



# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A DATE: 10/08/93  
CONTRACTOR: Tonto Drilling Services RIG #: 002  
REPORT NO.: 2 RIG DAYS: 2 DRLD. DAYS: \_\_\_\_\_  
DEPTH @ 0700: \_\_\_\_\_ FT: ROCKBIT \_\_\_\_\_ CORE \_\_\_\_\_  
HOURS: DRLD \_\_\_\_\_ TRPD \_\_\_\_\_ REPAIR \_\_\_\_\_ OTHER \_\_\_\_\_  
SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange  
DRILLERS: G. Behunin, C. McCracken

## CASING

_____	CND:	_____
_____	CSG:	_____
_____	CSG:	_____
_____	_____	_____
_____	_____	_____
_____	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

Rigging down, moved all of rig #002 from PV25-22A to PV 66-22A.  
Pumped 1000 gallons fresh water into well bore of 25-22A.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# Anadarko Petroleum Corporation Geothermal Drilling Report

**PROPRIETARY DATA**

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/10/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 4      RIG DAYS: 4      DRLD. DAYS: 1  
 DEPTH @ 0700: 48      FT: ROCKBIT 48      CORE \_\_\_\_\_  
 HOURS: DRLD 3      TRPD \_\_\_\_\_      REPAIR \_\_\_\_\_      OTHER 9  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

**CASING**

9-5/8	CND:	48
	CSG:	
	CSG:	
DATUM:		GL <input checked="" type="checkbox"/> KB <input checked="" type="checkbox"/>

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
1	12-1/4	8	Tricone		Used	0	48	48	3			

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**

Rigging up Tonto core rig #002. Drilled 12-1/4" hole from 0 to 48'.  
 Rigged up and ran 45' of 9-5/8" conductor pipe cemented in place with 44 sks cement.  
 Good cement returns to surface.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/11/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 5      RIG DAYS: 5      DRLD. DAYS: 2  
 DEPTH @ 0700: 308      FT. ROCKBIT 263      CORE \_\_\_\_\_  
 HOURS: DRLD 14.5      TRPD 2      REPAIR 0      OTHER 7.5  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	48
	CSG:	
	CSG:	
DATUM: <del>GL</del> <del>KB</del>		

KB = GL + 8'

## MUD

WT: \_\_\_\_\_      vis: 45-50      W.L.: \_\_\_\_\_      CK: \_\_\_\_\_      pH: \_\_\_\_\_      CHL: \_\_\_\_\_  
 YP: \_\_\_\_\_      PV: \_\_\_\_\_      GELS: \_\_\_\_\_      SNO% \_\_\_\_\_      SOL% \_\_\_\_\_      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Interbedded sand and claystone.

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
50	57	57		250	79	80					
100	57	61		300	81	81					
150	58	67		308	81	81					
200	59	71									

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
2	8-1/2	Tung	Tricone	BR 5387		45	308	263	14.5			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.
1				38-43		38-43		

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_      PICKUP WT: \_\_\_\_\_      TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Drilled 8-1/2' hole from 48' to 308' with good returns to surface.  
 Cir. hole clean. Pulled out of hole for wiper run. Ran bit back to bottom. Cir. hole clean.  
 Pulled out of hole, cut off conductor pipe. Rig up to run 7" casing.

CO<sub>2</sub>: 330 ppm.      H<sub>2</sub>S: 0 ppm.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/12/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 6      RIG DAYS: 6      DRLD. DAYS: 3  
 DEPTH @ 0700: 308      FT: ROCKBIT 0      CORE 0  
 HOURS: DRLD 0      TRPD 0      REPAIR 0      OTHER 24  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
	CSG:	
DATUM: GL [ x ]		KB [ ]

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

On bank with bit. Rig up and run 7" surface casing. Ran 14 jts 7", 8 round 23 # casing for a total of 303.8'.  
 Ran centralizers on first 3 jts. Hung Howco locked guide shoe at 308'GLM. Cemented casing with 62 sks  
 class B cement, displaced with 410 gal water. Good returns to surface throughout job. Good cement to surface,  
 did not run wiper plug. Cement in place at 1700 hrs. WOC to 1200, remove landing jt.  
 Install WH. Prepare to nipple up BOPS.

# Anadarko Petroleum Corporation Geothermal Drilling Report

**PROPRIETARY DATA**

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/13/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 7      RIG DAYS: 7      DRLD. DAYS: 3  
 DEPTH @ 0700: 308      FT. ROCKBIT 0      CORE 0  
 HOURS: DRLD \_\_\_\_\_ TRPD \_\_\_\_\_ REPAIR \_\_\_\_\_ OTHER 24  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

**CASING**

9-5/8"	CND:	45
7"	CSG:	308
	CSG:	
DATUM: GL[X] KB[ ]		

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**

WOC, Nipple up BOP. Start pressure test at 1700 hrs or 24 hrs after cement in place. 303'  
 Unable to hold pressure for a complete test. Ran in hole with 6-1/8" bit. Found firm cement at 300 ft.  
 When testing 7" casing and blind rams, lost 200# in 10 min. When testing pipe rams and casing,  
 lost 150# in 10 min. Unable to find any leaks at surface.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/14/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 8      RIG DAYS: 8      DRLD. DAYS: 4  
 DEPTH @ 0700: 482      FT. ROCKBIT 174      CORE \_\_\_\_\_  
 HOURS: DRLD 13      TRPD 2      REPAIR 0      OTHER 9  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
	CSG:	
DATUM: GL [ x ]		KB [ ]

KB = GL + 8'

## MUD

WT: \_\_\_\_\_      vis: 38      W.L.: \_\_\_\_\_      CK: \_\_\_\_\_      pH: \_\_\_\_\_      CHL: \_\_\_\_\_  
 YP: \_\_\_\_\_      PV: \_\_\_\_\_      GELS: \_\_\_\_\_      SND% \_\_\_\_\_      SOL% \_\_\_\_\_      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Samples to be logged on 10/15.

LOST-CIRCULATION AND FLUID ENTRY ZONES: None.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
350	73	79									
400	78	86									
450	79	80									
480	79	82									

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
3	6-1/8"		Drag			308	323	15	2			
4	6-1/8"	HTC	22	D 46wV	Out	323		159	11			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.
			48-50	38-43	200	Same		

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_      PICKUP WT: \_\_\_\_\_      TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

WOC. Check all bolts in BOP stack. Halliborton test tool on location at 0800. Set Howco Rtts Packer at 15', closed pipe rams and tested BOP. Held ok. Ran Packer to 147', tested casing with 1,000 psi, held ok. **Ran Packer to 290'**, tested casing and BOP to 1,000 psi, held ok. Tested **hydrill** with 700 psi, held ok. Pulled packer out of hole. Tested **blind rams** to 1,000 psi, held ok. Tested accumulator closing unit. Accuated pipe rams and blind rams 3 times with 1,200 psi left on unit. TIH w/6-1/8" drld to 313'. **Ran FM integrity test to 202 psi at 313'** (.65 psi/ft), WH pres dropped from 67 to 62 psi in 8 min. Drld 6-1/8" hole to 323', TOH for new bit. TIH, drld to 482'.





# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/16/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 10      RIG DAYS: 10      DRLD. DAYS: 7  
 DEPTH @ 0700: 1,000      FT: ROCKBIT 220      CORE 0  
 HOURS: DRLD \_\_\_\_\_ TRPD \_\_\_\_\_ REPAIR \_\_\_\_\_ OTHER \_\_\_\_\_  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
	CSG:	
DATUM: GL [ ] KB [x ]		
KB = GL + 8'		

## MUD

WT: \_\_\_\_\_ VIS: 45      W.L.: \_\_\_\_\_ CK: \_\_\_\_\_ pH: \_\_\_\_\_ CHL: \_\_\_\_\_  
 YP: \_\_\_\_\_ PV: \_\_\_\_\_ GELS: \_\_\_\_\_ SND% \_\_\_\_\_ SOL% \_\_\_\_\_ LCM: \_\_\_\_\_ #/BBL: \_\_\_\_\_

FORMATION DRLD: Siltstone and claystone.

LOST-CIRCULATION AND FLUID ENTRY ZONES: None.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
800	97	114									
850	99	107									
900	100	102									
950	102	109									

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
4	6-1/8	HTC	ATJ22	D46WW	-	325	1,000	675	36.5			

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

DRLG ASSY: 6-1/8" bit, bit sub.

STRING WT: \_\_\_\_\_ PICKUP WT: \_\_\_\_\_ TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Drilled 6-1/8" hole from 780' to 1,000'.  
 Cir hole clean, Pulled out of hole. Closed and locked blind rams.  
 Installed survey flang on top of Hydrill, closed 2,000# test valve. Installed safety fence around mud pump.  
 Rig shut down due to heavy rain and muddy roads. Unable to get Howco trucks to location.

# Anadarko Petroleum Corporation Geothermal Drilling Report

### PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A DATE: 10/17/93  
CONTRACTOR: Tonto Drilling Services RIG #: 002  
REPORT NO.: 11 RIG DAYS: 11 DRLD. DAYS: 7  
DEPTH @ 0700: 1,000 FT: ROCKBIT 0 CORE 0  
HOURS: DRLD TRPD REPAIR OTHER  
SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange  
DRILLERS: G. Behunin, C. McKracken

### CASING

9-5/8"	CND:	45
7"	CSG:	308
	CSG:	
DATUM: GL[x] KB[ ]		

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

On bank. Rig not in operation due to road too muddy to get Howco trucks over.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A DATE: 10/18/93  
 CONTRACTOR: Tonto Drilling Services RIG #: 002  
 REPORT NO.: 12 RIG DAYS: 12 DRLD. DAYS: 7  
 DEPTH @ 0700: \_\_\_\_\_ FT: ROCKBIT \_\_\_\_\_ CORE \_\_\_\_\_  
 HOURS: DRLD \_\_\_\_\_ TRPD \_\_\_\_\_ REPAIR \_\_\_\_\_ OTHER \_\_\_\_\_  
 SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND:	45	
7"	CSG:	308	
	CSG:		
DATUM: GL[x]		KB[ ]	

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
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---											

## 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

On bank. Rig not in operation due to road conditions to rig.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/19/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 13      RIG DAYS: 13      DRLD. DAYS: 7  
 DEPTH @ 0700: 1,000      FT: ROCKBIT \_\_\_\_\_      CORE \_\_\_\_\_  
 HOURS: DRLD \_\_\_\_\_ TRPD \_\_\_\_\_ REPAIR \_\_\_\_\_ OTHER \_\_\_\_\_  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
	CSG:	
DATUM: GL [ x ]		KB [ ]
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

On bank. Rig not in operation due to road conditions to rig. No rain.  
 Spread 50 yards dry sand and dirt over the wettest parts of road. Graded road to rig.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/20/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 14      RIG DAYS: 14      DRLD. DAYS: 8  
 DEPTH @ 0700: 1,008      FT: ROCKBIT \_\_\_\_\_      CORE \_\_\_\_\_  
 HOURS: DRLD 0.5      TRPD 2.5      REPAIR \_\_\_\_\_      OTHER 21  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1,007
DATUM: GL [x] KB [ ]		

KB = GL + 8'

## MUD

WT: \_\_\_\_\_      VIS: 45      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
1,001	82	124									
1,008	82	128									
Bottoms up		142									
1,007	-	132	Casing cir.								

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
4	6-1/2	HTC	ATJ22	D46WW		325	1,008	683				

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

Worked Howco cement and pump trucks to location over soft road, ran in hole with 6-1/8" bit.  
 Drilled 6-1/8" hole from 1,000' to 1,008'. Cir. hole clean, pulled out of hole. Changed pipe rams in BOPS.  
 Rigged up and ran 49 jts 4-1/2" 11.60# flush jt casing for a total of 1,005.83. Hung shoe at 1,007'.  
 With Howco, mixed and pumped through shoe at 1,007', 56 sks class G cmt w/1-to-1 perlite,  
 40% silca flour, 3" gel and .65% CFR3. Followed with 34 sks class G cmt w/40% silca flour, .65% CFR3,  
 displaced with 650 gal fresh water. Bumped plug with 500#. Released press. Float held ok.  
 Pumped app 1 bbl cement to pit. CIP 20:30 hrs. WOC to 0700 hrs.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/21/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 15      RIG DAYS: 15      DRLD. DAYS: 9  
 DEPTH @ 0700: 1,013      FT. ROCKBIT 4      CORE \_\_\_\_\_  
 HOURS: DRLD 3      TRPD 3      REPAIR 0      OTHER 18  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1,007
DATUM: GL [x]    KBI [ ]		

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
5	3-7/8		Tricone									

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

WOC to 20:30 hrs. **Tested BOPS.** Tested blind rams with 1,000 psi for 30 min., lost 50 psi.  
 Tested pipe rams with 1,000 psi for 21 min., lost 20 psi. Tested Hydrill with 700 psi for 25 min., lost 60 psi.  
 Tested 4-1/2 casing with 1,000 psi for 20 min., lost 60 psi. Tested choke manifold for 20 min., lost 60 psi.  
 Ran in hole with 3-7/8" Tricone bit. Found top of cement at 983', wiper plug at 988', float collar at 999',  
 guide shoe at 1,008'. Drilled formation to 1,013', cir hole clean. **Formation and cement shoe integrity**  
**tested with 220 psi, bled off to 170 psi in 5 min.** All tests witnessed by BLM (Dennis Simontacchi), and State of  
 Oregon, DOGMI (Dennis Olmstead). TOH to pick up core bit and BBL. TIH to core.

= 16 psi/ft fm integrity.

## Anadarko Petroleum Corporation Geothermal Drilling Report

**PROPRIETARY DATA**

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/22/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 16      RIG DAYS: 16      DRLD. DAYS: 10  
 DEPTH @ 0700: 1260      FT: ROCKBIT \_\_\_\_\_      CORE 247  
 HOURS: DRLD 20      TRPD \_\_\_\_\_      REPAIR \_\_\_\_\_      OTHER 4  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

**CASING**

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL [x] KBI I		
KB = GL + 8'		

**MUD**

WT: 8.7      VIS: 38      W.L.: \_\_\_\_\_      CK: \_\_\_\_\_      pH: \_\_\_\_\_      CHL: \_\_\_\_\_  
 YP: \_\_\_\_\_      PV: \_\_\_\_\_      GELS: \_\_\_\_\_      SND% \_\_\_\_\_      SOL% \_\_\_\_\_      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Siltstone & claystone w/ ss & clay interbeds.

LOST-CIRCULATION AND FLUID ENTRY ZONES: None.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
1050	53	105		1170	113	113					
1080	91	108		1200	110	116					
1110	87	107		1230	97	111					
1140	109	110		1260	102	107					

**MECHANICAL**

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
5	3.625		Tricone	N-80148		1008	1013	5	1			
6	3.90	HG	Core	L-21933		1013						

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.
			140-200	9-15				

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_      PICKUP WT: \_\_\_\_\_      TORQUE: \_\_\_\_\_

**REMARKS FOR 24 HOURS ENDING AT 0700**

Diamond cored from 1013 to 1260 with full returns to surface.  
 Bit #5 drilled cement, wiper, plug, float collar, shoe and 5' formation.

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# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/23/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 17      RIG DAYS: 17      DRLD. DAYS: 11  
 DEPTH @ 0700: 1436      FT: ROCKBIT      CORE 176  
 HOURS: DRLD 20      TRPD      REPAIR 2.5      OTHER 1.5  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL [ x ] KB [ ]		
KB = GL + 8'		

## MUD

WT: 8.9      VIS: 37      W.L.: 9.4      CK:      pH: 7      CHL: 500  
 YP: 10      PV: 8      GELS: 2-8      SND% 1/2      SOL% 96      LCM:      #/BBL:

FORMATION DRLD: Siltstone & claystone, tuffaceous below 1401.

LOST-CIRCULATION AND FLUID ENTRY ZONES: None.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
1260	102	107		1370	85	99					
1290	92	112		1400	76	127					
1310	93	124		1430	89	99					
1340	57	85									

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
6	3.90	HG	D Core	L-21933		1013		423	40			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.
			120-300	7-24	0-250			

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_ PICKUP WT: \_\_\_\_\_ TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 1260 to 1436 with full returns to surface.

Water pump located near 25-22A site moved by unknown party. Attempted vandalism or theft probably interrupted by traffic on road to Borax lake.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/24/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 18      RIG DAYS: 18      DRLD. DAYS: 12  
 DEPTH @ 0700: 1652      FT. ROCKBIT \_\_\_\_\_      CORE 216  
 HOURS: DRLD 20      TRPD \_\_\_\_\_      REPAIR \_\_\_\_\_      OTHER 4  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL[x] KB[ ]		
KB = GL + 8'		

## MUD

WT: 8.7      VIS: 49      W.L.: \_\_\_\_\_      CK: \_\_\_\_\_      pH: \_\_\_\_\_      CHL: \_\_\_\_\_  
 YP: \_\_\_\_\_      PV: \_\_\_\_\_      GELS: \_\_\_\_\_      SND% \_\_\_\_\_      SOL% \_\_\_\_\_      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Mudstone: 1432-1436. Ash & lapilli tuff: 1476-1652. Fracs: 1476, 1608, 1613.

LOST-CIRCULATION AND FLUID ENTRY ZONES: None. Good returns, no pressure increase with 8.7 ppg mud.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
1430	89	99		1550	94	102		1652	117	124	
1460	66	115		1580	99	111					
1490	91	110		1610	110	125					
1520	96	113		1640	117	122					

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
6	3.9	HG	Dicore	L-21933		1013		699	60			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.
			120-230	11-20		120-230		

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_      PICKUP WT: \_\_\_\_\_      TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 1436 to 1652' with good returns to surface.  
Bottom hole temperatures measured during core recovery: 1560 - 250°, 1580 - 259°, 1601 - 262°, 1621 - 264°, 1642 - 264°. (Time on bottom approx. 1 minute).

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/25/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 19      RIG DAYS: 19      DRLD. DAYS: 13  
 DEPTH @ 0700: 1842      FT. ROCKBIT: \_\_\_\_\_      CORE: 190  
 HOURS: DRLD 20      TRPD: \_\_\_\_\_      REPAIR: \_\_\_\_\_      OTHER: 4  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL[x] KB[ ]		
KB = GL + 8'		

## MUD

WT: 8.6      VIS: 42      W.L.: \_\_\_\_\_      CK: \_\_\_\_\_      pH: \_\_\_\_\_      CHL: \_\_\_\_\_  
 YP: \_\_\_\_\_      PV: \_\_\_\_\_      GELS: \_\_\_\_\_      SND%: \_\_\_\_\_      SOL%: \_\_\_\_\_      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Ash tuff: 1652' - 1690'. Mudstone: 1690' - 1842'.

## 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
1652	117	124	-	1770	75	107	-	1723	-	-	276
1680	101	105	-	1800	73	114	-	1760	-	-	272
1710	99	104	-	1830	96	104	-	1780	-	-	272
1740	63	95	(new mud)	1842	94	98	-	1840	-	-	274

## MECHANICAL

BIT # 6      SIZE 3.90      MAKE HG      TYPE Diamond      SER. NO. L21933      JETS \_\_\_\_\_      IN 1013      OUT \_\_\_\_\_      FT 829      HRS 80      WT \_\_\_\_\_      RPM \_\_\_\_\_      COND \_\_\_\_\_

PUMP \_\_\_\_\_      LINER \_\_\_\_\_      STROKE \_\_\_\_\_      SPM 70-250      GPM 6-23      PSI \_\_\_\_\_      TOTAL GPM 6-23      NOZ. VEL. \_\_\_\_\_      ANN. VEL. \_\_\_\_\_

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_      PICKUP WT: \_\_\_\_\_      TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 1652' to 1842' with good returns to surface.



# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/27/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 21      RIG DAYS: 21      DRLD. DAYS: 15  
 DEPTH @ 0700: 2093      FT: ROCKBIT \_\_\_\_\_      CORE 110  
 HOURS: DRLD 21      TRPD \_\_\_\_\_      REPAIR \_\_\_\_\_      OTHER 3  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: <input checked="" type="checkbox"/> GL <input type="checkbox"/> KBI <input type="checkbox"/>		

KB = GL + 8'

## MUD

WT: 8.9 - 9.3      vis: 36-40      W.L.: 10      ck: 2      pH: 7      CHL: 3000  
 YP: 8      PV: 8      GELS: 2/6      SND% 1/4      SOL% 5      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Ash tuff: 1983' - 2050'. Welded tuff: 2050' - 2093'. Open silica-lined frac @ 2074'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: Lost circulation followed by fluid entry at 2073'.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
1983	98	116		2093	63			2023	-	-	288
2010	103	107						2043	-	-	290
2040	80	98						2073	-	-	284
2070	82	111						2083	-	-	270

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
6	3.90	HG	Diamond	L-21933		1013		1080	100			

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

Function tested pipe rams and hydrill. Diamond cored from 1983' to 2073' with good returns to surface. Lost returns at 2073'. Cored with no returns to surface to 2093'. Well trying to flow while recovering core.

CO<sub>2</sub>: 210 - 1380 ppm.      H<sub>2</sub>S: 0 ppm.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 10/28/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 22      RIG DAYS: 22      DRLD. DAYS: 16  
 DEPTH @ 0700: 2160      FT: ROCKBIT \_\_\_\_\_      CORE 67  
 HOURS: DRLD 16      TRPD 4      REPAIR 0      OTHER 4  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL[x] KBI		
KB = GL + 8'		

## MUD

WT: 8.8-9.4      VIS: 44      W.L.: 10.4      CK: 2/32      pH: 8.5      CHL: 500  
 YP: 12      PV: 10      GELS: 2/8      SND% Tr      SOL% 3.5      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Ash tuff: 2091-2099. Welded tuff: 2099-2160. Open fracs @ 2136, 2148, 2149-53.

LOST-CIRCULATION AND FLUID ENTRY ZONES: No mud return below 2073.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2093	63	-		2103	-	-	250				
2160	62	-		2132	-	-	250				
				2160	-	-	264				

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
6	3.90	HG	Core	L-21933		1013	2122	1109	109			
7	3.90		Core	A253		2122		38	8			

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.
						9-23		

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_ PICKUP WT: \_\_\_\_\_ TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Function tested blind and pipe rams. Diamond cored from 2093 to 2122 with no mud returns to surface. TOH for new core bit. TIH, cored from 2122 to 2160 with no mud returns to surface. No hole problems during trip.

CO<sub>2</sub>: 110-1370 ppm. H<sub>2</sub>S: 0 ppm.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A DATE: 10/29/93  
 CONTRACTOR: Tonto Drilling Services RIG #: 002  
 REPORT NO.: 23 RIG DAYS: 23 DRLD. DAYS: 17  
 DEPTH @ 0700: 2209 FT: ROCKBIT \_\_\_\_\_ CORE 49  
 HOURS: DRLD 13.5 TRPD 5.5 REPAIR \_\_\_\_\_ OTHER 5  
 SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL[x] KB[ ]		
KB = GL + 8'		

## MUD

WT: 8.8 - 9.4 VIS: 41 W.L.: 9.6 CK: 2 pH: 8.5 CHL: 400  
 YP: 10 PV: 8 GELS: 2 - 7 SND% tr SOL% \_\_\_\_\_ LCM: \_\_\_\_\_ #/BBL: \_\_\_\_\_

FORMATION DRLD: Ash tuff. Open frags: 2170' - 2177', 2182' - 2188', 2192.5' - 2195', 2201'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: No mud return below 2073'.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2160	62										
2190	57										
2209	56										

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
7	3.90		Diamond	A 253		2122	2195	73	20			
8	3.90		Diamond	A 264-1		2195		14	6			

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

DRLG ASSY: Core barrel.

STRING WT: \_\_\_\_\_ PICKUP WT: \_\_\_\_\_ TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Diamond cored from 2160' to 2195' with no returns to surface. Formation very broken. Trip for new bit.  
 Diamond cored from 2195' to 2209' with no returns to surface.

CO<sub>2</sub>: 250 - 1470 ppm H<sub>2</sub>: 0 ppm

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A DATE: 10/30/93  
 CONTRACTOR: Tonto Drilling Services RIG #: 002  
 REPORT NO.: 24 RIG DAYS: 24 DRLD. DAYS: 18  
 DEPTH @ 0700: 2279 FT: ROCKBIT \_\_\_\_\_ CORE 70  
 HOURS: DRLD 16 TRPD 5 REPAIR \_\_\_\_\_ OTHER 3  
 SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL[x] KB[ ]		
KB = GL + 8'		

## MUD

WT: 8.9 - 9.5 VIS: 54 W.L.: 8.4 CK: 1 pH: 8.5 CHL: 400  
 YP: 15 PV: 10 GELS: \_\_\_\_\_ SND% tr SOL% 4 LCM: \_\_\_\_\_ #/BBL: \_\_\_\_\_

FORMATION DRLD: Welded tuff. Open frags: 2209' - 2223', 2253'.

LOST-CIRCULATION AND FLUID ENTRY ZONES: No mud return while drilling below 2073'.

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

DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH	DEPTH	IN	OUT	BH
2209	56							2243			250
2230	54							2252			262
2250	55							2260			269
2276	53							2279			271

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
8	3.9	Diamond		A 264-1		2195	2253	58	12			
9	3.90	Diamond		L 21373		2253		26	4			

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

Activated BOPS pipe rams & blind rams.

DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_ PICKUP WT: \_\_\_\_\_ TORQUE: \_\_\_\_\_

## REMARKS FOR 24 HOURS ENDING AT 0700

Activated BOPS pipe rams & blind rams. Diamond cored 2209' to 2253' with no returns to surface.  
 Dropped 5' core out of core bbl while retrieving. Could not get core bbl to latch in at bit.  
 Trip to clean out outer bbl, changed bit. TIH washed and reamed from 2200' to 2253'. Diamond cored  
 from 2253' to 2279' with **no returns** to surface. **Well attempted to flow at times on trip.**  
 Slipped core @ 2279'.

CO<sub>2</sub>: 180 - 1480 ppm H<sub>2</sub>S: 0 ppm



Anadarko Petroleum Corporation  
Geothermal Drilling Report

PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A DATE: 10/31/93  
CONTRACTOR: Tonto Drilling Services RIG #: 002  
REPORT NO.: 25 RIG DAYS: 25 DRLD. DAYS: 19  
DEPTH @ 0700: 2362 FT: ROCKBIT \_\_\_\_\_ CORE 83  
HOURS: DRLD 20 TRPD \_\_\_\_\_ REPAIR \_\_\_\_\_ OTHER 4  
SUPERVISOR: J.H. Moss FOREMAN: Mike LaOrange  
DRILLERS: G. Behunin, C. McCracken

CASING

<u>9-5/8"</u>	CND:	<u>45</u>
<u>7"</u>	CSG:	<u>308</u>
<u>4-1/2"</u>	CSG:	<u>1007</u>
_____	:	_____
_____	:	_____
DATUM: GL [x] KBI [ ]		
KB = GL + 8'		

MUD

WT: 8.9 - 9.4 vis: 54 W.L.: 8.8 CK: 1 pH: 8.5 CHL: 400  
YP: 18 PV: 12 GELS: 3-9 SND% TR SOL% 4 LCM: \_\_\_\_\_ #/BBL: \_\_\_\_\_

FORMATION DRLD: Tuff and welded tuff. Rubble zones: 2273', 2292' - 2293', 2296' - 2305'.

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
<u>2279</u>	<u>53</u>	<u>-</u>	<u>_____</u>	<u>2360</u>	<u>54</u>	<u>-</u>	<u>_____</u>	<u>2285</u>	<u>_____</u>	<u>_____</u>	<u>250</u>
<u>2300</u>	<u>53</u>	<u>-</u>	<u>_____</u>	_____	_____	_____	_____	<u>2329</u>	<u>_____</u>	<u>_____</u>	<u>244</u>
<u>2330</u>	<u>54</u>	<u>-</u>	<u>_____</u>	_____	_____	_____	_____	<u>2356</u>	<u>_____</u>	<u>_____</u>	<u>234</u>
<u>2362</u>	<u>54</u>	<u>-</u>	<u>_____</u>	_____	_____	_____	_____	_____	_____	_____	_____

MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
<u>9</u>	<u>3.90</u>	<u>Diamond</u>	<u>_____</u>	<u>L 21373</u>	<u>2253</u>	<u>_____</u>	<u>_____</u>	<u>109</u>	<u>24</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>

PUMP	LINER	STROKE	SPM	GPM	PSI	TOTAL GPM	NOZ. VEL.	ANN. VEL.
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DRLG ASSY: \_\_\_\_\_

STRING WT: \_\_\_\_\_ PICKUP WT: \_\_\_\_\_ TORQUE: \_\_\_\_\_

REMARKS FOR 24 HOURS ENDING AT 0700

Function tested pipe rams and hydrill.  
Diamond cored from 2279' to 2362' with no returns to surface. Core very broken in places.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 11/01/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 26      RIG DAYS: 26      DRLD. DAYS: 20  
 DEPTH @ 0700: 2376      FT. ROCKBIT: \_\_\_\_\_      CORE: 14  
 HOURS: DRLD 4      TRPD 5      REPAIR: \_\_\_\_\_      OTHER: 15  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND: <u>45</u>
7"	CSG: <u>308</u>
4-1/2"	CSG: <u>1007</u>
DATUM: <u>GLI x I</u> <u>KB I</u>	

KB = GL + 8'

## MUD

WT: 8.7 - 9.2      vis: 45      W.L.: \_\_\_\_\_      CK: \_\_\_\_\_      pH: \_\_\_\_\_      CHL: \_\_\_\_\_  
 YP: \_\_\_\_\_      PV: \_\_\_\_\_      GELS: \_\_\_\_\_      SND%: \_\_\_\_\_      SOL%: \_\_\_\_\_      LCM: \_\_\_\_\_      #/BBL: \_\_\_\_\_

FORMATION DRLD: Welded tuff.

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
2362	54	-									
<u>2376</u>	54	-									

## MECHANICAL

BIT #	SIZE	MAKE	TYPE	SER. NO.	JETS	IN	OUT	FT	HRS	WT	RPM	COND
9	3.90	Diamond		L-21373		2253	2376	123	30			

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

Diamond cored from 2362' to 2376'. Pumped 9.3 ppg mud in hole. Pulled out of hole. **Nippled down** BOP stack. Installed flow test equipment on master valve. Rigged up Tasco wire line service equipment on well, checked **bottom hole temp, 322°F @ 2100'**. Well not attempting to flow. Pumped 600 gal fresh water in hole. Shut-in for 2 hrs. Well head pressure 25 psi. Opened choke manifold. Well attempting to flow. Opened well through test equipment. Well flowed through partly open valve at 200 gpm, for approx. 10 min. Checked test equipment, shut well in for temp build up.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 11/02/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 27      RIG DAYS: 27      DRLD. DAYS: 21  
 DEPTH @ 0700: 2376      FT: ROCKBIT \_\_\_\_\_      CORE \_\_\_\_\_  
 HOURS: DRLD \_\_\_\_\_ TRPD \_\_\_\_\_ REPAIR \_\_\_\_\_ OTHER 24  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McCracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL[x] KB[ ]		

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
2070	-	-	325								

## 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

Checked out **flow test** equipment. Rigged up Tasco wire line service equipment. Opened well for test.  
 Well on stream 10:15. Shut well in @ 14:15 hrs. Pre-test shut-in press: 932 psia @ 2100'.  
**Flow rate: 258 gpm of water. Flowing bottom hole temp: 316° @ 2100'. Flowing bottom hole pressure: 924 psia @ 2100'.** Post-test shut-in well head pressure: 105 psig. Unable to get stable bottom hole pressure due to **bridge @ 1250'**. Rigged down logging equipment. Nipple up BOP stack. Tested blind rams with 1000 psi for 20 min. Tested pipe rams with 1000 psi for 20 min. Tested hydrill with 700 psi for 20 min. All held ok. BOP test witnessed by BLM representative Dennis Simontacchi.  
 Water samples of well and Borax Lake collect by Beak Consultants and Don Michels.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 11/03/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 28      RIG DAYS: 28      DRLD. DAYS: 22  
 DEPTH @ 0700: 2376 td      FT: ROCKBIT \_\_\_\_\_      CORE \_\_\_\_\_  
 HOURS: DRLD 0      TRPD 0      REPAIR 0      OTHER 24  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL [ x ]    KB [ 1 ]		

KB = GL + 8'

## MUD

WT: 8.9 - 10      vis: 38 - 46      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

Pumped approx 1000 gal of produced water from frac tanks to well to cool well bore.  
Pumped 6400 gal of mud with weight up to 10.0 ppg to compensate 105 psig WHP for wiper run.  
 WHP held at 50 psig after 6 hrs. Further operations postponed until well temperatures and pressures stabilize. Layed down drillpipe. Nipple down BOPS. Prepare to RD.

# Anadarko Petroleum Corporation Geothermal Drilling Report

## PROPRIETARY DATA

WELL NAME: Pueblo Valley Federal 66-22A      DATE: 11/04/93  
 CONTRACTOR: Tonto Drilling Services      RIG #: 002  
 REPORT NO.: 29      RIG DAYS: 29      DRLD. DAYS: 22  
 DEPTH @ 0700: \_\_\_\_\_      FT. ROCKBIT \_\_\_\_\_      CORE \_\_\_\_\_  
 HOURS: DRLD \_\_\_\_\_      TRPD \_\_\_\_\_      REPAIR \_\_\_\_\_      OTHER 24  
 SUPERVISOR: J.H. Moss      FOREMAN: Mike LaOrange  
 DRILLERS: G. Behunin, C. McKracken

## CASING

9-5/8"	CND:	45
7"	CSG:	308
4-1/2"	CSG:	1007
DATUM: GL [ x ]    KB [ ]		

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

*last well for 1993 program*  
Rig down, equipment to move from 66-22A to 52-22A. Pumped 8000 gal of water into 66-22A to displace heavy mud in wellbore and provide more accurate wellhead pressures. WHP: 38 psig. Moved part of rig to 52-22A.