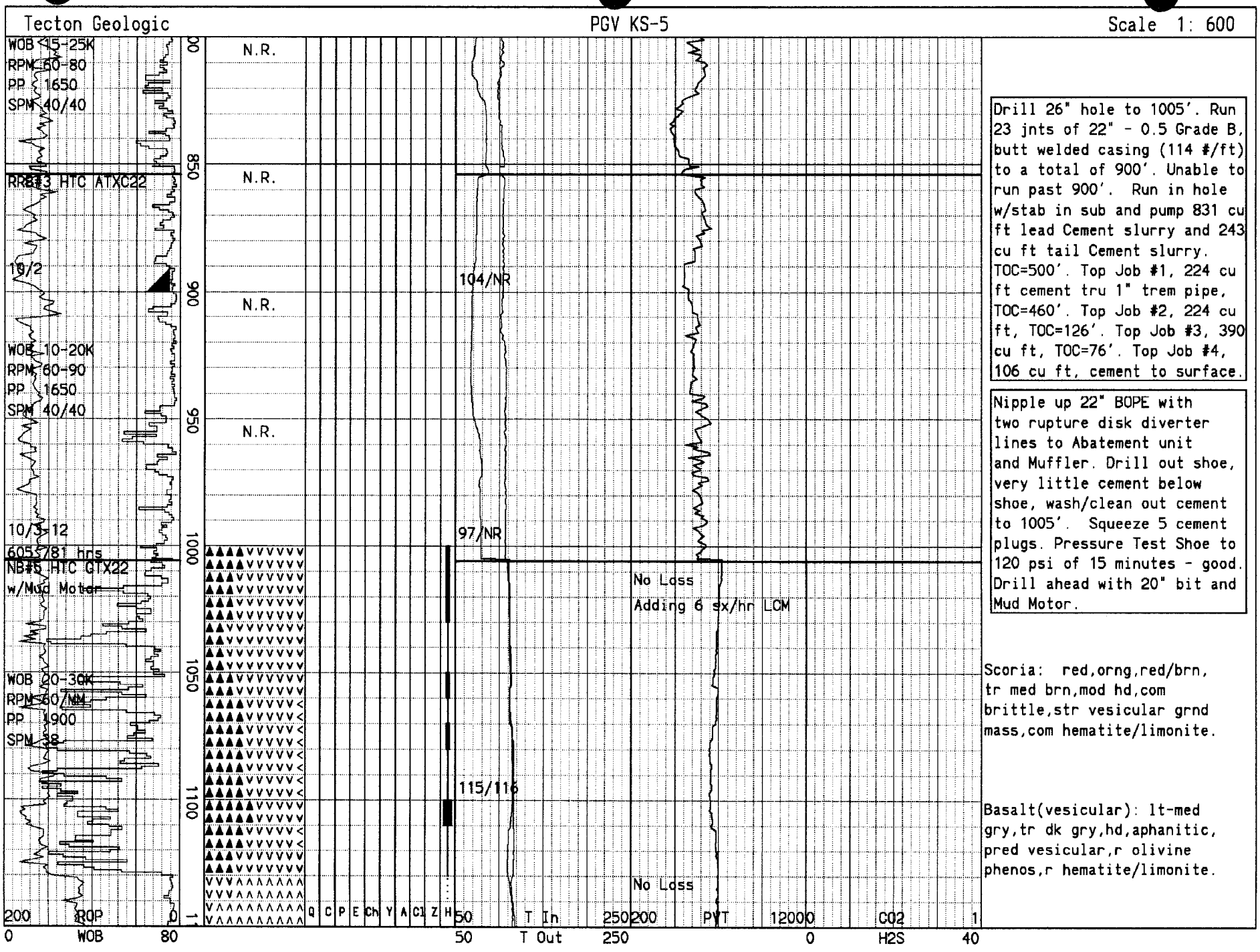
Gas Analysis
Carbon Dioxide
0 % 1
Hydrogen Sulfide
0 ppm 40

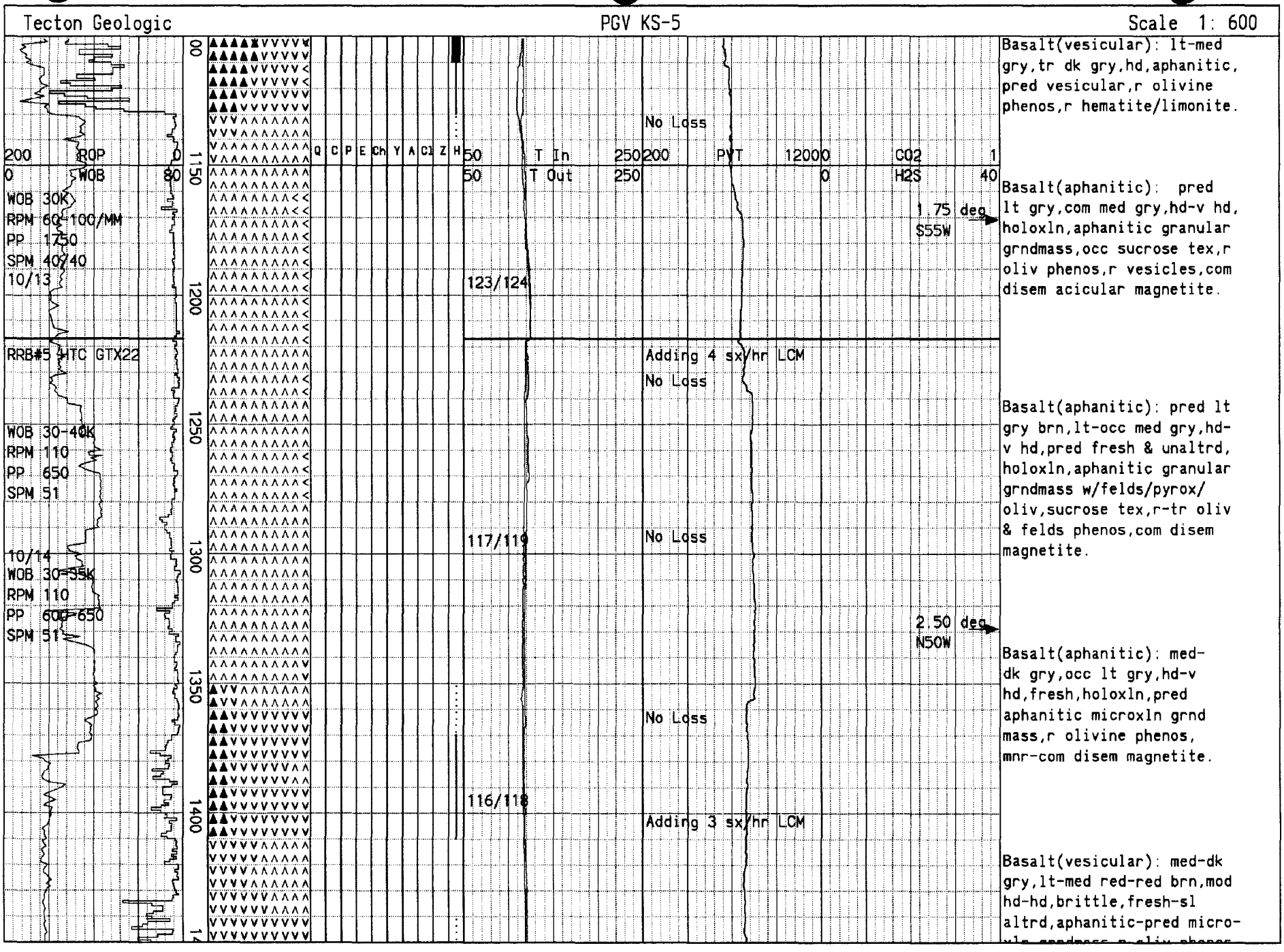
Descriptions

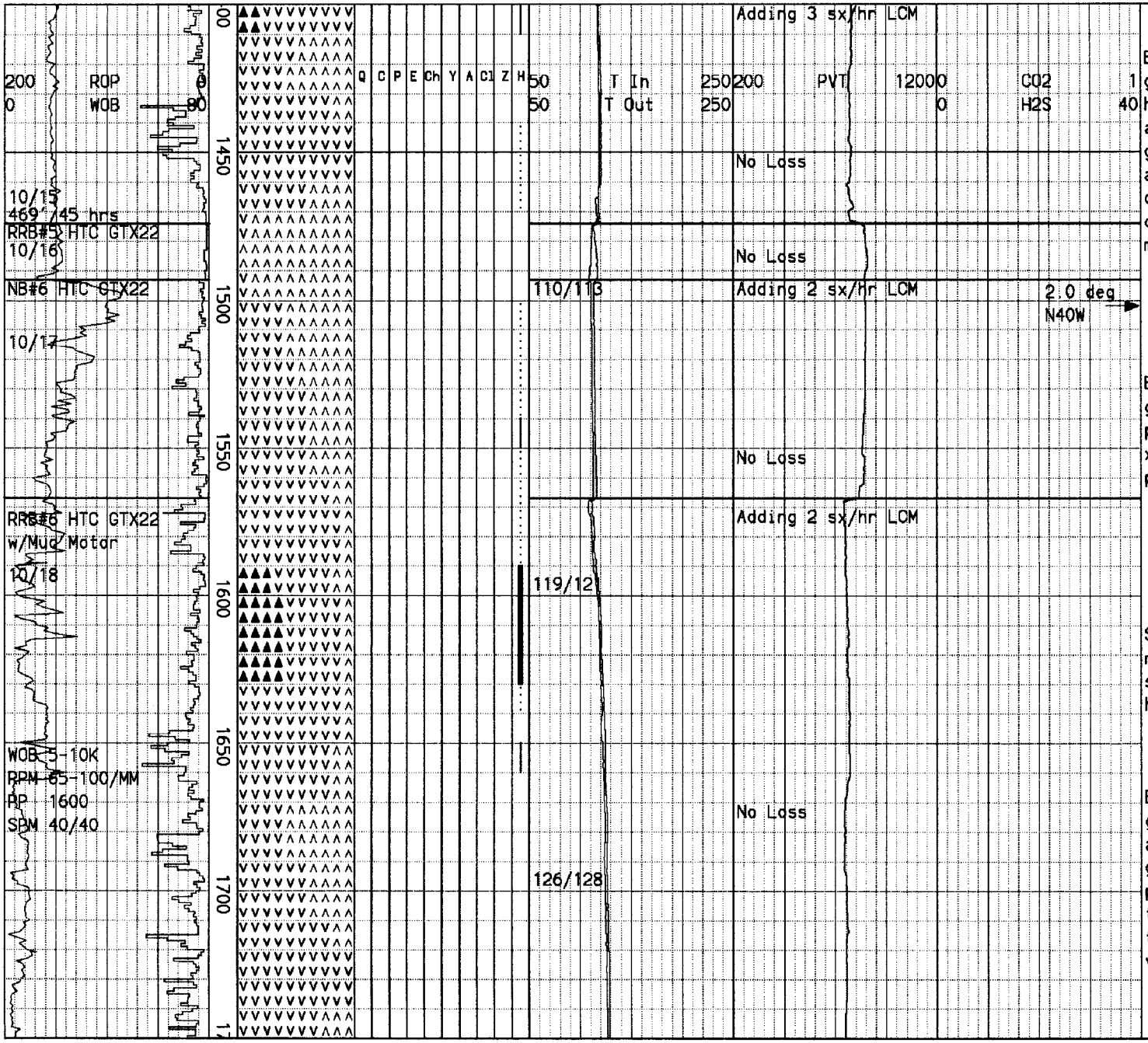
0
50
9/23
RRB#1 HTC ATX22
WOB 8-10K
RPM 66
PP 1350
SPM 40
9/24
100
N.R.
101/NR
No Returns
Spud well on 9/23/99. Rotary drill w/26" bit from 85'. Drilling blind with no returns.
WOB 10-15K
RPM 140
PP 1350
SPM 40/40
150
N.R.
0.5 deg
Drilling blind with water and high visc (150+) gel sweeps.
101/NR
200
N.R.
Drill blind with water, work pipe every 5', pump high visc (150+) gel sweeps every 10' or as needed.
9/25
RRB#1 HTC ATX22
2


Tecton Geologic
PGV KS-5
Scale 1: 600
9/25
RRB#1 HTC ATX22
WOB 12-15K
RPM 100
PP 1500
SPM 40/40
9/26
264'/38.5 hrs.
NB#3 HTC ATXC22
9/27
RRB#3 HTC ATXC22
9/28
WOB 10-15K
RPM 60
PP 1650
SPM 40/40
9/29
200 ROP 0
0 WOB 80
Q C P E Ch Y A C1 Z H
N.R.
104/NR
102/NR
108/NR
10 deg.
50 T In 250
50 T Out 250
200 PVT 1200
0
CO2 1
H2S 40
Drill blind with water,
work pipe every 5',
pump high visc (150+)
gel sweeps every 10' or
as needed.


Tecton Geologic
PGV KS-5
Scale 1: 600
N.R.
N.R.
WOB 15-20K
RPM 80
PP 1700
SPM 40/40
105/NR
N.R.
1.75 deg
N.R.
9/80
103/NR
RRB#3 HTC ATXC22
N.R.
200 ROP 0
0 WOB 80
Q C P E Ch Y A C1 Z H
50 T In 250
50 T Out 250
200 PVT 0
12000
CO2 1
H2S 40
10/11
N.R.
102/NR
WOB 15-25K
RPM 60-80
PP 1650
SPM 40/40
N.R.
Drill blind with water, work pipe every 5', pump high visc (150+) gel sweeps every 10' or as needed.
Drill to 700', pull out of hole and bail water sample for DLNR.
Drill blind with water, work pipe every 5', pump high visc (150+) gel sweeps every 10' or as needed.


Tecton Geologic
PGV KS-5
Scale 1: 600
WOB 15-25K
RPM 60-80
PP 1650
SPM 40/40
RR#3 HTC ATXC22
19/2
WOB 10-20K
RPM 60-90
PP 1650
SPM 40/40
10/3-12
605-781 hrs
NB#5 HTC GTX22
w/Mud Motor
WOB 20-30K
RPM 60/MM
PP 1900
SPM 38
N.R.
N.R.
N.R.
104/NR
97/NR
115/116
No Loss
Adding 6 sx/hr LCM
No Loss
Drill 26" hole to 1005'. Run 23 jnts of 22" - 0.5 Grade B, butt welded casing (114 #/ft) to a total of 900'. Unable to run past 900'. Run in hole w/stab in sub and pump 831 cu ft lead Cement slurry and 243 cu ft tail Cement slurry. TOC=500'. Top Job #1, 224 cu ft cement tru 1" trem pipe, TOC=460'. Top Job #2, 224 cu ft, TOC=126'. Top Job #3, 390 cu ft, TOC=76'. Top Job #4, 106 cu ft, cement to surface.
Nipple up 22" BOPE with two rupture disk diverter lines to Abatement unit and Muffler. Drill out shoe, very little cement below shoe, wash/clean out cement to 1005'. Squeeze 5 cement plugs. Pressure Test Shoe to 120 psi of 15 minutes - good. Drill ahead with 20" bit and Mud Motor.
Scoria: red,orng,red/brn, tr med brn,mod hd,com brittle,str vesicular grnd mass,com hematite/limonite.
Basalt(vesicular): lt-med gry,tr dk gry,hd,aphanitic, pred vesicular,r olivine phenos,r hematite/limonite.
Q C P E Ch Y A C1 Z H
200 ROP 0
0 WOB 80
50 T In 250
50 T Out 250
200 PVT 12000
0 H2S 40
CO2 1


Tecton Geologic
PGV KS-5
Scale 1: 600
ROP
WOB
Q C P E Ch Y A Cl Z H
T In
T Out
PVT
CO2
H2S
No Loss
WOB 30K
RPM 60-100/MM
PP 1750
SPM 40/40
10/13
123/124
RRB#5 HTC GTX22
Adding 4 sx/hr LCM
No Loss
WOB 30-40K
RPM 110
PP 650
SPM 51
117/119
No Loss
10/14
WOB 30-35K
RPM 110
PP 600-650
SPM 51
2.50 deg
N50W
No Loss
116/118
Adding 3 sx/hr LCM
1.75 deg
S55W
Basalt(vesicular): lt-med gry,tr dk gry,hd,aphanitic, pred vesicular,r olivine phenos,r hematite/limonite.
Basalt(aphanitic): pred lt gry,com med gry,hd-v hd, holoxln,aphanitic granular grndmass,occ sucrose tex,r oliv phenos,r vesicles,com disem acicular magnetite.
Basalt(aphanitic): pred lt gry brn,lt-occ med gry,hd-v hd,pred fresh & unaltrd, holoxln,aphanitic granular grndmass w/felds/pyrox/ oliv,sucrose tex,r-tr oliv & felds phenos,com disem magnetite.
Basalt(aphanitic): med-dk gry,occ lt gry,hd-v hd,fresh,holoxln,pred aphanitic microxln grnd mass,r olivine phenos, mnr-com disem magnetite.
Basalt(vesicular): med-dk gry,lt-med red-red brn,mod hd-hd,brittle,fresh-sl altrd,aphanitic-pred micro-



Basalt(vesicular): med-dk gry,lt-med red-red brn,mod hd-hd,brittle,fresh-sl altrd, aphanitic-pred microxln grndmass,r oliv phenos,com-abun vesicles,r-tr hem/lim coating vesicles,r glassy/ obsidian frags,mnr-com disem magnetite,r hematite stng.

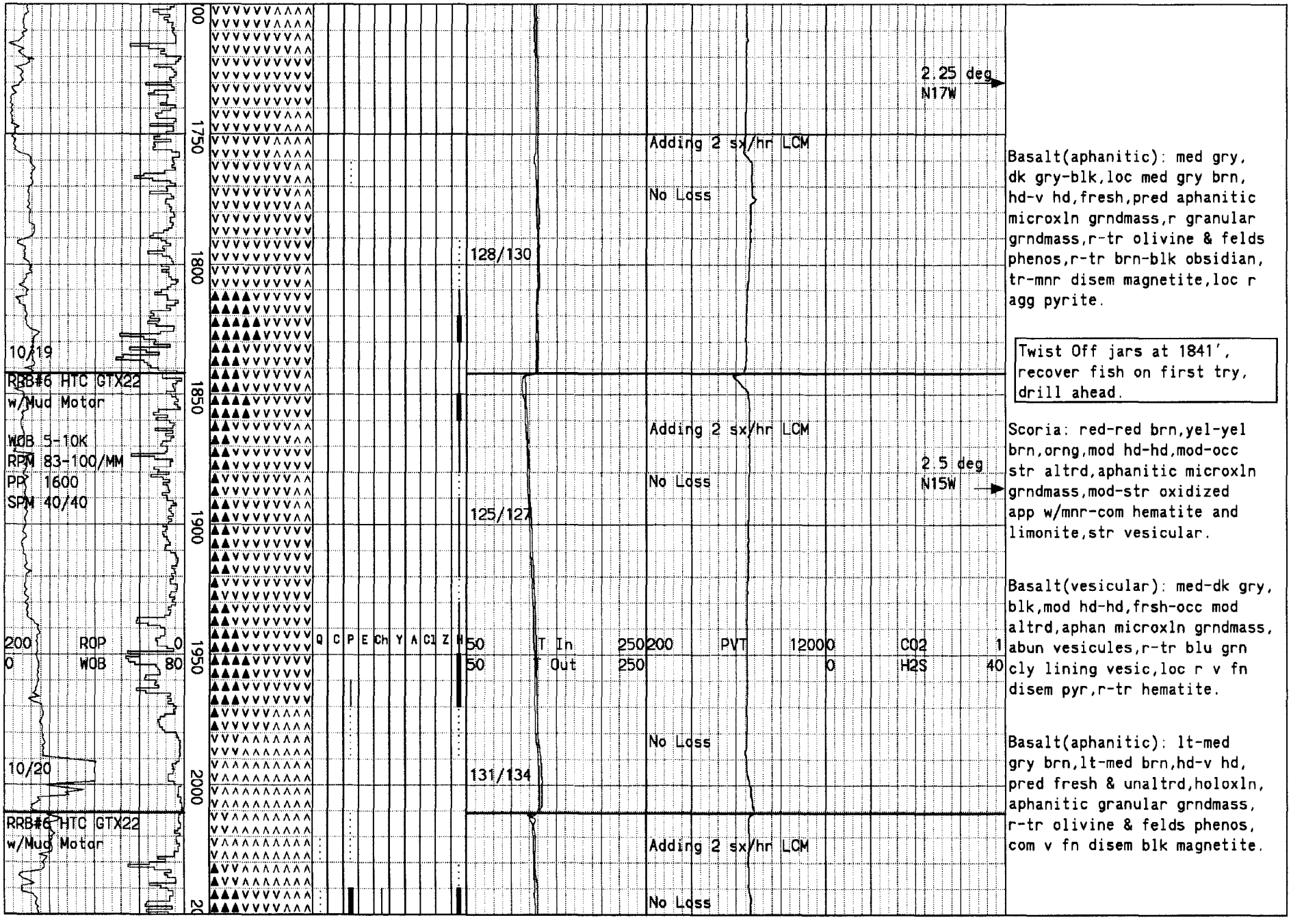
Lost a blade off of stablizer @ 1474', recover w/Magnet & drill ahead.

Basalt(aphanitic): lt-med gry brn,med-dk gry,pred hd, pred fresh,aphan gran-micro-xln grndmass,r oliv & felds phenos,com disem magnetite.

Drill to 1567', POH to work on Mud Pumps and pick up Mud Motor.

Scoria: orng,red/brn,tr med brn,mod hd,com brittle, str vesicular grndmass,com hematite/limonite.

Basalt(vesicular): med-dk gry,blk,mod hd-hd,fresh-v sl altrd,aphanitic microxln grndmass,r olivine & felds phenos,mnr-abun vesicles,r tr brn-blk obsidian/glass,r-tr blu grn clay(?) lining vesicles,tr-mnr disem magn.



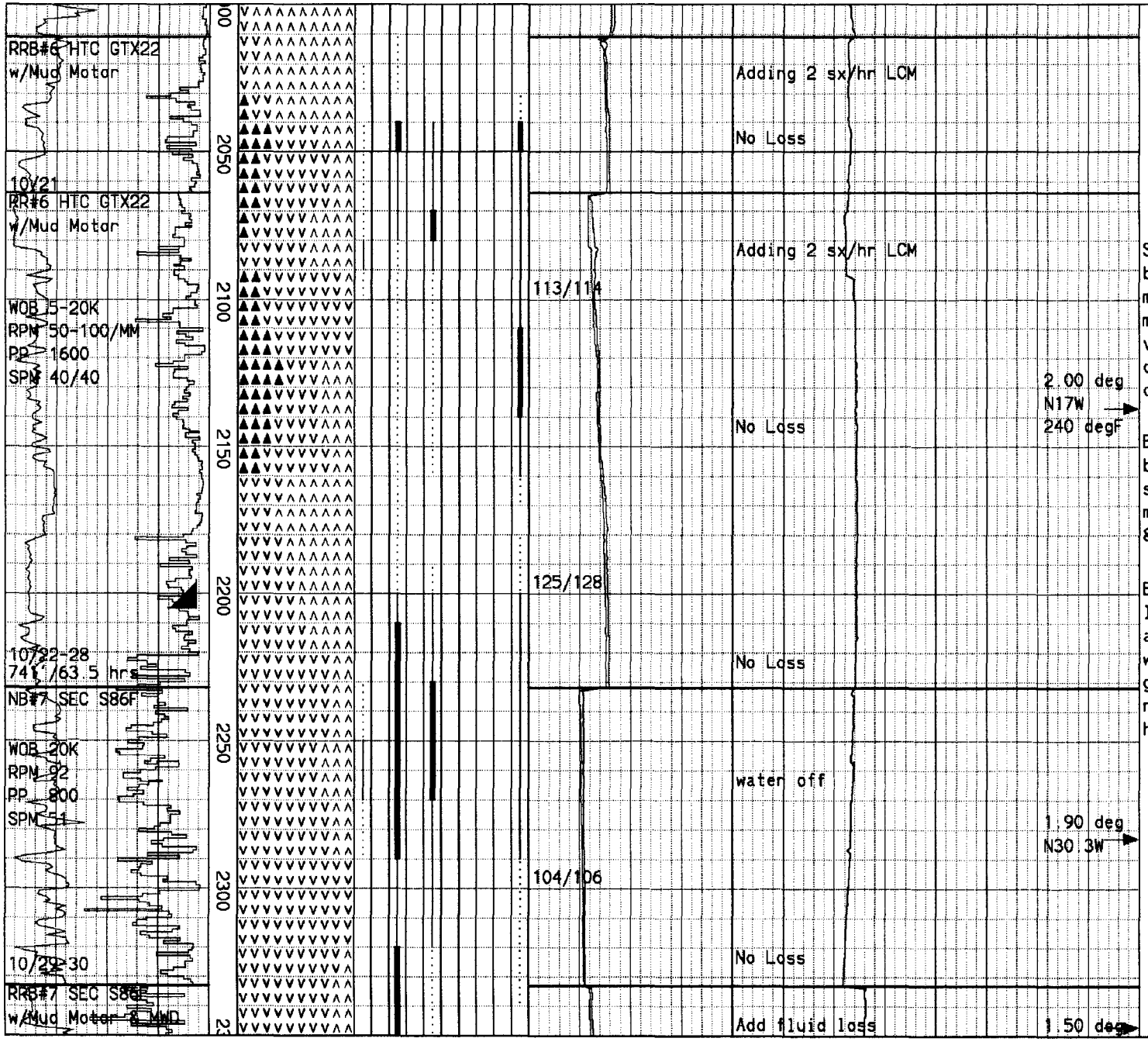
Basalt(aphanitic): med gry, dk gry-blk,loc med gry brn, hd-v hd,fresh,pred aphanitic microxln grndmass,r granular grndmass,r-tr olivine & felds phenos,r-tr brn-blk obsidian, tr-mnr disem magnetite,loc r agg pyrite.

Twist Off jars at 1841', recover fish on first try, drill ahead.

Scoria: red-red brn,yel-yel brn,orng,mod hd-hd,mod-occ str altrd,aphanitic microxln grndmass,mod-str oxidized app w/mnr-com hematite and limonite,str vesicular.

Basalt(vesicular): med-dk gry, blk,mod hd-hd,frsh-occ mod altrd,aphan microxln grndmass, abun vesicules,r-tr blu grn cly lining vesic,loc r v fn disem pyr,r-tr hematite.

Basalt(aphanitic): lt-med gry brn,lt-med brn,hd-v hd, pred fresh & unaltrd,holoxln, aphanitic granular grndmass, r-tr olivine & felds phenos, com v fn disem blk magnetite.



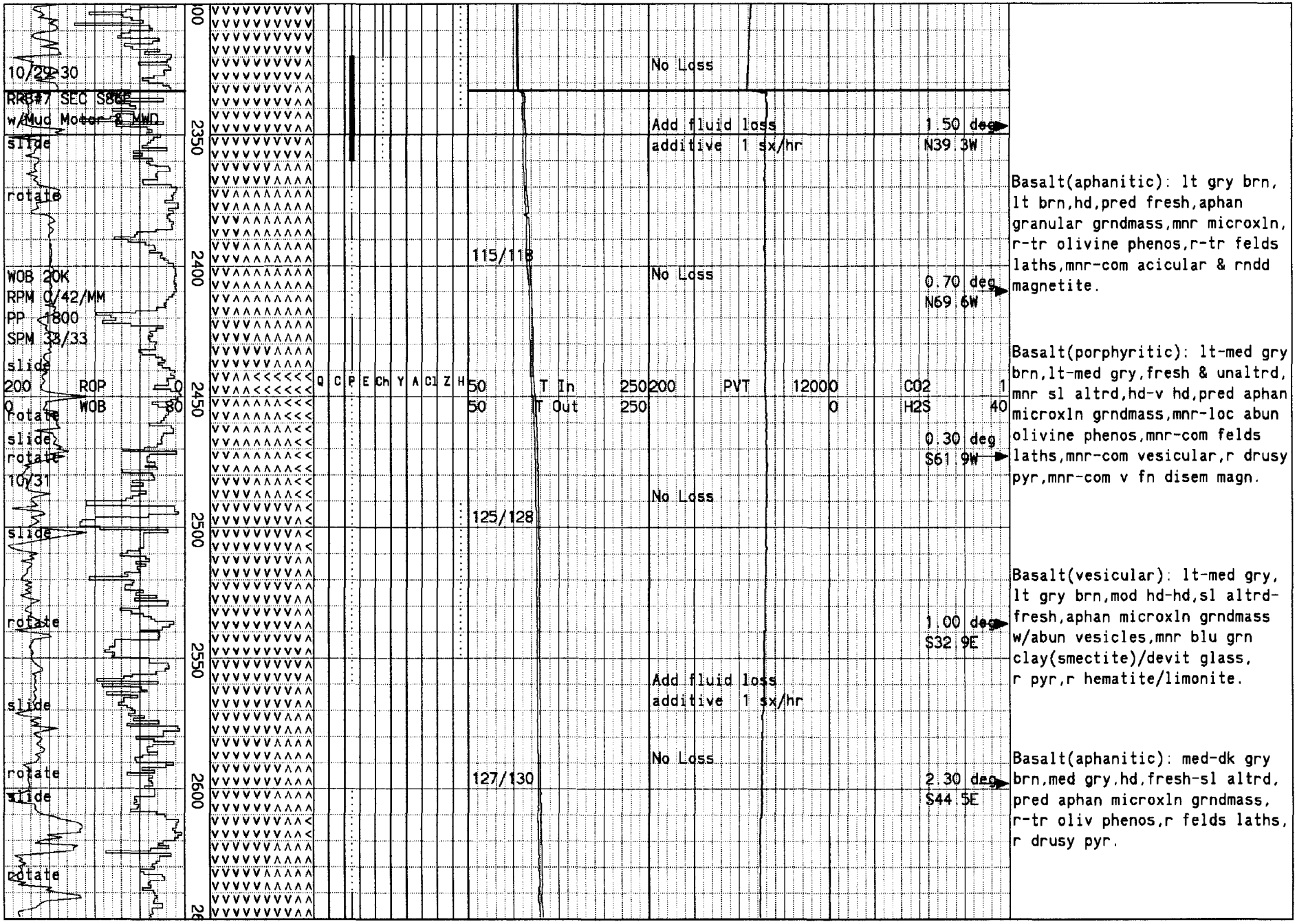
Twist Off in 10" collars at 2064', recover fish on first try, drill ahead.

Scoria: orng-red brn,blu grn, brick red,mod hd-hd,brittle, mod-str altrd,microxln grnd-mass w/abun vesicles,tr-mnr veslicles lined w/blu grn clay/hematite/limonite/pyr/ qtz,r-tr glass/devit glass.

Basalt(aphanitic): lt-med gry brn,lt-med gry,hd-v hd,fresh-sl altrd,aphan granular & microxln grndmass,r-mnr oliv & felds phenos,com disem magn.

Basalt(vesicular): lt-med gry, lt gry brn,mod hd-hd,sl-mod altrd,aphan microxln grndmass w/abun vesicles,com-abun blu grn clay(smectite)/devit glass, r-mnr pyr,r-tr chlorite,r-tr hematite/limonite.

Drill to 2232', run 51 joints of L80, 97#, 16" casing to 2208' with the shoe at 2205'. Pressure Test BOP, Leak Off Test shoe - No Good. Drill ahead with 14.75" bit to 2333', Leak Off Test - No Good. Squeeze 2 cement plugs. Drill ahead.

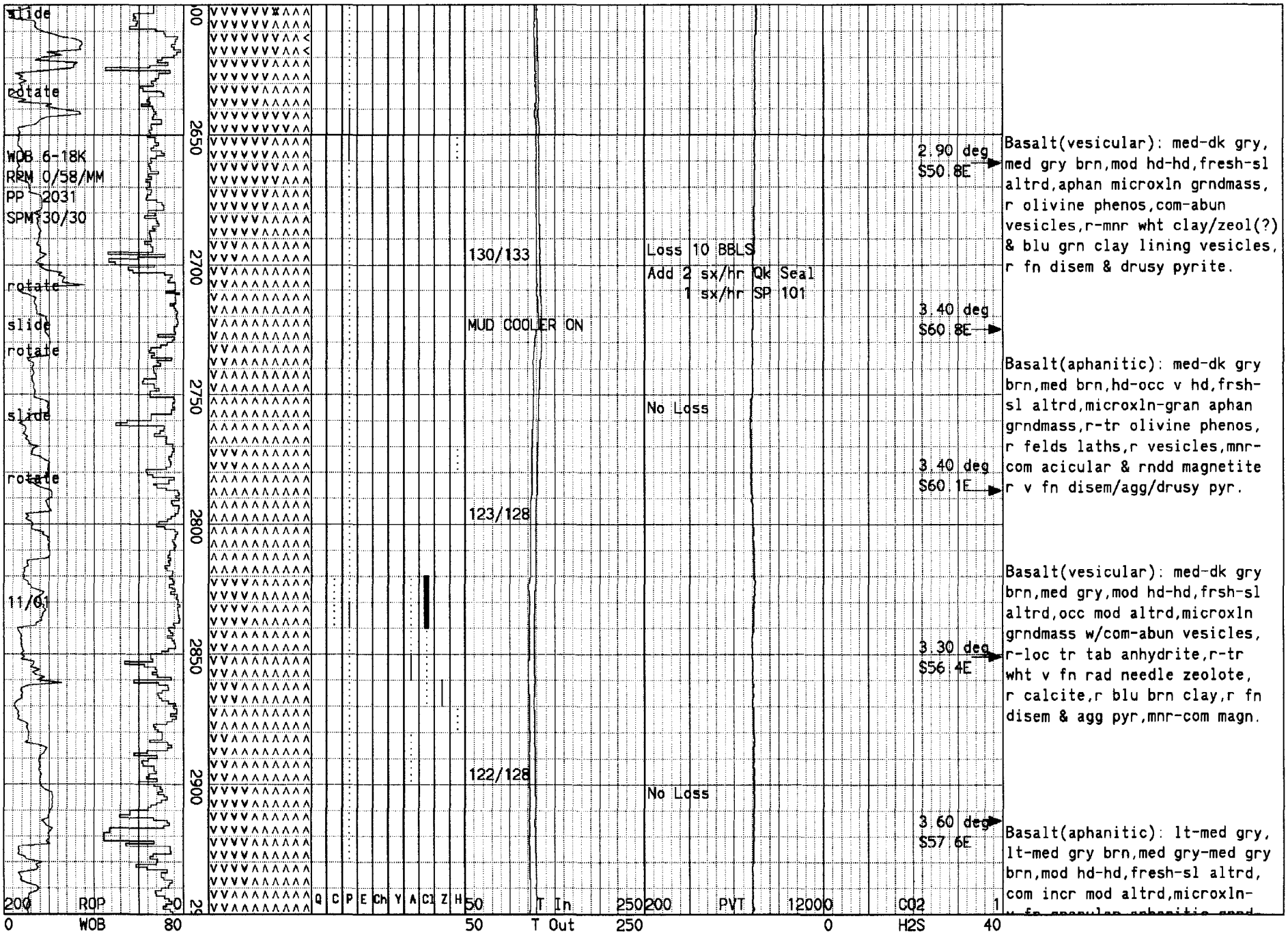


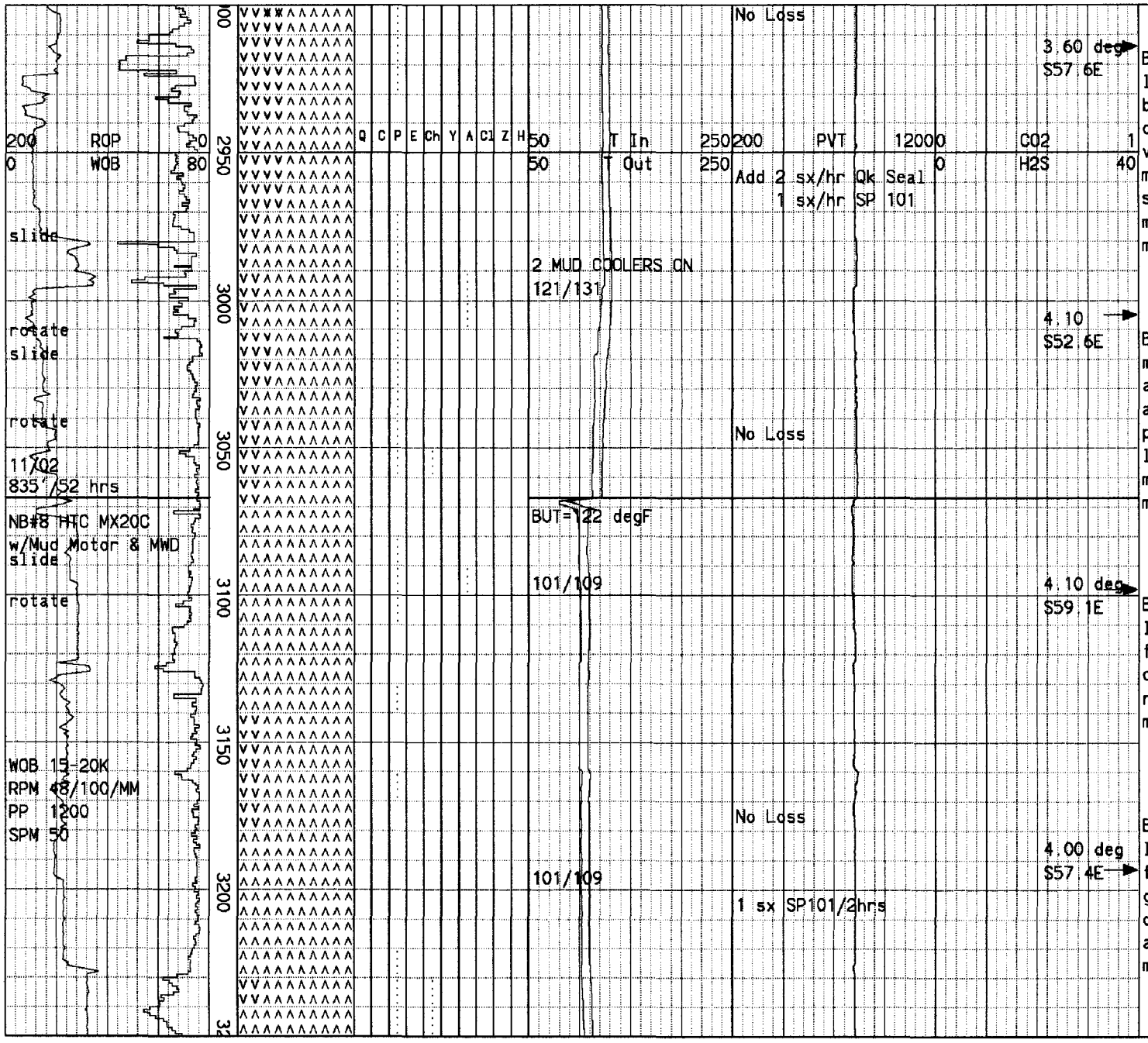
Basalt(aphanitic): lt gry brn, lt brn,hd,pred fresh,aphan granular grndmass,mnr microxln, r-tr olivine phenos,r-tr felds laths,mnr-com acicular & rndd magnetite.

Basalt(porphyritic): lt-med gry brn,lt-med gry,fresh & unaltrd, mnr sl altrd,hd-v hd,pred aphan microxln grndmass,mnr-loc abun olivine phenos,mnr-com felds laths,mnr-com vesicular,r drusy pyr,mnr-com v fn disem magn.

Basalt(vesicular): lt-med gry, lt gry brn,mod hd-hd,sl altrd-fresh,aphan microxln grndmass w/abun vesicles,mnr blu grn clay(smectite)/devit glass, r pyr,r hematite/limonite.

Basalt(aphanitic): med-dk gry brn,med gry,hd,fresh-sl altrd, pred aphan microxln grndmass, r-tr oliv phenos,r felds laths, r drusy pyr.


slide
rotate
WOB 6-18K
RPM 0/58/MM
PP 2031
SPM 30/30
rotate
slide
rotate
slide
rotate
11/61
2650
2700
2750
2800
2850
2900
130/133
MUD COOLER ON
123/128
122/128
Loss 10 BBLS
Add 2 sx/hr Qk Seal
1 sx/hr SP 101
No Loss
No Loss
2.90 deg
S50 8E
3.40 deg
S60 8E
3.40 deg
S60 1E
3.30 deg
S56 4E
3.60 deg
S57 6E
Q C P E Ch Y A C1 Z H
200 ROP 0
0 WOB 80
50 T In 250
50 T Out 250
200 PVT 12000
0 CO2 H2S 40
1
40
Basalt(vesicular): med-dk gry, med gry brn,mod hd-hd,fresh-sl altrd,aphan microxln grndmass, r olivine phenos,com-abun vesicles,r-mnr wht clay/zeol(?) & blu grn clay lining vesicles, r fn disem & drusy pyrite.
Basalt(aphanitic): med-dk gry brn,med brn,hd-occ v hd,frsh-sl altrd,microxln-gran aphan grndmass,r-tr olivine phenos, r felds laths,r vesicles,mnr-com acicular & rndd magnetite r v fn disem/agg/drusy pyr.
Basalt(vesicular): med-dk gry brn,med gry,mod hd-hd,frsh-sl altrd,occ mod altrd,microxln grndmass w/com-abun vesicles, r-loc tr tab anhydrite,r-tr wht v fn rad needle zeolote, r calcite,r blu brn clay,r fn disem & agg pyr,mnr-com magn.
Basalt(aphanitic): lt-med gry, lt-med gry brn,med gry-med gry brn,mod hd-hd,fresh-sl altrd, com incr mod altrd,microxln-

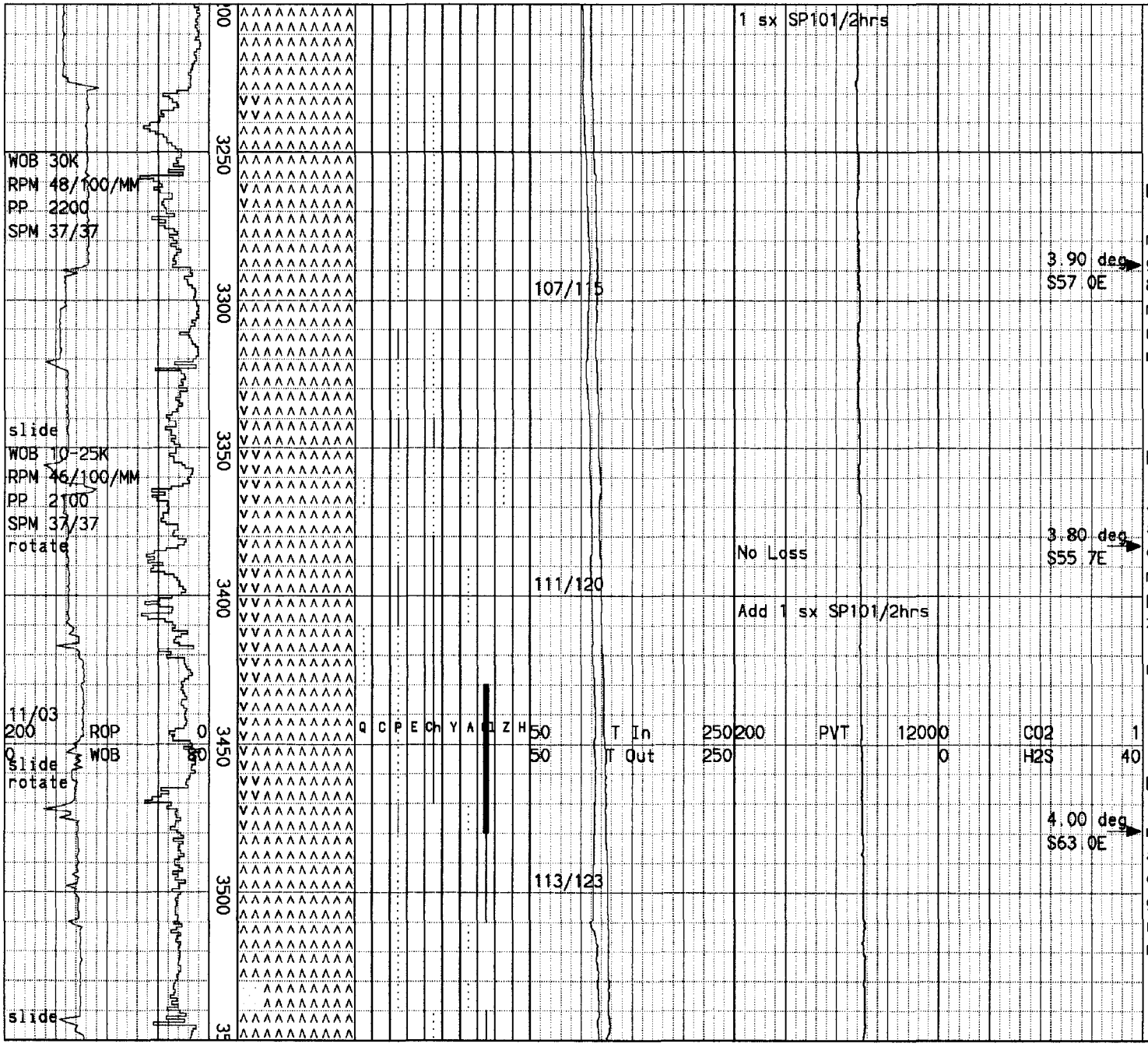


Basalt(aphanitic): lt-med gry, lt-med gry brn,med gry-med gry brn,mod hd-hd,fresh-sl altrd, com incr mod altrd,microxln-v fn granular aphanitic grnd-mass,r olivine & felds phenos, sl-com mod altrd felds & mafic mnrls,r agg pyrite,mnr-com fn magnetite.

Basalt(vesicular): lt-med gry, med gry brn,mod hd-hd,pred sl altrd,com mod altrd,microxln aphanitic grndmass,r olivine phenos,r wht & blu grn clay lining vesicles,r chlortzd mafic mnrls,r disem pyrite, mnr-com disem magnetite.

Basalt(aphanitic): lt-med gry, lt-med gry brn,mottld text, fn-granular,mod hd-hd,fresh, com well frmd olivine phenos, r v fg pyrite,mnr-com fn magnetite.

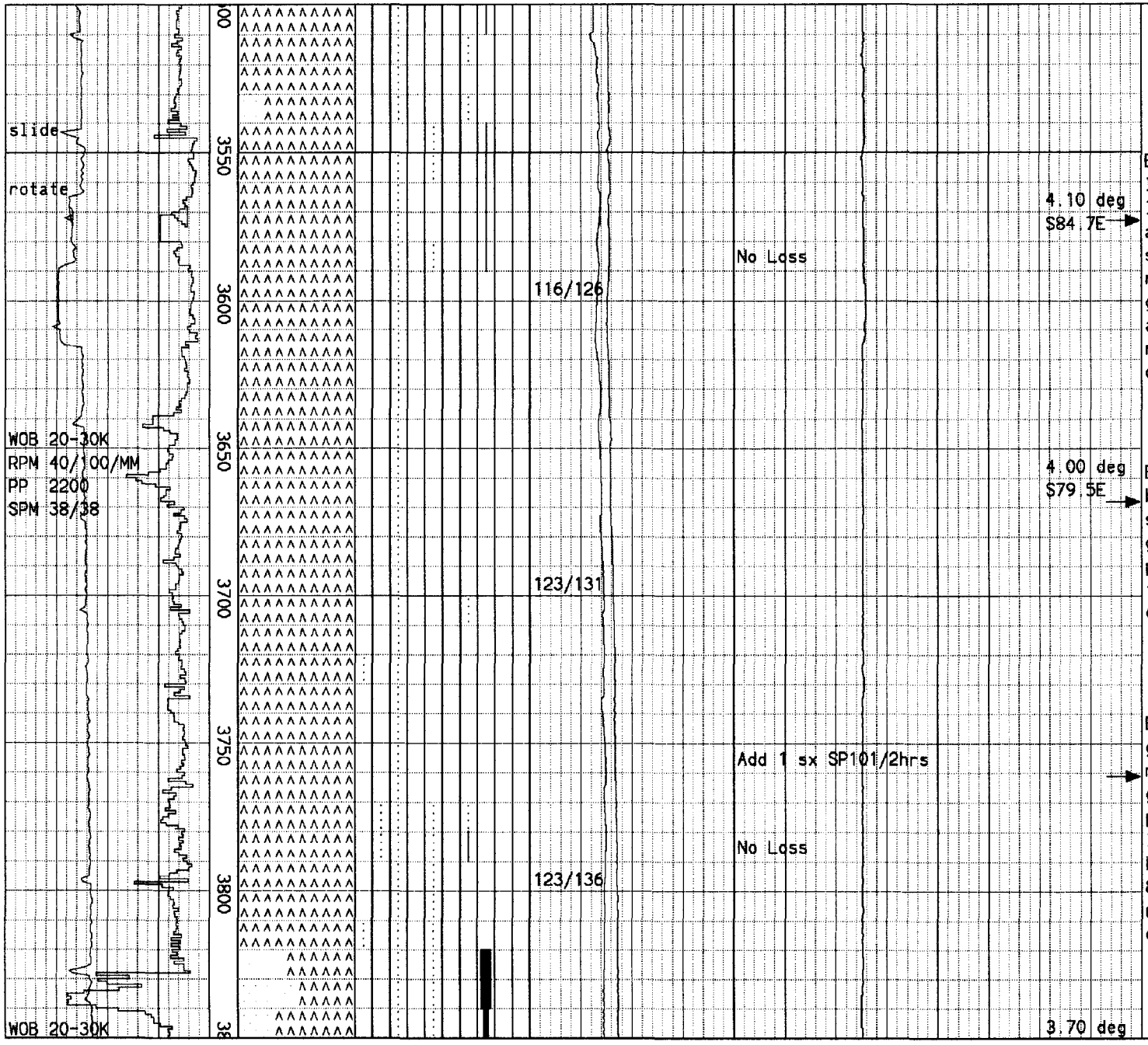
Basalt(aphanitic): lt-med brn, lt-med gry brn,lt gry,hd,pred fresh & unaltrd,granular aphan grndmass,tr-mnr subhed-euhed olivine,r-tr felds laths,com-abun acicular-occ rod shaped magnetite.



Basalt(aphanitic): lt-med gry, lt gry brn,mod hd-hd,sl-com mod altrd,pred microxln aphan grndmass,r-tr subhed olivine & felds phenos,r chlortzd mafics,r disem/vn/drusy pyr, r blu grn clay,r anhydrite, mnr-com disem magnetite.

Basalt(aphanitic): lt-med gry, lt gry brn,mod hd-hd,sl-mod altrd,microxln-v fn granular aphanitic grndmass,r-tr subhed olivine phenos,r-tr chlortzd mafics,r-tr v fn disem & drusy pyr,r anhydrite,r rad wht zeolite,r-loc tr blu grn clay, loc r euhed qtz,mnr disem magnetite.

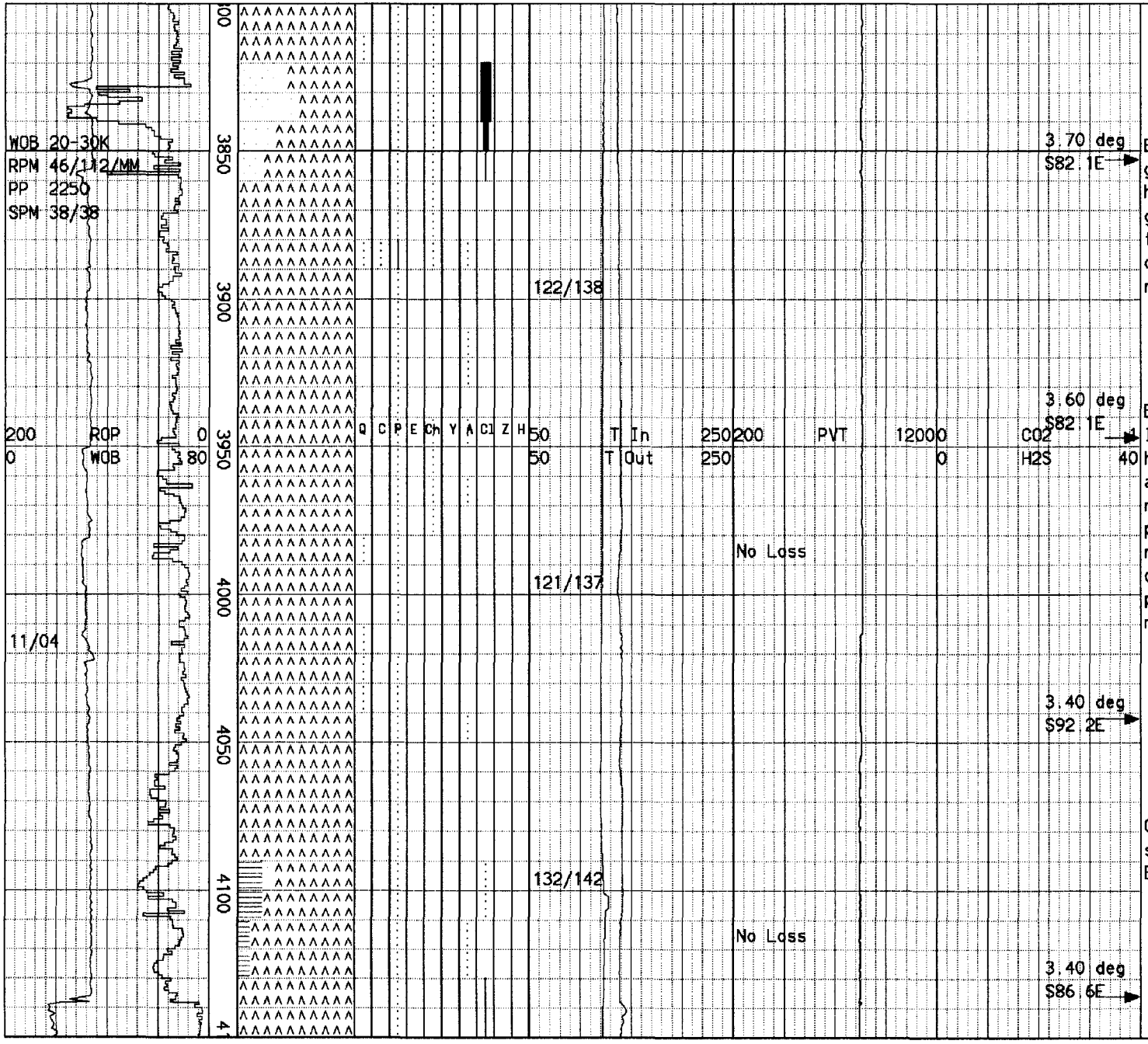
Basalt(aphanitic): lt-med gry, lt gry brn,mod hd-hd,sl-pred mod altrd,microxln-v fn gran aphanitic grndmass,r subhed olivine phenos,mnr-com sol gry clay,r vn & drusy pyrite, r blu grn clay,com disem v fn magnetite.



Basalt(aphanitic): lt-med gry, lt-med gry brn,mod hd-hd,frsh-loc mod altrd,v fn granular aphanitic grndmass,r-tr anhed-subhed olivine & felds phenos, r obsidian/glass frags,r blu grn clay,mnr sol gry clay,r anhydrite,r disem & vn pyrite, r chlortzd mafics,mnr-com fn disem magnetite.

Basalt(aphanitic): lt-med gry brn,med gry,mod hd-hd,fresh-sl altrd,microxln-v fn gran grndmass,r anhed-subhed oliv phenos,r chlortzd mafics,r v fn disem & vn pyrite,r anhyd, com disem magnetite.

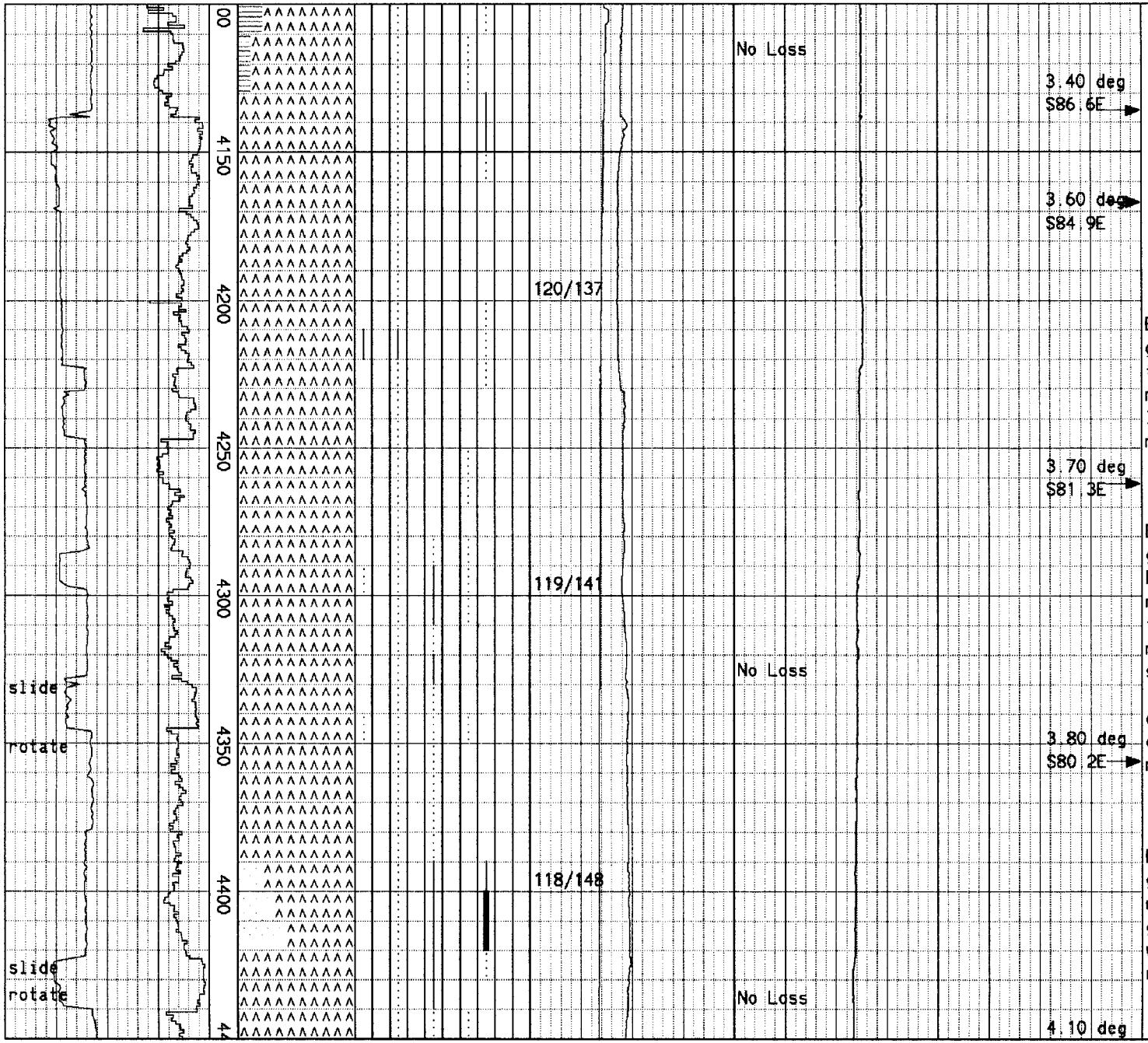
Basalt(aphanitic): lt gry,lt gry brn,mod hd-hd,pred sl-occ mod altrd,v fn granular aphan grndmass,r-tr subhed olivine phenos,r subhed-euhed felds laths,r chlortzd mafics,r-tr blu grn clay,r-tr v fn disem & vn pyrite,loc r-tr anhydrite, r intrstit calc,mnr-com fn disem magnetite.



Basalt(hyaloclastite): v lt grn,wht,lt gry grn,sft-mod hd,friable,str altrd,altrd glass/clay mtx w/mnr relic tex,com sol wht-gry clay, com insol wht clay,r chlor, r disem pyrite.

Basalt(aphanitic): lt-med gry, lt gry brn,occ lt grn gry,pred hd,sl-mod altrd,pred v fn gran aphanitic grndmass,mnr microxln r sl-mod altrd subhed olivine phenos,perv sl felds altrn,loc r euhed/drusy qtz,r-loc tr chlortzd mafics,r disem & vn pyrite,r anhydrite,mnr-com fn magnetite.

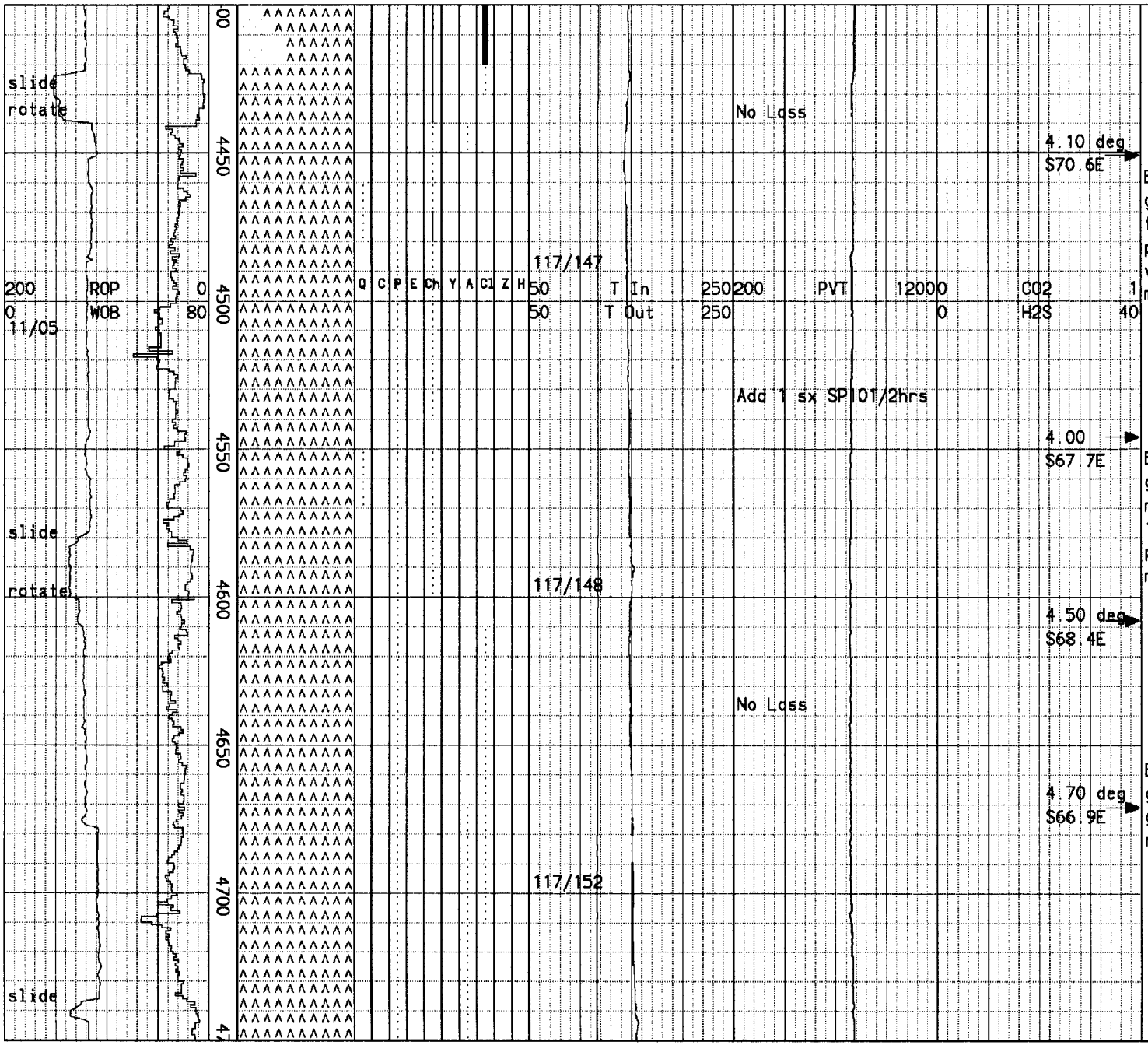
Clay: gry-drk gry, mod-strng stky,mod sol,sft w/ aphanitic Basalt as above.



Basalt(aphanitic): lt gry,lt gry brn,mod hd-hd,wk-unaltrd,v fn granular grndmass,r chlortzd mafics,r-tr v fn disem & vn pyr loc r 2mm qtz vn-mlky w/ pyr on mrgns, wk alt alng selvage.

Basalt(aphanitic): lt gry-med gry,lt gry brn,lt gry grn,mod hd-pred hd,sl-mod altrd w/perv mod altd mafics & sl altrd felds,pred v fn granular grnd-mass,com microxln,mnr-com subhed olivine phenos(0.25-.75mm),r-tr felds laths,r-tr chlortzd mafics,r milky wht qtz vng,r anhydrite,mnr fn magnetite.

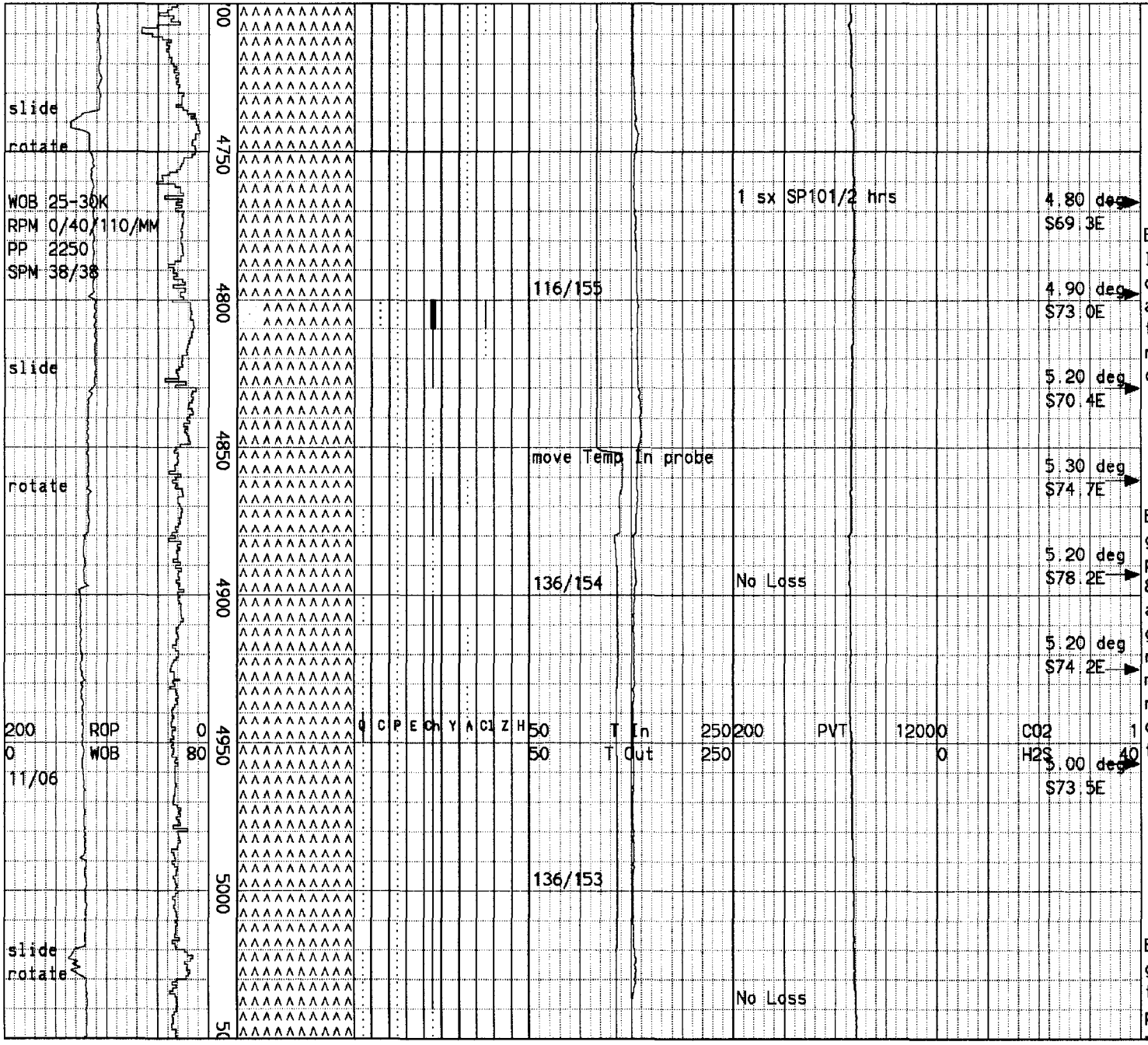
Basalt(hyaloclastite): lt gry grn,lt gry brn,lt grn,wht,sft-mod hd,friable,str altrd,devit glass/clay altrd mtx,tr-com sol wht/gry clay,abun insol wht clay r disem pyrite,r-tr chlorite.



Basalt(aphanitic): lt-med gry, gry-grn,mod hd-hd,pred frsh,v fg-mg grnd-mass,mnr-com chlortzd phenos,r wht 1-2mm qtz vng,r vfg pyr vng,r anhydrite,mnr fg magnetite.

Basalt(aphanitic): lt-med gry, gry,mod hd,pred frsh,fg grnd-mass,mnr-com chlortzd phenos,r 1-2mm mlky-wht qtz vng,r vfg pyr vng,r anhydrite,mnr fg magnetite.

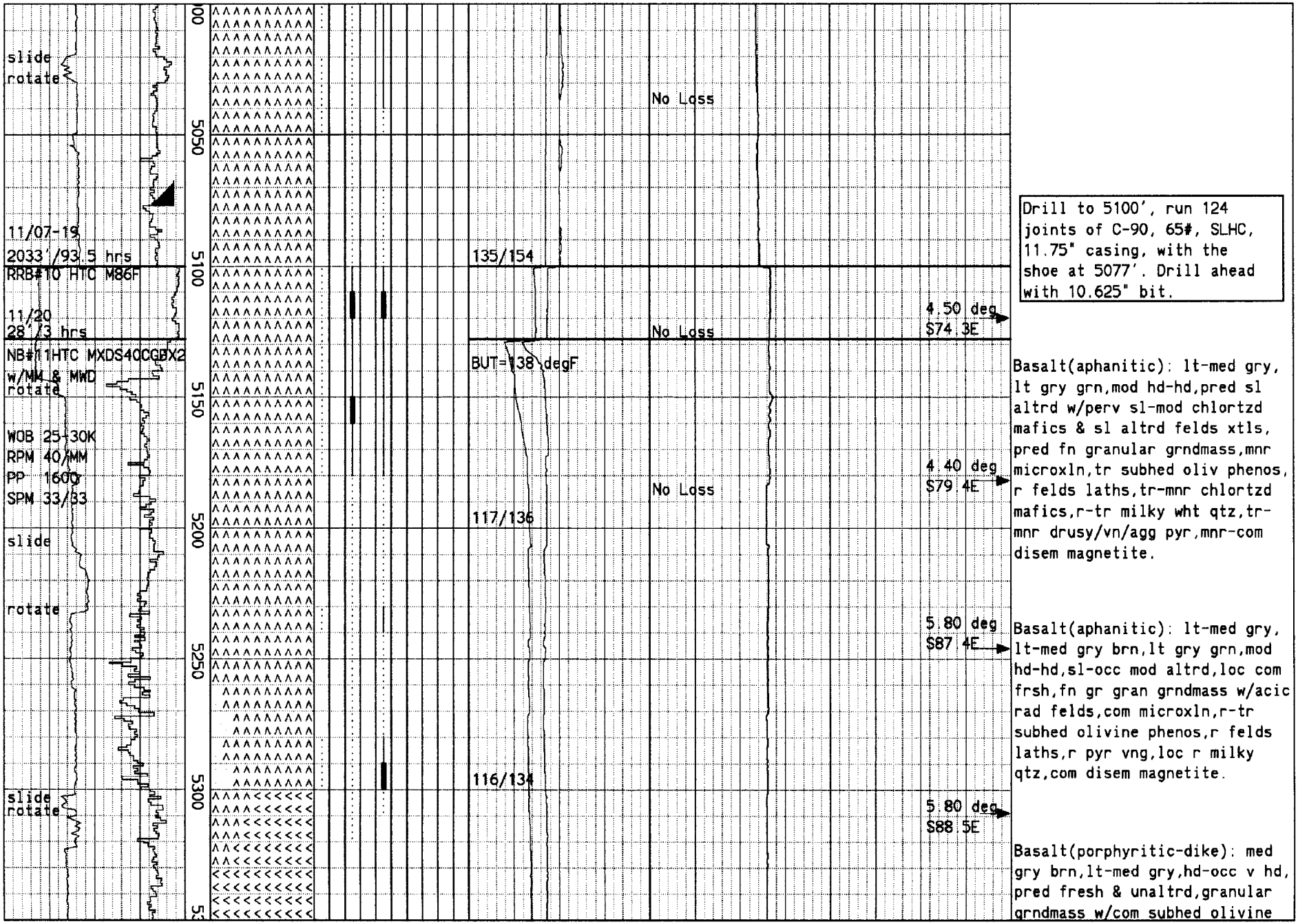
Basalt(aphanitic): lt-med gry, gry,mod hd,wk-no alt,v fn-med gr grndmass,r chlortzd mafics, r-tr v fn disem & vn pyr,

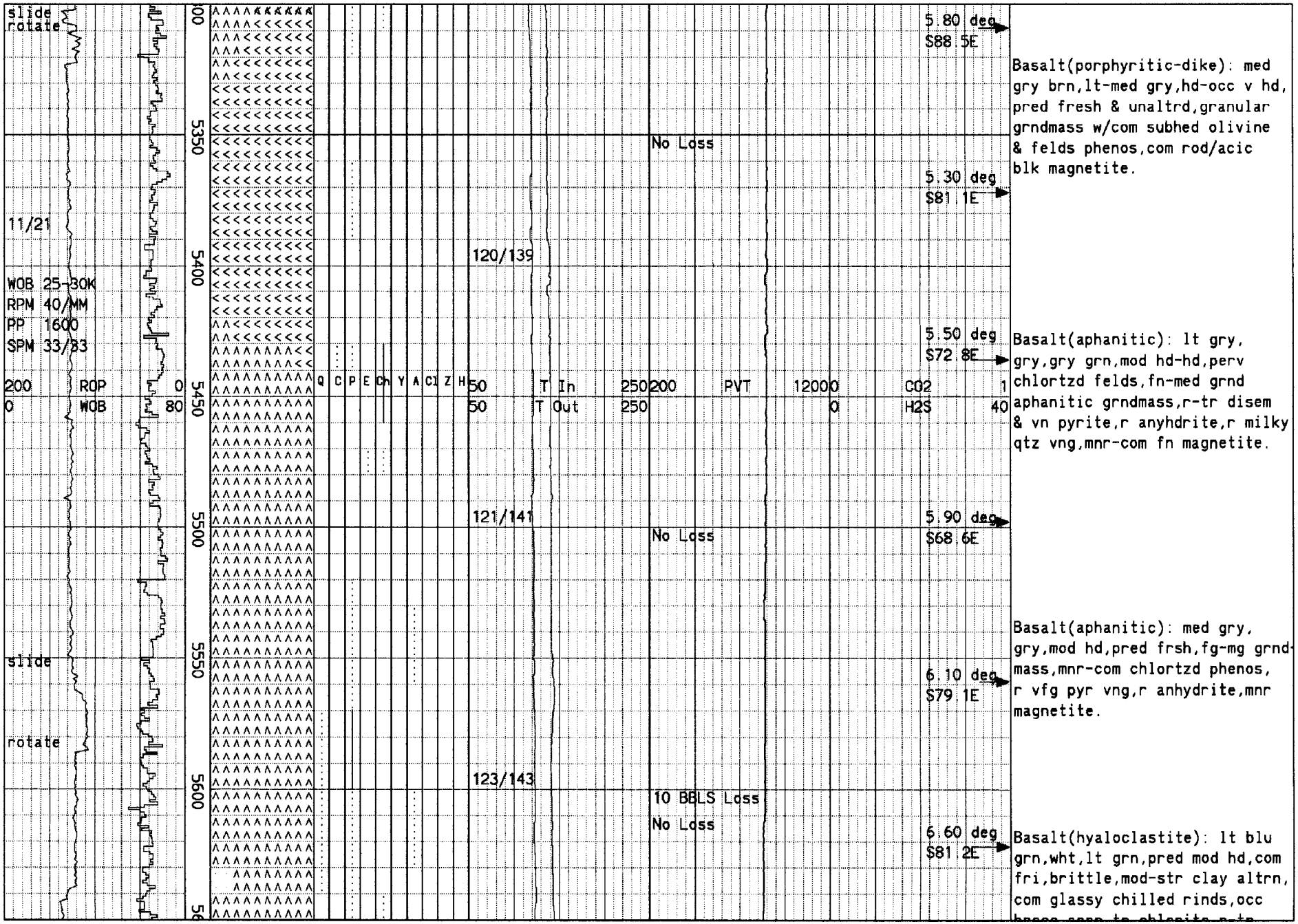


Basalt(aphanitic): prob dike, lt-med gry brn,lt-med gry,hd-com v hd,fresh-v sl altrd,gran aphan grndmass,diabasic tex, tr-mnr subhed olivine phenos, r-loc mnr felds laths,mnr-com disem gry-blk magnetite.

Basalt(aphanitic): lt gry,lt gry brn,occ lt grn gry,mod hd-pred hd,perv sl-mod felds altrn & mod-occ str olivine/pyrox altrn,fn granular aphanitic grndmass,tr-mnr olivine phenos, r-tr felds laths,r-tr chlortzd mafics,r disem & vn pyrite, r anyhdrite,loc r euhed/drusy qtz,r milky qtz vng,mnr-com fn magnetite.

Basalt(aphanitic): lt-med gry, gry-grn,mod hd-hd,pred frsh,v fg grndmass,mnr-com chlortzd phenos,absnt-r pyr vng,r euhed


slide
rotate
11/07-19
2033'/93.5 hrs
RRB#10 HTC M86F
11/20
28'/3 hrs
NB#11HTC MXDS40CGBX2
w/MM & MWD
rotate
WOB 25-30K
RPM 40/MM
PP 1600
SPM 33/33
slide
rotate
slide
rotate
5000
5050
5100
5150
5200
5250
5300
No Loss
135/154
No Loss
BUT=138 degF
No Loss
117/136
116/134
4.50 deg
$74.3E
4.40 deg
$79.4E
5.80 deg
$87.4E
5.80 deg
$88.5E
Drill to 5100', run 124 joints of C-90, 65#, SLHC, 11.75" casing, with the shoe at 5077'. Drill ahead with 10.625" bit.
Basalt(aphanitic): lt-med gry, lt gry grn,mod hd-hd,pred sl altrd w/perv sl-mod chlortzd mafics & sl altrd felds xtls, pred fn granular grndmass,mnr microxln,tr subhed oliv phenos, r felds laths,tr-mnr chlortzd mafics,r-tr milky wht qtz,tr-mnr drusy/vn/agg pyr,mnr-com disem magnetite.
Basalt(aphanitic): lt-med gry, lt-med gry brn,lt gry grn,mod hd-hd,sl-occ mod altrd,loc com frsh,fn gr gran grndmass w/acic rad felds,com microxln,r-tr subhed olivine phenos,r felds laths,r pyr vng,loc r milky qtz,com disem magnetite.
Basalt(porphyritic-dike): med gry brn,lt-med gry,hd-occ v hd, pred fresh & unaltrd,granular grndmass w/com subhed olivine

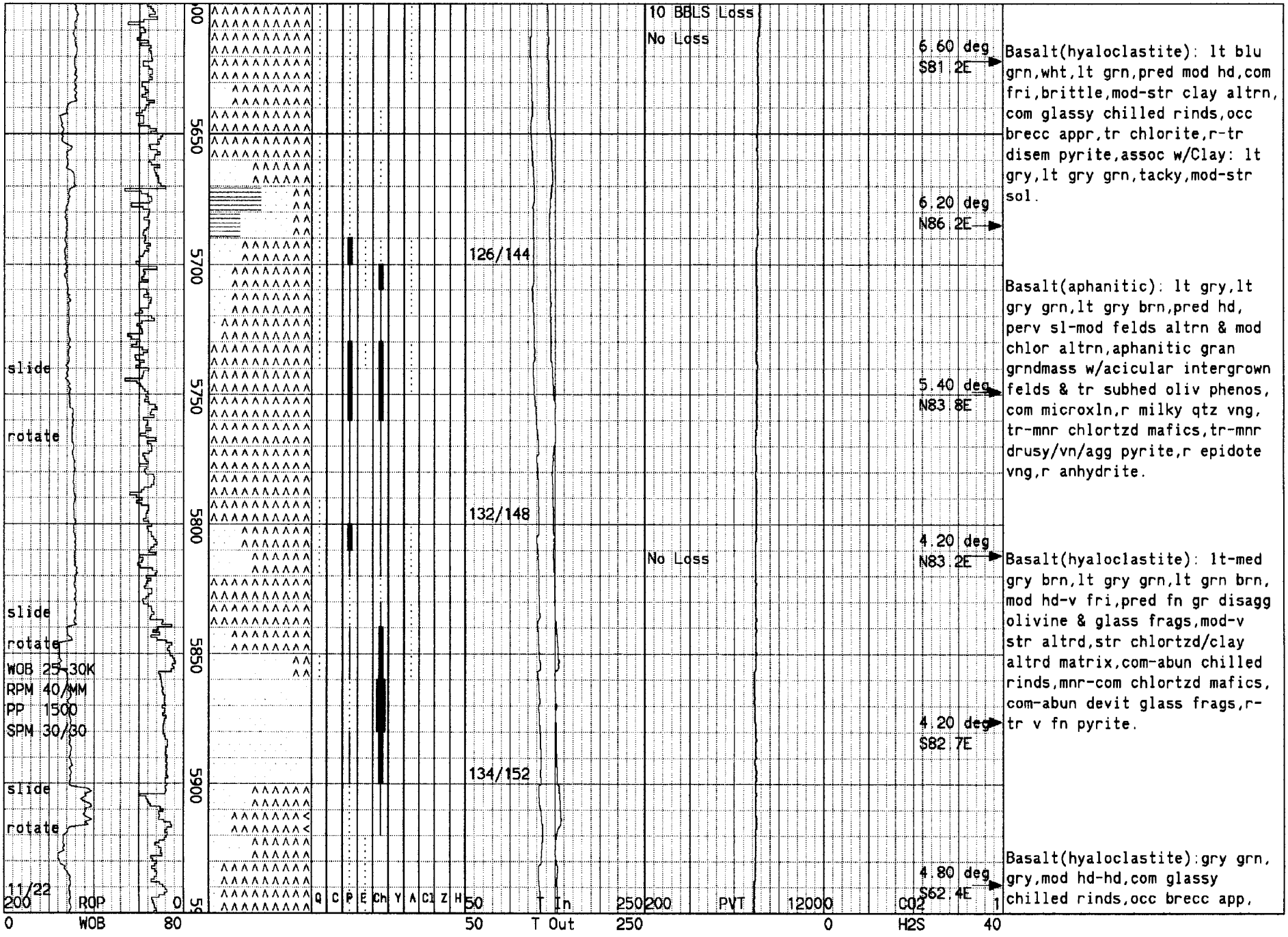


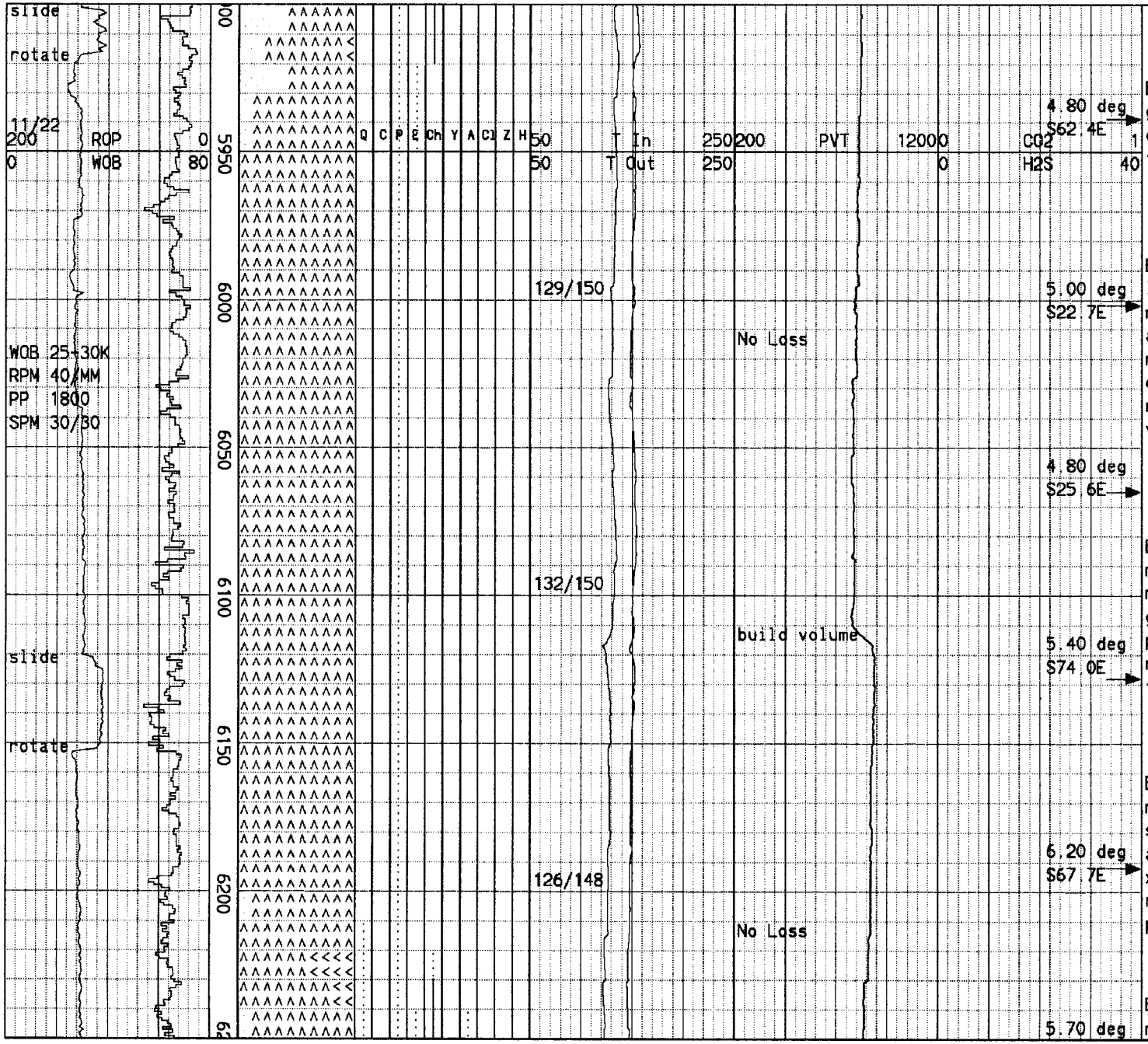
Basalt(porphyritic-dike): med gry brn,lt-med gry,hd-occ v hd, pred fresh & unaltrd,granular grndmass w/com subhed olivine & felds phenos,com rod/acic blk magnetite.

Basalt(aphanitic): lt gry, gry,gry grn,mod hd-hd,perv chlortzd felds,fn-med grnd aphanitic grndmass,r-tr disem & vn pyrite,r anyhdrite,r milky qtz vng,mnr-com fn magnetite.

Basalt(aphanitic): med gry, gry,mod hd,pred frsh,fg-mg grnd-mass,mnr-com chlortzd phenos, r vfg pyr vng,r anhydrite,mnr magnetite.

Basalt(hyaloclastite): lt blu grn,wht,lt grn,pred mod hd,com fri,brittle,mod-str clay altrn, com glassy chilled rinds,occ


10 BBLS Loss
No Loss
6.60 deg
S81 2E
6.20 deg
N86 2E
126/144
slide
5.40 deg
N83 8E
rotate
132/148
4.20 deg
N83 2E
No Loss
slide
rotate
WOB 25-30K
RPM 40/MM
PP 1500
SPM 30/30
4.20 deg
S82 7E
134/152
slide
rotate
4.80 deg
S62 4E
11/22
5700
5750
5800
5850
5900
ROP
WOB
Q C P E Ch Y A Cl Z H
T In
T Out
PVT
CO2
H2S
Basalt(hyaloclastite): lt blu grn,wht,lt grn,pred mod hd,com fri,brittle,mod-str clay altrn, com glassy chilled rinds,occ brecc appr,tr chlorite,r-tr disem pyrite,assoc w/Clay: lt gry,lt gry grn,tacky,mod-str sol.
Basalt(aphanitic): lt gry,lt gry grn,lt gry brn,pred hd, perv sl-mod felds altrn & mod chlor altrn,aphanitic gran grndmass w/acicular intergrown felds & tr subhed oliv phenos, com microxln,r milky qtz vng, tr-mnr chlortzd mafics,tr-mnr drusy/vn/agg pyrite,r epidote vng,r anhydrite.
Basalt(hyaloclastite): lt-med gry brn,lt gry grn,lt grn brn, mod hd-v fri,pred fn gr disagg olivine & glass frags,mod-v str altrd,str chlortzd/clay altrd matrix,com-abun chilled rinds,mnr-com chlortzd mafics, com-abun devit glass frags,r-tr v fn pyrite.
Basalt(hyaloclastite):gry grn, gry,mod hd-hd,com glassy chilled rinds,occ brecc app,



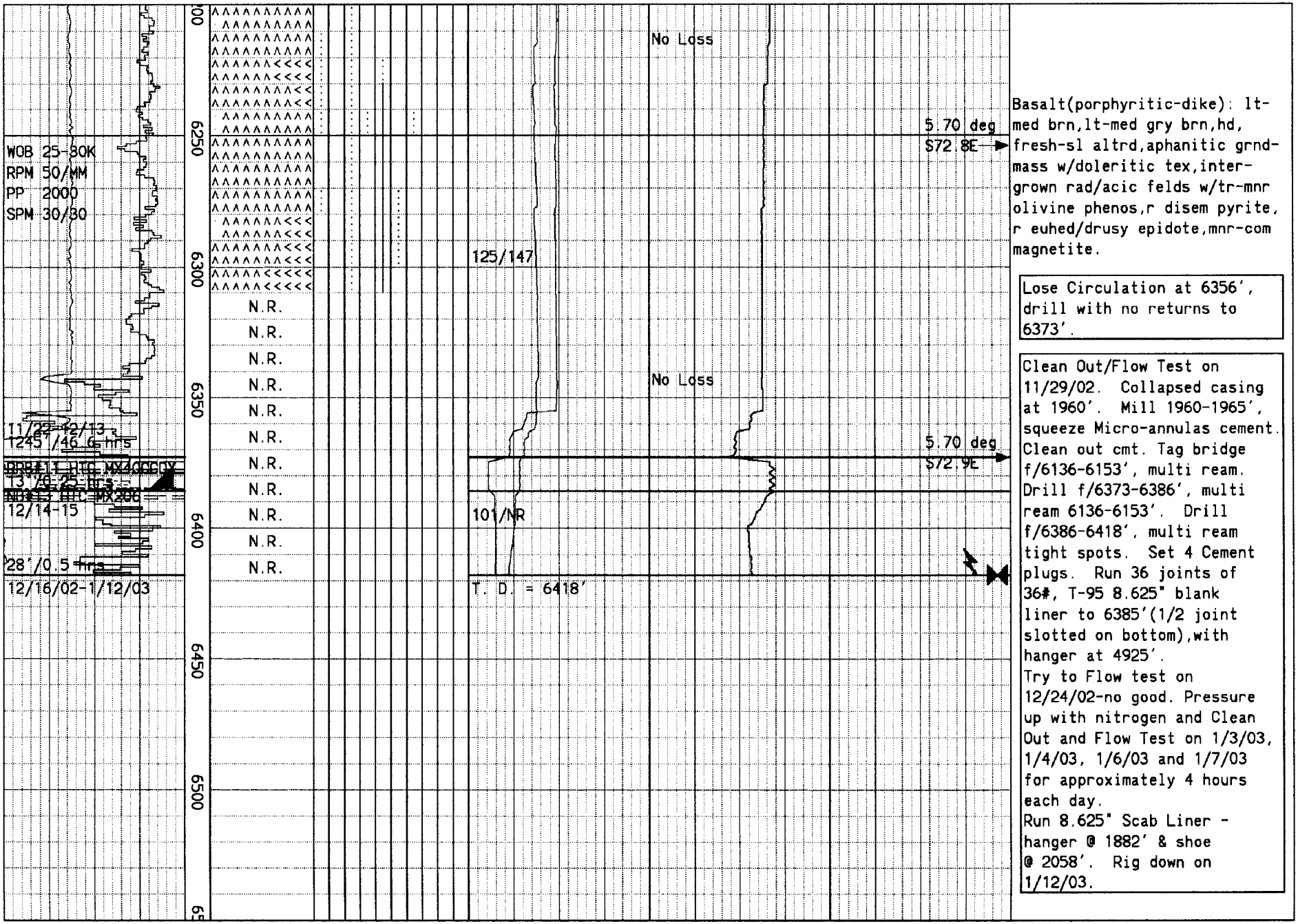
Basalt(hyaloclastite):gry grn, gry,mod hd-hd,com glassy chilled rinds,occ brecc app, tr chlorite,r-tr disem pyrite.

Basalt(aphanitic): lt-med gry, lt-med gry brn,pred hd,sl-occ mod altrd,com salt & pepper appr,aphanitic fn gr gran-microxln grndmass,r-tr subhed olivine phenos,tr felds laths, r chlortzd mafics,r disem & vn pyrite,mnr-com magnetite.

Basalt(aphanitic): lt-med gry, med brn,hd,fresh-sl altrd,occ mod altrd,pred microxln aphan grndmass,r olivine & felds phenos,loc r chlortzd mafics, r disem/vn/agg pyrite,com v fn magnetite.

Basalt(aphanitic): lt gry,lt-med gry brn,occ lt gry grn,hd, sl-occ mod altrd felds & sl altrd mafics,aphanitic micro-xln grndmass,r-tr subhed oliv, r felds laths,r disem & vn pyrite,com fn magnetite.

Basalt(porphyritic-dike): lt-med brn,lt-med gry brn,hd,


WOB 25-30K
RPM 50/MM
PP 2000
SPM 30/30
11/22-12/13
1245'/46.6 hrs
12/14-15
28'/0.5 hrs
12/16/02-1/12/03
6200
6250
6300
6350
6400
6450
6500
N.R.
No Loss
125/147
No Loss
5.70 deg
S72.8E
5.70 deg
S72.9E
101/NR
T. D. = 6418'
Basalt(porphyritic-dike): lt-med brn,lt-med gry brn,hd, fresh-sl altrd,aphanitic grnd-mass w/doleritic tex,inter-grown rad/acic felds w/tr-mnr olivine phenos,r disem pyrite, r euhed/drusy epidote,mnr-com magnetite.
Lose Circulation at 6356', drill with no returns to 6373'.
Clean Out/Flow Test on 11/29/02. Collapsed casing at 1960'. Mill 1960-1965', squeeze Micro-annulas cement. Clean out cmt. Tag bridge f/6136-6153', multi ream. Drill f/6373-6386', multi ream 6136-6153'. Drill f/6386-6418', multi ream tight spots. Set 4 Cement plugs. Run 36 joints of 36#, T-95 8.625" blank liner to 6385'(1/2 joint slotted on bottom),with hanger at 4925'.
Try to Flow test on 12/24/02-no good. Pressure up with nitrogen and Clean Out and Flow Test on 1/3/03, 1/4/03, 1/6/03 and 1/7/03 for approximately 4 hours each day.
Run 8.625" Scab Liner - hanger @ 1882' & shoe @ 2058'. Rig down on 1/12/03.

Richmond Energy Services, Inc.
5221 CENTRAL AVENUE, SUITE 201
RICHMOND, CALIFORNIA 94804-5829

TELEPHONE: (510) 527-9876
FAX: (510) 527-8164
E-MAIL: mw@geothermex.com

10. Cementing Proposal

Puna Geothermal - Venture Cons
PO Box 30
Pahoa, Hawaii 96778

KS # 5
Puna Rift Field
Hawaii County, Hawaii
United States of America

11 3/4" Multi-Stage Production Casing Geothermal Cementing Recommendation

Prepared for: Bill Livesay & Rob Eckert
October 16, 2002
Version: 1

Submitted by:
Marc Brennen & Bob Valentine
Halliburton Energy Services
1990 Hays Lane
Woodland, California 95776
530 666-0233

HALLIBURTON

Halliburton appreciates the opportunity to present this proposal and looks forward to being of service to you.

Foreword

Bill & Rob.

Enclosed is our revised recommended procedure for cementing the 11 3/4" 2 stage casing string in the KS # 5 steam production well near Pahoa, Hawaii. The information in this proposal includes well data, calculations, materials requirements, and cost estimates. This proposal is based on information supplied from our previous discussions, ongoing cement lab testing and previous successful cementing services in the area.

More specifically, this recommendation is revised with Halliburton's Latex 2000 system in the lead slurry of Stage #1. This will help provide protection in the slurry sheath from suspected low pH zones in the open hole annulus. The Latex 2000 additive concentrations are estimated and will require more detailed testing from our Cement Engineering Laboratory in Duncan, Oklahoma. Final additive concentrations will be adjusted to the results determined in the lab.

Halliburton Energy Services recognizes the importance of meeting society's needs for health, safety, and protection of the environment. It is our intention to proactively work with employees, customers, the public, governments, and others to use natural resources in an environmentally sound manner while protecting the health, safety, and environmental processes while supplying high quality products and services to our customers.

We appreciate the opportunity to present this proposal for your consideration and we look forward to being of service to you. Our Services for your well will be coordinated through the Service Center listed below. If you require any additional information or additional designs, please feel free to contact myself or our field representative listed below.

Prepared and Submitted by: _____

Marc Brennen
Senior Technical Professional

Prepared and Submitted by: _____

Bob Valentine
Geothermal Service Leader

SERVICE CENTER:	WOODLAND, CALIFORNIA
SERVICE COORDINATOR:	DALE CRAWFORD
OPER. ENGINEER:	MARC BRENNEN
PHONE NUMBER:	O. 530 666-0233 C. 530 219-3650

Job Information *KS 5 Production Casing (Stage 1)*

KS 5

Well Intervals:

11 3/4" Production Casing	0 - 5200 ft (MD)
Outer Diameter	11.750 in
Inner Diameter	10.682 in
Linear Weight	65 lbm/ft
Casing Grade	C-90
16" Intermediate Casing	0 - 2200 ft (MD)
Outer Diameter	16.000 in
Inner Diameter	14.841 in
Linear Weight	97 lbm/ft
Casing Grade	L-80
14 3/4" Open Hole	2200 - 5200 ft (MD)
Inner Diameter	14.750 in
Job Excess	100 %
Mud Type	Water Based
Mud Weight	8.40 lbm/gal
BHST	500 degF
BHCT	300 degF

Spacer:

2200.00 ft * 0.4483 ft^3/ft * 0 %	= 986.24 ft^3
Total Spacer	= 1684.38 ft^3
	= 300.00 bbl

Cement : (2464.00 ft fill)

2464.00 ft * 0.4336 ft^3/ft * 100 %	= 2136.81 ft^3
Total Lead Cement	= 2136.81 ft^3
	= 380.58 bbl
Sacks of Cement	= 803 sks

Cement : (536.00 ft fill)

536.00 ft * 0.4336 ft^3/ft * 100 %	= 464.82 ft^3
Tail Cement	= 464.82 ft^3
	= 82.79 bbl

Shoe Joint Volume: (42.00 ft fill)

42.00 ft * 0.6223 ft^3/ft	= 26.14 ft^3
	= 4.66 bbl
Tail plus shoe joint	= 490.96 ft^3
	= 87.44 bbl
Total Tail	= 300 sks

Total Pipe Capacity:

5200.00 ft * 0.6223 ft^3/ft	= 3236.20 ft^3
	= 576.39 bbl

Displacement Volume to Shoe Joint:

Capacity of Pipe - Shoe Joint	= 576.39 bbl - 4.66 bbl
	= 571.74 bbl

Fluid Instructions

Fluid 1: Water Spacer

FRESH WATER AHEAD

Fluid Density:	8.34 lbm/gal
Fluid Volume:	300 bbl

Fluid 2: Lead Cement

Premium Hi-Temp Westcoast

		Fluid Weight	12.50 lbm/gal
94 lbm/sk	Premium Hi-Temp Westcoast (Cement-api)	Slurry Yield:	2.66 ft^3/sk
30 %	SSA-1 (Additive Material)	Total Mixing Fluid:	12.66 Gal/sk
10 %	Silicalite (Additive Material)	Top of Fluid:	2200 ft
10 lbm/sk	Spherelite (Light Weight Additive)	Calculated Fill:	2464 ft
0.75 %	Halad(R)-9 (Low Fluid Loss Control)	Volume:	380.56 bbl
0.25 %	FWCA (Free Water Control)	Calculated Sacks:	803.26 sks
0.5 %	Universal Cement Systems (Conditioning Aid)	Proposed Sacks:	810 sks
0.5 %	HR-5 (Retarder)		
1.5 Gal/sk	Latex 2000 (Special Additive)		
0.3 Gal/sk	Stabilizer 434B (Stabilizer)		
0.5 Gal/sk	D-AIR 3000L (Defoamer)		

Fluid 3: Tail Cement

Premium Hi-Temp Westcoast

		Fluid Weight	15.50 lbm/gal
94 lbm/sk	Premium Hi-Temp Westcoast (Cement-api)	Slurry Yield:	1.64 ft^3/sk
35 %	SSA-1 (Additive Material)	Total Mixing Fluid:	6.75 Gal/sk
5 %	Silicalite (Additive Material)	Top of Fluid:	4664 ft
0.75 %	Halad(R)-322 (Low Fluid Loss Control)	Calculated Fill:	536 ft
0.5 %	Halad(R)-9 (Low Fluid Loss Control)	Volume:	87.47 bbl
0.5 %	Universal Cement Systems (Conditioning Aid)	Calculated Sacks:	300 sks
0.4 %	HR-5 (Retarder)	Proposed Sacks:	300 sks

Fluid 4: Water Spacer

DRILLING MUD

Fluid Density:	8.34 lbm/gal
Fluid Volume:	571.74 bbl

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	SPACER	FRESH WATER AHEAD	8.3	10.0	300 bbl
2	LEAD	HAWAII TYPE I-II CEMENT + 30% SSA-1 + 10% SILICALITE + 10 LB/SK SPHERELITE + .75% HALAD-9 + .25% FWCA + .5% UCS + .5% HR-5 + 1.5 GAL/SK LATEX 2000 + .3 GAL/SK STABILIZER 434B + .5% D-AIR 3000L	12.5	6.0	810 sks
3	TAIL	HAWAII TYPE I-II CEMENT + 35% SSA-1 + 5% SILICALITE + .75% HALAD-322 + .5% HALAD-9 + .5% UCS + .4% HR-5	15.5	6.0	300 sks
4	DISPLACE	DRILLING MUD	8.3	7.0	571.74 bbl

Cost Estimate KS 5 Production Casing (Stage 1)

SAP Quote #0

Mtrl Nbr	Description	Qty	U/M	Unit Price	Gross Amt	Net Amt
7523	PSL-CMT CEMENT PRODUCTION CASING-BOM	1	JOB	0.00	0.00	0.00
16091	PUMPING CHARGE	1	EA	4,054.00	4,054.00	4,054.00
	DEPTH	5200	FT			
16	MULTIPLE STAGE CEMENTING - 2ND STAGE	1	STG	2,809.00	2,809.00	2,809.00
	Number of Units	1				
141	RCM II W/ADC./JOB.ZI	1	JOB	1,106.00	1,106.00	1,106.00
	NUMBER OF UNITS	1				
130104	PORT. DATA ACQUIS. W/OPTICEM RT W/HES	1	EA	1,416.00	1,416.00	1,416.00
	DAYS OR PARTIAL DAY(WHOLE NO.)	1				
143	100 BBL BLENDER (4 HOURS)	1	EA	0.00	2,166.00	2,166.00
	HOURS OR FRACTION (MIN4)	1				
10	FOOD AND LODGING	3	DAY	350.00	5,250.00	5,250.00
	NUMBER OF PERSONNEL ON JOB	5				
16113	CEMENT EQUIPMENT OPERATOR,/DAY,ZI	2	EA	0.00	N/C	N/C
	DAYS OR PARTIAL DAY(WHOLE NO.)	3				
16112	TECH SUPPORT PERSONNEL, /HR,ZI	1	EA	0.00	N/C	N/C
	HOURS	36				
9	TRAVEL EXPENSES,ZI AIRFARE	5	EA	1,410.00	7,050.00	7,050.00
	STAGE 1					
101250222	PREMIUM - HI-TEMP CEMENT	1110	SK	24.05	26,695.50	26,695.50
100003691	SSA-1 - 200 MESH	32712	LB	0.34	11,122.08	11,122.08
100003722	SILICALITE	9024	LB	1.63	14,709.12	14,709.12
100003646	HALAD(R)-322	212	LB	10.50	2,226.00	2,226.00
100001617	HALAD(R)-9	713	LB	14.47	10,317.11	10,317.11
101226480	UNIVERSAL CEMENT SYSTEMS	522	LB	7.50	3,915.00	3,915.00
100005050	HR-5	494	LB	6.14	3,033.16	3,033.16
100012185	SPHERELITE	8100	LB	2.21	17,901.00	17,901.00
100003714	FWCA	191	LB	27.01	5,158.91	5,158.91
100003764	LATEX 2000	1215	GAL	35.19	42,755.85	42,755.85
100003765	STABILIZER 434B	243	GAL	50.39	12,244.77	12,244.77
101200026	D-AIR 3000L	405	GAL	78.10	31,630.50	31,630.50
	PACKER CEMENT					
101250222	PREMIUM - HI-TEMP CEMENT	60	SK	24.05	1,443.00	1,443.00
100003691	SSA-1 - 200 MESH	1974	LB	0.34	671.16	671.16
100003722	SILICALITE	282	LB	1.63	459.66	459.66
100003646	HALAD(R)-322	42	LB	10.50	441.00	441.00
100001617	HALAD(R)-9	28	LB	14.47	405.16	405.16
101226480	UNIVERSAL CEMENT SYSTEMS	28	LB	7.50	210.00	210.00
100005050	HR-5	23	LB	6.14	141.22	141.22

HALLIBURTON

Mtrl Nbr	Description	Qty	U/M	Unit Price	Gross Amt	Net Amt
	STAGE 2					
101250222	PREMIUM - HI-TEMP CEMENT	725	SK	24.05	17,436.25	17,436.25
100003691	SSA-1 - 200 MESH	23853	LB	0.34	8,110.02	8,110.02
100003722	SILICALITE	3408	LB	1.63	5,555.04	5,555.04
100003646	HALAD(R)-322	512	LB	10.50	5,376.00	5,376.00
101226480	UNIVERSAL CEMENT SYSTEMS	341	LB	7.50	2,557.50	2,557.50
3965	CEMENT AND ADDITIVES HANDLING / DISPOSAL NUMBER OF EACH	2457 1	CF	2.82	6,928.74	6,928.74
45	SPECIAL SHIPPING 25,180 LBS	1	EA	7,500.00	7,500.00	7,500.00
	11 3/4" LINER FLOATING EQUIPMENT					
45	11 3/4" X 14 3/4" CENTRALIZERS	28	EA	113.19	3,169.32	3,169.32
45	11 3/4" HINGED LIMIT CLAMP W/ SET SCREWS	28	EA	52.80	1,478.40	1,478.40
45	11 3/4" FLOAT COLLAR W/ SEAL LOCK HC THR	1	EA	4,728.95	4,728.95	4,728.95
45	11 3/4" SLIP JOINT, FLOAT SHOE	1	EA	1,227.04	1,227.04	1,227.04
	Total			**USD**		**273,398.46**
	Discount			**USD**		**0.00**
	Discounted Total			**USD**		**273,398.46**

Job Information — KS 5 Production Casing (Stage 2)

KS_v1 5 & 6

Well Intervals:

11 3/4" Production Casing	0 - 2200 ft (MD)
Outer Diameter	11.750 in
Inner Diameter	10.682 in
Linear Weight	65 lbm/ft
Casing Grade	C-90

16" Intermediate Casing with 20% Excess	0 - 2200 ft (MD)
Outer Diameter	16.000 in
Inner Diameter	14.841 in
Linear Weight	97 lbm/ft
Casing Grade	L-80
Job Excess	20 %

Calculations — KS 5 Production Casing (Stage 2)

Spacer:

Total Spacer	= 561.46 ft^3
	= 100.00 bbl

Cement : (2200.00 ft fill)

Total Tail Cement	= 0.00 ft^3
	= 0.00 bbl
Sacks of Cement	= 725 sks

Shoe Joint Volume: (1.00 ft fill)

0.00 ft * 0.0 ft^3/ft	= 0.00 ft^3
	= 0.00 bbl
Tail plus shoe joint	= 0.00 ft^3
	= 0.00 bbl

Total Pipe Capacity:

	= 0.00 bbl

Displacement Volume to Shoe Joint:

Capacity of Pipe - Shoe Joint	= 0.00 bbl - 0.00 bbl
	= 0.00 bbl

Fluid Instructions

Fluid 1: Water Spacer

FRESH WATER AHEAD

Fluid Density:	8.34 lbm/gal
Fluid Volume:	100 bbl

Fluid 2: Tail Cement

Premium Hi-Temp Westcoast

35 %	SSA-1 (Additive Material)	Fluid Weight	15.50 lbm/gal
5 %	Silicalite (Additive Material)	Slurry Yield:	1.63 ft^3/sk
0.75 %	Halad(R)-322 (Low Fluid Loss Control)	Total Mixing Fluid:	6.80 Gal/sk
0.5 %	Universal Cement Systems (Conditioning Aid)	Top of Fluid:	0 ft
		Calculated Fill:	2200 ft
		Volume:	210.90 bbl
		Calculated Sacks:	724.67 sks
		Proposed Sacks:	725 sks

Fluid 3: Water Spacer

DRILLING MUD

Fluid Density:	8.34 lbm/gal
Fluid Volume:	243.75 bbl

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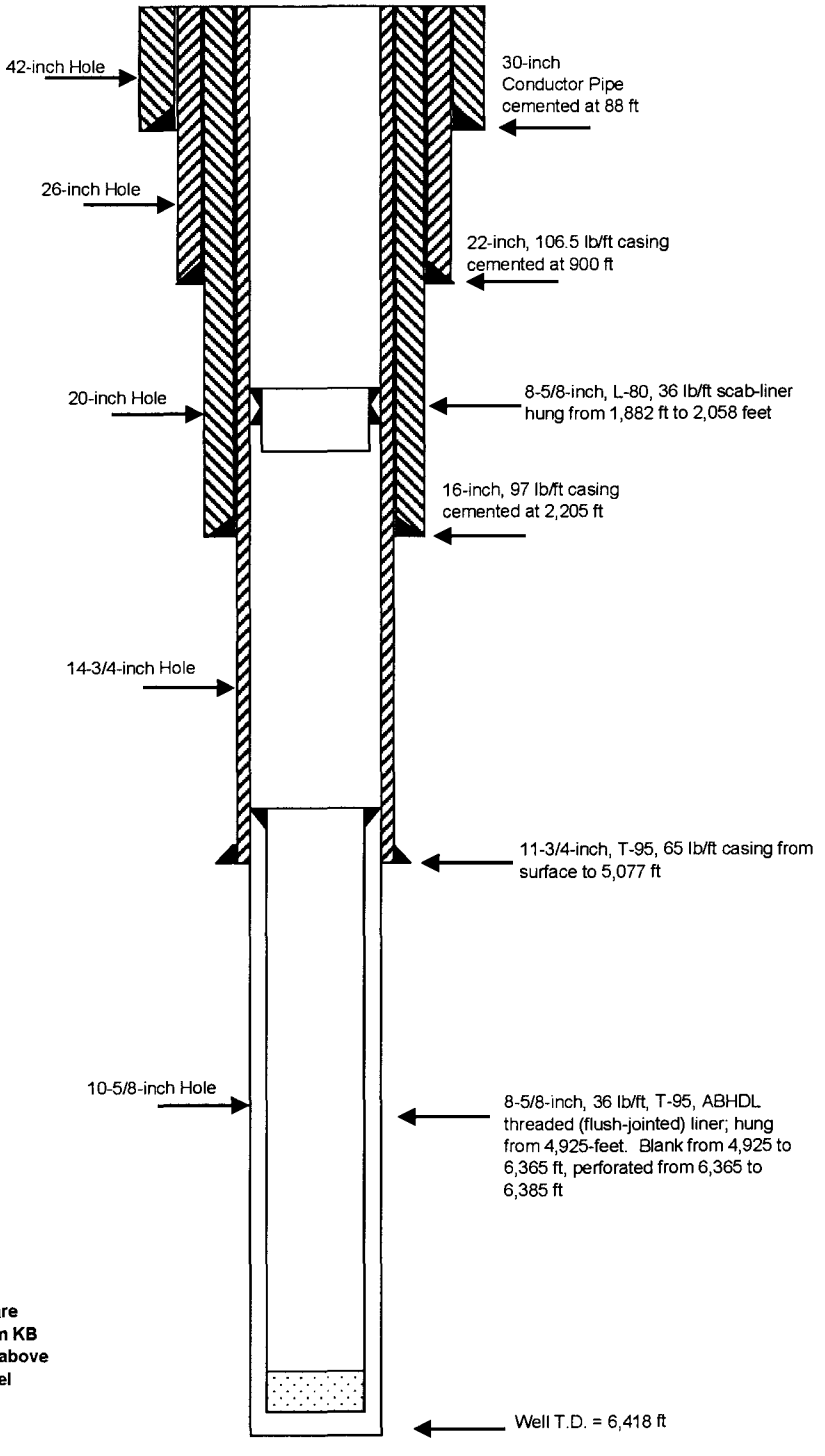
11. KS-5 – As-Built Diagram

Puna Geothermal Venture
Well KS-5
Schematic of Well Completion As Built



All depths are measured from KB elevation, 27 ft above ground level

Richmond Energy Services
May, 2003

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12. Wellhead Stack Diagram

Puna Geothermal Venture - Resource Recovery Project
Well KS-5 - Wellhead Stack Diagram