

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 09/22/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 1 RIG DAYS: 1 DRLD. DAYS: _____
 DEPTH @ 0700: _____ FT: ROCKBIT _____ CORE _____
 HOURS: DRLD _____ TRPD _____ REPAIR _____ OTHER 12
 SUPERVISOR: J.H. Moss FOREMAN: R. Fierbach
 DRILLERS: _____

CASING

8-5/8"	CND: <u>35'</u>
6-5/8"	CSG: <u>304'</u>
4-1/2"	CSG: <u>1,089'</u>
DATUM: GL [] KB [x]	
KB = GL + 8'	

MUD

WT: _____ VIS: _____ W.L.: _____ CK: _____ pH: _____ CHL: _____
 YP: _____ PV: _____ GELS: _____ SND% _____ SOL% _____ LCM: _____ #/BBL: _____

FORMATION DRLD: _____

LOST-CIRCULATION AND FLUID ENTRY ZONES: _____

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: _____

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Move in Tonto Drilling Services, rig #002.
 Unloaded trucks with H & H Rental Tool Co. stinger crane.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 09/29/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 8 RIG DAYS: 8 DRLD. DAYS: 5
 DEPTH @ 0700: 1,880 FT: ROCKBIT CORE: 131
 HOURS: DRLD 15.5 TRPD _____ REPAIR _____ OTHER 8.5
 SUPERVISOR: J.H. Moss FOREMAN: R. Fierbach
 DRILLERS: G. Behunin, C. McCracken

CASING

8-5/8"	CND: <u>35'</u>
6-5/8"	CSG: <u>304'</u>
4-1/2"	CSG: <u>1,089'</u>
DATUM: GL[] KB[x]	
KB = GL + 8'	

MUD

WT: 8.7 VIS: 45 W.L.: 19.2 CK: 2/32 pH: 8.5 CHL: 400
 YP: 12 PV: 6 GELS: 3/9 SND%: tr SOL%: 5 LCM: _____ #/BBL: _____

FORMATION DRLD: Silicic tuffs: 1,749' - 1,751'; Rhyolitic tuff: 1,756 - 1,781'; Rhyolitic tuff bx: 1,781' - 1,810'; Rhyolitic tuff: 1,810' - 1,880'. Open fracs: 1,742'; 1,747'; 1,849' - 1,851'; 1,858'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: _____

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
1,750	69	-									
1,800	69	-									
1,835	73	-									
1,880	67	-									

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
2	3.782		Core	L 21932	-	1,616		264	38.5			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 1,749' to 1,880' with no mud returns to surface. Well attempted to flow while recovering core from 1,818' to 1,828'. Pumped mud during core recovery.

CO₂: 160 - 1,300 ppm. H₂S: 0 ppm.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 09/30/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 9 RIG DAYS: 9 DRLD. DAYS: 6
 DEPTH @ 0700: 1,990 FT. ROCKBIT: _____ CORE: 110
 HOURS: DRLD 17 TRPD _____ REPAIR _____ OTHER 7
 SUPERVISOR: J.H. Moss FOREMAN: R. Fierbach
 DRILLERS: G. Behunin, C. McCracken

CASING

8-5/8"	CND: <u>35'</u>
6-5/8"	CSG: <u>304'</u>
4-1/2"	CSG: <u>1,089'</u>
DATUM: GL [] KB [x]	
KB = GL + 8'	

MUD

WT: 8.7 VIS: 44 W.L.: 18.8 CK: 2/32 pH: 8.5 CHL: 400
 YP: 12 PV: 5 GELS: 3/8 SND%: tr SOL%: 5 LCM: 0 #/BBL: _____

FORMATION DRLD: Rhyolite ash tuff: 1,880' - 1,990'; hard, partially welded. Breccia zones: 1,897' - 1,901'; 1,921' - 1,925'; 1,935' - 1,941'. Larger silica-lined frags/cavs: 1,903', 1,924' (8cm).

LOST-CIRCULATION AND FLUID ENTRY ZONES: _____

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
1,880	68	-									
1,900	67	-									
1,950	71	-									
1,990	68	-									

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
2	3.782		core	L 21932		1,616		374	55.5			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 1,880' to 1,990'. No mud returns to surface. Well not trying to flow.
Pumped mud during core recovery.

CO₂: 120 - 6,900 ppm. H₂S: 0 ppm.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 10/01/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 10 RIG DAYS: 10 DRLD. DAYS: 7
 DEPTH @ 0700: 2,073 FT: ROCKBIT CORE: 83
 HOURS: DRLD 13 TRPD 5 REPAIR 1 OTHER 5
 SUPERVISOR: J.H. Moss FOREMAN: R. Fierbach
 DRILLERS: G. Behunin, C. M. McCracken

CASING

8-5/8"	CND: 35'
6-5/8"	CSG: 304'
4-1/2"	CSG: 1,089'
DATUM: GL [] KB [x]	

KB = GL + 8'

MUD

WT: 8.7 - 9.8 vis: 45 W.L.: 16.8 CK: 2 pH: 8.5 CHL: 400
 YP: 13 PV: 7 GELS: 3/8 SND%: tr SOL%: 5 LCM: 0 #/BBL:

FORMATION DRLD: Rhyolite ash tuff. Partially open fracs: 2,046' - 2,053'. Less frac than above.

LOST-CIRCULATION AND FLUID ENTRY ZONES:

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
199	68	-									
2,000	68	-									
2,050	69	-									
2,073	67	-									

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
2	3.782		Core	L 21932	-	1,616	2,046	430	67			
3	3.830		Core	H 831732		2,046		27	6.25			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 1,990' to 2,046'. Trip for new bit. Diamond cored from 2,046 to 2,073' with no returns to surface. Pumping mud during core recovery.

CO₂: 110 - 1,530 ppm. H₂S: 0 ppm.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 10/02/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 11 RIG DAYS: 11 DRLD. DAYS: 8
 DEPTH @ 0700: 2,173 FT: ROCKBIT _____ CORE 100
 HOURS: DRLD 15 TRPD 0 REPAIR 1.5 OTHER 7.5
 SUPERVISOR: J.H. Moss FOREMAN: R. Fierbach
 DRILLERS: G. Behunin, C. McKracken

CASING

8-5/8"	CND: <u>35'</u>
6-5/8"	CSG: <u>304'</u>
4-1/2"	CSG: <u>1,089'</u>
DATUM: GL [] KB [x]	
KB = GL + 8'	

MUD

WT: 8.7 VIS: 44 W.L.: 13.6 CK: 2/32 pH: 8.5 CHL: 400
 YP: 12 PV: 8 GELS: 3/9 SND% _____ SOL% 6 LCM: _____ #/BBL: _____

FORMATION DRLD: Rhyolite ash tuff. Open fracs: 2,071'; 2,076'; 2,092' - 2,096'; 2,114' - 2,117'; 2,125'; 2,133'; 2,135' - 2,139'; 2,148' - 2,163'. BX zones: 2,092' - 2,096'; 2,148' - 2,163'.
 LOST-CIRCULATION AND FLUID ENTRY ZONES: _____

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2,073	67	-									
2,100	68	-									
2,144	67	-									
2,150	70	-									

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
3	3.830		Core	H 831732		2,046		127	21.25			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 2,073' to 2,173' with no returns to surface. Well attempted to flow while recovering core at 2,144'. Pumped mud during core recovery.

CO₂: 230 - 1,250 ppm. H₂S: 0 ppm.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 10/03/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 12 RIG DAYS: 12 DRLD. DAYS: 9
 DEPTH @ 0700: 2,273 FT: ROCKBIT _____ CORE 100
 HOURS: DRLD 16 TRPD _____ REPAIR _____ OTHER 8
 SUPERVISOR: J.H. Moss FOREMAN: R. Fierbach
 DRILLERS: G. Behunin, C. McCracken

CASING

8-5/8"	CND:	35'
6-5/8"	CSG:	304'
4-1/2"	CSG:	1,089'
DATUM: GL [] KB [x]		
KB = GL + 8'		

MUD

WT: 8.7 VIS: 4.2 W.L.: 13.2 CK: 2/32 pH: 8.5 CHL: 400
 YP: 10 PV: 8 GELS: 3/8 SND% tr SOL% 6 LCM: 0 #/BBL: _____

FORMATION DRLD: Rhyolite ash tuff. Open frags: 2,174' - 2,177'; 2,179'; 2,181'; 2,185' - 2,189'; 2,195'; 2,201' - 2,215'; 2,219' - 2,221'; 2,259'. BX zones: 2,174' - 2,177'; 2,185' - 2,189'; 2,201' - 2,213'; 2,219' - 2,227'; 2,259'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: _____

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2,173	67	-									
2,200	66	-									
2,250	67	-									
2,273	68	-									

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
3	3.830		Core	H 831732	-	2,046		227	37.25			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 2,173' to 2,273' with no returns to surface. Well attempted to flow through the annulus, at 2,253'. Pumped mud during core recovery.

CO₂: 200 - 1,360 ppm. H₂S: 0 ppm.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 10/04/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 13 RIG DAYS: 13 DRLD. DAYS: 10
 DEPTH @ 0700: 2,373 FT. ROCKBIT _____ CORE 100
 HOURS: DRLD 15 TRPD _____ REPAIR _____ OTHER 9
 SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange
 DRILLERS: G. Behunin, C. McCracken

CASING

8-5/8"	CND: <u>35'</u>
6-5/8"	CSG: <u>304'</u>
4-1/2"	CSG: <u>1,089'</u>
DATUM: <u>GLI 1</u> <u>KB[x]</u>	
KB = GL + 8'	

MUD

WT: 8.7 VIS: 47 W.L.: 11.6 CK: 2/32 pH: 8.5 CHL: 400
 YP: 14 PV: 10 GELS: 4/10 SND% _____ SOL% 6 LCM: 0 #/BBL: _____

FORMATION DRLD: Rhyolite ash tuff: 2,273' - 2,362'. Rhyolite lapilli tuff: 2,362' - 2,373'.
Open frags: 2,274' - 2,278'; 2,283' - 2,288'; 2,322' - 2,324'. BX zones: 2,277'; 2,283' - 2,288'; 2,319' - 2,324';
2,325' - 2,329'; 2,334' - 2,337'; 2,342' - 2,344'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: _____

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2,273	68	-									
2,300	67	-									
2,350	68	-									
2,373	66	-									

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
3	3.830		Core	H 831732	-	2,046		327	52.25			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 2,273' to 2,373' with no mud returns to surface.
Drill rods vibrating from 2,283' to 2,290'. Pumped mud down annulus to eliminate problem.
Pumped mud during core recovery.

CO₂: 250 - 1,540 ppm. H₂S: 0 ppm.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 10/05/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 14 RIG DAYS: 14 DRLD. DAYS: 11
 DEPTH @ 0700: 2,460 FT: ROCKBIT _____ CORE 87
 HOURS: DRLD 15 TRPD _____ REPAIR _____ OTHER 9
 SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange
 DRILLERS: G. Behunin, C. McCracken

CASING

8-5/8"	CND: <u>35'</u>
6-5/8"	CSG: <u>304'</u>
4-1/2"	CSG: <u>1,089'</u>
DATUM: <u>GL [] KB [x]</u>	
KB = GL + 8'	

MUD

WT: 8.7 VIS: 45 W.L.: 12 CK: 2/32 pH: 8.5 CHL: 400
 YP: 14 PV: 8 GELS: 3/10 SND% TR SOL% 6 LCM: 0 #/BBL: _____

FORMATION DRLD: Ash tuff bx: 2,362' - 2,372'. Mixed bx (rhy-and-bas): 2,372' - 2,412'.
 Basaltic bx: 2,412' - 2,419'. Basalt: 2,419' - 2,460'. Open frac @ 2,419'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: Fluid entry @ 2,450'.

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2,373	66	-									
2,400	68	-									
2,450	67	-									
2,460	66	-									

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
3	3.830		Core	H 831732	-	2,046		414	67.25			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 2,373' to 2,460' with no mud returns to surface.
Well attempted to flow through annulus at 2,450'. Pumped mud during core recovery.

CO₂: 800 - 1,600 ppm. H₂S: 0 ppm.

Anadarko Petroleum Corporation Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 25-22A DATE: 10/06/93
 CONTRACTOR: Tonto Drilling Services RIG #: 002
 REPORT NO.: 15 RIG DAYS: 15 DRLD. DAYS: 12
 DEPTH @ 0700: 2,500 (GL) FT. ROCKBIT _____ CORE 48
 HOURS: DRLD 5.75 TRPD 9.5 REPAIR _____ OTHER 8.75
 SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange
 DRILLERS: G. Behunin, C. McCracken

CASING

8-5/8"	CND: <u>35'</u>
6-5/8"	CSG: <u>304'</u>
4-1/2"	CSG: <u>1,089'</u>
DATUM: <u>GL [] KB [x]</u>	

KB = GL + 8'

MUD

WT: 8.7 - 9.8 vis: 43 W.L.: 13.2 CK: 2/32 pH: 8.5 CHL: 400
 YP: 12 PV: 8 GELS: 2-8 SND% TR SOL% 6 LCM: 0 #/BBL: _____

FORMATION DRLD: Basalt Bx: 2,460' - 2,475'. Basalt: 2,475' - 2,508'.
Silica lined cavs: 2,450' - 2,454'; 2,466' - 2,471'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: _____

TEMPERATURES, °F (MUD-IN, MUD-OUT, BOTTOMHOLE)

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2,460	66	-	-								
2,468	-	-	<u>298</u>	After trip for new bit.							
2,508	69	-	-								

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
3	3.830		Core	H 831732		2,046	2,471	425	68.25			
4	3.830		Core	H 253-3		2,471	2,500	29	6			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.

DRLG ASSY: 10' core barrel.

STRING WT: _____ PICKUP WT: _____ TORQUE: _____

REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 2,460' to 2,471' with no mud returns to surface. Trip for new bit.
 Diamond cored from 2,471' to 2,508' with no mud returns to surface. Pulled out of hole laying drill rods down.
 Closed master valve. Rigging Down.
 Pumped mud during trips and core recovery.

CO₂: 890 - 1,400 ppm H₂S: 0 ppm.

