

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
**GEOHERMAL SUNDRY NOTICE**

FORM APPROVED  
OMB NO. 1004-0132  
Expires: September 30, 1993

The Bureau of Land Management (BLM) requests this form or other BLM-approved forms to be prepared and filed in **triplicate** with requisite attachments with the authorized officer. The authorized officer must approve this permit prior to any lease operations.

6. Lease Serial No. OR- 45505	
7. Surface Manager: <input type="checkbox"/> BLM <input checked="" type="checkbox"/> FS <input type="checkbox"/> Other	
8. Unit Agreement Name Deschutes	
9. Well No. 86-21	10. Permit No.
11. Field or Area Newberry KGRA	
12. Sec., T., R., B. & M. Sec 21, T21S, R12E	
13. County Deschutes	
14. State Oregon	

1a. Well Type:  Production  Injection  Heat Exchange  Observation  Other

1b. Well Status: Shut-in

2. Name of Lessee/Operator  
CE Exploration / CalEnergy Co., Inc.

3. Address of Lessee/Operator  
950 W. Lindsey Road, Calipatria, CA 92233

4. Location of Well or Facility  
At surface: Approx. 1000' N & 200" W of SE corner Sec 21, T21S, R12E  
at TD: From surface location vs 2137.8 S 668.23 E 2034.1

5. Type of Work

<input type="checkbox"/> Change Plans	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Pull or Alter Casing
<input type="checkbox"/> Site and Road Construction	<input type="checkbox"/> Fracture Test	<input type="checkbox"/> Multiple Complete
<input type="checkbox"/> Construct New Production Facilities	<input type="checkbox"/> Shoot or Acidize	<input checked="" type="checkbox"/> Abandon
<input type="checkbox"/> Alter Existing Production Facilities	<input type="checkbox"/> Repair Well	<input type="checkbox"/> Other

15. Describe Proposed Operations (Use this space for well activities only. See instructions for current well conditions on reverse)  
See attachments 1 - 4 for current well condition  
1) Well completion, 2) Directional survey, 3) Well profile, 4) Location map

See attachments 5 and 6 for proposed abandonment of Well 86-21

16. Describe Proposed Operations (Use this space for all activities other than well work)

17. I hereby certify that the foregoing is true and correct  
Signed [Signature] Title Resource Manager Date 08/27/99  
(This space for Federal use)

Approved by [Signature] Title Geologist Date 9/29/99  
Conditions of Approval, if any:

**ATTACHED. 9/99 STIPS. AND DOWNHOLE CONDITIONS OF APPROVAL**

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 any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on reverse)

## DOWNHOLE CONDITIONS OF APPROVAL FOR WELL 86-21

### CE EXPLORATION NEWBERRY VOLCANO GEOTHERMAL PROJECT DESCHUTES COUNTY, OREGON

Unless otherwise approved by the State geologist or his designated representative:

1. DOGAMI shall be notified at least 24-hours prior to start up of the plugging operations. Contacts are indicated on the attached September 1999 Stipulations.
2. Prior to plugging, blowout prevention equipment shall be installed and tested with clear water to 1,000 psig. BOPE shall consist of a blind ram and pipe ram capable of sealing around the coiled tubing.
3. Prior to starting plugging, at least 1,000 bbls of water shall be kept on site, connected to the wellhead in such a way that it can immediately be pumped down the well in an emergency. This condition will not be required once plug #2 has been successfully set and there is no longer any wellhead pressure.
4. All cement used in plugging will be API Class "G" with 40% silica flour. (Note: ASTM Type II Cement will not be accepted).
5. Plug #1 will be considered successful only after tagging the top (full weight of coiled tubing or 10,000 lbs, whichever is less) and the top is found to be above 4,780'.
6. The design interval for plug #2 shall be 3,890' to 4,250'.
7. Plug #2 will be considered successful only after tagging the top (with the full weight of the coiled tubing or 10,000 lbs, whichever is less) and the top is found to be above 3,940'.
8. The design interval for plug #3 shall be 1,660' to 1,860'.
9. During the setting of plug #3, the amount of mud displaced shall be monitored and compared to the amount of cement pumped, and the fall back shall be monitored for at least one hour. If either of these measurements exceeds 50 linear feet:
  - a) Plug shall be tagged; and
  - b) Plug #3 will be considered successful only after tagging the top (with the full weight of the coiled tubing or 10,000 lbs, whichever is less) and the top is found above 1,710'.
10. Within 30 days of plugging, a report detailing the plugging operation will be submitted to:

Dan Wermiel  
Department of Geology and Mineral Industries  
800 NE Oregon Street  
Suite 965  
Portland, OR 97232

OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

STIPULATIONS WHICH APPLY TO GEOTHERMAL DRILLING PERMITS  
(SEPTEMBER 1999 STIPULATIONS)

1. The operator of a geothermal well must keep a daily record of work, collect drill samples, and maintain a log of rock formations penetrated.
2. If redrilling, deepening, altering of casing, testing or plugging is planned, written notice must be given to the Department on an approved form. Verbal approval or disapproval can be given, but work approved this way must still be submitted in writing by the operator.
3. A well summary, well history, representative drill samples and copies of borehole surveys must be submitted to the Department within 60 days after completion, abandonment, or suspension. These records will be kept confidential for a four year period from the date of completion, abandonment or suspension. The operator may request from the Department an extension of the confidentiality period.
4. In the event of an emergency or blow-out, a Department representative should be contacted as soon as possible:

Dennis Olmstead	Petroleum Engineer/ Acting Deputy State Geologist	(503) 731-4100 x228 (office) (503) 231-3835 (home)
Dan Wermiel	Petroleum Geologist	(503) 731-4100 x227 (office) (503) 646-8517 (home)
John Beaulieu	State Geologist	(503) 731-4100 x 319 (office) (503) 234-6323 (home)
5. Permission must be obtained from the Department of Environmental Quality (DEQ) for disposal of drilling mud or wastes. DEQ should be contacted in the event of any emergency that could affect adjoining properties.
6. No fluid shall be discharged unless a permit has been issued by DEQ.
7. Notice shall be given to the State Geologist or designated representative:
  - a. Prior to construction of drill site and sump.
  - b. Prior to BOP tests after running casing strings.
  - c. Prior to performing work to complete or abandon a well.
  - d. Prior to pulling casing strings.
  - e. Prior to deviating a well from vertical.
  - f. In the event of fire, spill of fluids, or serious accident.
8. Unless the surface owner wants the drilling pad to be left, the site is to be restored to as near original condition as practical, including revegetation with a native species.
9. This permit does not include land-use approval. A separate approval should be obtained from the county or city in which the drilling takes place.
10. The State Geologist or his representative may enter the site at any time to make inspections and/or witness work done.
11. Release of the bond will be granted following proper plugging of the hole, restoration of the drillsite, and filing of the required records.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB NO. 1004-0132  
Expires: September 30, 1990

**GEOHERMAL WELL COMPLETION REPORT**

The Bureau of Land Management (BLM) requires this form or other BLM-approved forms to be prepared and filed in duplicate with requisite attachments with the authorized officer within 30 days after completion of permitted operations.

- 1a. Well Type:  Production  Injection  Disposal  Water Supply  Observation  
 Cold  Heat Exchange  Other
- 1b. Completion:  New  Workover  Deepened  Plugback  Redrill  
 Recompleted  Drilled & Abandoned  Other

2. Name of Lessee/Operator  
C E EXPLORATION

3. Address of Lessee/Operator  
34 N W First Ave., Suite 302, Portland, Oregon 97209

18. Location of Well  
At Surface: App 1000' N & 200' W of SE corner Sec 21, T21S, R12E  
At Top of Production Zone:  
At Total Depth: From surface location V.S. 2137.80 S 668.23 E 2034.1

19. Total Depth  
Measured 9200' True Vertical: 8819.77'

20. Plugback Total Depth  
Measured: True Vertical:

21. Elevation:  Estimated  Final 6260'  
Reference Datum:  GR  MAT  DF  KB  RT  Casinghead Flange  Other

22. Drilling Media:  Air  Water  Mud  Foam  Other  
List Characteristics:  
Mud drill from surface to 9200'

23. Log Type & Intervals Ran Schlumberger FMS-Temp & G R Logs from 9198' to 4196'  
Ran Schlumberger DIL-LTD-CNL & G R Logs from 4196' to 8900'. Ran Dialog Calliper 0'-4199'

4. Lease Serial No.  
OR-45505
5. Surface Manager:  BLM  F  
 Other
6. Unit Agreement Name  
Deschutes
7. Well No.  
86-21
8. Permit No.  
GDP050-95-
9. Field or Area  
Newberry KGRA
10. Sec., T., R., B. & M.  
Sec 21, T21S, R12E
11. County  
Deschutes
12. State  
Oregon
13. Spud Date Date T.D. Rea.  
8-29-95 10-28-95
14. Completion Date (Ready to prod.)  
11-11-95
15. Directionally Drilled Intervals  
1022' to 9200'
16. Surveyed Intervals  
30' to 90'
17. Core Size and Intervals

**24. CASING RECORD**

Size	Weight	Grade	Collars & Threads	Depths Set		Hole Size	Cementing Recor (slurry volume)
				Top	Shoe		
30"	118.65#		welded	surface	80	36"	260 d/f slu
20"	94#	K-55	buttress	surface	905	26"	2506 c/f
13 3/8"	72#	L-80 - K-55	buttress	surface	4199	17 1/2"	5539 c/f

**25. LINER RECORD**

Size	Weight	Grade	Collars & Threads	Top	Bottom	Perforated Intervals	Cementing Recor (slurry volume)
9 5/8"	40#	K-55	buttress	3987	9185	1/2" - 5701' to 9185'	none

**26. TUBING RECORD**

Size	Weight	Grade	Depth Set	Packer Depth

27. Cement Squeeze, Acid, Fracture, etc. (detail type, amounts, intervals)

**28. PERFORATION RECORD**

Type	Total No.	Density (No./ft)	Size	Intervals

29. Attachments & Previous Submittals: List all reports, surveys, tests and logs, not listed in item 23, which have resulted from drilling and completion operations List relevant previously furnished data with date of submittal referenced.

See Attachment

30. Well Status:  Producing  Shut-In  Suspended  Injection  Disposal  Heat Exchange  Abandoned  Water Supply  Other

31. Do you consider the well to be commercial?  Yes  No Explain:

Well has not been tested commercial

32. I hereby certify the information on this report and the attached information is complete and accurate according to the best of my knowledge.  
Signed: Lester Brasfield Title Drilling Superintendent Date 5/20/96

# Directional Survey Report

CalEnergy Company

Well ID: 86-21Y551040

Well Name: NEWBERRY 86-21

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Plane of Vertical Section: 105 degrees

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Vertical Section	Dog Leg Severity
					N-S	E-W		
MSS	6406.00	20.00	105.00	6250.50	S 349.26	E 1116.05	1168.42	0.44
MSS	6532.00	19.75	105.00	6369.00	S 360.35	E 1157.43	1211.25	0.20
MSS	6655.00	18.75	106.00	6485.12	S 371.18	E 1196.50	1251.80	0.86
MSS	6776.00	19.50	104.00	6599.44	S 381.42	E 1234.79	1291.44	0.82
MSS	6901.00	20.00	105.00	6717.09	S 392.00	E 1275.69	1333.68	0.48
MSS	7025.00	21.00	109.00	6833.24	S 404.73	E 1317.18	1377.05	1.39
MSS	7144.00	21.00	110.00	6944.34	S 418.96	E 1357.38	1419.56	0.30
MSS	7269.00	22.00	112.00	7060.64	S 435.39	E 1400.14	1465.11	0.99
MSS	7393.00	21.50	105.00	7175.83	S 449.98	E 1443.63	1510.90	2.13
MSS	7517.00	20.00	113.00	7291.81	S 464.15	E 1485.11	1554.63	2.58
MSS	7679.00	20.50	110.00	7443.80	S 484.67	E 1537.26	1610.33	0.71
MSS	7805.00	21.00	106.00	7561.63	S 498.44	E 1579.70	1654.88	1.19
MSS	7929.00	20.00	107.00	7677.78	S 510.77	E 1621.34	1698.29	0.85
MSS	8053.00	21.00	118.00	7793.97	S 527.41	E 1661.25	1741.15	3.20
MSS	8177.00	21.75	115.00	7909.44	S 547.55	E 1701.69	1785.43	1.07
MSS	8303.00	22.00	110.00	8026.38	S 565.49	E 1745.03	1831.93	1.49
MSS	8428.00	22.50	115.00	8142.08	S 583.61	E 1788.72	1878.81	1.57
MSS	8558.00	22.00	105.00	8262.45	S 600.43	E 1834.80	1927.68	2.93
MSS	8685.00	22.00	107.00	8380.20	S 613.54	E 1880.52	1975.24	0.59
MSS	8811.00	22.00	110.00	8497.03	S 628.51	E 1925.27	2022.34	0.89
MSS	8937.00	20.00	109.00	8614.65	S 643.60	E 1967.82	2067.35	1.61
MSS	9054.00	19.00	110.00	8724.94	S 656.63	E 2004.64	2106.28	0.90
MSS	9154.00	18.00	113.00	8819.77	S 668.23	E 2034.16	2137.80	1.38

Calculations using Minimum Curvature Method

Printed: 12:27 21-May-96

End of Report

# Directional Survey Report

CalEnergy Company

Well ID: 86-21Y551040

Well Name: NEWBERRY 86-21

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Plane of Vertical Section: 105 degrees

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Vertical Section	Dog Leg Severity
					N-S	E-W		
MSS	2739.00	11.00	112.00	2713.46	S 77.57	E 235.23	247.29	0.43
MSS	2862.00	10.75	112.00	2834.25	S 86.26	E 256.75	270.32	0.20
MSS	2986.00	11.25	113.00	2955.97	S 95.32	E 278.60	293.78	0.43
MSS	3108.00	11.00	115.00	3075.68	S 104.89	E 300.11	317.03	0.38
MSS	3232.00	11.00	112.00	3197.40	S 114.32	E 321.80	340.42	0.46
MSS	3356.00	11.00	113.00	3319.12	S 123.38	E 343.65	363.88	0.15
MSS	3480.00	10.50	115.00	3440.94	S 132.77	E 364.78	386.72	0.50
MSS	3605.00	10.00	117.00	3563.95	S 142.52	E 384.78	408.55	0.49
MSS	3728.00	10.25	117.00	3685.03	S 152.33	E 404.04	429.70	0.20
MSS	3850.00	10.00	118.00	3805.13	S 162.23	E 423.07	450.64	0.25
MSS	3974.00	10.00	117.00	3927.25	S 172.17	E 442.17	471.66	0.14
MSS	4099.00	9.75	117.00	4050.40	S 181.91	E 461.27	492.63	0.20
MSS	4185.00	9.50	119.00	4135.19	S 188.65	E 473.96	506.64	0.49
MSS	4293.00	9.50	120.00	4241.71	S 197.43	E 489.48	523.90	0.15
MSS	4341.00	10.25	116.00	4288.99	S 201.28	E 496.75	531.92	2.12
MSS	4372.00	10.50	113.00	4319.49	S 203.60	E 501.82	537.42	1.92
MSS	4405.00	10.75	110.00	4351.92	S 205.82	E 507.48	543.46	1.84
MSS	4438.00	11.00	108.00	4384.33	S 207.85	E 513.37	549.67	1.37
MSS	4542.00	12.75	104.00	4486.10	S 213.69	E 533.94	571.06	1.86
MSS	4635.00	13.75	103.00	4576.63	S 218.66	E 554.67	592.37	1.10
MSS	4728.00	15.25	104.00	4666.66	S 224.11	E 577.31	615.64	1.64
MSS	4819.00	16.50	104.00	4754.19	S 230.13	E 601.46	640.53	1.37
MSS	4911.00	18.75	104.00	4841.86	S 236.87	E 628.49	668.38	2.45
MSS	5041.00	19.50	102.00	4964.69	S 246.43	E 669.99	710.94	0.77
MSS	5167.00	20.50	104.00	5083.09	S 256.14	E 711.97	754.00	0.96
MSS	5290.00	20.50	102.00	5198.30	S 265.83	E 753.93	797.04	0.57
MSS	5414.00	18.75	105.00	5315.10	S 275.51	E 794.42	838.66	1.63
MSS	5501.00	19.50	102.00	5397.30	S 282.14	E 822.13	867.15	1.42
MSS	5630.00	19.50	106.00	5518.90	S 292.56	E 863.89	910.18	1.03
MSS	5755.00	19.00	101.00	5636.92	S 302.19	E 903.93	951.34	1.38
MSS	5878.00	19.25	97.00	5753.14	S 308.48	E 943.71	991.39	1.08
MSS	6002.00	19.00	104.00	5870.31	S 315.86	E 983.59	1031.82	1.86
MSS	6128.00	19.75	105.00	5989.17	S 326.33	E 1024.05	1073.62	0.65
MSS	6252.00	20.00	103.00	6105.79	S 336.52	E 1064.95	1115.76	0.58

# Directional Survey Report

CalEnergy Company

Well ID: 86-21Y551040

Well Name: NEWBERRY 86-21

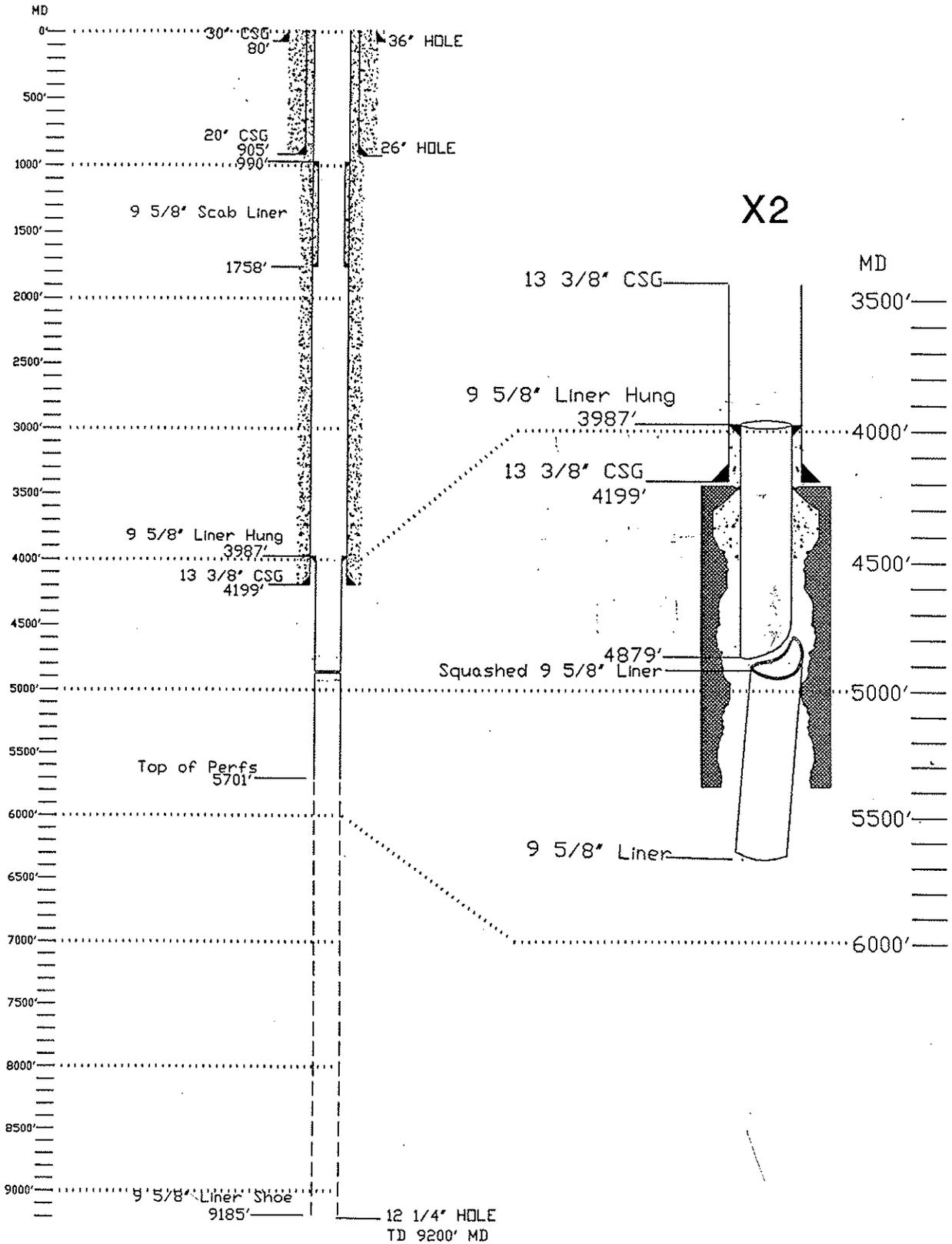
Page 1

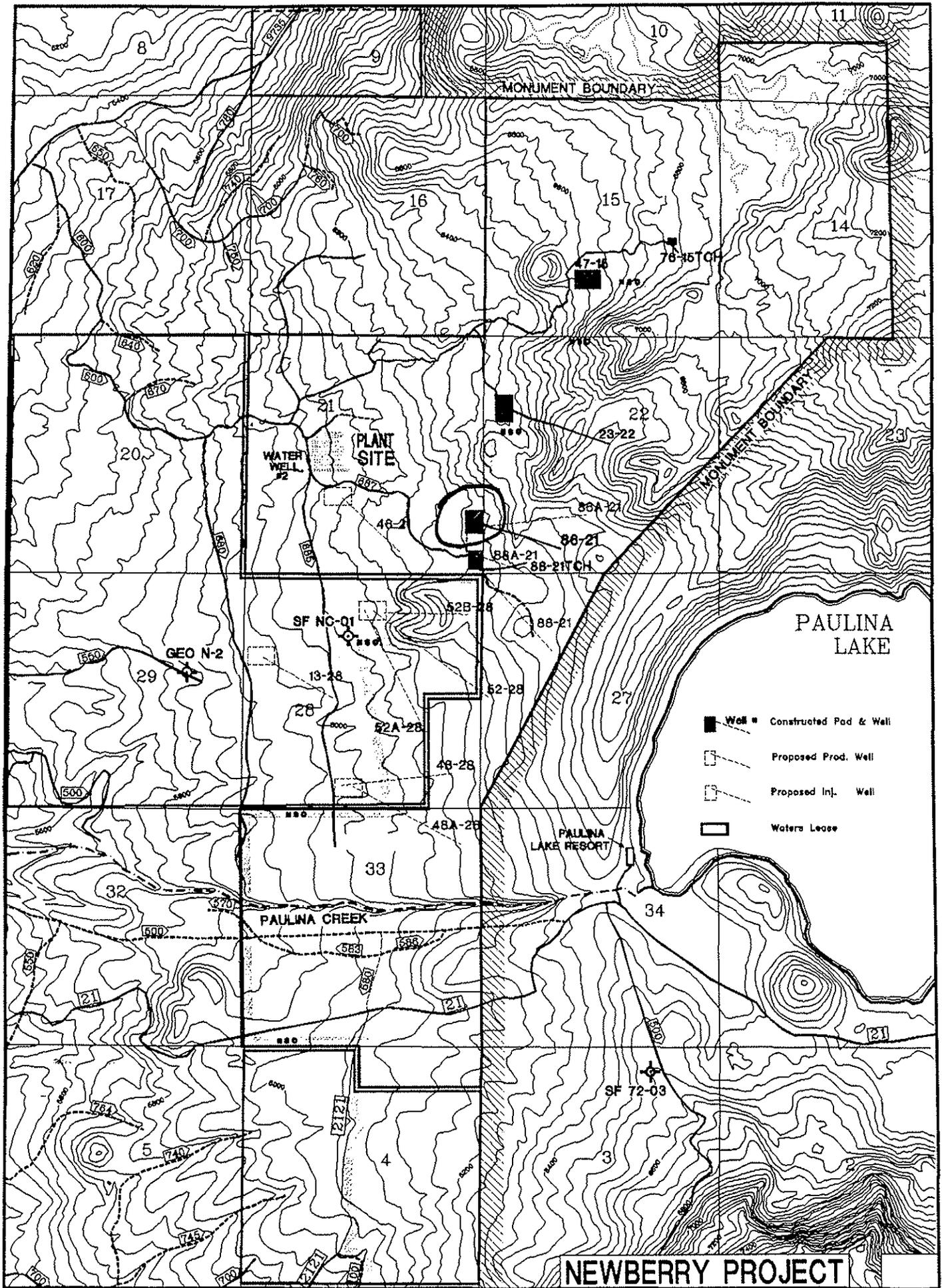
Plane of Vertical Section: 105 degrees

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Coordinates		Vertical Section	Dog Leg Severity
					N-S	E-W		
** Tieln	0.00	0.00	0.00	0.00			0.00	
MSS	218.00	0.25	111.00	214.38	S 13.43	E 31.69	34.08	8.49
MSS	510.00	0.75	211.00	506.37	S 15.30	E 31.30	34.19	0.28
MSS	707.00	2.50	322.00	703.31	S 13.02	E 27.99	30.40	1.45
MSS	902.00	3.25	291.00	898.08	S 7.68	E 20.21	21.51	0.87
MSS	997.00	2.25	284.00	992.97	S 6.27	E 15.88	16.96	1.11
MSS	1078.00	2.75	287.00	1073.89	S 5.32	E 12.48	13.43	0.64
MSS	1110.00	2.50	287.00	1105.86	S 4.89	E 11.08	11.97	0.78
MSS	1141.00	1.75	290.00	1136.84	S 4.53	E 9.99	10.82	2.44
MSS	1171.00	1.00	298.00	1166.83	S 4.25	E 9.33	10.11	2.57
MSS	1203.00	0.75	357.00	1198.82	S 3.91	E 9.07	9.77	2.78
MSS	1232.00	1.00	40.00	1227.82	S 3.52	E 9.22	9.82	2.35
MSS	1262.00	1.00	60.00	1257.82	S 3.19	E 9.62	10.12	1.16
MSS	1294.00	1.25	110.00	1289.81	S 3.17	E 10.19	10.66	3.05
MSS	1325.00	2.00	120.00	1320.80	S 3.56	E 10.97	11.52	2.58
MSS	1356.00	2.75	123.00	1351.77	S 4.23	E 12.07	12.75	2.45
MSS	1387.00	3.50	127.00	1382.72	S 5.21	E 13.44	14.34	2.52
MSS	1417.00	4.50	127.00	1412.65	S 6.47	E 15.12	16.28	3.33
MSS	1447.00	5.00	124.00	1442.55	S 7.91	E 17.14	18.60	1.86
MSS	1479.00	5.75	119.00	1474.41	S 9.46	E 19.70	21.48	2.76
MSS	1509.00	6.50	117.00	1504.24	S 10.96	E 22.53	24.60	2.60
MSS	1541.00	6.75	108.00	1536.02	S 12.37	E 25.93	28.25	3.33
MSS	1604.00	8.00	101.00	1598.50	S 14.35	E 33.75	36.32	2.44
MSS	1635.00	8.75	100.00	1629.17	S 15.17	E 38.19	40.82	2.46
MSS	1719.00	9.50	107.00	1712.11	S 18.31	E 51.11	54.11	1.59
MSS	1781.00	9.75	101.00	1773.24	S 20.80	E 61.16	64.46	1.67
MSS	1874.00	9.25	102.00	1864.96	S 23.86	E 76.20	79.78	0.57
MSS	1925.00	10.00	105.00	1915.24	S 25.86	E 84.49	88.30	1.77
MSS	1986.00	11.25	104.00	1975.20	S 28.67	E 95.38	99.55	2.07
MSS	2121.00	11.75	107.00	2107.49	S 35.87	E 121.30	126.45	0.58
MSS	2241.00	11.25	109.00	2225.08	S 43.26	E 144.05	150.34	0.53
MSS	2369.00	11.50	111.00	2350.57	S 51.89	E 167.77	175.49	0.36
MSS	2493.00	11.00	110.00	2472.18	S 60.37	E 190.43	199.57	0.43
MSS	2615.00	11.50	111.00	2591.84	S 68.71	E 212.72	223.26	0.44

# NEWBERRY 86-21

SPUD 8/29/85  
COMPLETION 11/11/85  
MD 9200', TVD 8867', SSD -2597'





**Newberry Crater  
Abandonment Procedure  
Well 86-21**

- 1) Mobilize coil tubing unit and cement pumping units.
- 2) Obtain any required gas samples while bleeding off wellhead pressure. Ample Scott air packs should be present during bleedoff in case of toxic gasses.
- 3) RIH circulate water while recording surface temperatures.
- 4) Plug #1 pump 200 lin. Ft (100% excess) of 15.8# cement with 40% silica from 4929' to 4729'. POOH and wait on cement.
- 5) RIH and tag cement plug#1, if plug is not present repeat step 4.
- 6) POOH with tubing to 4250' while displacing with drilling mud made of 9.0 #/gal and 36 Viscosity.
- 7) Plug #2 pump 200 lin. Ft (100% excess) of 15.8# cement with 40% silica from 4250' to 3940'. POOH and wait on cement.
- 8) RIH and tag cement plug#2, if plug is not present repeat step 7.
- 6) Pull tubing to 1808' while displacing with drilling mud made of 9.0 # and 36 Viscosity.
- 7) Plug #3 pump 100 lin. Ft of 15.8 # cement with 40 % silica from 1808' to 1708'.
- 8) Pull tubing to 1040' while displacing with drilling mud made of 9.0 # and 36 Viscosity.
- 9) Plug #4 pump 1040 lin. Ft of 15.8 # cement with 40 % silica.
- 10) Top off cement from surface.
- 11) Cut off all casings 4' below ground level. Weld plate on 13 3/8" casing inscribed with well name, number and date. Fill in hole to ground level.
- 12) Clean up pad. Release equipment.

**Note \*** All operations and/or plugs are to be witnessed and approved by the BLM representative.