

GTLT - _____19_____

**Village of Jemez Springs
26-18N-2E
Sandoval County**

Well No. 1



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
ENERGY RESOURCE AND DEVELOPMENT DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2770
113 WASHINGTON AVENUE
SANTA FE, NEW MEXICO 87501
(505) 827-2471

February 24, 1981

MEMORANDUM

TO: Larry Kehoe
THROUGH: Pat Rodriguez
FROM: George Scudella *JS*
SUBJECT: Jemez Springs Well-Site Inspection

On February 18th I was informed that the Village of Jemez Springs geothermal well was leaking. That afternoon Dr. Daw, Roy Cunniff and I drove to the Village and made an initial inspection and I am submitting the following information.

1. There is geothermal water coming up to the surface at a rate estimated to be .3 - .5 gallons per minute. It is difficult to estimate whether the water is coming up from inside the casing or from outside.
2. The visual impacts were not pleasing, but could be mitigated by digging a small trench to the river valley (about 10 meters away) and the city clerk said that a trench would be dug as soon as possible.
3. The extent of the damage, whether the well can be repaired and if it can be repaired, at what cost, will not be known until an experienced well driller gives us a report. NMSU is contacting Mr. Gibson who worked on the well two years ago.
4. The apparent cause of the leak was an automobile hitting the wellhead. Patrolman J.M. Gill of the Village of Jemez Springs said there were numerous cars parked by the well on the Saturday and Sunday prior to the leak. There were several clear sets of tire tracks leading to the drill pad.

We met with City Clerk Maestas, Councilman Montoya and Officer Gill and gathered the following information.

1. This fall a car drove over the drill pad and got hung-up upon the well-head. The car sat on top of the wellhead for 90 days and was then towed away by the city. Gill and Maestas both said they have seen cars hit the wellhead.

MEMO

Feb. 24, 1981

Page two

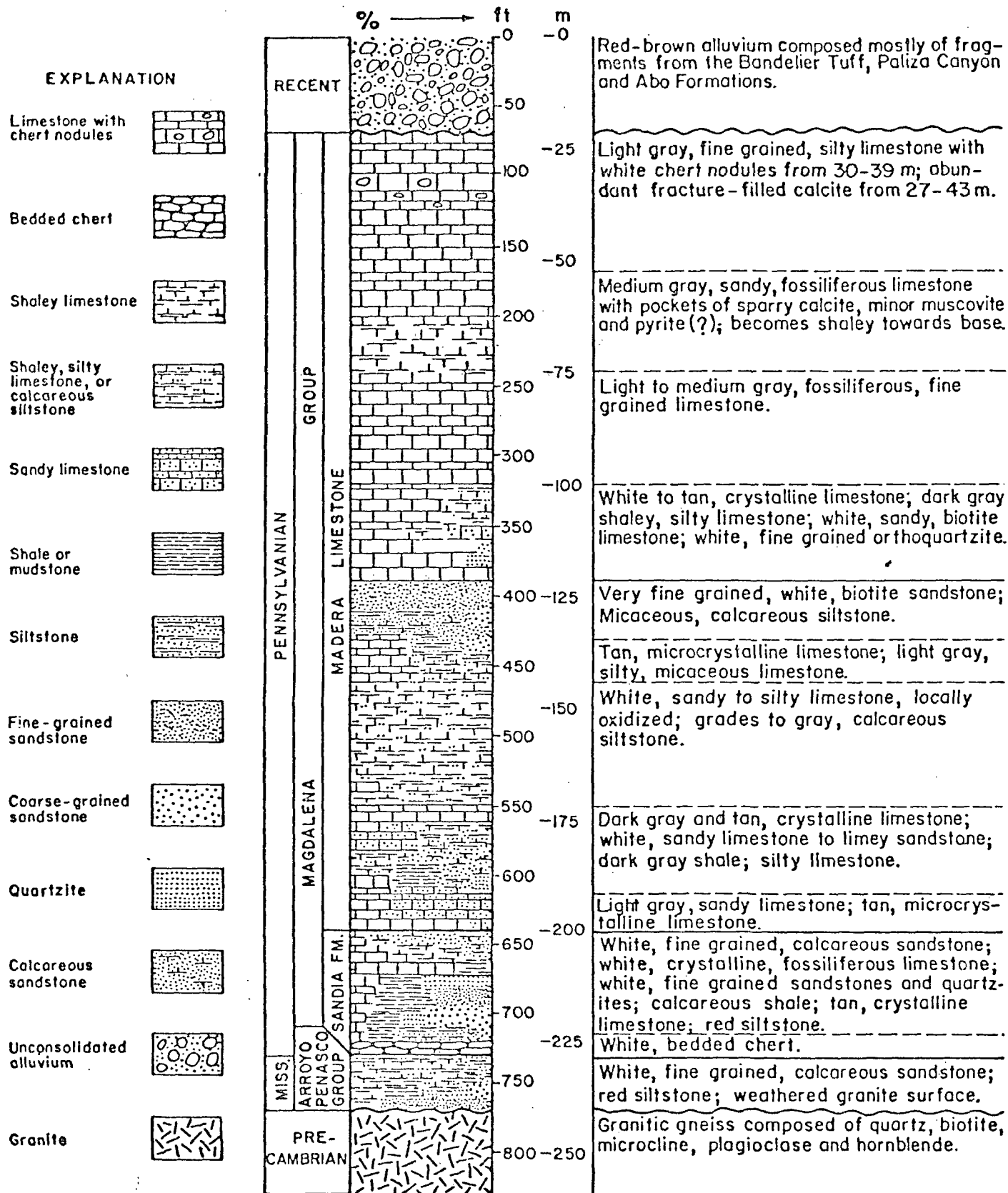
2. At the time of inspection the river was higher than normal and Maestas said that the bathhouse reported extensive seepage that day. The bathhouse serviced 25 customers on the 25th according to Maestas and experienced no problems with hot water delivery. The cistern used by the bathhouse appeared to be at a normal level.
3. Mrs. Maestas informed us that the city had failed to put the geothermal well on there insurance policy. Mrs. Maestas and Mr. Montoya both spoke to the fact that the city would have to repair the damage.
4. I suggested to all three representatives that some type of barrier be placed around the well pad. They agreed to construct a barrier.

On Thursday Dr. Daw, Roy Cunniff, Larry Icerman and I met with Pat and agreed to the following:

1. NMSU would work on the well only at the request of the Village.
2. NMSU's records show that the Village has formally accepted legal liability for the well.
3. The R&D project which funded well drilling is still open and EMD will use that project as the administrative mechanism for furnishing a reasonable amount of money to repair the well - not to exceed \$10,000.
4. Review of the well repair's scope of work will be done by the NMSUEI and subject to EMD approval.
5. The R&D project to heat city hall is also still open and will be accelerated so as to be completed as soon as possible.
6. Once both projects are closed the EMD will insure that all future actions on the well and system are the responsibility of the Village.

GS/cdm

LITHOLOGIC LOG OF JEMEZ SPRINGS GEOTHERMAL WELL



FEB - 4 1980

OIL CONSERVATION DIVISION
SANTA FE

GEOTHERMAL RESOURCES WELL SUMMARY REPORT

Operator Village of Jemez Springs Address Jemez Springs, New Mexico
 Lease Name _____ Well No. 1
 Unit Letter A Sec. 26 Twp. 18N Rge 2E
 Reservoir _____ County _____

Commenced drilling 3 Jan 79 to 15 Jan 79 GEOLOGICAL MARKERS _____ DEPTH _____
 Completed drilling 18 June 79 includes repair _____ 824 feet
 Total depth 824 feet Plugged depth 117 feet _____
 Junk _____
 Commenced producing _____ Geologic age at total depth: Pre Cambrian
 (Date)

Date	Static test		Production Test Data									
	Shut-in well head		Total Mass Flow Data					Separator Data				
	Temp. °F	Pres. Psig.	Lbs/Hr	Temp. °F	Pres. Psig.	Enthalpy	Orifice	Water cuft/Hr	Steam Lbs/Hr	Pres. Psig.	Temp. °F	
			no production tests have been run									
			The well has an artesian flow of 20gpm									
			of 160°F water from the 90 foot depth.									

CASING RECORD (Present Hole)

Size of Hole	Size of Casing	Weight of Csg/ft.	Grade of Casing	New or Used	Seamless or Lapweld	Depth of Shoe	Top of Casing	Number of Sacks Cement	Top of Cement	Cement Top Determined By
9 5/8"	7"	24 lbs/ft.	not known	used	seamless	117 feet cemented	to the surface	not known	surface	by visual input

PERFORATED CASING

(Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

diameter: 7" perforating interval: 40'-50', 90'- 100'. Plug depth: 117 ft.1/2" perforations; 4 holes, 4 intervals at each perforating interval.Was analysis of effluent made? yes Electrical log depths yes Temperature log depths yes

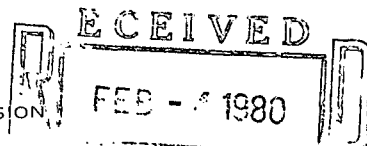
CERTIFICATION

I hereby certify that the information given above and the data and material attached hereto are true and complete to the best of my knowledge and belief.

Signed Harold A. Raw Position Assoc. Asst. VP Date 30 Jan 80

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NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501



Form G-103
Adopted 10/1/74

OIL CONSERVATION DIVISION
SANTA FE

**SUNDRY NOTICES AND REPORTS
ON
GEOTHERMAL RESOURCES WELLS**

5. Indicate Type of Lease	
State <input type="checkbox"/>	Fee <input type="checkbox"/>
5.a State Lease No.	

Do Not Use This Form for Proposals to Drill or to Deepen or Plug Back to a Different Reservoir. Use "Application For Permit -" (Form G-101) for Such Proposals.)

1. Type of well		Geothermal Producer <input type="checkbox"/>		Temp. Observation <input checked="" type="checkbox"/>		7. Unit Agreement Name	
		Low-Temp Thermal <input type="checkbox"/>		Injection/Disposal <input type="checkbox"/>		8. Farm or Lease Name	
2. Name of Operator Village of Jemez Springs							
3. Address of Operator Jemez Springs, New Mexico							
4. Location of Well							
Unit Letter <u>A</u> Feet From The _____ Line and _____ Feet From							
The _____ Line, Section <u>26</u> Township <u>18N</u> Range <u>2E</u> NMPM.							
15. Elevation (Show whether DF, RT, GR, etc.)							
12. County Sandoval							
10. Field and Pool, or Wildcat exploratory							
9. Well No. 1							

16. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK <input type="checkbox"/>	PLUG AND ABANDON <input type="checkbox"/>
TEMPORARILY ABANDON <input type="checkbox"/>	
PULL OR ALTER CASING <input type="checkbox"/>	CHANGE PLANS <input type="checkbox"/>

OTHER Convert from Temp. obs. to low Temp thermal production. ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK <input checked="" type="checkbox"/>	ALTERING CASING <input type="checkbox"/>
COMMENCE DRILLING OPNS. <input type="checkbox"/>	PLUG & ABANDONMENT <input type="checkbox"/>
CASING TEST AND CEMENT JOB <input type="checkbox"/>	

OTHER This is a followup report to the 17 April report. ☐

17. Describe Proposed or completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 203.

This well was satisfactorily repaired on June 18. The problem was caused by an improper drilling operation resulting in a 20gpm leak outside the casing. An early attempt by Tom Gipson of Calvert Drilling greatly reduced the flow (2gpm). See letter of April 17 attached. It involved putting a plastic pipe down to the 80 foot level and placing a wire basket at about that level. The annulus between the casing and the plastic pipe was filled with cement and cement was forced to the surface outside the casing through perforation at about 40 feet. A second attempt at completion was made with a hand held auger with the same firm which did not succeed. A week later a hole was drilled to thirty feet outside the casing and cement was forced from this level to the surface resulting in a complete stoppage of the leak. The area around the well was cemented. Later the village of Jemez Springs had the earth work done to restore the area. The well is in usable condition and under complete control. It has a natural artesian flow of about 20gpm of 160°F water controlled by a valve on the plastic pipe. No leaking has occurred over the intervening months.

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

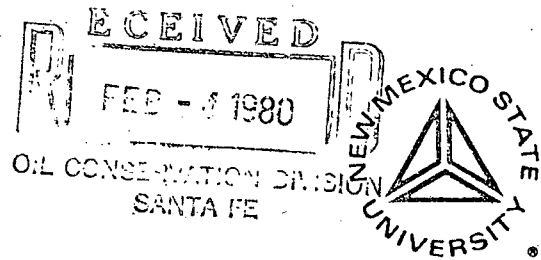
SIGNED Harold A. Daw TITLE Assoc. Geol UP NMSS DATE 30 Jan 80

APPROVED BY Carl Ulvog TITLE SENIOR PETROLEUM GEOLOGIST DATE 2/4/80

CONDITIONS OF APPROVAL, IF ANY:

ASSOCIATE ACADEMIC VICE PRESIDENT

Box 3004/Las Cruces, New Mexico 88003
Telephone (505) 646-2022



April 17, 1979

Carl Ulvog
Senior Petroleum Geologist
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Carl,

This letter is sent to bring you up to date on Jemez Springs geothermal well. On March 29 a meeting was held in Santa Fe with the Department of Energy and Minerals (EMD), New Mexico State University Energy Institute, the Oil Conservation Commission, and the State Engineer's Office. Tom Kleeman was present at the meeting as well as representatives of Stewart Brother's Drilling Company of Grants. Considerable discussion occurred relative to the status of the well at Jemez Springs and problems encountered and the actions of Tom Kleeman. I will not outline all of the difficulties that have arisen relative to the financial management, the engineering management, etc., related to that project, but some new difficulties have surfaced.

On Monday, April 2, I called Larry Kehoe, Secretary of Energy and Minerals, and indicated that we must resolve whether or not that department was going to take the initiative and see the well was corrected or closed, or whether or not the NMSU Energy Institute was going to take the initiative over and see that the well was corrected or closed. It was decided that since the contract with the Village of Jemez Springs was from New Mexico State University Energy Institute, even though the money came from EMD, the Energy Institute would take that responsibility. Note here that responsibility is different than liability. Inasmuch as the principal investigator was Mayor Eddie Armenta of Jemez Springs with his agent Tom Kleeman, an employee of Coupland and Moran, the liability still remains in that area. In our judgment, Tom Kleeman was no longer performing in an adequate manner to indicate he could successfully complete the work and that therefore someone else had to see that it was done. Following that decision, the NMSU Energy Institute engaged the services of Tom Gipson, who has done extensive geothermal drilling for Union Oil, Los Alamos, and is associated with Calvert Western Exploration Company of Grand Junction, Colorado. At the same time, Stewart Brother's Drilling Company was informed that while I had engaged a consultant to advise us that things were being done properly, the ultimate responsibility for seeing that the well was properly closed in terms of decisions to be made was with Stewart Brothers.

Carl Ulvog
April 17, 1979
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In addition, I visited the Village of Jemez Springs and secured from the mayor a signed statement that should the correcting or plugging operations damage the existing springs, neither NMSU or its agents were liable.

On Friday, April 13, Stewart Brothers moved in their equipment. I was present representing the Energy Institute as were Tom Gipson, George Scudella from EMD, a representative from the State Engineer's Office, and yourself. Operations began on correcting the well. A plastic pipe (2 1/2 inches approximately) was inserted to a depth of 80 feet and a wire basket was placed on that pipe at a depth of 70 feet. Initially some cement was put into the wire basket which simply went on down the well and subsequently some pea gravel and sand was put down to expand the wire basket. Then cement was placed on top of the wire basket full of gravel to, I suspect, a depth of 30 feet from the surface. A short time was allowed, namely over lunch, for the cement to take on a set. However, whether it was set or not was not terribly crucial at that point. Then additional cement was put into the pipe and cement came out through the perforations in the casing at roughly the 40 foot level and came up on the outside of the pipe to the surface. It did not, however, totally stop the leaking so it was determined to go to what I will call Phase II of the operation. This was somewhat more dangerous in terms of perserving the well. Cement was put down the plastic pipe to the 80 foot level. A substantial quantity, I believe 15 barrels, was placed in that area making zero difference on the modest leaks which were occurring at the surface. At that point, that operation was terminated and the cement flushed out with water so that circulation was made to the outside aquifer. There appeared to be no connection between the 90 foot level and the 40 foot level.

Cement and earth were removed from around the casing to a depth of approximately four feet and then cement was totally filled in around the casing to see if that would provide enough pressure to override the modest leaking which was still occurring. After the cement was in place, a small plastic pipe was inserted down through the cement to the bottom of the hole which allowed the upwelling of fresh water, a very modest amount, through the cement so that it would not continuously wash the cement and keep it from setting. At the time operations terminated on Friday, there was very little water coming to the surface but there was a little stirring in the cement and it was decided to leave everything in place until Tuesday. Conditions at that time had water flowing up the 2 1/2 inch pipe and being discharged via a cement hose at a distance of about 20 feet from the casing, a small one inch pipe with a modest amount of clear water flowing from it across the top of the cement surface and being discharged from the one inch pipe at the edge of the concrete pad, and some modest indications of some upwelling within the pad.

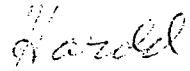
I checked with the Mayor of Jemez Springs on Saturday and its condition was roughly the same. I checked again on Monday and found that, in addition,

Carl Ulvog
April 17, 1979
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a trickle coming from the plastic pipe that was, I guess, upwelling, has led to a three inch hole at the surface of the concrete, tapering down to a very tiny hole deeper in the concrete out of which a very minor amount of water is coming.

I trust this brings you up to date as to where we now stand. On Tuesday, April 17, the valve was closed to the water at the 80 foot level. The well will then be observed. If things are going well, minor changes should be able to correct the very modest surface leakage. If not, we are now fairly confident that we could move and do further work at the 40 foot level on the outside of the casing and secure the well in a satisfactory manner.

Sincerely yours,



Harold A. Daw

dr

bc: Arlene Starkey

TABLE 2. FIELD DATA, CHEMICAL ANALYSES, AND SELECTED RATIOS OF THERMAL, MINERAL, AND NON-THERMAL WATERS OF THE JEMEZ SPRINGS REGION, NEW MEXICO; ANALYSES REPORTED IN mg/L. SAMPLES LA-1 THROUGH LA-4 ISSUE FROM THE LOS ALAMOS AREA.

No.	Name	Date	Temp., °C	Field Flow, l/min	Rock Type	SiO ₂	Al ³⁺	Fe	Mn	Ca	Mg	Na	K	Li	HCO ₃	SO ₄	Cl	F	B ¹	Li/Na	B/Cl
VA-7	Travertine Mound Spg	1/3/79	70	6.28	4	Al(P)	93	--	.15	.18	182	4.56	614	75.2	8.20	723	36.1	829	5.21	--	.0134
VA-8	Buddist Spg	1/3/79	49	6.38	4	Al(P)	81	--	.18	.24	154	9.57	458	53.0	7.56	697	37.6	653	3.86	--	.0165
VA-9	Soda Dam Spg	1/4/79	48	6.40	60	P	50	--	.14	.47	340	24.4	938	183	13.2	1514	38.4	1503	3.67	12.5	.0141
VA-10	Main Jemez Spg	1/4/79	55	7.01	207	Al(P)	93	.015	.20	.17	152	5.40	656	74.2	10.1	711	40.9	904	5.19	7.4	.0154
VA-12	Unnamed warm spg	1/5/79	49	6.35	2	Al(P)	100	--	.99	.49	129	7.82	609	70.0	8.16	738	41.8	903	4.56	--	.0134
VA-15	500 Ft. aquifer, Jemez Well	1/19/79	60.5	6.69	80	P	24	.018	.39	.02	120	9.31	185	29.9	2.27	479	38.0	243	3.30	--	.0123
VA-16	Buddist Spg	1/19/79	50	6.59	4	Al(P)	72	.013	.16	.19	128	7.50	494	57.8	6.06	708	40.6	653	3.76	--	.0123
VA-17	Travertine Mound Spg	1/19/79	72	6.66	4	Al(P)	83	.016	.15	.11	114	4.48	612	70.3	8.46	714	43.2	936	5.05	--	.0138
VA-18	Main Jemez Spg	1/19/79	35.5	7.51	27	Al(P)	85	.014	.02	.10	115	4.52	690	74.0	9.00	699	45.4	968	5.19	--	.0131
VA-19	80 Ft. aquifer, Jemez Well	1/19/79	68	6.64	120	P	70	.013	.39	.11	122	5.76	546	61.6	6.96	642	45.0	705	4.42	--	.0128
Donaiville, Union Oil Co., oral communication, 1978																					
Deep thermal water, Valles Caldera																					
		--	93	7.2	--	V&P	599	--	--	--	15	--	1749	370	--	127	64	3061	--	23	--
Goff, F. E., unpublished data, 1978 (analyst J. Hösler, University of New Mexico)																					
LA-1	Gallery Spg	8/7/78	11	5.6	160	V	43	--	<.04	<.02	7	3.3	5.8	1.4	.02	52	<5	<1	.12	<.05	--
LA-4	Sacred Spg	8/7/78	14	5.7	Seep	SF	34	--	<.04	<.02	22	0.45	20	2.5	.04	114	7	2	.46	<.05	--
LA-5	Basalt Spg	8/17/78	15	5.8	4	V&Pu	44	--	<.04	<.02	26	7.6	12	3.1	.03	98	18	12	.32	<.05	--
LA-19	Spg, White Rock Can.	9/7/78	19	6.5	6	V	71	--	<.04	<.02	12	3.1	11	1.4	.03	74	<5	<1	.45	<.05	--
Mariner et al., 1977 (Mineral Springs near San Ysidro, NH)																					
	Unnamed Mineral Spg	--	11	7.27	--	P	18	--	<.02	.05	220	110	3800	140	6.3	2265	3700	2700	2.0	8.0	.0017
	Unnamed Warm Spg	--	25	6.25	--	P	15	.007	.42	.30	390	65	3000	91	5.2	1855	2600	2400	4.0	6.9	.0017
	Unnamed Mineral Spg	--	15	6.33	--	P	20	--	.14	.57	300	68	2000	83	6.1	2005	1200	1900	3.4	11.0	.0030
Trainer, 1978																					
H2	Agua Durme Spg	5/8/73	16	7.8	400	V	64	--	--	--	18	5	13	--	--	88	3	6	.6	--	--
H4	Fenton Hill Well, GT-2*	4/23/74	26	8.8	0	P	27	--	1.20	.07	2	2	63007	350	25.0	6820	2110	3500	0	25.0	.00407
N10	Fish Hatchery Spg	12/2/72	11.5	--	--	V	--	--	--	--	11	1	9	2.4	--	62	5	4	.4	.02	--

*Al = Alluvium, V = Plio-Pleistocene Volcanics, Pu = Puye Formation, SF = Santa Fe Formation, P = Paleozoic Rocks, () = Probable Rock Type at Depth.

*Aluminum analyses by J. Owens, LASL, samples VA-7 to VA-19.

*Boron analyses of Soda Dam and Jemez Springs from Trainer (1974).

*Water apparently contaminated with Na₂CO₃ from drilling mud.

TABLE 2: Isotope data,¹ lithium, chloride, and boron concentrations from thermal/mineral and non-thermal waters of the Jemez Springs region, New Mexico.

No.	Name	Temp., °C	δD ‰	$\delta^{18}O$ ‰	Li, mg/L	Cl, mg/L	B, mg/L
VA-9	Soda Dam Spring	48	-84.9	-10.6	13.2	1503	12.5
VA-10	Main Jemez Spring 500 ft Aquifer	55	-82.3	-10.6	10.1	904	7.4
VA-15	Jemez Well	60.5	-85.9	-11.8	2.27	243	-
VA-18	Main Jemez Spring 80 ft Aquifer	35.5	-81.4	-10.4	9.00	968	-
VA-19	Jemez Well	68	-84.0	-11.3	6.96	705	-
Goff, F. E., unpub. data, 1978.							
LA-1	Gallery Spring	11	-84.3	-12.2	<0.02	< 1	<0.05
LA-4	Sacred Spring	14	-81.8	-11.8	0.04	2	<0.05
LA-5	Basalt Spring	15	-76.5	-10.8	0.03	12	<0.05
LA-19	Spring, White Rock Canyon	19	-76.8	-11.0	0.03	< 1	<0.05
Mariner et al., 1977							
	Unnamed Mineral Spring	11	-85.6	-10.01	6.30	2700	8.0
	Unnamed Warm Spring	25	-90.1	-11.22	5.20	2400	6.9
	Unnamed Mineral Spring	15	-86.5	-10.12	6.10	1900	11.0
Trainer, 1978							
H2	Agua Durma Spring	16	-80.0	-12.05	-	6	-
H6	Soda Dam Spring	48	-84.8	-10.40	3.0(?)	1500	12.5
H14	Travertine Mound Spring	75	-82.1	-10.52	8.7	920	7.4
H17	Aboutseman Well	58	-85.2	-11.42	-	700	7.4
M4	Hot Dry Rock Well, GT-2	<76	-78.9	-8.12	25	3500	25
M10	Fish Hatchery Spring	11.5	-96.5	-13.14	-	4	0.02

¹Isotope analyses of samples VA-9 through LA-19 by L. Merlivat, Dept. de Recherche et Analyse, Saclay, France.

TABLE 3: Chemical geothermometry of thermal/mineral waters of the Jemez Springs region, New Mexico.

No.	Name	Measured Temp., °C	Quartz	Na-K-Ca		
				$\beta=4/3$	$\beta=1/3$	Mg Corrected
Va-7	Travertine Mound Spring	70	133	147	195	187
VA-8	Buddhist Spring	49	126	132	188	153
VA-9	Soda Dam Spring	48	102	178	226	171
VA-10	Main Jemez Spring	55	133	153	194	178
VA-12	Unnamed Warm Spring	49	137	155	195	160
VA-15	500 ft Aquifer, Jemez Well	60.5	71	104	192	142
VA-16	Buddhist Spring	50	120	143	192	157
VA-17	Travertine Mound Spring	72	127	159	196	180
VA-18	Main Jemez Spring	35.5	128	163	194	178
VA-19	80 ft. Aquifer, Jemez Well	68	118	149	192	167
Dondanville, 1978						
	Deep thermal water, Valles Caldera	93 ¹	269	427	286	-
Mariner et al., 1977						
	Unnamed Mineral Spring	11	58	206	162	37
	Unnamed Warm Spring	25	55	158	144	84
	Unnamed Mineral Spring	15	60	155	155	70

¹Temperature given is approximate boiling temperature at surface at an elevation of 2460 m; the known temperature at depth is ~28°C.

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SUNDRY NOTICES AND REPORTS
ON
GEOTHERMAL RESOURCES WELLS

5. Indicate Type of Lease

State ☐ Fee ☐

5.a State Lease No.

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1. Type of well Geothermal Producer <input type="checkbox"/> Temp. Observation <input checked="" type="checkbox"/> Low-Temp Thermal <input type="checkbox"/> Injection/Disposal <input type="checkbox"/>	7. Unit Agreement Name
2. Name of Operator Village of Jemez Springs	8. Farm or Lease Name
3. Address of Operator Jemez Springs, New Mexico	9. Well No. 1
4. Location of Well Unit Letter <u>A</u> Feet From The _____ Line and _____ Feet From The _____ Line, Section <u>26</u> Township <u>18N</u> Range <u>2E</u> NMPM.	10. Field and Pool, or Wildcat exploratory
15. Elevation (Show whether DF, RT, GR, etc.)	12. County Sandoval

16. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐
PULL OR ALTER CASING ☐ CHANGE PLANS ☐OTHER Convert from Temp. obs. to low Temp thermal production. ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☒ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ PLUG & ABANDONMENT ☐
CASING TEST AND CEMENT JOB ☐OTHER This is a followup report to the 17 April report. ☐

17. Describe Proposed or completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 203.

This well was satisfactorily repaired on June 18. The problem was caused by an improper drilling operation resulting in a 20gpm leak outside the casing. An early attempt by Tom Gipson of Calvert Drilling greatly reduced the flow (2gpm). See letter of April 17 attached. It involved putting a plastic pipe down to the 80 foot level and placing a wire basket at about that level. The annulus between the casing and the plastic pipe was filled with cement and cement was forced to the surface outside the casing through perforation at about 40 feet. A second attempt at completion was made with a hand held auger with the same firm which did not succeed. A week later a hole was drilled to thirty feet outside the casing and cement was forced from this level to the surface resulting in a complete stoppage of the leak. The area around the well was cemented. Later the village of Jemez Springs had the earth work done to restore the area. The well is in usable condition and under complete control. It has a natural artesian flow of about 20gpm of 160°F water controlled by a valve on the plastic pipe. No leaking has occurred over the intervening months.

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

SIGNED Harold A. Daw TITLE Assoc. Geol VP NMSS DATE 30 Jan 80APPROVED BY Carl Ulvog TITLE SENIOR PETROLEUM GEOLOGIST DATE 2/4/80

CONDITIONS OF APPROVAL, IF ANY:

NEW MEXICO OIL CONSERVATION COMMISSION

P. O. Box 2088, Santa Fe 87501

OIL CONSERVATION DIVISION
SANTA FEForm G-106
Adopted 10/1/74

GEOTHERMAL RESOURCES WELL SUMMARY REPORT

Operator Village of Jemez Springs Address Jemez Springs, New Mexico
 Lease Name _____ Well No. 1
 Unit Letter A Sec. 26 Twp. 18N Rge 2E
 Reservoir _____ County _____

Commenced drilling 3 Jan 79 to 15 Jan 79 GEOLOGICAL MARKERS _____ DEPTH _____
 Completed drilling 18 June 79 includes repair _____ 824 feet
 Total depth 824 feet Plugged depth 117 feet _____
 Junk _____
 Commenced producing _____ (Date) _____ Geologic age at total depth: Pre Cambrian

Date	Static test		Production Test Data									
	Shut-in well head		Total Mass Flow Data					Separator Data				
	Temp. °F	Pres. Psig.	Lbs/Hr	Temp. °F	Pres. Psig.	Enthalpy	Orifice	Water cuft/Hr	Steam Lbs/Hr	Pres. Psig.	Temp. °F	
			no production tests have been run									
			The well has an artesian flow of 20gpm									
			of 160°F water from the 90 foot depth.									

CASING RECORD (Present Hole)

Size of Hole	Size of Casing	Weight of Csg/ft.	Grade of Casing	New or Used	Seamless or Lapweld	Depth of Shoe	Top of Casing	Number of Sacks Cement	Top of Cement	Cement Top Determined By
9 5/8"	7"	24 lbs/ft.	not known	used	seamless	117 feet cemented	to the surface	not known	surface	by visual input

PERFORATED CASING

(Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

diameter: 7" perforating interval: 40'-50', 90'-100'. Plug depth: 117 ft.

1/2" perforations; 4 holes, 4 intervals at each perforating interval.

Was analysis of effluent made? yes Electrical log depths yes Temperature log depths yes

CERTIFICATION

I hereby certify that the information given above and the data and material attached hereto are true and complete to the best of my knowledge and belief.

Signed Harold A. Daw Position Assoc. Asst. VP Date 30 Jan 80



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

July 31, 1979

Dr. Harold A. Daw
New Mexico State University
P. O. Box 3004
Las Cruces, New Mexico 88003

Dear Harold:

With respect to our telephone conversation today, here is what we propose:

I. For Jemez Springs well:

Submit Form G-103 to change status from "Temperature Observation" to "Low-Temperature Thermal" well. Refer to Rule 203-B (9) and Rule 203-C (5) and (7).

Submit Form G-106. Refer to Rule 206-B.
Submit Form G-107. Refer to Rule 207-B.

II. For New Mexico State University "Water Well":

Submit same forms as described above, except that Form G-103 will be for purpose of "convert water supply well" to "Low-Temperature Thermal" well. See Rule 203-B (9) and Rule 203-C (1), (2) and (3). This assumes of course that well is to be temporarily abandoned, ie, not to be put on production immediately.

It will be apparent that the foregoing described methods of getting the wells "legal" and helping us to get our files into some semblance of logical order, are somewhat unorthodox. However, these two cases are the first of their kinds and we are sort of "plowing new ground" so a little improvising may be justified on the basis that we are simplifying reaching our objective. Anyhow, the Jemez Springs deal was such a fiasco to begin with, that there is now no way that the rules could be complied with strictly. Incidentally, it might be wise to consider the operator of the well located in Unit A, Section 26, Township 18 North, Range 2 East to be the "Village of Jemez Springs" rather than "Eddie Armenta." (See copy of last G-103 filed by Kleeman, attached). Also, you could be "Project Manager" as of March 30th.

-2-

Enclosed are the forms referred to above. You will note that the rules specify they be filed in "triplicate." For our purposes one original and two copies suffice.

Should you be confused by the methods outlined above or have questions concerning the data required by the forms do not hesitate to contact us.

Yours truly,

CARL ULVOG
Senior Geologist

CU/og

ASSOCIATE ACADEMIC VICE PRESIDENT

Box 3004/Las Cruces, New Mexico 88003
Telephone (505) 646-2022

Dr. Daw 646-2542



April 17, 1979

Carl Ulvog
Senior Petroleum Geologist
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Carl,

This letter is sent to bring you up to date on Jemez Springs geothermal well. On March 29 a meeting was held in Santa Fe with the Department of Energy and Minerals (EMD), New Mexico State University Energy Institute, the Oil Conservation Commission, and the State Engineer's Office. Tom Kleeman was present at the meeting as well as representatives of Stewart Brother's Drilling Company of Grants. Considerable discussion occurred relative to the status of the well at Jemez Springs and problems encountered and the actions of Tom Kleeman. I will not outline all of the difficulties that have arisen relative to the financial management, the engineering management, etc., related to that project, but some new difficulties have surfaced.

On Monday, April 2, I called Larry Kehoe, Secretary of Energy and Minerals, and indicated that we must resolve whether or not that department was going to take the initiative and see the well was corrected or closed, or whether or not the NMSU Energy Institute was going to take the initiative over and see that the well was corrected or closed. It was decided that since the contract with the Village of Jemez Springs was from New Mexico State University Energy Institute, even though the money came from EMD, the Energy Institute would take that responsibility. Note here that responsibility is different than liability. Inasmuch as the principal investigator was Mayor Eddie Armenta of Jemez Springs with his agent Tom Kleeman, an employee of Coupland and Moran, the liability still remains in that area. In our judgment, Tom Kleeman was no longer performing in an adequate manner to indicate he could successfully complete the work and that therefore someone else had to see that it was done. Following that decision, the NMSU Energy Institute engaged the services of Tom Gipson, who has done extensive geothermal drilling for Union Oil, Los Alamos, and is associated with Calvert Western Exploration Company of Grand Junction, Colorado. At the same time, Stewart Brother's Drilling Company was informed that while I had engaged a consultant to advise us that things were being done properly, the ultimate responsibility for seeing that the well was properly closed in terms of decisions to be made was with Stewart Brothers.

Carl Ulvog
April 17, 1979
Page 2

In addition, I visited the Village of Jemez Springs and secured from the mayor a signed statement that should the correcting or plugging operations damage the existing springs, neither NMSU or its agents were liable.

On Friday, April 13, Stewart Brothers moved in their equipment. I was present representing the Energy Institute as were Tom Gipson, George Scudella from EMD, a representative from the State Engineer's Office, and yourself. Operations began on correcting the well. A plastic pipe (2 1/2 inches approximately) was inserted to a depth of 80 feet and a wire basket was placed on that pipe at a depth of 70 feet. Initially some cement was put into the wire basket which simply went on down the well and subsequently some pea gravel and sand was put down to expand the wire basket. Then cement was placed on top of the wire basket full of gravel to, I suspect, a depth of 30 feet from the surface. A short time was allowed, namely over lunch, for the cement to take on a set. However, whether it was set or not was not terribly crucial at that point. Then additional cement was put into the pipe and cement came out through the perforations in the casing at roughly the 40 foot level and came up on the outside of the pipe to the surface. It did not, however, totally stop the leaking so it was determined to go to what I will call Phase II of the operation. This was somewhat more dangerous in terms of perserving the well. Cement was put down the plastic pipe to the 80 foot level. A substantial quantity, I believe 15 barrels, was placed in that area making zero difference on the modest leaks which were occurring at the surface. At that point, that operation was terminated and the cement flushed out with water so that circulation was made to the outside aquifer. There appeared to be no connection between the 90 foot level and the 40 foot level.

Cement and earth were removed from around the casing to a depth of approximately four feet and then cement was totally filled in around the casing to see if that would provide enough pressure to override the modest leaking which was still occurring. After the cement was in place, a small plastic pipe was inserted down through the cement to the bottom of the hole which allowed the upwelling of fresh water, a very modest amount, through the cement so that it would not continuously wash the cement and keep it from setting. At the time operations terminated on Friday, there was very little water coming to the surface but there was a little stirring in the cement and it was decided to leave everything in place until Tuesday. Conditions at that time had water flowing up the 2 1/2 inch pipe and being discharged via a cement hose at a distance of about 20 feet from the casing, a small one inch pipe with a modest amount of clear water flowing from it across the top of the cement surface and being discharged from the one inch pipe at the edge of the concrete pad, and some modest indications of some upwelling within the pad.

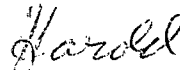
I checked with the Mayor of Jemez Springs on Saturday and its condition was roughly the same. I checked again on Monday and found that, in addition,

Carl Ulvog
April 17, 1979
Page 3

a trickle coming from the plastic pipe that was, I guess, upwelling, has led to a three inch hole at the surface of the concrete, tapering down to a very tiny hole deeper in the concrete out of which a very minor amount of water is coming.

I trust this brings you up to date as to where we now stand. On Tuesday, April 17, the valve was closed to the water at the 80 foot level. The well will then be observed. If things are going well, minor changes should be able to correct the very modest surface leakage. If not, we are now fairly confident that we could move and do further work at the 40 foot level on the outside of the casing and secure the well in a satisfactory manner.

Sincerely yours,

A handwritten signature in cursive script that reads "Harold".

Harold A. Daw

dr



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OFFICE OF THE SECRETARY

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2770
113 WASHINGTON AVENUE
SANTA FE, NEW MEXICO 87501
(505) 827-2471

MEMORANDUM

TO: Tom Kleeman
Mayor Edward Armenta, Jemez Springs
Coupland, Moran and Associates
Stewart Brothers Drilling Company
Dr. Harold Daw, New Mexico State University
Gene Gray, State Engineer's Office
✓ Joe Ramey, Oil Conservation Division

FROM: Larry Kehoe, Secretary K

DATE: April 5, 1979

RE: JEMEZ SPRINGS GEOTHERMAL PROJECT

After our March 29 meeting between Tom Kleeman and representatives of the Energy Institute, Stewart Brothers Drilling Company, the State Engineer's Office, the Oil Conservation Division and the Energy and Minerals Department, Dr. Daw and I have agreed that the Energy Institute at New Mexico State University will henceforth have full responsibility for the completion of the Jemez project, including the repair of the well. This is the same procedure used in all other R & D projects funded by the Department, and Dr. Daw and I feel that there is no reason to divert from those procedures in this case. The statutory duties and responsibilities of the State Engineer and the Oil Conservation Division will, of course, not be affected.

Dr. Daw will soon be contacting those of you who will have advisory or active roles in the completion of the project. Meanwhile, if you have any questions or comments, please let me know.

LK/smt

April 2, 1979

Mr. Larry Kehoe
Secretary of Energy
Energy and Minerals Department
State Securities Building
Santa Fe, New Mexico

Dear Mr. Kehoe:

I am writing to present my case for the record dispassionately after feelings have had an opportunity to subside. Since accusations were made concerning my competence and responsibility, I would like to set forth a chronological recounting of some of the significant events on this project. I think this will serve, for the objective reader, to rebut some of the charges leveled against me. Such a statement will also provide insight into why the project was carried out in the manner in which it was.

The actions and judgements of the driller are of paramount significance when considering the outcome of this project. From the beginning the driller's professional judgement was sought. This was evident in the 16 December meeting with Arlene Starkey, Mayor Armenta, Fraser Goff (LASL), David Stewart (the driller), and me. At that meeting in Jemez Springs, the opinion of the driller was sought concerning the choice of drilling sites and the possible effects drilling would have on the bathhouse water supply. I mention this meeting in order to demonstrate the significance of the driller's involvement from the outset and the knowledge of Energy Institute personnel concerning the driller's role. The importance of this point will be elaborated upon later.

I was promised in mid December, when I first came out here, that we would have a thermister available so that it would be possible to make temperature measurements during drilling. This vital piece of equipment was not available on 2 January, and despite assurances that it would be readied, the LASL technician responsible for it did not have the instrument calibrated until after drilling was completed. Other than pleading and cajoling, I had no leverage to make him act more quickly.

Without the thermister we were drilling in the dark with no way of establishing even a rough temperature gradient. With hindsight I realize, as do others, that the heat source for the aquifer is not located below the drill site. However, at the time we were drilling, I could only hope that by measuring returning drilling fluids, we would determine whether or not it was getting hotter as we drilled deeper. Because of the promises that the thermister would soon be forthcoming, I continued to drill deeper and seek funds to continue drilling with the hope that we would soon have a meaningful preliminary temperature gradient.

Thus, I sought additional funds from EMD and elsewhere. When LASL offered \$6,000 (two more days of drilling), I felt compelled to take it. This acceptance seemed to be in the best interest of the project and the village. While LASL was vitally interested in the project, they did not want their financial participation known and asked that I respect this request. It may have been a Faustian bargain. Nonetheless the two days' efforts provided useful data about the stratigraphy of the area.

As to why the leak occurred, I have heard a considerable number of opinions after the fact. The point is that, despite my seeking and acting upon the advice of those with technical expertise about geothermal well drilling, the leak did occur. Questions concerning the driller's culpability did not seem nearly as significant as devising a plan for stopping a leak and getting on with the post-drilling assessment. Unfortunately, any attempts to bring equipment to the well were delayed by three weeks of unusually heavy snow.

At this juncture there is a matter which I have been wishing to air for some time. While I was discussing the leak and the village's long-term desires for the well with Dan Nutter and Carl Ulvog of your Oil Conservation Division, Joe Ramey, Division Chief, said to me, "Now that I've heard what you have to say, I'm sympathetic to what you want to do. I think this would make a good case for you to present at our hearing." At that point he handed me a subpoena for an OCD hearing on 23 February. Because of these remarks and subsequent statements at that meeting, I had the impression that I was to present the OCD with a plan of action which they would either approve or disapprove; this I did. It was my belief that I was not to take action prior to the hearing unless they accepted my plan and cancelled the hearing. While waiting for this hearing, I heard from members of your staff, "Larry Kehoe wants you to plug the well prior to the hearing." On each of these occasions I informed the relevant staff member that I was trying to cooperate with the OCD and did not have any formal approval of the plan I had submitted. As we all know, the OCD approved the plan and issued an order to stop the leak within 14 days.

At the time of the hearing, and presently, Stewart Bros. Drilling Company was under investigation by the State Engineer's Office. Mr. Gray of that office informed me that Stewart Bros. would be held responsible for stopping the leak at the well. While he would not disallow bringing in another driller, he made it clear that Stewart Bros. would be held accountable. This was unfortunate since I could have brought a cable tool rig in for \$60/hour and Stewart Bros.'s more sophisticated rotary equipment cost \$110/hour. Naturally, given their situation with the State Engineer, David Stewart preferred his company to do the work on stopping the leak. I felt it was impossible not to go along with him on this point.

Before going into the events relating to the attempts to plug the leak, I think it pertinent to state a couple of points which have a bearing on my actions during this time.

1. Harold Daw's letter of 15 February made it quite clear that he wished to wash his hands of the mayor and me and otherwise distance the Energy Institute as far as possible from the conduct of this project.
2. After numerous and long conversations with David Stewart, I called both Arlene Starkey and Charles Wood. I told them we had an even more feasible plan to stop the leaks than that presented to the OCD. I said that it would probably cost a little more money and asked if the State would be likely to cover this additional cost. In both cases I was informed that you would probably not be amenable to such a recommendation. While there were uncertainties concerning the well, it became quite clear to me that I would have to deal with them on my own.

Bob Moran and I had lengthy discussions about the plugging job. We even brought in a consulting geologist who had had no prior contact with the project. In the end we decided to go with Stewart's plan because of his convictions of its feasibility and his situation with the State Engineer's Office.

As was pointed out in the meeting in your office last week, Stewart's proposal to stop the flow did indeed work. On the morning of March 6, there was no water flowing up the casing. This fact has been noted by representatives of the OCD and the State Engineer's Office, as well as by the driller and me. Obviously the new leak resulted from the efforts to drill out the cement inside the casing and to perforate in the production zone. At this point it is impossible to say whether waiting 48 hours for the cement to set up would have prevented the resulting leak. I informed your staff last week as to how the decision was made to drill after the cement had set up only 12 hours. Both OCD and the State Engineer's Office had official representatives at the site during the cementing and subsequent drilling out. Neither of these representatives bothered to inform the driller's representative that he was not in compliance with the rules of their respective agencies. It is difficult to appreciate these agencies' concern now when they were silent at the time the event occurred. I saw no purpose in trying to establish this point at last week's meeting since Mr. Gray felt called upon to "stick his nose in where it doesn't belong" as he put it.

When the driller left, there was no water coming up outside the casing. The representatives of both the regulatory agencies seemed satisfied that the leak had been stopped. The next day there was a new leak.

Mr. Larry Kehoe
Energy and Minerals Department

April 2, 1979
Page Four

Since I had already been turned down in my request for financing to repair the well, I had to try to solve the problem with the limited funds at my disposal. I attempted to stop the new leak by pumping cement down a tremie pipe and a makeshift burlap packer. I was acting on the advice of Francis West at LASL. Because of the money shortage, I personally carried out this work and, for several days, the well was dry. Unfortunately, this was not to remain the case. My actions in dealing with these repeated leaks were motivated by frustration resulting from my feeling that I had been abandoned and was strictly on my own. I could see no source of funds.

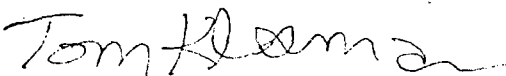
This brings up another point which you raised in last week's meeting.

— You stated that you deemed it inappropriate for me, as project manager, to receive funds from Sunoco. Only the week before our meeting had I instructed Sunoco to send the funds to me. The reason for this was simple. Because of your actions, which I consider arbitrary and capricious, over 60 days had elapsed since subcontractors had performed their work and none of them had been paid. Since your attitude toward this project seemed to be one of antipathy, I considered it prudent to have at least one source of funds to help defray expenses.

In closing, I shall note a matter which I find to be extremely ironic. You and Harold Daw are now willing to bear whatever expenses necessary to repair the well. Indeed, I gather from last week's meeting, that you are willing to take on the additional burden of trying to save the well while plugging the leak. Where were you when I needed you? In the midst of his diatribe, Mr. Gray stated that, in his opinion, the State did not get its money's worth in this project. I disagree. We now know that Jemez Springs has a viable geothermal resource at shallow depths--at least in the area of the drill site. This is an important discovery; yet, I have never once heard an official recognition of this fact from your office. Apparently your new-found willingness to save the well must signify such.

I am sending to Mr. Carlson the financial data he requested. I assume now that he is dealing directly with the driller, my services to your office are no longer necessary. Unless otherwise notified, this letter shall serve as my final report on this project.

Sincerely,



Tom Kleeman

cc: Coupland-Moran Associates
Mayor Eddie Armenta
W. A. Laughlin, LASL
Gary Carlson, EMD
Harold Daw, NMEI

Field characteristics and chemical data of 11 flowmeters in the Tenej Springs area, New Mexico;
 chemical values reported in mg/l.

2.14

No.	Name	Date	Temp., °C	Al	Fe	Mn	Ca	Mg	Na	K	Li	HCO ₃	SO ₄	Cl	F	SiO ₂	Field pH	Flow, l/min	Gases
VA-7	Traverse Mend Spg	3 Jan 79	70	—	0.15	0.18	182	4.56	614	75.2	8.20	723	36.1	829	5.21	43.4	6.28	4	CO ₂
VA-8	Buddist Spg	"	49	—	0.18	0.24	154	9.57	458	53.0	7.56	697	37.6	653	3.86	37.9	6.38	4	CO ₂
VA-9	Soda Dam Spg	4 Jan 79	48	—	0.14	0.47	340	24.4	938	183.	13.2	1514	38.4	1503	3.67	23.3	6.40	60	CO ₂ , H ₂ S?
VA-10	Main Tenej Spg	"	55	0.015	0.20	0.17	152	5.40	656	74.2	10.1	711	40.9	904	5.19	43.3	7.01	20?	CO ₂
VA-11	Artesian water, Tenej Well	5 Jan 79	44	—	5.19	1.02	140	12.2	628	79.2	8.84	738	104.8	927	5.27	68.3	6.92	4	CO ₂
VA-12	Unnamed Warm Spg	"	49	—	0.99	0.49	129	7.82	609	70.0	8.18	738	41.8	903	4.56	46.6	6.35	2	CO ₂
VA-15	500 ft. aquifer, Tenej Well	19 Jan 79	61	0.018	0.39	0.02	120	9.31	185	29.9	2.27	479	38.0	243	3.30	11.3	6.69	80	CO ₂ , H ₂ S
VA-16	Buddist Spg	"	50	0.013	0.16	0.19	128	7.50	494	57.8	6.06	708	40.6	653	3.76	33.8	6.59	4	CO ₂
VA-17	Traverse Mend Spg	"	72	0.016	0.15	0.11	114	4.48	612	70.3	8.46	714	43.2	936	5.05	38.7	6.66	4	CO ₂
VA-18	Main Tenej Spg	"	35.5	0.014	0.02	0.10	115	4.52	690	74.0	9.00	699	45.4	968	5.19	39.5	7.51	2?	None
VA-19	80 ft. aquifer, Tenej Well	"	68	0.013	0.39	0.11	122	5.76	546	61.6	6.96	642	45.0	705	4.42	32.9	6.64	120	CO ₂ , H ₂ S

✓ Aluminum analyzed by Jim Dickens, LASL

NEW MEXICO OIL CONSERVATION COMMISSION
FIELD TRIP REPORT

INSPECTION	CLASSIFICATION	FACILITY	HOURS	QUARTER
------------	----------------	----------	-------	---------

Name Carl Ulvog Date 3/26/79 Miles 168 District IV
Time of Departure 4:00 a.m. 3/26 Time of Return 5:00 p.m. 3/26 Car No. 5622

In the space below indicate the purpose of the trip and the duties performed, listing wells or leases visited and any action taken.

Signature Carl Ulvog

From Santa Fe to Sandoval County for investigation of suspected violations at geothermal well and false reports pertaining to same.

O P 13

A-26-18N-2E: Locate buried drain pipe carrying hot water from leak around well casing. Excavate same, photograph, measure temperatures and flows, and restore location. Prepare for action against operator. (Armenta #1 Jemez)

TYPE INSPECTION
PERFORMED

INSPECTION
CLASSIFICATION

NATURE OF SPECIFIC WELL
OR FACILITY INSPECTED

H = Housekeeping
P = Plugging
C = Plugging Cleanup
T = Well Test
F = Waterflow
M = Mishap or Spill
W = Water Contamination
O = Other

U = Underground Injection Control - Any inspection of or related to injection project, facility, or well or resulting from injection into any well. (SWD, 2ndry injection and production wells, water flows or pressure tests, surface injection equipment, plugging, etc.)
O = Other - Inspections not related to injection

D = Drilling
P = Production
I = Injection
S = SWD
U = Underground Storage
G = General Operation
O = Other

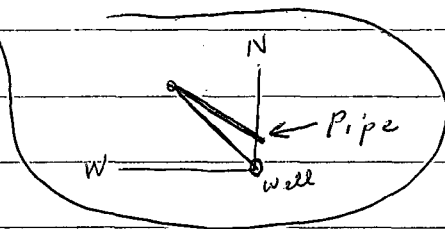
Jamez Springs Well Inspection 3/26/79

Located buried 4" PVC Sewer Pipe [ASTM 2729
1102-D 2103]

Excavated both ends. Found inlet about 2' below
GL and outlet about 4' below level of dirt & rock
pile in vicinity - est. \pm 3' below normal GL.

Outlet end approx. 35' from nearest edge of gazebo
over old spring, and 40' from well casing. End is
due NW of well.

Inlet end enters under well pad approx 6' from
casing, on N-NE side. Orientation of discharge
line is W-NW.



Temp of water from drain pipe (carrying water from hole)
is 160°F. Flow estimated at 8 to 10 gpm.

Flow line from well (open, no valve installed) carrying
water at 158°F at est. 20 to 22 gpm.

When flow line raised approx. 6' above level of casing
top, water flow stopped and flow from discharge
(drain pipe) increased. Amount of increase not measured.
(No help - couldn't get flow line braced up to permit such
measurement.)

Is lower temperature of water from inside of casing due to mixing of deeper water with shallow water??? Only ± 2 hr. waiting on cement in bottom plug before perforating!!!

INSPECTION	CLASSIFICATION	FACILITY	HOURS	QUARTER HOURS
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In the space below indicate the purpose of the trip and the duties performed, listing wells or leases visited and any action taken.

Carl Mwoy

F	O	D	12
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TYPE INSPECTION
PERFORMED

NATURE OF SPECIFIC WELL
OR FACILITY INSPECTED

U = Underground Injection Control - Any inspection of or related to injection project, facility, or well or resulting from injection into any well. (SWD, 2ndry injection and production wells; water flows or pressure tests, surface injection equipment, plugging, etc.)

D = Drilling
P = Production
I = Injection
S = SWD
U = Underground
Storage
G = General
Operation



INSIDE THE CAPITOL

By: FRED McCAFFEREY

3-6-79

22

Here's how things have been in your Capital City this week, for those who care to know.

MUSCLE:

Legislators, acting tougher than they have in many seasons, have voted to restore death penalty and stiffen punishment for juvenile offenders. (both bills have passed House and are now moving through Senate)...Juvenile code has been softened somewhat, due to Governor's wife, who has a formal office on the fourth floor of the Roundhouse...Mrs. King state chairperson for the International Year of the Child, met with backers of the new Juvenile Code there and on some concessions from them...Bill is still tough, in line with attitude of Senator C.B. Trujillo of Taos, who says, "The public is demanding a little more sternness."

BIG-TOWNED:

Village of Jemez Springs, sitting on top of running hot water (like Ojo Caliente, T or C and other state communities) decided to try a unique experiment--developing hydrothermal energy, first to heat Village Hall complex, then for other uses..Experimental well they sunk brought up hot water from a mere 80 feet, but water flowed up outside piping. Upon which, state agencies descended...Oil Conservation Division complained well was to be experimental, not producing, State Engineer hollered that they were using water without his permission, Energy and Minerals Department said, "This is our money"...Tough mayor, ex-cop Eddie Armenta, is reportedly sorry he ever heard of all this in the first place.

HOMEWORD:

New state agency heads are learning they'd better be prepared before they show up to explain their budgets to legislative committees....Most dramatic example was John Salvo, named by King to head Department of Commerce and Industry. He got thrown out of John Mershon's House Appropriations and Finance Committee even before testifying, because the chairman thought he was trying to con the committee about number of his employees and their pay scales...Mershon, highly respectful of the value of a dollar, considers such "inaccuracies" a mortal sin.

3/25/79

— Jamez Springs Geothermal Well —

No report of workover to stop leak that developed after operations described by 2/21/79 report (G-103).

No final G-103 submitted.

No application (G-101) for anything other than Temp. Obs. well.

Armenta #1 Jenny Springs Well

3/5/79: Witnessed workover to stop leak.

Rigged pump in hole to empty pit around well.

When water level got below top of 7", it was obvious that water was coming in around outside of casing and also leaking badly around cap on top of casing. i.e. - water from shallow (80'-90') zone and also from deep (500'-800'?) zone.

— Conversation with Mike Stoy —

LASL people attempted to measure temperature downhole several times. First instruments got to $\pm 150'$. On each successive try, got to successively shallower depths. Last try reached only $\pm 50'$. Obviously some material getting inside casing.

Stewart Drilg Co. rig set up. Went in with 4" bit (or thereabouts) and drilled up gravel, sand and black plastic from approx 15' to 25', then additional small bridges of same material with empty spaces between to about 75'-80'. Casing open from there on to $\pm 200'$. Pulled up to $\pm 140'$. Pumped cement and came out of hole ($\pm 3:30$ pm). After ± 30 min. water pump - for keeping water out of well pit (cellar?) plugged up. Water leaking from outside of casing filled pit and ran in 7" csg (on top of cement) filling casing to top.

Dalton Well Service (Grante) ran in with wire-line gun and perforated @ $\pm 40'$.^{5:30 pm} Resultant water flow est @ 55-60 g.p.m. (Mud pumps on rig required to pump down water in pit.)

Pumped mud down csg until water flow stopped. Then followed with cement. No cement noted at surface, only mud.
 $\pm 12:00$ midnight. SI overnight.

Cont'd

3/6/79 - Drilled out to $\pm 80'$ (top of cement not reported)
Drilling started $\pm 6:30$ am. (I was not yet at site)

Ran in with Dalton perforating gun. Shot @ $\pm 70'-80'$
Water flow thru casing resumed. No water flow
detected in pit. Water level was near top of 7" csg.
and $\pm 4'-5'$ deep.

Stewart Dry Co. washed in 1" pipe outside of 7" csg
to $\pm 15'-20'$. Pumped cement.

Additional cement poured in pit at surface to form
pad around csg. S.D.

4/13/79: 9:30a cut off casing, run electric log to 80', cement
backed to 70'. Circ. water to clean log. Pump cement (neat)
~~in~~ thru 1" log in csg - log annulus. Pull 1" out.

11:00. Wtr flow stopped. Pump water down 2" pipe. Wtr flow
thru 2" resumed. Let wtr flow from 2". Run back in
with 1". Pump more cement in csg - log annulus. Eat 1st plug
up 10'.

12:15: Pull 1" log. S.D. for leak, let csg flow. Wtr from
csg stopped, leak under pad continuing
 $\pm 1:15$. Pump cement into annulus until full. Leak under pad
abated, not stopped. Dig out pad, most of cement broken
up around csg & moved aside. Run cement into csg & let
overflow. Build dam and fill pit around csg. 2:45.

Did not stop leak. Pumped water back down 2" csg.
Flow to wellhouse spring increased. Run more cement into pit.
Leak broke thru by csg. Ran 1" pipe down (repeatedly) until
wtr from leak came up 1". 3:45. Connected above to 1" and
hooked up flow line to take leak water away. 3:45

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501

GEOHERMAL RESOURCES WELL HISTORY

Operator THE VILLAGE OF JEMEZ SPRINGS Address JEMEZ SPRINGS, NEW MEXICO
Lease Name JEMEZ SPRINGS Well No. 1
Unit Letter _____ Sec. 26 Twp. 18N Rge 2E
Reservoir _____ County SANDOVAL

It is of the greatest importance to have a complete history of the well. Use this form to report a full account of all important operations during the drilling and testing of the well or during re-drilling, altering of casing, plugging, or abandonment with the dates thereof. Be sure to include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests, shooting, and initial production data and zone temperature. (Attach additional sheets if necessary.)

Date	
3 Jan 79	Drilling Commenced (9 3/4" hole)
4 Jan 79	Ran casing to 71.4 ft. Cemented casing and cement did not hold.
5 Jan 79	Reamed hole with 6 1/4" bit. Set 5 in. casing and then pulled out of the hole. Reamed hole with a 9 3/4" bit to 140 ft.
6 Jan 79	Set 7 in. O.D. casing to 117 ft. and cemented into hole.
9 Jan 79	Set blowout preventer, drilled cement out of casing from 70 to 120 ft. Drilled to 240 ft.
10 Jan 79	Ran pressure check on casing, drilled to 467 ft.
11 Jan	Drilled to 743 ft. and ran resistance checks for temperature.
14 Jan	Drilled to 817 ft.
15 Jan	Stopped drilling at 824 ft. Rigged down to move equipment.
5 Mar	Cement plug set between 70 ft. and 140 ft. Casing perforated at 40 ft. and mud was pumped to stop external flow of water. Cement was pumped through perforations and returned to surface.
6 Mar	Casing was perforated between 75 ft. and 90 ft. to produce hot water.
8 Mar	Cement pumped from top to stop slow external water flow
A detailed daily drilling report has been submitted to the Oil Conservation Division along with an analysis of the water chemistry.	

CERTIFICATION

I hereby certify that the information given above and the data and material attached hereto are true and complete to the best of my knowledge and belief.

Signed Tommy E. Egan Position Project Manager Date 16 Mar 79

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U. S. G. S.	
Operator	
Land Office	

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2036, Santa Fe 87501

**SUNDRY NOTICES AND REPORTS
ON
GEOTHERMAL RESOURCES WELLS**

5. Indicate Type of Lease
State ☐ Fee ☒
5.a State Lease No.

Do Not Use This Form for Proposals to Drill or to Deepen or Plug Back to a Different Reservoir. Use "Application For Permit -" (Form G-101) for Such Proposals.)

1. Type of well
Geothermal Producer ☐ Temp. Observation ☒
Low-Temp Thermal ☐ Injection/Disposal ☐

7. Unit Agreement Name

2. Name of Operator
Village of Jemez Springs

8. Farm or Lease Name

3. Address of Operator
Jemez Springs, New Mexico

9. Well No.
Jemez Springs #1

4. Location of Well
Unit Letter **A** **90** Feet ~~From~~ The **West of Townhall** Line and Feet From

10. Field and Pool, or Wildcat
UNDES.

The Line, Section **26** Township **18N** Range **2E** NMPM.

15. Elevation (Show whether DF, RT, GR, etc.)
6275

12. County
Sandoval

16. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:
PERFORM REMEDIAL WORK ☒ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐
PULL OR ALTER CASING ☐ CHANGE PLANS ☐
OTHER ☐

SUBSEQUENT REPORT OF:
REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ PLUG & ABANDONMENT ☐
CASING TEST AND CEMENT JOB ☐
OTHER ☐

17. Describe Proposed or completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 203.

It is Proposed to plug the well with concrete from 140 Ft. back up inside the casing to 90 Ft. The casing would be opened from 90 Ft up to 80 Ft. This should allow the shallow geothermal water to flow up the inside of the casing. The casing would then be cemented along the outside by a tremie tube which was lowered from the top. This would make the well appropriate for being converted to a production well.

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

SIGNED Tom Klee TITLE Project Manager DATE 21 Feb. '79

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

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Operator	
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NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2038, Santa Fe 87501

**SUNDRY NOTICES AND REPORTS
ON
GEOTHERMAL RESOURCES WELLS**

5. Indicate Type of Lease
State <input type="checkbox"/> Fee <input checked="" type="checkbox"/>
5.a State Lease No.

Do Not Use This Form for Proposals to Drill or to Deepen or Plug Back to a Different Reservoir. Use "Application For Permit -" (Form G-101) for Such Proposals.)

1. Type of Well	Geothermal Producer <input type="checkbox"/>	Temp. Observation <input checked="" type="checkbox"/>
	Low-Temp Thermal <input type="checkbox"/>	Injection/Disposal <input type="checkbox"/>
2. Name of Operator	Village of Jemez Springs	
3. Address of Operator	Jemez Springs, New Mexico	
4. Location of Well	Unit Letter <u>A</u> <u>90</u> Feet <u>West of</u> The <u>Townhall</u> Line and <u> </u> Feet From	
	The <u> </u> Line, Section <u>26</u> Township <u>18 N</u> Range <u>2E</u> NMPM.	

7. Unit Agreement Name
8. Farm or Lease Name
9. Well No.
Jemez Springs #1
10. Field and Pool, or Wildcat
UNDES.

15. Elevation (Show whether DF, RT, GR, etc.)
6275

12. County
Sandoval

16. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK <input type="checkbox"/>	PLUG AND ABANDON <input type="checkbox"/>	REMEDIAL WORK <input type="checkbox"/>	ALTERING CASING <input type="checkbox"/>
TEMPORARILY ABANDON <input type="checkbox"/>		COMMENCE DRILLING OPNS. <input type="checkbox"/>	PLUG & ABANDONMENT <input type="checkbox"/>
PULL OR ALTER CASING <input type="checkbox"/>	CHANGE PLANS <input checked="" type="checkbox"/>	CASING TEST AND CEMENT JOBS <input type="checkbox"/>	
OTHER <input type="checkbox"/>		OTHER <input type="checkbox"/>	

17. Describe Proposed or completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 203.

The well will be extended from 750 Ft. to 824 Ft.

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

SIGNED Tom Kleemz TITLE Project Manager DATE 12 Jan. '79

APPROVED BY _____ TITLE _____ DATE _____

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6461
Order No. R-5941

APPLICATION OF THE OIL CONSERVATION COMMISSION TO PERMIT
MAYOR EDDIE ARMENTA, THE VILLAGE OF JEMEZ SPRINGS, AND ALL
OTHER INTERESTED PARTIES TO APPEAR AND SHOW CAUSE WHY THE
JEMEZ WELL NO. 1 LOCATED IN UNIT A OF SECTION 26, TOWNSHIP
18 NORTH, RANGE 2 EAST, SANDOVAL COUNTY, NEW MEXICO, SHOULD
NOT BE PLUGGED AND ABANDONED IN ACCORDANCE WITH A DIVISION-
APPROVED PLUGGING PROGRAM.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 23,
1979, at Santa Fe, New Mexico, before the Oil Conservation
Commission of New Mexico, hereinafter referred to as the
"Commission."

NOW, on this 2nd day of March, 1979, the Commission, a
quorum being present, having considered the testimony presented
and the exhibits received at said hearing, and being fully
advised in the premises,

FINDS:

- (1) That due public notice having been given as required
by law, the Commission has jurisdiction of this cause and the
subject matter thereof.
- (2) That the Jemez Well No. 1 located in Unit A of Section
26, Township 18 North, Range 2 East, Sandoval County, New Mexico,
was spudded on January 3, 1979, and was drilled to a total depth
of 824 feet.
- (3) That the operator of record of said well is Eddie
Armenta, Mayor of the Village of Jemez Springs.
- (4) That said well encountered waters in excess of 150°F
at a depth of approximately 80-90 feet and another naturally
heated water at a depth of approximately 500 feet.

(5) That 7-inch casing was set in said well at approximately 120 feet.

(6) That the cementing of said 7-inch casing was inadequate to prevent waters from escaping from the strata in which they are found into other strata and to the surface.

(7) That water from the 80-90 foot zone is flowing from the well to the surface of the ground outside the 7-inch casing at a rate of approximately 1000 gallons per hour.

(8) That said waters flowing to the surface of the ground are of sufficient temperature to be considered a geothermal resource.

(9) That allowing said water to flow unrestricted from the well without being utilized constitutes waste of a geothermal resource.

(10) That allowing said well to flow unrestricted could result in injury to neighboring properties.

(11) That caving has occurred both within the wellbore and around the 7-inch casing, creating a hole and resultant pond at the wellhead of sufficient size to be a hazard to human life and health.

(12) That said pond should be fenced in a manner sufficient to prevent access by children and livestock and other animals.

(13) That said well should be repaired in such a manner that geothermal resources will be contained within the 7-inch casing.

(14) That if said well cannot be repaired, then said well should be plugged and abandoned in a manner that will confine all waters to the strata in which they are found.

IT IS THEREFORE ORDERED:

(1) That the Mayor Eddie Armenta Jemez Springs Well No. 1, located in Unit A of Section 26, Township 18 North, Range 2 East, Sandoval County, New Mexico, shall be re-entered and repaired in such a manner that geothermal resources are contained within the 7-inch casing.

(2) That the water flow encountered at approximately 500 feet shall be isolated by setting a cement plug across the shoe of the 7-inch casing.

Case No. 6461
Order No. R-5941

(3) That in the event re-work operations are unsuccessful in containing the geothermal resources inside the 7-inch casing, the well shall be plugged and abandoned in a manner prescribed by the Santa Fe district office of the Oil Conservation Division.

(4) That, so long as the hazardous conditions described in Finding No. 12 above shall prevail, the area surrounding said well shall be fenced in a manner sufficient to prevent access by children and livestock and other animals.

(5) That re-work or plugging and abandonment operations shall be commenced immediately and shall be concluded within 14 days following the date of this order.

(6) That the Santa Fe District Office shall be notified at least 48 hours prior to commencing re-work or plugging and abandonment operations.

(7) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

ALEX J. ARMIJO, Member


EMERY C. ARNOLD, Member


JOE D. RAMEY, Member & Secretary

S E A L

fd/

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501

GEOHERMAL RESOURCES WELL LOG

Operator The Village of Jemez Springs
Address Jemez Springs, New Mexico
Reservoir UNDES.
Lease Name Jemez Springs Well No. 1 Unit Letter A
Location: 90 feet West of the Townhall line and
 feet from the line Section 26
Township 18N Range 2E County Sandoval

FORMATIONS PENETRATED BY WELL

DEPTH TO		Thickness	Drilled or Cored	Recovery	DESCRIPTION
Top of Formation	Bottom of Formation				
0	80 Ft.	80 Ft.	Drilled		Alluvial
80	680 Ft.	600 Ft.	"		Limestone
680Ft.	760 Ft	80 Ft.	"		Sandia Conglomerate
760	824	64Ft.	"		Precambrian Granite

Attach Additional Sheets if Necessary

This form must be accompanied by copies of electric logs, directional surveys, physical or chemical logs, water analyses, tests, and temperature surveys (See Rule 205).

CERTIFICATION

I hereby certify that the information given above and the data and material attached hereto are true and complete to the best of my knowledge and belief.

Signed Tom Fleeman Position Project Manager Date 23 Feb. '79

Dockets Nos. 9-79 and 10-79 are tentatively set for hearing on March 14 and 28, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

Docket No. 7-79

DOCKET: COMMISSION HEARING - FRIDAY - FEBRUARY 23, 1979

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6461: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Mayor Eddie Armenta, the Village of Jemez Springs, and all other interested parties to appear and show cause why the Jemez Well No. 1 located in Unit A of Section 26, Township 18 North, Range 2 East, Sandoval County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501

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Operator	/
Land Office	

APPLICATION FOR PERMIT TO DRILL, DEEPEN,
OR PLUG BACK--GEOTHERMAL RESOURCES WELL

5. Indicate Type of Lease
STATE <input type="checkbox"/> Village <input checked="" type="checkbox"/> Property FEE <input type="checkbox"/>
5.a State Lease No.
N.A.

1a. Type of Work	Drill <input checked="" type="checkbox"/>	Deepen <input type="checkbox"/>	Plug Back <input type="checkbox"/>	7. Unit Agreement Name	N.A.
b. Type of Well	Geothermal Producer <input type="checkbox"/>	Temp Observation <input checked="" type="checkbox"/>	Injection/Disposal <input type="checkbox"/>	8. Name of Lease Name	Jemez Lease
2. Name of Operator	Mayor Eddie Armenta			9. Well No.	1
3. Address of Operator	Village of Jemez Springs, New Mexico			10. Field and Pool, or Wildcat	UNDES.
4. Location of Well	UNIT LETTER <u>A</u> LOCATED <u>90</u> <u>West of Town Hall</u> FEET FROM THE <u>LINE</u>				
AND	FEET FROM THE	LINE OF SEC.	TWP.	RGE.	NMPM
12. County					
Sandoval					
19. Proposed Depth			19A. Formation	20. Rotary or C.T.	
750 ft.			Madera Limestone	Rotary	
21. Elevations (Show whether DF, RT, etc.)	21A. Kind & Status Plug. Bond	21B. Drilling Contractor	22. Approx. Date Work will start		
6275 G.L.	Exempt	Stuart Bros./Grants, NM	2 January 1979		

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
8 3/4 in.	7 in. O.D.	14 lbs./ft.	100 ft.	30	circ.
5 in.					

APPROVAL VALID FOR 90 DAYS
PERMIT EXPIRES 3/28/79
UNLESS DRILLING UNDERWAY

BEFORE THE	
OIL CONSERVATION COMMISSION	
Santa Fe, New Mexico	
Case No. <u>0401</u>	Exhibit No. <u>1</u>
Submitted by <u>OCC</u>	
Hearing Date <u>2-23-79</u>	

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. Give blowout preventer program, if any.

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

Signed Eddie Armenta Title Mayor, Village of Jemez Springs Date 22 December 1978

(This space for State Use)

APPROVED BY Daniel S. Nutter TITLE DANIEL S. NUTTER DATE 12/28/78
CONDITIONS OF APPROVAL, IF ANY: CHIEF ENGINEER

THE VILLAGE OF JEMEZ SPRINGS, NEW MEXICO
JEMEZ SPRINGS, NEW MEXICO

Mr. Joe D. Ramey, Director
Oil Conservation Division
Energy and Minerals Department
State Land Office Building
Old Santa Fe Trail
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

In lieu of posting a bond for a permit to drill a geothermal observation well, I am writing to assure you that The Village of Jemez Springs guarantees that the above mentioned well will be plugged and the area cleaned in accordance with the rules of the Oil Conservation Division as stipulated in The Rules and Regulations. We look forward to working with the Division in this endeavor.

Sincerely,



Eddie Armenta, Mayor
The Village of Jemez Springs, N.M.

BEFORE THE	
OIL CONSERVATION COMMISSION	
Santa Fe, New Mexico	
Case No. <u>0461</u>	Exhibit No. <u>2</u>
Submitted by <u>OCC</u>	
Hearing Date <u>2-23-79</u>	

JEMEZ No. 1
A-26-18N-2E, Sandoval County

BEFORE THE
OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

Case No. 6461 Exhibit No. 3

Submitted by OCC

Hearing Date 2-23-79

III. PROPOSED WORK EFFORT

The Village of Jemez Springs, New Mexico proposes using State funds for drilling geothermal test wells and assessing the results. These wells will make it possible to ascertain the deliverable quantities of geothermal fluids (flow rates, their temperatures and chemical makeup). This data will lend more precision to determining the engineering and economic feasibility of utilizing the resource.

The work plan, shown on the following chart, calls for execution of assignments in the following order:

1. Prior to drilling, geologic mapping of the area, part of the ongoing San Diego Canyon mapping program, will be completed by geologists from Los Alamos Scientific Laboratories. These maps will be necessary in locating the drilling site.
2. Upon the completion of the mapping, expected in early August, personnel from L.A.S.L. will lend expertise in locating an optimal drilling site along a controlling fault. Given the extant information on geothermal and hydrological phenomena in the area, the locations of hot springs and wells and the data yielded from mapping, it should be possible to locate a favorable test site:
3. Upon locating a test site that meets with the satisfaction of the project geologist and the principal investigator, the project director will secure the services of a drilling subcontractor.
4. Drilling will be carried out under the supervision and with the advise of the project geologist. Two test wells, of a diameter of 4" - 6", to be determined upon completion of mapping, will be drilled into the limestone formation. Well depths are not expected to go below 750 Ft. Fluids brought to the surface will be held during the test and subsequently reinjected into the formation.
5. After the well is completed the project geologist will inform the project director and project engineer of the relevant engineering data, e.g. temperatures, flow rates (determined by draw down tests) etc. The project geologist will analyze the well data for its geologic significance regarding the geothermal resource. Upon the completion of this effort, he will present the project director with a short report on his findings which will be included in the final project report;
6. The project engineer will use the findings of the geologists to determine engineering and, with the participation of the project director, economic feasibility of resource utilization. At the end of this assessment the project engineer will present his findings to the project director.
7. The project director will then write a final report based on the findings of the participants. This final report is expected to include a clear, precise and acceptable determination of the efficacy of the utilization of geothermal resource ~~utilization~~ in the Village of Jemez Springs, New Mexico. *After the report is issued pipes will be laid to deliver hot water from the well to the Town Hall to be used for space heating.*

BEFORE THE
OIL CONSERVATION COMMISSION
SAL. B. N. Mexico

Case No. 6461 FILED No. 4
Submitted to OCIC
Hearing Date 2-23-79

Project Heating Up Energy Prospects At Jemez Springs

By TOMAS O. MARTINEZ
Assistant State Editor

JEMEZ SPRINGS — The Village of Jemez Springs may become energy self-sufficient if a test project, currently under way, shows that geothermal energy can provide the village with heat and electricity.

The Village of Jemez Springs, located about 50 miles northwest of Albuquerque, is drilling a test well on village property to locate underground volcanic-heated water to use as a power source.

The drilling, project management, and feasibility studies are being funded through a \$32,000 grant from the New Mexico Department of Energy.

Jemez Springs Mayor Eddie Armenta, 39, said he hopes the well will produce water heated at 250 degrees Fahrenheit. Hot water or steam from that well would be used to heat homes within the village and generate electricity.

"It's a tremendous project. If it works, we could become energy self-sufficient. Residents would be able to cut their utility costs by about 50 percent. I hope it works. We all do," Armenta, a retired Treasury Department agent and former Albuquerque police officer, said.

The well is being dug on village property behind the Jemez Springs City Hall. The project is the brain child of Project Engineer Tom Kleeman.

Armenta said Kleeman visited Jemez Springs in late 1977 to bathe in the hot springs near the village.

"He (Kleeman) came up with the idea," Armenta said. "The village hired him to study the possibility of such a project, and to write a proposal to the federal government for funding.

"The federal government (Department of Energy) turned down our \$4 million proposal. They said they could not fund exploratory projects. In July 1978 we submitted a proposal to the state. It was approved in late Novem-

ber. If the well produces water at 250 degrees, we will resubmit our proposal to the federal government for construction of a generating plant," Armenta said.

Kleeman said, "If the test is a success, it will be a tremendous event for New Mexico."

Kleeman, who represents Copeland-Moran Associates of Albuquerque, said drilling began Wednesday.

The drilling is being done by Stuart Brothers Drilling Co. of Grants. The firm has drilled similar wells for Los Alamos Scientific Labs in the Valle Grande area between Los Alamos and Jemez Springs.

Two Los Alamos scientists, Bill Laughlin and Francis West of LASL's Geothermal Groups, were at the drilling site Thursday to provide technical advice. West said the hot water the village is trying to locate escapes through faults from the Valle Grande, the site of a gigantic extinct volcano.

Laughlin said the volcano last erupted about 40,000 years ago and hot rocks heat the water in the calderon. That water escapes through faults, and one of those faults runs through the area where the well is being dug.

If the drilling project is a success, Armenta said that included in the second proposal to the U.S. Department of Energy will be a request to fund construction of village greenhouses.

Armenta said village greenhouses would represent a cooperative village effort to provide residents with vegetables and other food stuffs.

"It's a tremendous opportunity for the Village of Jemez Springs. If the well is a success, we hope the federal government will fund this as a pilot project," Armenta said.

Kleeman anticipates the possibility of geothermal energy for Jemez Springs could become a reality by late 1980. That is, if the well comes through, and the federal government funds the project.



A-26-18N-2E

Taken 1/29/79

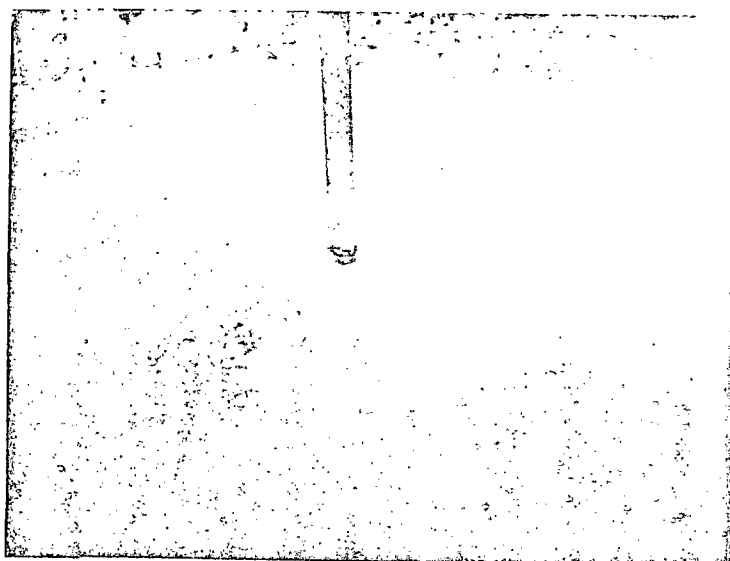
C.U.



A-26-18N-2E

Taken 1/29/79

C.U.



A-26-18N-2E

Taken 1/29/79

C.U.

BEFORE THE
OIL CONSERVATION COMMISSION

San Francisco, Mexico

Case No. 6461 Sub No. 5

Submitted by OCC

Hearing Date 2-23-79

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

JERRY APDACA
GOVERNOR
NICK FRANKLIN
SECRETARY

February 1, 1979

POST OFFICE BOX 2028
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Mr. Eddie Armenta
Mayor of Jemez Springs Village
P. O. Box 87
Jemez Springs, New Mexico 87025

Dear Sir:

You are the recorded operator of a geothermal temperature observation well located in Unit A of Section 26, Township 18 North, Range 2 East, NMPM, Sandoval County, New Mexico. According to the permit granted by this office the total depth would not exceed seven hundred fifty feet (750'), would have seven inch (7") casing set at one hundred feet (100') and cemented into the full length of the hole (cemented circulated). Furthermore, your letter to this agency requesting a waiver of bonding requirements states that your well will be plugged and the location cleaned in accord with State regulations.

An inspection of the site on January 29th last, indicates that your project is in violation of State Regulations in several respects. Please refer to the rules and make such changes as are necessary to be in compliance. Of primary importance is the immediate shutting off of the water that is escaping to the surface.

Kindly submit your plan for remedial action and/or plugging for abandonment in time for same to be witnessed by a representative of this agency.

Yours truly,

CARL ULVOG
Senior Geologist

CU/og



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

JERRY APDACA
GOVERNOR
NICK FRANKLIN
SECRETARY

January 30, 1979

POST OFFICE BOX 2028
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Mayor Eddie Armenta
Village of Jemez Springs
Jemez, New Mexico

Subject: Jemez Lease Well No. 1
Unit A, Section 26, Township
18 North, Range 2 East,
NMPM, Sandoval County,
New Mexico

Dear Sir:

The subject well appears to have been drilled. It was permitted as a "Temperature Observation" well by this agency on December 28, 1978. To date, no reports or other information concerning that operation have been received in this office.

Kindly refer to the New Mexico State Regulations and supply all of the now-delinquent data. Also, because this agency was not notified prior to the setting and/or cementing of any casing in the subject well, please submit affidavits from the companies or individuals employed for such operations.

Yours truly,

Carl Ulvog
CARL ULVOG
Senior Geologist

CU/og
cc: Lynn Teschendorf
Oil Conservation Division
General Counsel

BEFORE THE	
OIL CONSERVATION COMMISSION	
Case No.	04461
Submitted by	OCE
Hearing Date	2-23-79

A. DEFINITIONS

COMMISSION shall mean the Oil Conservation Commission.

CONDENSATE shall mean the liquid recovered from the condensation of gases or steam produced from a geothermal reservoir.

CORRELATIVE RIGHTS shall mean the opportunity afforded, insofar as is practicable to do so, the owner of each property in a geothermal reservoir to produce his just and equitable share of the geothermal resources within such reservoir, being an amount, so far as can be practicably determined, and so far as can be practicably obtained without waste, substantially in the proportion that the quantity of recoverable geothermal resources under such property bears to the total recoverable geothermal resources in the reservoir, and for such purpose to use his just and equitable share of the natural heat or energy in the reservoir.

DESIGNATED AGENT shall mean that person designated by the owner or operator of any geothermal resources well to be his agent in all matters concerning the keeping of records within the state.

DEVELOPMENT WELL shall mean a well drilled within the established limits of a designated geothermal field or within one mile thereof, for the commercial production of geothermal resources.

DISPOSAL WELL shall mean a well drilled or converted for the purpose of disposing of fluids into a formation other than a geothermal reservoir.

DIVISION shall mean the Oil Conservation Division of the New Mexico Energy and Minerals Department.

DRILLING OPERATIONS shall mean the actual drilling, redrilling, completion, or recompletion of a well for geothermal production or injection, including the running and cementing of casing, the performance of such operations as logging and perforating, and the installation of wellhead equipment.

EXPLORATORY WELL shall mean a well drilled for the discovery or evaluation of geothermal resources one mile or more beyond the established limits of a designated geothermal field.

GEOHERMAL SECTION shall mean that section of the Oil Conservation Division charged with the authority and duty of regulating the drilling, development, and production of geothermal resources, and with conserving and preventing waste of geothermal resources within this state pursuant to the provisions of the Geothermal Resources Conservation Act.

GEOHERMAL FIELD shall mean an area defined by the Division which contains a well, or wells, capable of commercial geothermal production. "Geothermal Field" includes "Low-Temperature Thermal Field."

GEOHERMAL OBSERVATION WELL shall mean a well drilled solely for temperature observation purposes, and which shall not be completed as a geothermal producing well or as an injection well.

GEOHERMAL RESERVOIR shall mean any common source of geothermal resources, whether the fluids produced from the reservoir are native to the reservoir, or flow into or are injected into said reservoir.

GEOHERMAL RESOURCES shall mean the natural heat of the earth, or the energy, in whatever form, below the surface of the earth present in, resulting from, created by, or which may be extracted from, this natural heat, and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases, and steam, in whatever form, found below the surface of the earth, but excluding oil, hydrocarbon gas and other hydrocarbon substances.

GEOHERMAL RESOURCES AREA shall mean the same general surface area which is underlain, or appears to be underlain, by one or more formations containing geothermal resources.

GEOHERMAL RESOURCES WELL (See WELL)

GEOHERMAL WATERS shall mean the water of brine produced from a geothermal reservoir.

INJECTION shall mean the placing of fluids in an underground stratum through a wellbore, whether by pressure at the surface or by gravity flow, and whether for disposal or other purpose.

INJECTION WELL shall mean a well drilled or converted for the purpose of injecting fluids into a geothermal reservoir.

LOG or WELL LOG shall mean a systematic detailed and correct recorded description of the lithologic sequence encountered while drilling a geothermal well.

LOW-TEMPERATURE THERMAL FIELD shall mean an area defined by the Commission which contains a well, or wells, capable of production of low-temperature thermal waters.

B. Form G-103 as a Subsequent Report

Form G-103 as a subsequent report of operations shall be filed in accordance with the section of this rule applicable to the particular operation being reported.

Form G-103 is to be used in reporting such completed operations as:

- ✓ (1) Commencement of drilling operations
- ✓ (2- Casing and cement test
- (3) Altering a well's casing installation
- ✓ (4) Temporary abandonment
- (5) Plugging and Abandonment
- (6) Plugging back or deepening
- (7) Remedial work
- (8) Change in ownership of a drilling well
- (9) Such other operations which affect the original status of the well but which are not specifically covered herein.

C. Filing Form G-103 as a Subsequent Report

Information to be entered on Form G-103, Subsequent Report, for a particular operation is as follows:

(1) Report of Commencement of Drilling Operations

Within ten days following the commencement of drilling operations, the operator of the well shall file a report thereof on Form G-103 in DUPLICATE. Such report shall indicate the hour and the date the well was spudded.

D-2

✓ (2) Report of Results of Test of Casing and Cement Job; Report of Casing Alteration

A report of casing and cement test shall be filed by the operator of the well within ten days following the setting of each string of casing or liner. Said report shall be filed in DUPLICATE on Form G-103 and shall present a detailed description of the test method employed and the results obtained by such test, and any other pertinent information required by Rule 108 B(5). The report shall also indicate the top of the cement and the means by which such top was determined. It shall also indicate any changes from the casing program previously authorized for the well.

✓ (3) Report of Temporary Abandonment

A report of temporary abandonment of a well shall be filed by the operator of the well within ten days following completion of the work. The report shall be filed in DUPLICATE and shall present a detailed account of the work done on the well, including location and type of plugs used, if any, type and status of surface and downhole equipment, and other pertinent information relative to the overall status of the well.

(4) Report on Plugging of Well

A report of plugging operations shall be filed by the operator of the well within 30 days following completion of plugging operations on any well. Said report shall be filed in TRIPLICATE on Form G-103 and shall include the date the plugging operations were begun and the date the work was completed, a detailed account of the manner in which the work was performed including the depths and lengths of the various plugs set, the nature and quantities of materials employed in the plugging operations including the weight of the mud used, the size and depth of all casing left in the hole, and any other pertinent information. (See Rules 301-303 regarding plugging operations.)

D-3

BEFORE THE	
OIL CONSERVATION COMMISSION	
P.O. Box 1000, Mexico	
Case No. 6461	Sub. No. 7
Sufficiency of Fee <u>o.c.c.</u>	
Hearing Date <u>2-23-79</u>	

B. MISCELLANEOUS RULES

RULE 1. SCOPE OF RULES AND REGULATIONS

(a) The following Geothermal Rules and Regulations are of statewide application and have been adopted by the Oil Conservation Division of the New Mexico Energy and Minerals Department to conserve the natural geothermal resources of the State of New Mexico, to prevent waste, and to protect the correlative rights of all owners of geothermal resources. Special rules, regulations, and orders may be adopted from time to time when required for a particular geothermal resources area, and shall prevail over the Geothermal Rules and Regulations if in conflict therewith. However, when these Geothermal Rules and Regulations do not conflict with special rules hereafter adopted, these Geothermal Rules and Regulations will apply.

(b) The Division may grant exceptions to these rules and regulations after notice and hearing, when the granting of such exceptions will not result in waste but will protect correlative rights or prevent waste.

RULE 2 ENFORCEMENT OF LAWS, RULES, AND REGULATIONS DEALING WITH CONSERVATION OF GEOTHERMAL RESOURCES

The Division, its agents, representatives, and employees are charged with the duty and obligation of enforcing all statutes, rules, and regulations of the State of New Mexico relating to the conservation of geothermal resources. However, it shall be the responsibility of all geothermal resource owners or operators to obtain information pertaining to the regulation of geothermal resources before operations have begun. Minor deviations from the requirements of these rules as to field practices may be permitted by the Division or its duly authorized representatives where such can be safely done without waste, and burdensome delay or expense to the operator avoided.

RULE 3 WASTE PROHIBITED

(a) The production or handling of geothermal resources of any type or in any form, or the handling of products thereof, in such a manner or under such conditions or in such an amount as to constitute or result in waste is hereby prohibited.

(b) All owners, operators, contractors, drillers, transporters, service companies, pipe pulling and salvage contractors, and other persons shall at all times conduct their operations in the drilling, equipping, operating, producing, and plugging and abandoning of geothermal resource wells in a manner that will prevent waste of geothermal resources, and shall not wastefully utilize geothermal resources, or allow leakage of such resources from a geothermal reservoir, or from wells, tanks, containers, or pipe, or other storage, conduit, or operating equipment.

RULE 4. PROTECTION OF LIFE, HEALTH, AND THE ENVIRONMENT

All geothermal operations, exploratory, drilling, and producing, shall be conducted in a manner that will afford maximum reasonable protection to human life and health and to the environment.

RULE 5. OTHER DEPARTMENTS AND AGENCIES

Nothing in these rules shall be construed to supersede the authority which any state department or agency has with respect to the management, protection and utilization of the state lands and resources under its jurisdiction.

RULE 6. UNITED STATES GOVERNMENT LEASES

It is recognized by the Division that all persons conducting geothermal operations on United States Government land shall comply with the United States government regulations. Such persons shall also comply with all applicable State rules and regulations which are not in conflict therewith.

RULE 7. UNITIZED AREAS

After notice and hearing, the Division may grant approval for the combining of two or more contiguous leases into a unitized area for purposes of exploration for and production of geothermal resources.

RULE 8. CLASSIFYING AND DEFINING POOLS

The Division will determine whether a particular well or field is a high-temperature geothermal well or field or a low-temperature thermal well or field, as the case may be, and will, from time to time, classify and reclassify wells and name pools accordingly, and will determine the limits of any field so designated and from time to time redetermine such limits.



A-26-18N-2E
Taken 2/21/79
C.U.



A-26-18N-2E
Taken 2/21/79
C.U.

BEFORE THE
OIL CONSERVATION COMMISSION
San Francisco, California

Case No. 6461 Exhibit No. 8

Submitted by: OCC

Hearing Date 2-23-79

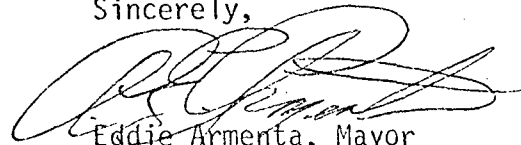
THE VILLAGE OF JEMEZ SPRINGS, NEW MEXICO
JEMEZ SPRINGS, NEW MEXICO

Mr. Joe D. Ramey, Director
Oil Conservation Division
Energy and Minerals Department
State Land Office Building
Old Santa Fe Trail
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

In lieu of posting a bond for a permit to drill a geothermal observation well, I am writing to assure you that The Village of Jemez Springs guarantees that the above mentioned well will be plugged and the area cleaned in accordance with the rules of the Oil Conservation Division as stipulated in The Rules and Regulations. We look forward to working with the Division in this endeavor.

Sincerely,



Eddie Armenta, Mayor
The Village of Jemez Springs, N.M.

JEMEZ No. 1

A-20-180-2E, Sandoval County

SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one).

- ☒ Show to whom and date delivered 25¢
☐ Show to whom, date, & address of delivery 45¢
☐ RESTRICTED DELIVERY.
☐ Show to whom and date delivered 85¢
☐ RESTRICTED DELIVERY.
☐ Show to whom, date, and address of delivery ... \$1.05

(Fees shown are in addition to postage charges and other fees).

2. ARTICLE ADDRESSED TO:

Mr. Eddie Armenta
 P. O. Box 37
 Jemez Springs, New Mexico 87025

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	540531	

(Always obtain signature of addressee or agent)

I have received the article described above.

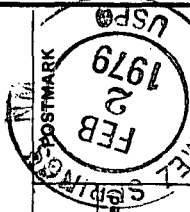
SIGNATURE

☐ Addressee ☒ Authorized agent

DATE OF DELIVERY

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:



CLERK'S INITIALS

UNITED STATES POSTAL SERVICE
OFFICIAL BUSINESS

SENDER INSTRUCTIONS

Print your name, address, and ZIP Code in the space below.

- Complete items 1, 2, and 3 on the reverse.
- Moisten gummed ends and attach to front of article if space permits. Otherwise affix to back of article.
- Endorse article "Return Receipt Requested" adjacent to number.

PENALTY FOR PRIVATE
USE TO AVOID PAYMENT
OF POSTAGE, \$300



**RETURN
TO**



Oil Conservation Division

(Name of Sender)

P. O. Box 2088

(Street or P.O. Box)

Santa Fe, New Mexico 87501

(City, State, and ZIP Code)

Lehigh Valley CO.

Page 1 of 1
Property _____

Work Order No. _____

CHARGE[illegible][illegible]

Lehigh Valley Coal Co.

Rig Number 117 Date 15 1288 Hole Number 2624 / 4

Property

Date 15/1/2018 Hole Number 92261 / 1

Property

Work Order No. _____

	DRILLER	HELPER	HELPER	HELPER
EMPL. NO.	1132	1142	1137	
NAME	JOE MAYER JR	JOE MAYER	PAULANCE LUCAS	
HOURS	1.5	1.5	1.5	

START		% Return	Drilling	Coring	Trip - 1/0	TD	Logging	Lay Down	Rig-Up/Dwn	Move	Circulating	Mix Mud	Stand By	Mainten.	Other	REMARKS	BIT INFORMATION			Retip	Bit	Hour	Material
Time	Depth																Part No.	Serial No.					
012000	100'	X																					
0145-0505															X		REPAIRING PULL OUT OF HOLE						
0150-01700															X		REPAIRING GIP						
02300															X		SET CASING						
0300																	PULL CASING OUT OF HOLE						

MATERIALS

OTHER		DESC.		UNIT	QTY	PART NO.	CH
#	FUNCTION						
1.	Washing to Bottom						
2.	Reaming						
3.	Waiting on Cement						
4.	Cementing						
5.	Running Casing						
6.	Fishing						
7.	Waiting on Water						
8.	Other - Specify						

Joe Moring
Driller Signature

Arnold H. Henry
Tool Pusher Signature

Continental Drilling Co.
Continental Drilling Co.

DAILY DRILLING REPORT

Rig Number 17 Date 1 15 1979 Hole Number well 1th

Client	Contract

Page 1 of 1
Property

Client James Springs
Total Footage Today
Total Loads of Water
Work Order No.

	DRILLER	HELPER	HELPER	HELPER
EMPL. NO.	<u>1134</u>	<u>1139</u>	<u>1148</u>	<u>1159</u>
NAME	<u>Raymond Marez</u>	<u>Robert Brito</u>	<u>Jim Pacey</u>	<u>Robert Sauer</u>
HOURS	<u>9</u>	<u>9</u>	<u>9</u>	<u>9</u>

START		Depth	% Return	Drilling	Coring	Trip - I/O	TD	Logging	Lay Down	Rig-Up/Dwn	Move	Circulating	Mix Mud	Stand By	Mainten.	Other	REMARKS	BIT INFORMATION			Retip	Bit	Hour	Material
Time																		Part No.	Serial No.					
01:00																	Start Equip							
01:15																	Wait on Orders							
01:30																	Prim pump							
01:45																	Run in Hole							
02:00																	Reaming hole							
02:15																								
02:30																								
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15:30																								
15:45																								
16:00																								
16:15																								

OTHER		FUNCTION										DESC.									
#	FUNCTION	1. Washing to Bottom	2. Reaming	3. Waiting on Cement	4. Cementing	5. Running Casing	6. Fishing	7. Waiting on Water	8. Other - Specify	Driller Signature	Tool Pusher Signature	UNIT	QTY	PART NO.	CH	DESC.	UNIT	QTY	PART NO.	CH	
										<i>Raymond Marez</i>	<i>Robert Brito</i>					<i>Quick Set</i>		<i>13</i>			
																<i>Twist Seal</i>		<i>4</i>			

Charles F. Johnson
INCORPORATED CO.

Page 1 of 1

Property _____

	DRILLER	HELPER	HELPER	HELPER
EMPL. NO.	1132	1147	1137	
NAME	JOE PIERCE JR	TIMMY MACC	WILFRED LUCERO	
HOURS	12	12	12	

[illegible]

CH

MATERIALS

Scientific Book
SELLERS CO.

Client	Contract

Client Jimenez Springs

Total Footage Today _____

Total Loads of Water

Work Order No. _____

START		% Return	Drilling	Coring	Trip - I/O	TD	Logging	Lay Down	Rig-Up/Dwn	Move	Circulating	Mix Mud	Stand By	Mainten.	Other	*	*	*	*	*	CHARGE
Time	Depth																				
* REMARKS																BIT INFORMATION			Bit	Hour	Material
																Part No.	Serial No.	Retip			

[illegible][illegible]

Defendant's Exhibit
Exhibit 66.

Page 1 of 1

Property _____

Total Footage Today _____

Work Order No. _____

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START			BIT INFORMATION	
Time	Depth		Part No.	Serial No.
		% Return		
		Drilling		
		Coring		
		Trip - I/O		
		TD		
		Logging		
		Lay Down		
		Rig-Up/Dwn		
		Move		
		Circulating		
		Mix Mud		
		Stand By		
		Mainten.		
		Other		
		* REMARKS		
			Retrip	
			Bit	
			Hour	
			* Material	

[illegible][illegible]

#	FUNCTION
1.	Washing to Bottom
2.	Reaming
3.	Waiting on Cement
4.	Cementing
5.	Running Casing
6.	Fishing
7.	Waiting on Water
8.	Other - Specify _____

Driller Signature [Signature]

Tool Pusher Signature [Signature]

Levin & Co.

Property _____

Client	Contract

Property _____

Client		Contract	

Property _____

[illegible][illegible]

Client	Contract

Client	Contract

Client	Contract

[illegible]

Client	Contract

[illegible][illegible]

Client Demet

Total Footage Today 100

Total Loads of Water _____

Work Order No. _____

	DRILLER	HELPER	HELPER	HELPER
EMPL. NO.	1132	1147	1137	
NAME	Joe Harez Joe	Joey Harez	Laurence Lucero	
HOURS	15	15	15	

CHARGE

[illegible]

MATERIALS

OTHER	
#	FUNCTION
1.	Washing to Bottom
2.	Reaming
3.	Waiting on Cement
4.	Cementing
5.	Running Casing
6.	Fishing
7.	Waiting on Water
8.	Other - Specify

DESC.	UNIT	QTY	PART NO.	CH	DESC.	UNIT	QTY	PART NO.	CH
					Quicks Gel		6		
<div style="display: flex; justify-content: space-between;"><div>Driller Signature <i>[Signature]</i></div><div>Tool Pusher Signature <i>[Signature]</i></div></div>									

Levinthal & Co.
NEW YORK CO.



Page 7 of 7

Property _____

Total Footage Today

$$\frac{2}{3} \times \frac{1}{6}$$
CHARGE

MATERIALS

Driller Signature	
Tool Pusher Signature	

Levin & Sons
PRINTING CO.

- of -

Property _____

Total Footage Today 117

Total Loads of Water _____

	DRILLER	HELPER	HELPER	HELPER
EMPL. NO.	B 361	1139	1158	
NAME	Raymond Pines	Ruben Brito	Robert Salazar	
HOURS	15	15	15	

Time	Depth	% Re	Drilling
------	-------	------	----------

Q116-0205

1533-0250	2-4-0		
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[illegible]

OTHER	
-------	--

1. Washing to Bottom
2. Reaming

5.	Waiting on Water	10
6.	Fishing	10
7.	Waiting on Water	10

[illegible]

MATERIALS

Edmund C. Johnson
PRINTING CO.

Property _____

Property _____

Work Order No. _____

START		% Return Drilling Coring Trip - I/O TD Logging Lay Down Rig-Up/Dwn Move Circulating Mix Mud Stand By Mainten. Other	BIT INFORMATION		
Time	Depth		* REMARKS	Part No.	Serial No.
			Retrip	Bit	Hour
					Material

[illegible]

OTHER		#	FUNCTION	DESC.	UNIT	QTY	PART NO.	CH	DESC.	UNIT	QTY	PART NO.	CH
1. Washing to Bottom													
2. Reaming													
3. Waiting on Cement													
4. Cementing													
5. Running Casing													
6. Fishing													
7. Waiting on Water													
8. Other - Specify													

[Signature]

Driller Signature

[Signature]

Tool Pusher Signature

[Signature]

[Signature]

[Signature]

[Signature]

DAILY DRILLING REPORT

Client		Contract	

Page _____ of _____
Property _____

Total Footage Today _____

Total Loads of Water _____



Work Order No. _____

	DRILLER	HELPER	HELPER	HELPER
EMPL. NO.	1132	1147	1137	
NAME	Joe Macer Jr.	Donny Macer	Laurence Lucero	
HOURS	17 1/2	17 1/2	17 1/2	

CHARGE

START		Depth	% Return	Drilling	Coring	Trip - I/O	TD	Logging	Lay Down	Rig-Up/Dwn	Move	Circulating	Mix Mud	Stand By	Mainten.	Other	REMARKS	BIT INFORMATION							
Time																		Part No.	Serial No.	Retip	Bit	Hour	Material		
1700-2105	592-		X															23andl							
2145-2245	734'		X															22H.T. 5'8"	69222						
2245-2345	743'		X																						
2345-2400																									

MATERIALS

OTHER											
#	FUNCTION										
1.	Washing to Bottom										
2.	Reaming on Cement										
3.	Waiting on Cement										
4.	Cementing										
5.	Running Casing										
6.	Fishing										
7.	Waiting on Water										
8.	Other - Specify										
 Driller Signature											
 Tool Pusher Signature											
		DESC.	UNIT	QTY	PART NO.	CH	DESC.	UNIT	QTY	PART NO.	CH

**Lehigh Brothers
BRILLING CO.**

Client	Contract

Page ✓ of 1
Property _____

Total Footage Today 2

Work Order No. _____

	DRILLER	HELPER	HELPER	HELPER
EMPL. NO.	1132	1147	1137	
NAME	JOE HARRIS JR.	JOEY HARRIS	LAURENCE LUCERO	
HOURS	8	8	8	

Retip		CHARGE
Bit		
Hour		
Material		

X	Home Pump
X	Run in Hole
X	Washing in
X	

OTHER											
#	FUNCTION	DESC.	UNIT	QTY	PART NO.	CH	DESC.	UNIT	QTY	PART NO.	CH
1.	Washing to Bottom										
2.	Reaming										
3.	Waiting on Cement										
4.	Cementing										
5.	Running Casing										
6.	Fishing										
7.	Waiting on Water										
8.	Other - Specify										

Driller Signature
[Signature]

Tool Pusher Signature
[Signature]

[Signature]

Client	Contract

Client Jeffrey

Total Footage Today _____

Total Loads of Water

Work Order No. _____

CHARGE[illegible]

OTHER											
#	FUNCTION										
1.	Washing to Bottom	DESC.	UNIT	QTY	PART NO.	CH	DESC.	UNIT	QTY	PART NO.	CH
2.	Sampling										
3.	W. sitting on Cement										
4.	Cementing										
5.	Running Casing										
6.	Setting										
7.	Waiting on Water										
8.	Other - Specify										

[Signature]

Driller Signature

[Signature]

Tool Pusher Signature

1. Wash to Bottom

2. Sampling

3. W. sitting on Cement

4. Cementing

5. Running Casing

6. Setting

7. Waiting on Water

8. Other - Specify

No. 540531

RECEIPT FOR CERTIFIED MAIL—30¢ (plus postage)

SENT TO <i>Eddie Armenta</i>		POSTMARK OR DATE
STREET AND NO. <i>P.O. Box 87</i>		
P.O., STATE AND ZIP CODE <i>James Springs, N-Mex</i>		
OPTIONAL SERVICES FOR ADDITIONAL FEES		
RETURN RECEIPT SERVICES	1. Shows to whom and date delivered	15¢
	With delivery to addressee only	65¢
	2. Shows to whom, date and where delivered ..	35¢
	With delivery to addressee only	85¢
DELIVER TO ADDRESSEE ONLY		50¢
SPECIAL DELIVERY (extra fee required)		

PS Form 3800
Apr. 1971

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See other side)

☆ GPO: 1970 O-397-458



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

JERRY APODACA
GOVERNOR

NICK FRANKLIN
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

February 1, 1979

Mr. Eddie Armenta
Mayor of Jemez Springs Village
P. O. Box 87
Jemez Springs, New Mexico 87025

Dear Sir:

You are the recorded operator of a geothermal temperature observation well located in Unit A of Section 26, Township 18 North, Range 2 East, NMPM, Sandoval County, New Mexico. According to the permit granted by this office the total depth would not exceed seven hundred fifty feet (750'), would have seven inch (7") casing set at one hundred feet (100') and cemented into the full length of the hole (cemented circulated). Furthermore, your letter to this agency requesting a waiver of bonding requirements states that your well will be plugged and the location cleaned in accord with State regulations.

An inspection of the site on January 29th last, indicates that your project is in violation of State Regulations in several respects. Please refer to the rules and make such changes as are necessary to be in compliance. Of primary importance is the immediate shutting off of the water that is escaping to the surface.

Kindly submit your plan for remedial action and/or plugging for abandonment in time for same to be witnessed by a representative of this agency.

Yours truly,

CARL ULVOG
Senior Geologist

CU/og

FIELD TRIP REPORT

Name Carl Ulvog, Date 1/30/79 Miles 206 District IVTime of Departure 7:00 a.m. 1/29 Time of Return 4:45 p.m. 1/29 Car No. 5622

In the space below indicate the purpose of the trip and the duties performed, listing wells or leases visited and any action taken.

Signature _____

From Santa Fe to Jemez Springs for inspection of Geothermal Observation well. Return to Santa Fe

F	O	P	9	3	<p>A-26-18N-2E: Inspect well drilled on village property with mayor of Jemez Springs as operator. Very bad location. Surface casing (if any) not visible. Small diameter pipe-est. 3" dia.-protruding 4' above pool of hot bubbling water which flows to Jemez River at 150° F and 1000 gals/hr. est. Operator requested to furnish data relative to casing, cementing, etc., immediately.</p>
---	---	---	---	---	--

TYPE INSPECTION
PERFORMEDINSPECTION
CLASSIFICATIONNATURE OF SPECIFIC WELL
OR FACILITY INSPECTED

H = Housekeeping
 P = Plugging
 C = Plugging Cleanup
 T = Well Test
 F = Waterflow
 M = Mishap or Spill
 W = Water Contamination
 O = Other

U = Underground Injection Control - Any inspection of or related to injection project, facility, or well or resulting from injection into any well. (SWD, 2ndry injection and production wells; water flows or pressure tests, surface injection equipment, plugging, etc.)

O = Other - Inspections not related to injection

D = Drilling
 P = Production
 I = Injection
 S = SWD
 U = Underground Storage
 G = General Operation
 O = Other



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

JERRY APODACA
GOVERNOR

NICK FRANKLIN
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

January 30, 1979

Mayor Eddie Armenta
Village of Jemez Springs
Jemez, New Mexico

Subject: Jemez Lease Well No. 1
Unit A, Section 26, Township
18 North, Range 2 East,
NMPM, Sandoval County,
New Mexico

Dear Sir:

The subject well appears to have been drilled. It was permitted as a "Temperature Observation" well by this agency on December 28, 1978. To date, no reports or other information concerning that operation have been received in this office.

Kindly refer to the New Mexico State Regulations and supply all of the now-delinquent data. Also, because this agency was not notified prior to the setting and/or cementing of any casing in the subject well, please submit affidavits from the companies or individuals employed for such operations.

Yours truly,

Carl Ulvog
CARL ULVOG
Senior Geologist

CU/og
cc: Lynn Teschendorf
Oil Conservation Division
General Counsel

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Operator		
Land Office		

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501SUNDRY NOTICES AND REPORTS
ON
GEOTHERMAL RESOURCES WELLS5. Indicate Type of Lease
State ☐ Fee ☒

5.a State Lease No.

Do Not Use This Form for Proposals to Drill or to Deepen or Plug Back to a Different Reservoir. Use "Application For Permit -" (Form G-101) for Such Proposals.)

1. Type of well Geothermal Producer <input type="checkbox"/> Temp. Observation <input checked="" type="checkbox"/> Low-Temp Thermal <input type="checkbox"/> Injection/Disposal <input type="checkbox"/>	7. Unit Agreement Name
2. Name of Operator Village of Jemez Springs	8. Farm or Lease Name
3. Address of Operator Jemez Springs, New Mexico	9. Well No. Jemez Springs #1
4. Location of Well Unit Letter <u>A</u> <u>90</u> Feet <u>West of</u> <u>Townhall</u> Line and _____ Feet From The _____ Line, Section <u>26</u> Township <u>18N</u> Range <u>2E</u> NMPM.	10. Field and Pool, or Wildcat <u>UNDES</u>
15. Elevation (Show whether DF, RT, GR, etc.) <u>6275</u>	12. County <u>Sandoval</u>

16. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐
PULL OR ALTER CASING ☐ CHANGE PLANS ☐
OTHER ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ PLUG & ABANDONMENT ☐
CASING TEST AND CEMENT JOB ☒
OTHER And commencement of Drilling ☒
Operations

17. Describe Proposed or completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 203.

A 7 inch O.D. casing has been cemented into limestone at approximately 120ft. A pressure check of the casing was performed and the casing held under 3500=lbs. of pressure. The well was drilled to a T.D. of 824 ft.

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

SIGNED Tom Klemm TITLE Project Manager DATE 15 Jan. 1979

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

Project Heating Up Energy Prospects At Jemez Springs

By TOMAS O. MARTINEZ

Assistant State Editor

JEMEZ SPRINGS — The Village of Jemez Springs may become energy self-sufficient if a test project, currently under way, shows that geothermal energy can provide the village with heat and electricity.

The Village of Jemez Springs, located about 50 miles northwest of Albuquerque, is drilling a test well on village property to locate underground volcanic-heated water to use as a power source.

The drilling, project management, and feasibility studies are being funded through a \$32,000 grant from the New Mexico Department of Energy.

Jemez Springs Mayor Eddie Armenta, 39, said he hopes the well will produce water heated at 250 degrees Fahrenheit. Hot water or steam from that well would be used to heat homes within the village and generate electricity.

"It's a tremendous project. If it works, we could become energy self-sufficient. Residents would be able to cut their utility costs by about 50 percent. I hope it works. We all do," Armenta, a retired Treasury Department agent and former Albuquerque police officer, said.

The well is being dug on village property behind the Jemez Springs City Hall. The project is the brain child of Project Engineer Tom Kleeman.

Armenta said Kleeman visited Jemez Springs in late 1977 to bathe in the hot springs near the village.

"He (Kleeman) came up with the idea," Armenta said. "The village hired him to study the possibility of such a project, and to write a proposal to the federal government for funding.

"The federal government (Department of Energy) turned down our \$4 million proposal. They said they could not fund exploratory projects. In July 1978 we submitted a proposal to the state. It was approved in late Novem-

ber. If the well produces water at 250 degrees, we will resubmit our proposal to the federal government for construction of a generating plant," Armenta said.

Kleeman said, "If the test is a success, it will be a tremendous event for New Mexico."

Kleeman, who represents Copeland-Moran Associates of Albuquerque, said drilling began Wednesday.

The drilling is being done by Stuart Brothers Drilling Co. of Grants. The firm has drilled similar wells for Los Alamos Scientific Labs in the Valle Grande area between Los Alamos and Jemez Springs.

Two Los Alamos scientists, Bill Laughlin and Francis West of LASE's Geothermal Groups, were at the drilling site Thursday to provide technical advice. West said the hot water the village is trying to locate escapes through faults from the Valle Grande, the site of a gigantic extinct volcano.

Laughlin said the volcano last erupted about 40,000 years ago and hot rocks heat the water in the calderon. That water escapes through faults, and one of those faults runs through the area where the well is being dug.

If the drilling project is a success, Armenta said that included in the second proposal to the U.S. Department of Energy will be a request to fund construction of village greenhouses.

Armenta said village greenhouses would represent a cooperative village effort to provide residents with vegetables and other food stuffs.

"It's a tremendous opportunity for the Village of Jemez Springs. If the well is a success, we hope the federal government will fund this as a pilot project," Armenta said.

Kleeman anticipates the possibility of geothermal energy for Jemez Springs could become a reality by late 1980. That is, if the well comes through, and the federal government funds the project.

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NEW MEXICO OIL CONSERVATION COMMISSION

P. O. Box 2088, Santa Fe 87501

APPLICATION FOR PERMIT TO DRILL, DEEPEN,
OR PLUG BACK--GEOTHERMAL RESOURCES WELL

5. Indicate Type of Lease
STATE <input type="checkbox"/> <u>Village</u> <input type="checkbox"/> FEE <input type="checkbox"/> <u>Property</u>
5.a State Lease No. <u>N.A.</u>

1a. Type of Work Drill <input checked="" type="checkbox"/> Deepen <input type="checkbox"/> Plug Back <input type="checkbox"/>	7. Unit Agreement Name <u>N.A.</u>
b. Type of Well Geothermal Producer <input type="checkbox"/> Temp Observation <input checked="" type="checkbox"/> Low-Temp Thermal <input type="checkbox"/> Injection/Disposal <input type="checkbox"/>	8. Lease Lease Name <u>Jemez Lease</u>
2. Name of Operator <u>Mayor Eddie Armenta</u>	9. Well No. <u>1</u>
3. Address of Operator <u>Village of Jemez Springs, New Mexico</u>	10. Field and Pool, or Wildcat <u>UNDES.</u>
4. Location of Well UNIT LETTER <u>A</u> LOCATED <u>90</u> <u>West of Town Hall</u> FEET FROM THE <u>LINE</u> AND FEET FROM THE LINE OF SEC. TWP. RGE. NMPM	12. County <u>Sandoval</u>
19. Proposed Depth <u>750 ft.</u> 19A. Formation <u>Madera Limestone</u> 20. Rotary or C.T. <u>Rotary</u>	
21. Elevations (Show whether DF, RT, etc.) <u>6275</u> <u>G.L.</u>	21A. Kind & Status Plug. Bond <u>Exempt</u>
21B. Drilling Contractor <u>Stuart Bros./Grants, NM</u>	
22. Approx. Date Work will start <u>2 January 1979</u>	

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
8 3/4 in.	7 in. O.D.	14 lbs./ft.	100 ft.	30	circ.
5 in.					

APPROVAL VALID FOR 90 DAYS
PERMIT EXPIRES 3/28/79
UNLESS DRILLING UNDERWAY

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. Give blowout preventer program, if any.

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

Signed [Signature] Title Mayor, Village of Jemez Springs Date 22 December 1978

(This space for State Use)

APPROVED BY [Signature] TITLE DANIEL S. NUTTER DATE 12/28/78
CONDITIONS OF APPROVAL, IF ANY: CHIEF ENGINEER

GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

All distances must be from the outer boundaries of the Section.

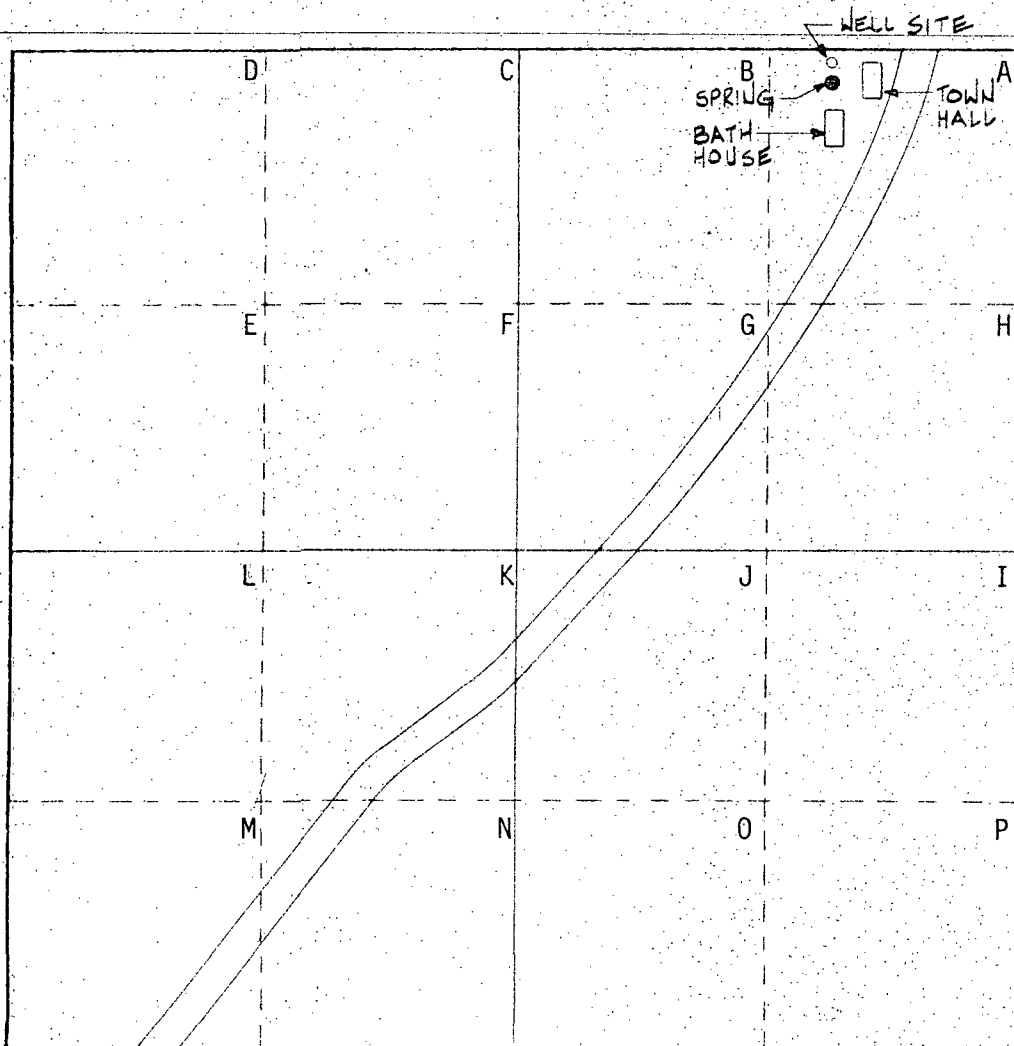
Operator Mayor Eddie Armenta			Lease Village		Well No. 1
Unit Letter A	Section 26	Township 18 North	Range 2 East	County Sandoval	
Actual Footage Location of Well: 90 feet west of town hall					
Ground Level Elev. 6275	Producing Formation Madera Limestone	Pool UNDEST.		Dedicated Acreage: None Acres	

- Outline the acreage dedicated to the subject well by colored pencil or hatchure marks on the plat below.
- If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).
- If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

☐ Yes ☐ No If answer is "yes," type of consolidation _____

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

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

Name
Tom Kleeman

Position
Consultant

Company
Coupland, Moran & Assoc.

Date
21 December 1978

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed _____

Registered Professional Engineer
~~and/or Land Surveyor~~

Certificate No. _____

PROPOSAL TO THE NEW MEXICO ENERGY AND MINERALS DEPARTMENT
BY THE VILLAGE OF JEMEZ SPRINGS, NEW MEXICO
FOR FUNDS TO CONDUCT A GEOTHERMAL TEST WELL DRILLING PROGRAM.

5 July 1978

SUMMARY

This is a proposal from the Village of Jemez Springs, New Mexico to the New Mexico Energy and Minerals Department requesting \$31,162.50. These funds are to be used in evaluating the geothermal resource in the Village. It is proposed here to drill two (2) wells to test for temperature, flow rates and chemical composition of the hydrothermal reservoir.

Preliminary engineering-economic feasibility studies have shown that it could be possible to utilize a 110°-127°C geothermal resource for space heating and agribusiness in the Village. The U.S.G.S. lists Jemez Springs as one of six known geothermal resource areas in New Mexico.

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I. INTRODUCTION

Presently, the U. S. Department of Energy (D.O.E.), Division of Geothermal Energy (D.G.E.), is sponsoring a program to demonstrate the direct applications (non-electrical) or geothermal energy. These applications may fall into any one or more of the following categories: 1. residential/commercial space heating, 2. agricultured utilization, 3. industrial process heating.

At this time D.O.E has released a Program Opportunity Notice (P.O.N.) requesting proposals seeking federal funding of projects demonstrating the direct applications of geothermal energy. This P.O.N. closes in mid July and another P.O.N. is expected to be released following the start of the new Federal Fiscal Year, 1 Oct, 1978.

The Village of Jemez Springs, New Mexico may well qualify for funding under this program. The Jemez hot springs are one of six known Geothermal Resource Areas (K.G.R.A.s) in the state of New Mexico listed in circular #726 of the U. S. Geological Survey (U.S.G.S.). Temperature estimates of the U.S.G.S. list Jemez hot springs at 134°C at depth. The U.S.G.S. also estimates the reservoir to have a volume of 2.25 KM³, with a heat content of $.2 \times 10^{18}$ cal, (7937×10^{11} BTUS).

The main source of heating in the village is propane, used by more than 75% of the residents. Propane costs over 40¢/gal. According to a village heating survey conducted by Coupland, Moran & Associates, 12% of the households heat their homes with electricity. Electricity costs approximately 3¢/kwh and is subject to the passing on of increased fuel costs. Wood fires in stoves and fireplaces accounted for 12% of the village heating supply. While wood is cheaper than either propane or electricity, there is potential for environmental degradation if it were to become the major source of heating in the village.

The potential for a lower cost alternative heating source in Sandoval County is important when considering the socio-economic considerations. According to state government estimates the 1975 per capita income in Sandoval County was \$2,973. The 1970 U. S. Census showed that 41.8% of the households in the county were below the poverty level.

The Village of Jemez Springs has the best known geothermal anomaly in Sandoval County. However, there are several other K.G.R.A.s and P.G.R.A.s (Potential Geothermal Resource Areas) in the county. If this resource can be demonstrated to work well in the village there are implications for the rest of the county as well.

At this time there is a demonstratable need for an alternative energy source in the area. There are, also, indications that there are significant geothermal resources in the area around the Village of Jemez Springs. However, there is not enough firm data to warrant applying for federal funding at this time. In order to intelligently discuss the nature of the geothermal resource and how it may be applied there needs to be exact information on the actual temperature of the waters, the flow rate which may reasonably be expected and the size of the resource which is being tapped. This information will be available only after test wells have been drilled.

II. ECONOMICS OF RESOURCE USE

In the fall of 1977 the firm of Coupland, Moran & Associates undertook preliminary assessment of the potential for utilizing geothermal resources in The Village of Jemez Springs. This assessment found that the costs of operating a geothermal heating system in the village were quite favorable when compared to the costs associated with conventional systems now employed.

Presently, heating costs, exclusive of heating domestic hot water, came to a little more than 30¢/ft², for most structures. The annual village heating bill is estimated to be approximately \$100,000. A geothermal system was assumed to provide the same quantity of heat at a cost of only 15¢/ft². The annual heating bill was reduced to approximately \$48,000. This represents a substantial savings to households since the heating costs with geothermal energy would be only 48% of those with conventional fuels.

In the Coupland, Moran & Associates study the village was assumed to be the owner and operator of the system. If a geothermal resource were available with waters of 127°C then the estimated cost of operating the system comes to approximately \$18,500. If the city were selling heat at the 15¢/ft² rate, the revenues would exceed costs by about \$29,500. In a community with a limited tax base (There are three tax free religious institutions in the village) and increasing costs the new source of revenue would help to guarantee solvency.

III. PROPOSED WORK EFFORT

The Village of Jemez Springs, New Mexico proposes using State funds for drilling geothermal test wells and assessing the results. These wells will make it possible to ascertain the deliverable quantities of geothermal fluids (flow rates, their temperatures and chemical makeup). This data will lend more precision to determining the engineering and economic feasibility of utilizing the resource.

The work plan, shown on the following chart, calls for execution of assignments in the following order:

1. Prior to drilling, geologic mapping of the area, part of the ongoing San Diego Canyon mapping program, will be completed by geologists from Los Alamos Scientific Laboratories. These maps will be necessary in locating the drilling site.
2. Upon the completion of the mapping, expected in early August, personnel from L.A.S.L. will lend expertise in locating an optimal drilling site along a controlling fault. Given the extant information on geothermal and hydrological phenomena in the area, the locations of hot springs and wells and the data yielded from mapping, it should be possible to locate a favorable test site:
3. Upon locating a test site that meets with the satisfaction of the project geologist and the principal investigator, the project director will secure the services of a drilling subcontractor.
4. Drilling will be carried out under the supervision and with the advise of the project geologist. Two test wells, of a diameter of 4" - 6", to be determined upon completion of mapping, will be drilled into the limestone formation. Well depths are not expected to go below 750 Ft. Fluids brought to the surface will be held during the test and subsequently reinjected into the formation.
5. After the well is completed the project geologist will inform the project director and project engineer of the relevant engineering data, e.g. temperatures, flow rates (determined by draw down tests) etc. The project geologist will analyze the well data for its geologic significance regarding the geothermal resource. Upon the completion of this effort, he will present the project director with a short report on his findings which will be included in the final project report.
6. The project engineer will use the findings of the geologists to determine engineering and, with the participation of the project director, economic feasibility of resource utilization. At the end of this assessment the project engineer will present his findings to the project director.
7. The project director will then write a final report based on the findings of the participants. This final report is expected to include a clear, precise and acceptable determination of the efficacy of the utilization of geothermal resources ~~utilization~~ in the Village of Jemez Springs, New Mexico. *After the report is issued pipes will be laid to deliver hot water from the well to the Town Hall to be used for space heating.*

III. Continued

The entire project is not expected to exceed twelve (12) weeks, excluding reasonable delays due to weather conditions, from the time drilling begins. Conduct of activities associates with the project are subject to the approval of the Mayor of Jemez Springs and other appropriate governmental representatives.

WORK SCHEDULE

Time In Weeks (All predrilling activity not shown)

1 2 3 4 5 6 7 8 9 10 11 12

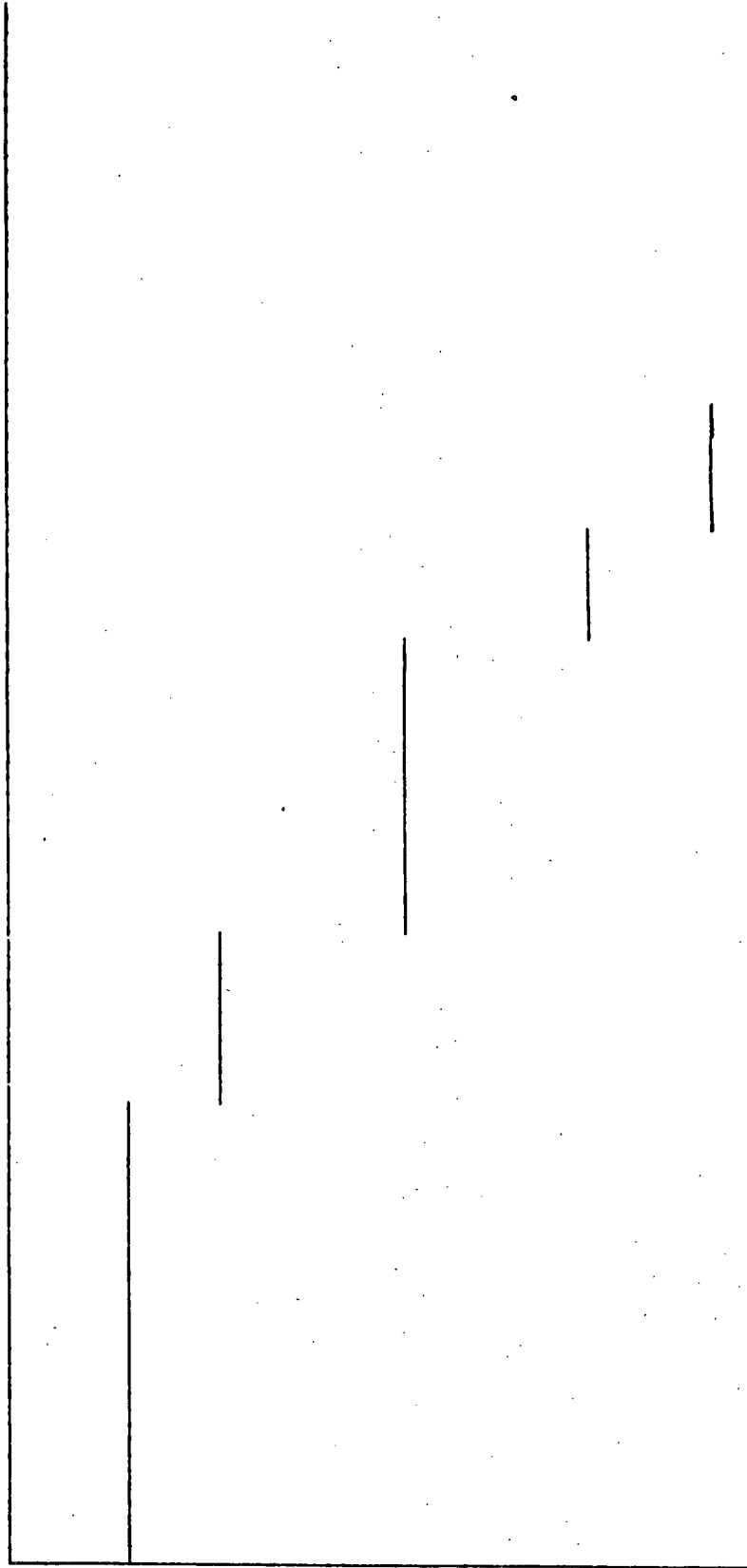
Drill
Test
Wells

Post Drilling
Measuring
and
Testing

Assess
Data
(Geologist
and
engineering)

Write
reports of
results
for project
director

Final
Report



IV. PROJECT BUDGET

Funds requested to conduct this resource evaluation amount to \$31,162.50. An itemized breakdown of this total follows:

1. Drilling Costs \$22,000.00
 - a. 2 wells @ \$20/ft with a maximum depth of 750 feet each \$15,000.
(It is entirely possible that the wells will not have to be drilled to a depth of 750 ft. in which case the unused funds could be remitted to the state.)
 - b. Pump installation and operation \$ 7,000.
2. Project Management \$ 5,962.50
 - a. Time
 - 5 weeks @ \$750/wk - full time \$3,750.00
 - 7 weeks @ \$750/wk - 1/4 time \$1,312.50
 - \$5,062.50
 - b. Travel \$ 900.
3. Project Engineering \$ 3,200.00
 - a. Time
 - 1 engineer @ \$1,000/wk - 3 weeks \$ 3,000.
 - b. Travel \$ 200.

Against this budget request the following are the sources of matching funds:

1. Value of land made available by The Village of Jemez Springs, 16.4 acres @ \$7,482/acre.	\$122,704.80
2. Time contributed by Los Alamos Scientific Laboratories Geologists, 100 hrs. @ \$36/hr.	\$ 3,600.00
3. Preliminary Resource Evaluation and Proposal Preparation by Coupland, Moran & Associates (and subcontractor).	\$ 10,700.00
	<hr/>
TOTAL MATCHING FUNDS	\$137,004.80

V. PROJECT PARTICIPANTS - KEY PERSONNEL

The principal investigator and the person with final approval of the location of drilling sites will be Mr. Eddie Armenta, Mayor of the Village of Jemez Springs.

The project director is Mr. Tom Kleeman, who is familiar with the area involved. His involvement with all of the different parties facilitates his coordinating the various work efforts and assembling the final reports.

Director of engineering is G. Robert Moran of Coupland, Moran & Associates, the firm which performed the preliminary evaluation.

Geological expertise will be furnished by Los Alamos Scientific Laboratories. Presently there are several geologists from L.A.S.L. working on geothermal related phenomena in and around the Jemez Springs and A. W. Laughlin of L.A.S.L. will appoint a geologist to be in charge of this effort during the project.

The well drilling contractor will be chosen on the basis of price, availability, experience and reputation.

Appropriate resumes for the project director and the engineers follows.

WILLIAM THOMAS (TOM) KLEEMAN, JR.
ON CONTRACT TO COPLAND, MORAN & ASSOCIATES
200 ALTEZ SE
ALBUQUERQUE, NM 87123

ENERGY CONSULTANT

AGE: 30

EDUCATION:

1972 B.A. University of Texas at Austin (Special Honors
in Economics)

1972-1974 Economics Ph.D. Program - University of Texas at Austin

EXPERIENCE:

Mr. Kleeman has worked as a consultant in energy and related fields since 1975. Most recently he worked on a preliminary design and economic feasibility study of utilizing geothermal resources for a space heating system for the Village of Jemez Springs, New Mexico. His work has involved projecting energy demands of a new community; assessing the economic infra-structure requirements of urban planning projects; analyzing the environmental/socio-economic impacts of the Trans-Canada Pipeline; assessing the economic impact of geothermal developments; planning of regional geothermal research and development programs; and constructing input-output models to measure the economic impacts of water quality legislation. During this period Mr. Kleeman has been an advisor to the Texas Railroad Commission, Office of Surface Mining and Reclamation, and to the Texas Energy Advisory Council. Currently coordinating efforts to form a joint U.S. Mexico research and development program in the Rio Grande Region of Chihuahua and Texas.

From 1974 to 1975 Mr. Kleeman served as economist and Chief of Program Review and Monitoring, Planning Division, Texas General Land Office.

During the period 1973 to 1974, he was a research associate in the Center for Research in Water Resources, University of Texas. Has worked as staff coordinator and chief economist on the Economics/Land Use TaskForce of an NSF/RANN project studying management of the Texas Coastal Zone.

PUBLICATIONS

"Economics and Land Use Impact: Technological Assessment of Alternative Environmental Policies," Final National Science Foundation (RANN) Report, University of Texas at Austin, June 1974, (w/Hazelton, et. al.)

"Technological Assessment of the Impact of Geothermal Development in the Corpus Christi Area of Texas," Proceedings of the Second United Nations Symposium on the Development and Use of Geothermal Resources, San Francisco, Calif., May '75 (w/K. E. Haynes and T. F. Freeland).

"Environmental Quality and Inflation: The Cost-Push Effects of the 1972 Pure Water Legislation," Environment and Planning, Vol. 7, Kent, England, Summer '75 (w/K. E. Haynes).

"Environmental Quality and Inflation: A Regional Perspective on Cost-Push Impacts," Invited Paper Regional Science Association, National Meetings Nov, '75 (w/K. E. Haynes).

Rio Grande Geothermal Resources: A Regional Perspective, Report to ERDA, The Texas Gov's Energy Advisory Council and the New Mexico Energy Resources Board, Houston, Texas, Mar., '75.

"Geothermal Resources as an Alternative for an Area with an Energy Problem: The Rio Grande Region," Proceedings Geothermal Resources Council State of the Art Meeting, San Diego, Calif. May '77 (w/H. Savage).

"Rio Grande Geothermal Resources: An International Resource." Los Alamos Scientific Laboratories, Los Alamos, N.M. Aug, '78

B I O G R A P H Y

NAME: G. Robert Moran

DUTIES: Principal, Electrical Division

REGISTRATION: New Mexico, Texas, Colorado, Arizona, Utah

BIRTH: December 29, 1935

EDUCATION: BSEE, University of Texas at El Paso

EXPERIENCE:

1954 - 1961: Designer and Project Engineer - Randal & True Consulting Engineers

1961 - 1964: Project Engineer - Uhl & Lopez Consulting Engineers

1964 - 1968: President and Chief Engineer - Altura Engineering Corporation

1968 - Present: Principal - Coupland, Moran & Associates, Inc.

PROFESSIONAL AFFILIATION:

Consulting Engineers Council of New Mexico
New Mexico Society of Professional Engineers
Illuminating Engineering Society

B I O G R A P H Y

NAME: James O. Coupland

DUTIES: Principal, Mechanical Division

REGISTRATION: New Mexico, Texas

BIRTH: June 12, 1936

EDUCATION: BSME, University of New Mexico

EXPERIENCE:

1959 - 1963: Junior Engineer and Project Engineer - Dr. Marcello Giomi, PE

1963 - 1965: Project Engineer - Swanson-Rink & Associates

1965 - 1967: Project Engineer and Manager of Electrical and Mechanical Divisions - Kruger, Lake & Associates

1967 - 1968: Partner - Steele and Coupland

1968 - Present: Principal - Coupland, Moran & Associates, Inc.

PROFESSIONAL AFFILIATION:

American Society of Heating, Refrigeration, Air Conditioning Engineers
New Mexico Society of Professional Engineers
Construction Specifications Institute