CALPINE

CALPINE NATURAL GAS COMPANY
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COPY OF LETTER SENT TO NM-OCD AZTEC, NM

January 24, 2003

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1000 Rio Brazos Rd.
Aztec, New Mexico 87410

Re: Conversion of Roosevelt #1 (API No. 30-045-26458) to Class II Injection Well

Attention: Mr. Frank Chavez

Dear Mr. Chavez,

Calpine has approval to convert the Roosevelt #1 (API No. 30-045-26458) to a Class II injection well under the New Mexico's Underground Injection Program. This well was originally completed as a conventional oil and gas well with perforations in the Dakota Sandstone (5891'-6046' BGS). Cement plugs have subsequently been set across the Dakota (5385'-6061') and Gallup (4924'-5124') Sandstones with the intent to convert the well to a Class II injection well. A cement bond log run on the well from 2000' to 5407' indicated a top of cement at 2438' with a good bond to 5407'.

It is proposed to perforate the well in the Cliff House (2802'-2895') and Point Lookout (3735'-3830') Formations for injection. Mechanical integrity tests have been run on this well, and the well holds pressure from 2560' (242' above the top of the proposed perforations) to the top of the cement plug; however, leaks were detected in the casing above 2400'. As seen on the attached well completion reports several attempts were made to rehabilitate the well to meet the integrity test requirements for a Class II injection well.

Given these conditions we propose the following alternative completion procedure:

- Rerun a cement bond log on the 4-1/2" well casing to confirm the bond and the top of cement,
- Rerun the pressure test below 2560' to confirm the mechanical integrity of the well below this depth,
- Perforate the well in the Point Lookout (3735'-3830') and Cliff House (2802'-2895') Formations,
- Install 2-7/8" tubing with a packer and seating nipple to 2752' (50' above the top perforation),
- Cement the tubing to surface inside the well casing,
- Clean out tubing.
- Run a cement bond log inside the 2-7/8" tubing.

Director Rocky Mountain Operations

Cc: David Catnach-New Mexico OCF- Santa Fe
Jim Lovato-BLM – Farmington, New Mexico

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**	**Well Name:**	Roosevelt #1		
Date:	6-Nov-02	**Report #:**	1		
Field:	Basin DakotaMV SWD	**Location:** 22/30N/14W	**County:**	San Juan	**State:** NM
Contractor:	JC Well Service	**Supervisor:**	Paul Thompson		

Work Summary:

Move on location and rig up JC Well Service. Blew well down. ND wellhead and NU BOP. Pulled the donut and loaded the hole with 80 bbls of City water. Circulated the hole clean with another 40 bbls. Picked up additional tubing from Walsh stock and tagged fill at 6010' KB. Pulled up to 5989' KB. Rigged up Halliburton. Established circulation and spotted a 50 sx (59 cu.ft.) of Cl "B" cement with ¼#/sk celloflake across the Dakota perfs. Displaced cement with 19 bbls of water. TOH to 5111'. Established circulation with fresh water and cemented across the Gallup with 15 sx (18 cu.ft.) of Cl "B" cement. Displace cement with 17.5 bbls of water. Finished TOH. Recovered a total of 186 jts, SN and tail joint of 2-3/8", 4.7#, J-55, EUE tubing. Tubing appears to be in good shape. SI well overnight to WOC. Will run CBL and perforate the Point Lookout tomorrow.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$2,050	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing	$4,128	Bailer	
Completion Fluids (City water)	$576	Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$533	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (csg. head)			
		Total Daily Costs	$7,437
		Cumulative Costs	$7,437

Well Record

TD:	6159		Run in well					
PBTD:	6096		Tubing		Joints		Grade	
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length	
			Tubing Subs				Length	
Perforations	5891' - 6046'		Seating Nipple				Length	
						Top of tbg to KB		
				Bottom of Tubing/Production String Landed at:				
SPF:	1 spf		Rods		Size			
			Rods		Size			
	Pulled from well		Pony subs					
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump					
Packer			Packer Depth					
Rods			Type					
Pump			How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	7-Nov-02			**Report #:**	2		
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

Finish laying down 2-3/8 out of the derrick. Rig up Halliburton logging. TIH with CBL tool. Tagged cement top at 5407'. The plug across the Gallup was not there. Loaded the hole and ran the CBL from 5407' to 2000'. Good bond across the Mesa Verde and top of cement is at approximately 2438'. Top MV perf is at 2803'. Rig down Halliburton. Pick up 162 jts of 2-3/8" and set at 5111' KB. Plan to spot cement across the Gallup again tomorrow tomorrow.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,450	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating	$3,473	Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$533	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (csg. head)			
		Total Daily Costs	$5,606
		Cumulative Costs	$13,043

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**	**Well Name:**	Roosevelt #1		
Date:	8-Nov-02	**Report #:**	3		
Field:	Basin DakotaMV SWD	**Location:** 22/30N/14W	**County:**	San Juan	**State:** NM
Contractor:	JC Well Service	**Supervisor:**	Paul Thompson		

Work Summary:

Rig up Halliburton and load hole with 4 bbls of water. Establish circulation with another 6 bbls. Shut the pipe rams and casing valves. Established injection into the well at 1 BPM and 230 psi. Spotted 25 sx (29 cu.ft.) of CL "B" cement at 5111' KB. Displaced cement with 17.5 bbls. Job completed at 0915 hrs. Rig down Halliburton and TOH with the tubing. SI well to WOC.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,000	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing	$2,663	Bailer	
Completion Fluids (City water)	$55	Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$283	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (csg. head)			
		Total Daily Costs	$4,151
		Cumulative Costs	$17,194

Well Record

TD:	6159		Run in well					
PBTD:	6096		Tubing		Joints		Grade	
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length	
			Tubing Subs				Length	
Perforations	5891' - 6046'		Seating Nipple				Length	
						Top of tbg to KB		
				Bottom of Tubing/Production String Landed at:				
SPF:	1 spf		Rods		Size			
			Rods		Size			
	Pulled from well		Pony subs					
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump					
Packer			Packer Depth					
Rods			Type					
Pump			How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**		**Well Name:**	Roosevelt #1			
Date:	9-Nov-02		**Report #:**	4			
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service		**Supervisor:**		Paul Thompson		

Work Summary:

Rigged up Three Rivers pump truck and loaded the hole. SI the rams and established an injection rate of ½ BPM with 0 psi. Opened bradenhead valve and established circulation. Picked up a Halliburton tension set packer and isolated holes in the 4-1/2" casing between 160' and 2560'. Because of circulating pressures, major holes are estimated to be between 1600' and 1900'. Pressure tested casing below 2560' to 2000 psi – held OK. TOH and laid down the packer. Rigged up Halliburton pump truck and waited on cement. Shut down at 1700 hrs due to darkness and rain. Will squeeze 11/10/02.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$2,050	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing	$1,500	Tanks	
Cementing		Bailer	
Completion Fluids (City water)	$680	Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (csg. head)			
		Total Daily Costs	$4,647
		Cumulative Costs	$21,841

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**		**Well Name:**	Roosevelt #1			
Date:	10-Nov-02		**Report #:**	5			
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service		**Supervisor:**		Paul Thompson		

Work Summary:

Halliburton bulk truck got stuck driving to location. Waited on dozer operator to pull trucks to location. Rigged up Halliburton to the casing valve. Established circulation through the bradenhead with 12 bbls of water. Pumped 560 sx (823 cu.ft.) of Cl "B" 50:50 poz with 3% gel, 5#/sk gilsonite, 0.8% Halad – 9, and 0.2% CFR-3. Lost full returns with 80 bbls of cement gone. Slowed rate to 1 bpm and re-established full returns. Circulated 10 bbls of good cement to surface. Displaced cement with 5 bbls of water at 1 bpm and 100 psi, then SI the bradenhead valve. Pumped 3.75 bbls and pressure increased to 320 psi. SD for 15 min. pressure dropped to 55 psi. Pumped another 2.75 bbls and pressure increased to 340 psi. SD for 15 min and pressure dropped to 54 psi. Pumped 3.5 bbls and pressure increased to 400 psi. Pressure was slowly dropping. Total displacement was 15 bbls (TOC in 4-1/2" is at approximately 970'). SI well and rigged down Halliburton. WOC overnight.

Daily Costs:

Road & Location		Tubulars	
Rig Costs		Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing	$11,597	Bailer	
Completion Fluids (City water)	$300	Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$408	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (csg. head)			
		Total Daily Costs	$12,455
		Cumulative Costs	$34,296

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	11-Nov-02			**Report #:**	6		
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

Set and filled workover pit. Picked up a 3-7/8" step mill on 4 – 3-1/8" DC. TIH and tagged cement at 824'. Picked up power swivel and drilled soft to medium hard cement to 1464'. Pulled 5 joints and SDON.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,600	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies	$500	Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)	$250		
		Total Daily Costs	$2,767
		Cumulative Costs	$37,063

Well Record

TD:	6159
PBTD:	6096
Casing Size:	4-1/2", 11.6#
Perforations	5891' - 6046'
SPF:	1 spf
Pulled from well	
Tubing	187 jts 2-3/8", 4.7#, EUE & SN
Packer	
Rods	
Pump	

Run in well					
Tubing		Joints		Grade	
Wt		Thread		Length	
Tubing Subs				Length	
Seating Nipple				Length	
			Top of tbg to KB		
	Bottom of Tubing/Production String Landed at:				
Rods		Size			
Rods		Size			
Pony subs					
Pump					
Packer Depth					
Type					
How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	12-Nov-02			**Report #:**	7		
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

Continued to drill soft cement to 1883'. TIH to 2074'. Drilled soft cement from 2074' to 2232'. TIH to 2560' without tagging any more cement. Circulated hole clean with 65 bbls of fresh water. Started TOH with tubing. Pulled 16 jts and SDON.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,750	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$2,167
		Cumulative Costs	$39,230

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**	**Well Name:**	Roosevelt #1		
Date:	13-Nov-02	**Report #:**	8		
Field:	Basin DakotaMV SWD	**Location:** 22/30N/14W	**County:**	San Juan	**State:** NM
Contractor:	JC Well Service	**Supervisor:**	Paul Thompson		

Work Summary:

Finished TOH with the tubing and bit. Picked up a 4-1/2" casing scrapper on 2-3/8" tubing to 2520'. Hole was clean. Picked up a Halliburton tension packer and found holes from 160' to 2400' (same interval as before). Pressure would fall from 350 psi to 100 psi in 30 min. I suspect that the cement never set up. TOH and laid down the packer. Contacted the NMOCD about cementing in the 2-7/8" plastic lined tubing – waiting on a decision.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,750	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing	$700	Tanks	
Cementing		Bailer	
Completion Fluids (City water)	$510	Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$3,377
		Cumulative Costs	$42,607

Well Record

TD:	6159
PBTD:	6096
Casing Size:	4-1/2", 11.6#
Perforations	5891' - 6046'
SPF:	1 spf
	Pulled from well
Tubing	187 jts 2-3/8", 4.7#, EUE & SN
Packer	
Rods	
Pump	

Run in well					
Tubing		Joints		Grade	
Wt		Thread		Length	
Tubing Subs				Length	
Seating Nipple				Length	
			Top of tbg to KB		
	Bottom of Tubing/Production String Landed at:				
Rods		Size			
Rods		Size			
Pony subs					
Pump					
Packer Depth					
Type					
How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**		**Well Name:**	Roosevelt #1			
Date:	14-Nov-02		**Report #:**	9			
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service		**Supervisor:**		Paul Thompson		

Work Summary:

TIH to 2400' open ended with 75 jts of 2-3/8" tubing. Rigged up Halliburton. Established circulation down the tubing and out the casing valve. SI casing valve and pressured up well to 400 psi – dropped to 200 psi in 5 min. Opened the casing valve and filled the casing with 160 sx (189 cu.ft.) Cl "B" with 0.3% Halad 322 (dispersant). Circulated a trace of cement to surface. TOH with the tubing. Tried to mix 20 more sx of cement but Halliburton could only get the weight to 10 ppg. Pumped that 3.5 bbls to load the casing. Closed the casing valve and pressured the well to 400 psi with 2.2 bbls of water. Dropped to 180 psi in 5 min. Pressured well to 650 psi with 0.7 bbls and well broke back to 50 psi. SI well. Pressure to 15 psi in 20 min. Pressured well to 700 psi with 2.3 bbls. SI and pressure dropped to 275 psi in 1 min and 120 psi in 25 min. Pressured well to 815 psi with 0.6 bbls. Dropped to 500 psi in 1 min and to 220 psi in 15 min. Pressured well to 1060 psi with 1.7 bbls. Slow build up. SI well and rigged down Halliburton to WOC

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,750	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing	$2,966	Bailer	
Completion Fluids (City water)	$200	Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$142	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$5,208
		Cumulative Costs	$47,815

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**		**Well Name:**	Roosevelt #1			
Date:	15-Nov-02		**Report #:**	10			
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service		**Supervisor:**		Paul Thompson		

Work Summary:

Picked up 3-7/8" step mill on 4 3-1/8" drill collars and 2-3/8" tubing. Tagged cement top at 568'. Drilled hard cement to 984'. Circulated the hole clean. Pulled one joint off bottom and shut down for the weekend.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,750	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$2,167
		Cumulative Costs	$49,982

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**	**Well Name:**	Roosevelt #1		
Date:	18-Nov-02	**Report #:**	11		
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:** San Juan	**State:** NM
Contractor:	JC Well Service	**Supervisor:**	Paul Thompson		

Work Summary:

Pressure tested casing to 300 psi at 984' – held OK. Continued drilling hard cement to 1176 and lost circulation. Could not get casing to hold more than 125 psi. Regained circulation and circulated hole clean. Plan to rig up larger triplex pump 11/19/02. SDON.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$1,750	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$2,167
		Cumulative Costs	$52,149

Well Record

TD:	6159		Run in well				
PBTD:	6096		Tubing		Joints		Grade	
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length	
			Tubing Subs				Length	
Perforations	5891' - 6046'		Seating Nipple				Length	
						Top of tbg to KB		
				Bottom of Tubing/Production String Landed at:				
SPF:	1 spf		Rods		Size			
			Rods		Size			
	Pulled from well		Pony subs					
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump					
Packer			Packer Depth					
Rods			Type					
Pump			How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	19-Nov-02			**Report #:**	12		
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

Installed tri-plex pump. Drilled to 1272'. TOH and replaced the bit. TIH with another step drag bit on 4 3-1/8" DC. Continued drilling hard cement to 1400'. Penetration rate increased with new bit. SDON.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$2,000	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	$250
Engr. & Supervision		Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$2,400
		Cumulative Costs	$54,549

Well Record

TD:	6159
PBTD:	6096
Casing Size:	4-1/2", 11.6#
Perforations	5891' - 6046'
SPF:	1 spf
Pulled from well	
Tubing	187 jts 2-3/8", 4.7#, EUE & SN
Packer	
Rods	
Pump	

Run in well					
Tubing		Joints		Grade	
Wt		Thread		Length	
Tubing Subs				Length	
Seating Nipple				Length	
			Top of tbg to KB		
	Bottom of Tubing/Production String Landed at:				
Rods		Size			
Rods		Size			
Pony subs					
Pump					
Packer Depth					
Type					
How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	20-Nov-02			**Report #:**	13		
Field:	Basin Dakota/MV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

Drilled hard cement from 1400' to 1720'. Tried to pressure test to 300 psi – dropped to 250 psi in 5 min. SDON

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$2,000	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$2,417
		Cumulative Costs	$56,966

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	21-Nov-02			**Report #:**	14		
Field:	Basin Dakota/MV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

Drilled hard cement from 1720' to 2072'. Should drill out of cement at 2400'. At 2072', tried to pressure test to 300 psi – dropped to 250 psi in 5 min (same result as yesterday). SDON

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$2,000	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$2,417
		Cumulative Costs	$59,383

Well Record

TD:	6159
PBTD:	6096
Casing Size:	4-1/2", 11.6#
Perforations	5891' - 6046'
SPF:	1 spf
Pulled from well	
Tubing	187 jts 2-3/8", 4.7#, EUE & SN
Packer	
Rods	
Pump	

Run in well					
Tubing		Joints		Grade	
Wt		Thread		Length	
Tubing Subs				Length	
Seating Nipple				Length	
			Top of tbg to KB		
	Bottom of Tubing/Production String Landed at:				
Rods		Size			
Rods		Size			
Pony subs					
Pump					
Packer Depth					
Type					
How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	22-Nov-02			**Report #:**	15		
Field:	Basin Dakota/MV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

Drilled out of the cement at 2424' KB. TIH to 2680' but did not tag any more stringers. Circulated hole clean. Tried to pressure test to 300 psi – dropped to 250 psi in 5 min (same result as before). TOH and SD for the weekend. Plan to pick up a packer and find holes 12/25/02.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$2,000	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$2,417
		Cumulative Costs	$61,800

Well Record

TD:	6159		Run in well						
PBTD:	6096		Tubing		Joints		Grade		
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length		
			Tubing Subs				Length		
Perforations	5891' - 6046'		Seating Nipple				Length		
						Top of tbg to KB			
				Bottom of Tubing/Production String Landed at:					
SPF:	1 spf		Rods		Size				
			Rods		Size				
	Pulled from well		Pony subs						
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump						
Packer			Packer Depth						
Rods			Type						
Pump			How set						

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**	**Well Name:**	Roosevelt #1		
Date:	25-Nov-02	**Report #:**	16		
Field:	Basin Dakota/MV SWD	**Location:** 22/30N/14W	**County:**	San Juan	**State:** NM
Contractor:	JC Well Service	**Supervisor:**	Paul Thompson		

Work Summary:

Picked up Halliburton tension set packer and isolated holes from 320' to 2400' (same interval as before). Pressure would fall from 320 psi to 200 psi in 5 min. TOH and laid down packer. TIH open ended to 4936' and tagged cement top. Landed 155 joints in the well (laid down 7 joints). ND BOP and NU wellhead. Laid down the collars. Cleaned out the mud pit and rigged down. Will wait on NMOCD decision to cement in 2-7/8" tubing.

Daily Costs:

Road & Location		Tubulars	
Rig Costs (Adj for pump)	$6,505	Wellhead Equipment	
Equipment Rental (BOP)	$150	Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing	$750	Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$267	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)			
		Total Daily Costs	$7,672
		Cumulative Costs	$69,472

Well Record

TD:	6159		Run in well					
PBTD:	6096		Tubing		Joints		Grade	
Casing Size:	4-1/2", 11.6#		Wt		Thread		Length	
			Tubing Subs				Length	
Perforations	5891' - 6046'		Seating Nipple				Length	
						Top of tbg to KB		
				Bottom of Tubing/Production String Landed at:				
SPF:	1 spf		Rods		Size			
			Rods		Size			
	Pulled from well		Pony subs					
Tubing	187 jts 2-3/8", 4.7#, EUE & SN		Pump					
Packer			Packer Depth					
Rods			Type					
Pump			How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**	**Well Name:**	Roosevelt #1
Date:	26-Nov-02	**Report #:**	17
Field:	Basin Dakota/MV SWD	**Location:**	22/30N/14W
County:	San Juan	**State:**	NM
Contractor:	JC Well Service	**Supervisor:**	Paul Thompson

Work Summary:

Finished cleaning out steel mud pit and rigging down. Moved to the Tiger #5

Daily Costs:

Road & Location		Tubulars	
Rig Costs (Adj for pump)	$1,000	Wellhead Equipment	
Equipment Rental (BOP)		Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing		Tanks	
Cementing		Bailer	
Completion Fluids (City water)		Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision		Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (trucking)	$200		

Total Daily Costs	$1,200
Cumulative Costs	$70,672

Well Record

TD:	6159
PBTD:	6096
Casing Size:	4-1/2", 11.6#
Perforations	5891' - 6046'
SPF:	1 spf
	Pulled from well
Tubing	187 jts 2-3/8", 4.7#, EUE & SN
Packer	
Rods	
Pump	

Run in well					
Tubing		Joints		Grade	
Wt		Thread		Length	
Tubing Subs				Length	
Seating Nipple				Length	
			Top of tbg to KB		
	Bottom of Tubing/Production String Landed at:				
Rods		Size			
Rods		Size			
Pony subs					
Pump					
Packer Depth					
Type					
How set					

WALSH ENGINEERING & PRODUCTION CORPORATION

WORKOVER AND COMPLETION REPORT

Operator:	**Calpine Natural Gas**			**Well Name:**	Roosevelt #1		
Date:	2-Jan-03			**Report #:**	1		
Field:	Basin DakotaMV SWD	**Location:**	22/30N/14W	**County:**	San Juan	**State:**	NM
Contractor:	JC Well Service			**Supervisor:**	Paul Thompson		

Work Summary:

12/31/02. Move on location and rig up JC Well Service. TOH with 155 jts of 2-3/8" tubing. SD for New Years. 1/2/03. Picked up Weatherford cup-type bridge plug and retrievable tension packer on 75 jts of 2-3/8" tubing. Set RBP at approximately 2400' and packer 2395'. Pressure tested to 500# - OK. Released the packer and re-set at 2336'. Pressure dropped from 500# to 200# in 1 min. Moved RBP to 2336' and set the PKR at 2208'. Pressure dropped from 600# to 300# in 5 min. Set BPR at 2208' and PKR at 2080'. Pressure dropped from 500# to 150# in 5 min. Reset RBP at 2080' and PKR at 1952'. Pressure dropped from 570# to 420# in 5 min. Reset RBP at 1952' and PKR at 1824'. Pressure dropped from 520# to 340# in 5 min. ResetRBP at 1824' and PKR at 1696'. Pressure dropped from 500# to 400# in 5 min. Reset RBP at 288' and PKR at 224'. Pressure dropped from 500# to 300# in 2 min. Reset RBP at 224' and PKR at 160'. Pressure dropped from 500# to 400# in 5 min. Holes are over the entire interval from 160' to 2400' and would be very difficult to squeeze. Laid down the RBP and PKR. Start TIH open ended with the tubing until it got dark. Will finish TIH tomorrow and move to the Roosevelt #1.

Daily Costs:

Road & Location		Tubulars	
Rig Costs	$2,500	Wellhead Equipment	
Equipment Rental		Subsurface Equipment	
Logging & Perforating		Artificial Lift Equipment	
Stimulation solvent		Sucker Rods	
Testing	$2,614	Tanks	
Cementing		Bailer	
Completion Fluids (City water)	$640	Flowlines	
Contract Services		Installation/Labor	
Miscellaneous Supplies		Fittings, Valves, Etc..	
Engr. & Supervision	$533	Meters, Lact, Etc..	
Slick line		Electrical Equipment	
Other (csg. head)			
		Total Daily Costs	$6,287
		Cumulative Costs	$76,959

Well Record

TD:	6159
PBTD:	6096
Casing Size:	4-1/2", 11.6#
Perforations	5891' - 6046'
SPF:	1 spf
Pulled from well	
Tubing	155 jts 2-3/8", 4.7#, EUE
Packer	
Rods	
Pump	

Run in well					
Tubing		Joints		Grade	
Wt		Thread		Length	
Tubing Subs				Length	
Seating Nipple				Length	
			Top of tbg to KB		
	Bottom of Tubing/Production String Landed at:				
Rods		Size			
Rods		Size			
Pony subs					
Pump					
Packer Depth					
Type					
How set					

COPY OF EPA GUIDANCE DOCUMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 300
DENVER, COLORADO 80202-2466

SUBJECT: **GROUND WATER SECTION GUIDANCE NO. 36**
Completing, operating, monitoring, and testing wells that have tubing cemented in place.

FROM: Tom Pike, Chief
UIC Direct Implementation Section

TO: All Section Staff
Montana Operations Office

This guidance is for UIC permit, compliance, and enforcement personnel to use when conducting permit, compliance, and enforcement actions on wells that have tubing cemented in place.

STANDARD WELL COMPLETIONS vs. CEMENTED TUBING COMPLETIONS

Injection wells should be designed and operated to prevent fluid from entering any formation other than the designated injection formation. One of EPA's duties is to monitor and test injection wells to make sure that injection occurs only into authorized formations. In a well with a tubing/casing annulus, EPA can (by monitoring and testing the pressures in the annulus) maintain a high degree of assurance that no injected fluid is lost through leaks in the well. For wells where the annulus is filled with cement, EPA loses this simple test to monitor for leaks in the well. Therefore, we need to take special precautions in dealing with wells where the tubing is cemented in place.

Standard Completions

The standard well completion (an annulus between the long-string casing, tubing, and packer) allows for two features that are very important to the safe operation and monitoring of injection wells:

1) **MONITORING** - By comparing the pressure relationship between the tubing and the annulus, an inspector can "look" into an injection well and assess the tubing/packer integrity. The inspector can use this "look" to determine if any injected fluids are lost through leaks in the well (i.e., leaks which may contaminate USDWs). Since the operator usually maintains the annulus at zero (0) psi, any pressure

evident on an annular pressure gauge suggests a potential problem with the well. When the annulus and tubing gauges show similar pressures, a tubing/packer leak may be the cause.

2) **MITs** - The standard well completion allows for a simple mechanical integrity test (MIT). A typical MIT consists of adding pressure to the annulus, and then monitoring that pressure for a certain time period. A drop in pressure indicates a leak in the annulus.

Cemented Tubing Completions

When an operator cements the tubing in the hole, we lose the monitoring and testing features described above. At first glance, it seems that cementing the injection tubing in the casing would provide additional protection against USDW contamination. The opposite is true, however.

We generally think of tubing as a string of pipe that can be run in and out of the hole as conditions and workovers warrant. When we cement the tubing in the hole, the tubing can no longer be retrieved; thereby making it a slim-hole casing string. The well should be considered just that: a slim-hole casing injection well.

Any string that is cemented in place may develop leaks. For example, leaks are common in a casing string that is fully cemented. Also, leaks may develop in a tubing string cemented in the hole. These leaks may allow injected fluid to exit the wellbore and to contaminate USDWs.

Since the annulus is full of cement, an inspector (either the operator or an EPA inspector) is unable to "look" into the well to find a leak by simple surface monitoring.

Also, cementing the tubing inside the casing prevents a straight-forward mechanical integrity test. We must now design an alternate MIT that may be more costly to the operator, which may not provide the same assurance that we would get from a standard annular pressure test.

Besides the limits described above, there may be other serious drawbacks to cementing the tubing string in the hole. With such a small wellbore, any problem with the well becomes much more serious than with a conventional completion. For example, we may not be able to run conventional logging tools for monitoring or testing due to the reduced I.D. of the tubing. Any mechanical problems with the well (i.e., scale buildup, internal corrosion,

buckled pipe, etc.) may prevent proper logging or plugging. Also, workover procedures that require entering the well may cause tools to become stuck or lost. If the stuck or lost tools happen to bridge the hole, the only alternative may be to abandon the well. If we must plug the well, the stuck tools may make it impossible to place cement in the proper interval(s) necessary to prevent flow into and between USDWs. Again, slim-hole completions do pose a greater environmental risk.

Cementing the tubing inside a bad string of casing should not become standard practice. Cementing a tubing string in the hole should be considered only as a last resort necessary to keep a vital well in service.

ADVISING OPERATORS WHO WISH TO CEMENT THE TUBING IN PLACE

To ensure that a well with tubing cemented in place will protect all USDWs, one must carefully plan the well completion, operation and testing program. A well that has tubing cemented in the hole is usually more costly to complete and to test. Therefore, the operator wishing to convert a well by cementing tubing in place must consider many factors before proceeding with the operation. Some of these factors include:

1) Consider the location of USDWs. If the operator cannot run tubing through all USDWs, a MIT may be difficult or impossible to conduct. Make sure that all USDWs are covered by tubing.

2) Consider the P&A plan. How will the recompletion affect the P&A plan? If we cement the tubing inside another casing string, it may be difficult to place a plug outside the casing string during the P&A operation. In this situation, we may want to squeeze cement outside the casing **before** cementing tubing in place. This step should not compromise the integrity of the well since the squeeze perforations will be covered by the cemented tubing.

   Will the operator be able to plug the well properly if there are any obstructions in the tubing? Any stuck tools or wireline may prevent a proper P&A. The operator may be forced to conduct an expensive fishing or milling operation prior to the P&A in order to place cement in the required intervals.

3) Consider the MIT. How will the MIT be conducted once the tubing is cemented in place? What type of tubing will be

run? Operators may wish to reduce corrosion problems by using tubing that has a corrosion resistant internal coating. This type of tubing may require that the operator conduct a very expensive MIT if the completion is not properly designed. Also, check the pressure ratings of different tools to see that they can withstand the pressure test at or above the maximum permitted injection pressure.

The operator must also know that the well will be subject to more frequent MITs. Cost may quickly become a limiting factor for an operator considering to recomplete a well by cementing the tubing in place.

4) Consider the finality of the recompletion. Since there is no way to pull tubing, a simple problem in the well may require that the well be plugged and abandoned.

MIT METHODS FOR WELLS WITH TUBING CEMENTED IN PLACE

If you must conduct a mechanical integrity test on a well where the tubing is cemented in place, you have several options. Each method has pros and cons as explained below.

Seating Nipple

Description:

A seating nipple is a mechanical device which is installed on the tubing string before it is cemented in the hole. The seating nipple is a polished bore receptacle (PBR) that accepts a slickline conveyed tool. With the tool seated, pressure can be applied to assess the integrity of the tubing.

Pros:

Pressure test is a reliable indicator of mechanical integrity of the tubing above the tool.

The tool is widely available.

With the tool seated, the tubing can be pressure tested in much the same way as with a standard MIT.

The cost of running the test is low (1994 prices run from $1300/well for single wells, with multi-well discounts pushing the cost down into the $700/well range).

Low "down-time" required for the MIT (approximately 1 hour).

Cons:

The seating nipple must be made up on the tubing string before the string is cemented in the hole.

The up-front cost is higher since tubing must be pulled, and the seating nipple installed in the lower tubing string before cementing the tubing in the hole.

The tool may not provide a positive seal in wells that have scale problems or that are highly corrosive. Scale or corrosion buildup on the seating nipple may not allow the wireline tool to seat properly.

If scale or trash falls onto the wireline tool after it is set, we may experience problems pulling the tool out of the PBR.

The tool is not drillable; thus, it must be milled if it is stuck.

The pressure test must be conducted at a pressure equal to or greater than the maximum permitted injection pressure.

Coiled-tubing conveyed packer

Description:

For wells that have internally coated tubing, but do not have seating nipples installed, a small-bore inflatable packer may be run and set near the lower end of the tubing. When set, this packer allows us to test the tubing in a manner much the same as with a standard completion.

Pros:

Pressure test is a reliable indicator of mechanical integrity.

The rubber packer elements will not damage a tubing's internal coating when the tool is set.

The tool can be used in rough tubing since the inflatable packer elements will expand to fill voids in the tubing wall.

With the tool seated, the tubing can be pressure tested in

much the same way as with a standard MIT.

Cons:

This method is expensive (1994 prices are roughly $7,000 - $10,000/well), and tools is not widely available.

Down-time runs about 6 hours per well.

The pressure test must be conducted at a pressure equal to or greater than the maximum permitted injection pressure.

Slick-line conveyed plug

Description:

This method is intended for wells that do not have seating nipples installed. The tool is run in (and out) in two separate runs. The first run sets either a collar stop (set in the tubing collars), or a slip stop (sets in the middle of a joint). After the stop is run and set, the test tool is run in and is set on top of the stop. The test tool seats against the tubing wall and provides the seal. The tubing can then be pressure tested.

Pros:

Pressure test is a reliable indicator of mechanical integrity.

The tool is widely available.

The tool may be used where no seating nipple was installed.

Low cost (1994 prices approximately $800/well).

Low down-time (approximately 2 hours/well since tool must be run-in (and retrieved) with two separate runs).

Cons:

May not provide a seal on rough-walled or pitted tubing.

Cannot be used with internally coated tubing since the tool mechanically engages the tubing wall.

The pressure test must be conducted at a pressure equal to or greater than the maximum permitted injection pressure.

Radioactive Tracer Survey (RTS)

Description:

There are several methods (drag, velocity shot, and slug area) for using tracer logs. However, only the drag method has been approved for use in determining Part I (internal) mechanical integrity.

The drag method involves injecting successive "slugs" of tracer material into the wellbore, and following these slugs down-hole with the detector. As the tool follows a tracer slug down-hole, it detects any tracer material that has passed through a hole in the tubing. This indicates a mechanical integrity failure.

Pros:

The tracer logging tools are usually widely available.

Cons:

The drag method may be unreliable for determining Part I (internal) mechanical integrity.

The limited depth of investigation may limit the detection of leaks (90% of the gammas registered by the tracer tool originates from within a foot of the detector).

The survey must be run at the highest permitted injection pressure so as to detect leaks that would occur while the well is operating. Consequently, the survey may not be applicable for wells with small-bore tubing since fluid velocity may be too fast to track.

Tracer material that may "hang up" at the collars between tubing joints suggests a leak, and may require the operator to run another type of MIT.

May not be reliable in wells where the tracer material may "hang-up" in pits or scale on the tubing wall.
A specific tracer survey must be designed for each well since tubing size(s) and the corresponding fluid velocity (at maximum permitted pressure) dictates how we conduct the test.

Temperature Survey

Description:

The temperature survey when used properly may be used to determine if any injected fluids are exiting the tubing above the approved injection interval. Several log passes are required to detect leaks in tubing - one pass while the well is injecting, and several passes made with the well shut in. For specific procedures, refer to Section Guidance #38 - "Using temperature surveys to determine Mechanical Integrity (MI) for a Class II injection well."

Pros:

Temperature tools are widely available.

Temperature tools are available in sizes applicable for most tubing strings.

Resolution is adequate to detect leaks in the tubing.

Cons:

The well must be shut-in to run the complete set of log passes. This down-time may be considerable, and may be impractical for some operators.

Interpretation is often made more difficult since many factors can affect the logging results.

The survey must be run at the highest permitted injection pressure so as to detect leaks that would occur while the well is operating.

CHOOSING A TEST METHOD

Since injection wells are completed in many different ways, you must choose a test that fits the well's completion. If one of these tests described above will not fully demonstrate the integrity of the tubing, a combination of two or more tests may be necessary. In addition, one of the tests listed above may be used with another test - one that may not be listed above - to prove the integrity of the tubulars through the USDWs.

CONDUCTING MECHANICAL INTEGRITY TESTS

Frequency of Testing

For wells that have tubing cemented in place, the operator needs to conduct MITs more often than for a well with a standard completion. More frequent testing is required since the well's completion makes it impossible to assess

mechanical integrity during a surface inspection. Unless it is tested more frequently, a well with a cemented tubing completion could operate up to 5 years with a hole in the tubing - a hole that could allow contamination of USDWs.

The frequency of conducting mechanical tests is based on the location of USDWs containing less than 3000 mg/l TDS. If all USDWs containing water with TDS ≤ 3000 mg/l occur behind cemented surface casing, then the well may operate for up to two years between MITs. If any USDW containing water with ≤ 3000 mg/l TDS occurs below the surface casing, the well must be tested once per year.

Test Pressure

Wells that have tubing cemented in the hole must be tested at a pressure equal to or greater than the maximum permitted injection pressure. This is required so that EPA can assess the condition of the tubing under operating conditions.

FCD:December 29, 1994:RCT/RCT/K:\GUIDANCE.36

COPY OF BLM SUNDRY

FORM 3160-5
(June 1990)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reenter a different reservoir.
Use "APPLICATION FOR PERMIT -" for such proposals

SUBMIT IN TRIPLICATE

5. Lease Designation and Serial No.
NM 20314

6. If Indian, Allottee or Tribe Name

7. If Unit or CA, Agreement Designation

1. Type of Well
Oil Well [ ] Gas Well [x] Other [ ]

8. Well Name and No.
Roosevelt #1

9. API Well No.
30-045-26458

2. Name of Operator
Calpine Natural Gas

10. Field and Pool, or Exploratory Area

3. Address and Telephone No.
1200 17th Street, Suite 770, Denver, CO 80202 720-359-9144

11. County or Parish, State
San Juan County, New Mexico

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
1850' FSL & 790' FEL Sec. 22-T30N-14W

12. **CHECK APPROPRIATE BOX(es) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA**

TYPE OF SUBMISSION	TYPE OF ACTION	
[x] Notice of Intent	[ ] Abandonment	[ ] Change of Plans
[ ] Subsequent Report	[ ] Recompletion	[ ] New Construction
[ ] Final Abandonment Notice	[ ] Plugging Back	[ ] Non-Routine Fracturing
	[ ] Casing Repair	[ ] Water Shut-Off
	[ ] Altering Casing	[x] Conversion to Injection
	[ ] Other _____	[ ] Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state pertinent details, and give pertinent dates including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Calpine is proposing to cement the tubing in place and revise the testing procedure.
Proposed procedure and testing schedule is attached.

14. I hereby certify that the foregoing is true and correct
Signed Hugo Cartaya Hugo Cartaya Title Production Manager Date 01/27/03

(This space for Federal or State office use)
Approved by _____ Title _____ Date _____
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States andy false, ficticous or fraudulent statements or representations as to any mater within its jurisdiction.

***See Instructions on Reverse Side**

COPY OF STATE SUNDRY

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised March 25, 1999

WELL API NO.
30-045-26458

5. Indicate Type of Lease
STATE ☐ FEE ☐

6. State Oil & Gas Lease No.
NM-20314

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name:
Roosevelt #1

1. Type of Well:
Oil Well ☐ Gas Well ☒ Other

2. Name of Operator
Calpine Natural Gas

8. Well No.
#1

3. Address of Operator
1200 17th Street, Ste 770, Denver, Colorado 80202

9. Pool name or Wildcat

4. Well Location

Unit Letter **I** : **1850** feet from the **South** line and **790** feet from the **East** line

Section **22** Township **30N** Range **14W** NMPM County **San Juan**

10. Elevation *(Show whether DR, RKB, RT, GR, etc.)*
5661 KB; 5647 GL

11. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
PERFORM REMEDIAL WORK	☐	PLUG AND ABANDON	☐	REMEDIAL WORK	☐	ALTERING CASING	☐
TEMPORARILY ABANDON	☐	CHANGE PLANS	☒	COMMENCE DRILLING OPNS.	☐	PLUG AND ABANDONMENT	☐
PULL OR ALTER CASING	☐	MULTIPLE COMPLETION	☐	CASING TEST AND CEMENT JOB	☐		
OTHER:			☐	OTHER:			☐

12. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompilation.

Calpine is proposing to cement the tubing in place and revise the testing procedure.
Proposed procdure and testing schedule is attached.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Hugo Cartaya TITLE **Production Manager** DATE **1/27/03**

Type or print name **Hugo Cartaya** Telephone No. **720-946-1302**

(This space for State use)

APPPROVED BY _____ TITLE _____ DATE _____

Conditions of approval, if any:

CALPINE

CALPINE NATURAL GAS COMPANY
TABOR CENTER
1200 17th STREET, SUITE 770
DENVER, COLORADO 80202
720.359.9144
720.359.9140 FAX

January 27, 2003

New Mexico Oil Conservation Division
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Attention: Mr. David Catnach

Dear Catnach,

Calpine is proposing to cement the tubing inside the casing in our attempt to convert the Roosevelt #1 to an SWD well. We have had several discussions with the Aztec office regarding this matter. I spoke with Lori Wrotenberry and she recommended that I put the proposal in writing to the Aztec office and that I copy you on this correspondence to provide guidance.

Enclosed please find a copy of a letter sent to New Mexico OCD, a copy of the state sundry notice, a copy of an EPA guidance document, a copy of the recompletion reports as well as a copy of the BLM sundry notice for the proposed action. Please do not hesitate to call if you have any questions. Any comments or suggestions would be appreciated.

Sincerely,

Hugo Cartaya

Hugo Cartaya
Rocky Mountain Production Manager

SWD-823

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

February 11, 2003

Certified Receipt #7001 1140 0000 4018 5745

Mr. Hugo Cartaya
Calpine Natural Gas Company
1200 17TH ST STE 770
Denver CO 80202

Re: Roosevelt #1, API# 30-045-26458

Dear Mr. Cartaya:

Our office does not approve your proposal to cement 2-7/8" tubing in the referenced well and converting it to injection without tubing and packer. We have been informed that the BLM concurs with this decision.

I will address each of your points.

1. Although the EPA may approve of such a configuration, the scope of the NMOCD's responsibility is broader than only protecting water. The EPA could conceivably approve an operation that protects water but allows migration of fluids from one zone to another even to the point of causing underground waste.

2. Although there are no designated fresh water aquifers there are still zones, including the productive Pictured Cliffs and Fruitland Coal, susceptible to the migration of fluids behind the pipe.

3. Actually, the standard configuration with the required leak detection system provides a continuous test of the integrity of the injection string that is monitored with every visit to the well. To reduce this to only twice a year is unacceptable. Secondly, the tests required by 704 test not only the primary protection offered by the injection string but also the important secondary containment provided by the casing. This would be totally absent in your proposed configuration.

4. The argument that only Calpine's interests would be affected by a failure is specious. The logical extension would be to allow a failure to continue because Calpine gains more benefit from injecting than is lost by the watering out of an otherwise productive zone.

From the information you supplied, this well is in violation of Rule 19.15.3.108. and our records indicate that it is also in violation of 19.15.4.201 as it has not produced since August of 2000.

Sincerely,

Frank T. Chavez
District Supervisor
ftchavez@state.nm.us

FTC/mk

Cc David Catanach
Jim Lovato, BLM, Farmington