MK022PR
SECTION 19 MINE
(OLD STOPE LEACH)

Quivira Mining Company

P.O. Box 218, Grants, NM USA 87020 (505)287-8851

August 9, 2000

Mr. Fernando Martinez
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

Re: Mining Permit MK009RE
Section 19 Resampling

Dear Mr. Martinez,

Pursuant to General Obligation and Condition H within Section 10 of the approved mine permit referenced above, Quivira is proposing to resample Section 19 for release. Attached to this is Quivira's proposed sampling plan and objectives for this project The proposed sampling methodology is consistent with the methods that were used on the October 1998 prior reclamation inspection performed by MMD. This will allow for direct comparison to the past results.

Quivira is anticipating performing the sampling on August 31, 2000. By this letter, Quivira is informing MMD of the sampling date in the event MMD wishes to be present for the sampling. As a result of the sampling plan requiring MMD approval prior to sampling, Quivira requests that MMD promptly review and approve the attached plan.

If you have any questions, please contact me at (505) 287-8851, extension 205.

Regards,

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

As stated

xc: P. Goranson
File

RANDOM NUMBER TABLE FOR
SAMPLE LOCATION/DIRECTION

random number	node	direction
33.852	33	85
9.659	9	65
52.298	52	298
78.323	78	323
77.076	77	76
83.428	83	42
2.247	2	247
36.038	36	38
75.239	75	239
12.918	12	91
22.073	22	73
4.911	4	91
3.785	3	78
15.115	15	115
19.887	19	88
2.470	2	47
25.514	25	51
30.506	30	50
48.613	48	61
31.734	31	73
32.978	32	97
31.582	31	58
79.286	79	286
41.078	41	78
37.650	37	65

Note: only one transect will be run at any given node.

The table that will be used to determine sample locations will be generated on the day sampling occurs.

Prior Reclamation Release Survey - Section 19 Mine Site

Sampling Methodology

The sampling methodology that will be utilized for this survey will be consistent with the methods that were used on the October 1998 prior reclamation inspection performed by MMD. This will allow for direct comparison to the past results.

The vegetation survey shall be performed by Mr. Richard Montoya, district conservation with the U.S.D.A. Natural Resource Conservation Service, Grants Office. Mr. Montoya has extensive experience in evaluating range conditions similar to those in the vicinity of Quivira's mining operation.

A uniform 100 foot grid pattern will be overlain on a map of the subject area with each node identified by a discrete whole number. Microsoft Excel will be used to generate a random number table that will consist of 87 random numbers from which the sampling location and direction will be determined. Sampling locations will be selected in sequential order from the numbers generated. A map depicting this grid system at the Section 19 mine site is attached. Actual field locations will be found through either ground measurements or through the use of a GPS unit. Also attached is a sample random number output to establish sampling points. A minimum of 10 transects will be run. Additional transects may be conducted if the spatial distribution of the first 10 transects as compared to the overall prior reclamation area warrants it.

Sampling will be performed via the Line Intercept method to evaluate cover. Each transect will be 50 feet in length with a sampling interval every foot, thereby obtaining 50 points per transect. Each point along the transect represents 2% of the cover for a given transect. Species data will be collected at each sampling point along the transect. Data will be tabulated to present percent cover and species diversity.

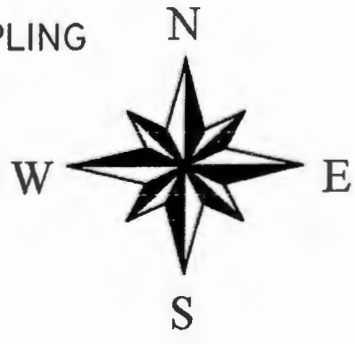
Sampling Objectives

The cover requirements that will be used to determine success for this survey will be that perennial cover must average at least 75% of the perennial cover in the Sandy (WP-2) range site description. The average perennial ground cover for a potential natural plant community in the Sandy (WP-2) RSD is 18%. 75% of this is value is 13.5%. Therefore, the cover requirements that will be used to determine success for this survey will be that perennial cover must average 13.5%.

The diversity requirement will be that at least four (4) different grass species, including both warm season and cool season species, be found at the site.

SECTION 19
PRIOR RECLAMATION AREA

NODE ASSIGNMENTS FOR VEGETATION SAMPLING



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SECTION 19
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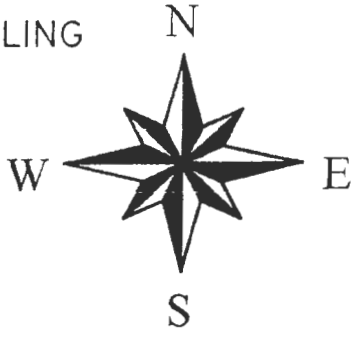

0.06 0 0.06 0.12 Miles

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QUIVIRA MINING COMPANY
P.O. BOX 218
GRANTS, NEW MEXICO 87020
(505)287-8851

FACSIMILE NO. - (505)287-8851 EXT. 295
or (505) 285-5550

FACSIMILE REQUEST

TO
NAME: Holland S.
COMPANY: _____

FROM
NAME: Peter L
COMPANY: _____

TOTAL NUMBER OF PAGES (INCLUDING FACSIMILE REQUEST): 2

MESSAGE: Seed mix used for interseeding (This is from a 8/17/99 submittal on the old slope backing closeout plan development/negotiations

DATE SENT: _____ TIME SENT: _____ SENT BY: _____

TABLE 1

Quivira Mining Company
Revegetation Standard

Quivira Seed Mix	Seed Mix Percentage	WP-2 RSD Percentage	Revegetation Standard[1]
Blue Grama	20	25 – 30	18.75% - 30%
Indian Ricegrass	15.5	5 – 10	3.75% - 10%
Native Western Wheatgrass	19	15 – 20	11.25% - 20%
Sideoats Grama	21	-	-
Galleta	2	1 – 5	0.75% - 5%
Sand Dropseed	0.5	10 – 15	7.5% - 15%
Alkali Sacaton	3	-	-
Sheep Fescue	15	-	-
Fourwing Saltbush	4	5 – 10	3.75% - 10%

Notes:

1. Revegtation standard determined by using 75% of the allowable composition specified within the WP-2 RSD for each component present within Quivira's seed mix.

Similarly, Quivira's revegetation standard for average percent cover for grasses, grasslike, and forb species shall be 14% based on average percent of surface area (18% * 0.75 = 13.5% [Sec. E.4 of Sandy WP-2 RSD]).

Evaluation Methods

Quivira will utilize an evaluation process similar to those described within the NRCS National Range Handbook ("NRH") within Section 604, *Methods of Determining Production and Composition.* Quivira will also use the NRCS Range Condition Worksheet to evaluate the revegetation effort. A copy of the form that will be used is attached. The evaluation methodology is described below.

The sampling locations will be randomly selected utilizing a numeric grid system established for the permit area. A 250 foot long transect will be established at each sampling location and every 25 feet along a transect will be considered a discrete sampling plot, resulting in ten (10) sample plots per transect. A minimum of ten (10) transects will

Quivira Mining Company

P.O. Box 218, Grants, NM USA 87020 (505)287-8851

October 11, 1999

Mr. Doug Bland, Director
Mining and Minerals Division
2040 S. Pacheco Street
Santa Fe, NM 87505

Re: **Prior Reclamation Sites**

Dear Mr. Bland,

In response to your May 6, 1999 letter regarding Quivira's prior reclamation sites, Quivira provides the following vegetation survey information on the sites. These surveys were conducted by Mr. Richard Montoya, District Conservationist for the Natural Resources Conservation Service ("NRCS") using accepted sampling methodologies. Surveys were conducted at each of the remaining sites in order to obtain additional information on the success of the revegetation efforts.

Quivira believes it is important to include all sites in this re-evaluation because the 1998 inspection (October 1-2, 1998), which the decision to deny release was primarily based on, could not evaluate the success of the interseeding activities performed by Quivira in mid-1998. The surveys conducted by NRCS in August 1999 provided this important information and Quivira believes that it should be included in all the site evaluations.

Based on the results of the NRCS surveys, all sites faired extremely well from the interseeding and it is Quivira's belief that the mandate of the Mining Act, which requires the sites to be reclaimed to a condition that allows for the re-establishment of a self-sustaining ecosystem, has been achieved at all the prior reclamation sites with the exception of Section 24. For this reason, Quivira requests that these sites be released under prior reclamation process and the Section 24 prior reclamation area be incorporated into the existing mine permit for old stope leaching (Mine Permit MK009RE).

Please contact me at (505) 287-8851, extension 205 if you have any questions regarding this submittal.

Regards,

Peter Luthiger
Supervisor, Radiation Safety
And Environmental Affairs

Attachment

Xc: P. Goranson
File

QUIVIRA MINING COMPANY
PRIOR RECLAMATION EVALUATION

Introduction

Quivira conducted reclamation activities at its former underground uranium mines in Ambrosia Lake, New Mexico and requested release from the New Mexico Mining Act ("Act") through the prior reclamation provisions afforded by the Act. Inspections have been performed by MMD in August 1995, October 1997, and October 1998 with the most recent inspection resulting in MMD denying Quivira's request for release of five of the sites (Sections 17, 19, 22, 24, and 33 mine sites).

Within the determination letter, dated May 6, 1999, MMD provided an option to Quivira to resample one site based on MMDs evaluation of the October 1998 survey data. As a result of interseeding that was performed in mid 1998 shortly before the October 1998 inspection, no information was available to evaluate the success of this additional measure implemented by Quivira. To facilitate this gap, vegetation surveys were conducted on August 27, 1999 by Mr. Richard Montoya, District Conservationist for the Natural Resources Conservation Service ("NRCS"). This report presents the findings of these surveys.

Sampling Methodologies

In an effort to provide a comparison to the October 1998, the NRCS surveys utilized some of the same sampling locations and methodologies that were established and utilized to conduct the 1998 surveys. Three transects at each site were randomly selected from the 1998 transects. The one difference from the MMD surveys was that the NRCS surveys used a 100 foot long transect rather than a 50 foot transect. Consistent with the MMD surveys, a one foot sampling interval was used, which would correspond to having each sampling point represent 1% of the cover for a given transect for a 100 foot transect. In addition to the transect sampling, diversity information was collected by identifying other species that were not along the transect but were present in the immediate vicinity of the transect. The following table depicts the 1998 transects that were randomly selected for use in the NRCS surveys. Copies of the field surveys are attached.

Table 1
NRCS Transect Points
August 1999 Survey

Mine Site	Transects Sampled		
Section 17	2 (grid 14, 134°)	5 (grid 32, 354°)	7 (grid 46, 326°)
Section 19	1 (grid 35, 316°)	4 (grid 21, 58°)	7 (grid 11 278°)
Section 22	3 (grid 29, 316°)	5 (grid 9, 166°)	6 (grid 12, 177°)
Section 24	1 (grid 4, 239°)	4 (grid 51, 115°)	6 (grid 62, 256°)
Section 33	3 (grid 46, 10°)	6 (grid 7, 15°)	8 (grid 8, 329°)

Surevy Results - August 1999

Evaluation of the NRCS vegetation survey results from the randomly selected transects provides interesting results. Quivira believes that these results highlight important and necessary information on the success of not only the 1998 interseeding, which was not able to be evaluated during the October 1998 MMD surveys; but the results also indicate that Quivira has achieved the reclamation requirement of reclaiming the land surface to a condition that allows for the re-establishment of a self-sustaining ecosystem. Table 2 summarizes the transect results for each of the sites.

Table 2
NRCS Transect Sampling Results
August 1999 Survey

	PERCENT COVER (%)				
Transect	Soil	Perennial Species	Annual Species	Litter	Rock
17-14-134	48	41	11	0	0
17-32-354	60	26	13	1	0
17-46-326	42	31	26	1	0
19-35-316	47	26	24	3	0
19-21-58	65	27	7	1	0
19-11-278	54	35	9	2	0
22-29-316	31	30	24	15	0
22-9-166	42	43	2	12	0
22-12-177	42	29	17	12	0
24-4-115	61	12	20	7	0
24-51-115	48	11	39	2	0
24-62-256	48	11	37	4	0
33-46-10	28	23	49	0	0
33-7-15	18	20	31	0	31
33-8-329	68	30	1	1	0

Diversity was also evaluated by identifying other species that were not recorded along the transect sampling points but were present in the immediate vicinity of the transect. For all transects, an average of over 4 additional perennial species (grasses, forbs, shrubs) were observed adjacent to the transect locations at the sites.

In their evaluation of the October 1998 survey results for Quivira's prior reclamation sites, MMD adopted a perennial cover requirement of 13.5%. This is based on the vegetation reclamation standard that Quivira and MMD developed for the old stope leaching permit. Although Quivira questions using a performance standard that was established for an existing mine permit and applying it to prior reclamation sites, the 13.5% cover requirement was used as the milestone in this evaluation to maintain consistency with MMDs evaluation process. Comparing the NRCS survey results to the perennial cover standard adopted by MMD indicates that all sites easily exceed the cover standard of 13.5% except for the Section 24 site, which is just slightly below the adopted standard.

Table 3
Perennial Cover Comparison
October 1998 to August 1999

	PERENNIAL COVER (%)		
Transect	October 1998	August 1999	% Change
17-14-134	14	41	+27
17-32-354	16	26	+10
17-46-326	4 2	31	+27
19-35-316	20	26	+6
19-21-58	12	27	+15
19-11-278	6	35	+29
22-29-316	18	30	+12
22-9-166	14	43	+29
22-12-177	34	29	-5
24-4-115	12	12	0
24-51-115	18	11	-7
24-62-256	0	11	+11
33-46-10	10	23	+13
33-7-15	12	20	+8
33-8-329	6	30	+24

Another one of Quivira's concerns arising from the October 1998 survey was the fact that the interseeding that Quivira conducted in mid-1998 would not be factored in the site evaluation process due to the short time between interseeding and performing the survey. The results presented within Table 3 show that the interseeding was very successful in dramatically improving the perennial cover at all the sites.

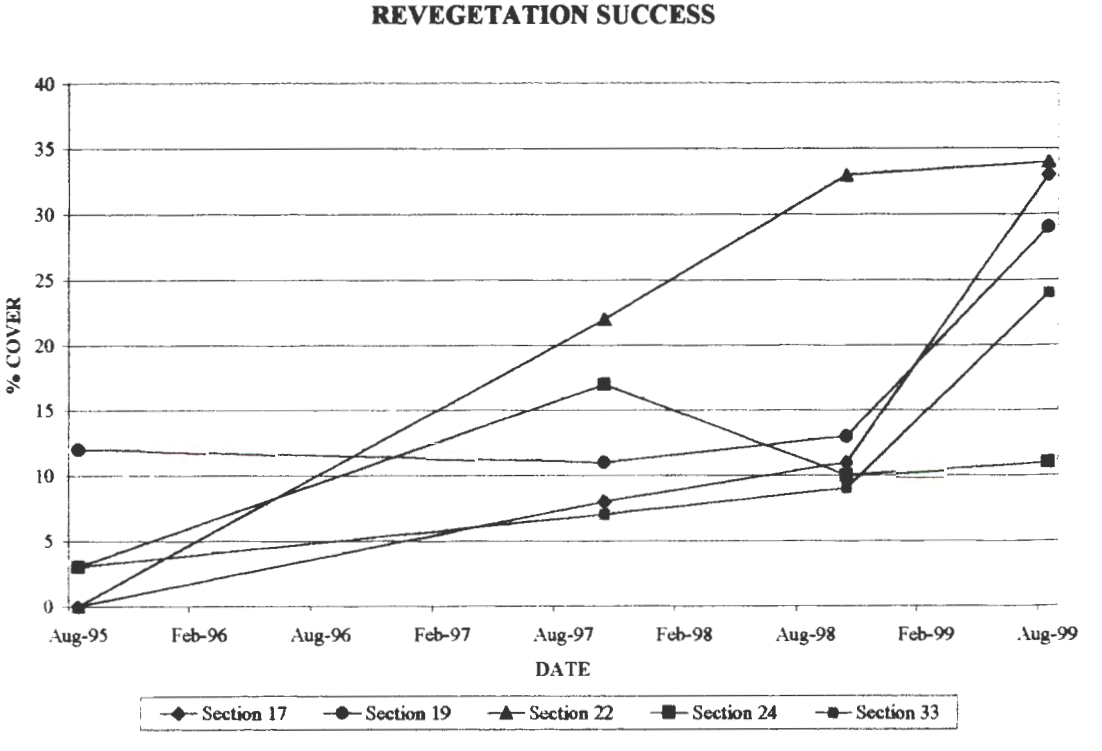
The August 1999 NRCS survey provided the fourth data set on Quivira's prior reclamation sites. This information can be utilized to address a concern expressed by MMD staff regarding releasing areas that have been revegetated without having information on any trend that is occurring. Evaluating the data from the four surveys over a four year period should provide trend information

which could be used by MMD in evaluating the success of the reclamation and revegetation work. Although different sampling methods were used for the first two surveys (August 1995, October 1997) when compared to the sampling methods employed on second two surveys (October 1998, August 1999), the overall results pertaining to percent cover can be evaluated to determine evidence of any trending. Table 4 provides the percent cover values that were reported in the four surveys. The values represent the average perennial cover value for native and other species. Figure 1 depicts the vegetation survey data contained in Table 4 and provides an obvious trend in which direction the revegetation efforts are going.

Table 4
Perennial Cover Values
Prior Reclamation Surveys 1995 - 1999

17	0	8	11	33
19	12	11	13	29
22	0	22	33	34
24	3	17	10	11
33	3	7	9	24

Figure 1
Rvegetation Trend Data
Prior Reclamation Sites 1995 - 1999



Quivira believes that MMD should consider the August 1999 NRCS vegetation survey information as a component of the overall prior reclamation process for the mines as it provides valuable data on the interseeding activities that were performed prior to MMDs 1998 inspection but could not be evaluated at that time.

Based on the overall prior reclamation evaluation process initiated in August 1995 and continuing through August 1999, there is overwhelming data to support Quivira's belief that, with the exception of Section 24, the revegetation of the prior reclamation sites has been successful in achieving the Mining Act requirement of reclaiming the land surface to a condition that allows for the re-establishment of a self-sustaining ecosystem, and warrant release.

QUIVIRA PRIOR RECLAMATION SITES
NRCS VEGETATION SURVEY
DATA SHEETS
AUGUST 27, 1999

S - soil
BG - Blue Grama
RT - Russian Thistle
SD - Sand Dropseed
K - Kochia
AAFF - Annual Forbs
IR - Indian Rice Grass
WW - Western Wheatgrass
L - Litter
CW - Crested Wheatgrass
AS - Alkali Sacaton
GM - Globemallow
R - Rock
PPFF - Perennial Forbs
FT - Fox Tail
AAGG - Annual Grasses
FWS - Four Winged Saltbush
BW - Buckwheat
G - Groundsel
BBS - Bottle Brush Squirreltail
BS - Broom Snakeweed

Form 4: Line-Point Int.

Date: 9/2-/20

State: NM

Sample #: 46-326

Rep: Sec 17

Line (circle one):

N-S W-E

Observer: R Montoya
P. Luthiger

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		S							
2		AS	S						
3		AS	S						
4		AA GG	S						
5		S							
6		SD	S						
7		SD	S						
8		S							
9		S							
10		AS	S						
11		AS	S						
12		SD	S						
13		BG	S						
14		BG	S						
15		AS	BG	S					
16		AS	BG	S					
17		AS	S						
18		AS	S						
19		AS	AAGG	S					
20		S							
21		AS	BG	S					
22		AS	S						
23		S							
24		BG	S						
25		SD	S						
26		SD	WW	S					
27		Rab. Br.	S						
28		S							
29		WW	S						
30		WW	S						
31		S							
32		S							
33		S							
34		K	S						
35		K	S						
36		S							
37		S							
38		S							
39		S							
40		S							
41		K	S						

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Line (circle one):

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****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Rep: _____

Line (circle one):

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42		S							
43		K	S						
44		K	S						
45		K	S						
46		K	S						
47		S							
48		S							
49		S							
50		S							
51		S							
52		S							
53		S							
54		K	S						
55		K	S						
56		R.T	K	S					
57		S							
58		K	S						
59		K	S	-					
60		S							
61		L	S						
62		S							
63		K	S						
64		K	S						
65		K	S						
66		S							
67		K	S						
68		S							
69		K	S						
70		S							
71		K	S						
72		S							
73		S							
74		S							
75		K	S						
76		S							
77		S							
78		S							
79		IR	S						
80		SD	S						
81		S							
82		S							

4: Line-Point Int.

Date: ______________

N-S W-E

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Line (circle one):

N-S W-E

Observer: ______________

v.5/27/98

Pt.	Ht. Ft.Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		S						
84		Rub brn	S					
85		S						
86		K	S					
87		BG	S					
88		K	S					
89		S						
90		K	S					
91		S						
92		K	S					
93		SD	S					
94		K	S					
95		S						
96		K	S					
97		IR	S					
98		[illegible]						
99		[illegible]	[illegible]	[illegible]				
100		[illegible]	S					
101								
102								
103								
104								
105		Other Species not in the Intercept but						
106		in area:						
107		Rocky Mt. Bee Plant, Four O'clock						
108		Broom Snakeweed, Selsify, Globe Mallow						
109		Bottle brush Squirrel Tail						
110								
111								
112		Subtotal:	Rock			0%		
113			Soil			42%		
114			Perennial Species			31%		
115			Annual Species			26%		
116			Litter			1%		
117			(Annual + Perennial Species = 57%)					
118								
119			Total For Transect = 100%					
120								
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/[illegible]

State: NM

Sample #: 32-354

Rep: Sec 17

Line (circle one):

N-S W-E

Observer: R. Montoya
P. Zuttermeister

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

v:5/27/99

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
1		S						
2		S						
3		S						
4		AS	S					
5		S						
6		WW	S					
7		S						
8		K	S					
9		S						
10		S						
11		S						
12		WW	S					
13		S						
14		S						
15		S						
16		S						
17		S						
18		L	S					
19		AS	S					
20		AS	S					
21		AS	S					
22		AS	S					
23		AS	S					
24		S						
25		S						
26		S						
27		K	S					
28		K	S					
29		K	S					
30		S						
31		S						
32		S						
33		S						
34		S						
35		S						
36		S						
37		K	S					
38		FT	S					
39		S						
40		S						
41		S						

Line-Point Int.

17-32-354

N-S W-E

Observer:_____

Dead Canopy Codes (use only if no live canopy at p
DT = Dead Tree
DS = Dead Shrub (incl. succul)
DG = Dead Graminoid
DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.
AAFFxx = Annual Forb
PPFFxx = Perennial Forb
AAGGxx = Annual Grass
PPGGxx = Perennial Grass
SSSSxx = Shrub
TTTTxx = Tree

Additional Codes
L = litter
R = rock (>0.2 inch diameter)
LIC = Lichen on soil
M = Moss
C = Cyanobacterial soil crust
W = water
S = soil
*Write an "X" in the call after basal hits.
**Place a flag for soil stability measurements at all points at which height is measured.

State: _____
Sample #: 32-354
Rep: Sec 17
Line (circle one):
N-S W-E
Observer:_____

Pt.	Ht. Ft Tenths	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	v:5/27/99 Code
83		S						
84		AFS	S					
85		AF	S					
86		AF	K					
87		K	S					
88		S						
89		WW	S					
90		2						
91		S						
92		K	S					
93		K	S					
94		WW	S					
95		K	WW	S				
96		SD	S					
97		NW	S					
98		S						
99		SD	S					
100		SD	WW	S				
101								
102								
103								
104								
105								
106		Other Species not in Line Intercept						
107		but in area. Rev. Bee Plant Snake weed,						
108		Indian Ricegrass, Groundsel						
109								
110								
111								
112		Subtotal:	Rock			0%		
113			Soil			62%		
114			Perennial Species			26%		
115			Annual Species			13%		
116			Litter			1%		
117			(Annual + Perennial Species =			39%)		
118								
119		Total for Transect = 100%						
120								
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/99

State: NM

Sample #: 14-13Y

Rep: Sec 17

Line (circle one):

N-S W-E

Observer: R. Monday
P. Luthiger

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft.Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		WW	S						
2		S							
3		WW	S						
4		S							
5		S							
6		WW	S						
7		S							
8		S							
9		Bindweed	S						
10		S							
11		SD	S						
12		WW	S						
13		RT	S						
14		SD	S						
15		CW	S						
16		SD	S						
17		S							
18		RT	S						
19		WW	S						
20		SD	X						
21		AS	S						
22		WW	S						
23		S							
24		S							
25		SD	S						
26		SD	S						
27		S							
28		S							
29		AS	X						
30		CW	S						
31		S							
32		S							
33		Sq Tail	X						
34		AS	BG	S					
35		CW	S						
36		S							
37		S							
38		S							
39		AS	X						
40		S							
41		S							

Form 4: Line-Point Int.

Date: _____

Rep: 17-14-134

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site).

Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft.Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
42		WW	S						
43		WW	S						
44		SD	S						
45		RT	WW	S					
46		S							
47		SD	WW	S					
48		AS	S						
49		AS	BW	WW	S				
50		AS							
51		S							
52		S							
53		Bindweed	S						
54		SD	BG	CW	S				
55		S							
56		IR	RT	S					
57		AS	S						
58		WW	S						
59		WW	S						
60		S							
61		S							
62		S							
63		S							
64		S							
65		S							
66		S							
67		S							
68		S							
69		S							
70		CW	S						
71		AAFF	S						
72		RT	S						
73		WW	S						
74		WW	S						
75		S							
76		S							
77		RT	S						
78		SD	RT	S					
79		RT	S						
80		S							
81		S							
82		IR	RT	S					

.. Line-Point Int.

Site: _____

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site).

Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

***Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: 14-134

Rep: Sec 17

Line (circle one):

N-S W-E

Observer: _____

Pt.	Ht. Ft. Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		S						
84		S						
85		S						
86		S						
87		S						
88		S						
89		LT	S					
90		S						
91		LT	S					
92		S						
93		SW	S					
94		S						
95		S						
96		LT	S					
97		S						
98								
99		LT	S					
100		LT?	S					
101								
102								
103								
104								
105								
106		Other species not in line intercept but in						
107		area						
108		Rabbit brush	Broom snake weed, Aster,					
109		Threadleaf cin-	-dex					
110			D					
111								
112		Sightd	Rock			0%		
113			Soil			48%		
114			Perennial Species			41%		
115			Annual Species			11%		
116			Litter			0%		
117			(Bare + Perennial Species = 52%)					
118								
119		Total	for Transect = 100%					
120								
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/97

State: NM

Sample #: 11-273

Rep: Sec 19

Line (circle one):

N-S W-E

Observer: R. Montoya
P. Lakiza

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: ____________

Sample #: _________

v:5/27/99

Pt.	Ht.	Top Canopy	Lower Layers (Canopy and Soil Surface)					
	Ft Tenth	Sp. Code	Code	Code	Code	Code	Code	Code
1		S						
2	[redacted]	BG	S					
3	[redacted]	BG	LT	S				
4	[redacted]	S						
5	[redacted]	CW	S					
6	[redacted]	S						
7	[redacted]	SD	S					
8	[redacted]	S						
9	[redacted]	S						
10	[redacted]	K	S					
11	[redacted]	S						
12	[redacted]	SD	K	S				
13	[redacted]	SD	Lambsquarters	S				
14	[redacted]	RT	SD	S				
15	[redacted]	S						
16	[redacted]	RT	SD	S				
17	[redacted]	S						
18	[redacted]	S						
19	[redacted]	RT	SD	S				
20		K	S					
21	[redacted]	S						
22	[redacted]	RT	S					
23	[redacted]	RT	WW	S				
24	[redacted]	S						
25	[redacted]	S						
26	[redacted]	SD	S					
27	[redacted]	S						
28	[redacted]	S						
29	[redacted]	BG	S					
30	[redacted]	S						
31	[redacted]	SD	S					
32	[redacted]	S						
33	[redacted]	CW	S					
34	[redacted]	S						
35	[redacted]	S						
36	[redacted]	S						
37	[redacted]	S						
38	[redacted]	S						
39	[redacted]	S						
40		AAFF	S					
41	[redacted]	SD	IR	S				

Form 4: Line-Point Int.

Date: ____________

N-S W-E

Observer: 11-278

Sec 19

Dead Canopy Codes (use only if no live canopy at p[oint])

DT = Dead Tree

DS = Dead Shrub (incl. succul.)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

*Write an "X" in the cell after basal hits.

**Place a flag for soil stability measurements at all points at which height is measured.

State: ____________

Sample #: ____________

Rep: ____________

Line (circle one): N-S W-E

Observer: ____________

v:5/27/99

Pt.	Ht. Ft.Ten	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		Cw	S					
84		S						
85		AT	S					
86		L	S					
87		IR	S					
88		Cw	S					
89		Cw	X					
90		Cw	S					
91		S						
92		SD	S					
93		S						
94		S						
95		S						
96		S						
97		S						
98		Cw	S					
99		Cw	X					
100		S						
101								
102								
103								
104								
105								
106		Yellow species not in line intercept but						
107		area						
108		Broom snakeweed yellow sweet clover,						
109		[illegible] 4 wing saltbush L						
110								
111		Subtotal:	Soil	54%				
112			Perennial Species		35%			
113			Annual Species		9%			
114			Litter	2%				
115		(Cover for Annual and Perennial Species 44%)						
116		Total	For Transect 100%					
117								
118								
119								
120								
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/04

State: NM

Sample #: 35-316

Rep: Sec 19

Line (circle one):

N-S W-E

Observer: R Montoya
P. Lutheyer

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
								v:5/27/99
1		PPFF	S					
2		PPFF	S					
3		CW	S					
4		CW	FWS	S				
5		S						
6		S						
7		S						
8		S						
9		K	S					
10		K	S					
11		S						
12		BgHe Bg	S					
13		L	S					
14		S						
15		K	S					
16		K	S					
17		S						
18		S						
19		K	S					
20		S						
21		S						
22		K	S					
23		L	S					
24		S						
25		S						
26		K	S					
27		K	S					
28		RT	S					
29		S						
30		S						
31		RT	S					
32		S						
33		S						
34		S						
35		S						
36		L	S					
37		S						
38		K	S					
39		RT	S					
40		IR	RT	WW	S			
41		IR	X					

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site).

Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: 19-35-316

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
								v:5/27/99
42		SD	S					
43		SD	S					
44		S						
45		S						
46		S						
47		CW	S					
48		S						
49		CW	S					
50		CW	S					
51		CW	S					
52		K	S					
53		Aster	S					
54		S						
55		S						
56		S						
57		L	S					
58		K	S					
59		S						
60		Sq. tail	S					
61		K	S					
62		K	S					
63		K	S					
64		K	S					
65		S						
66		K	S					
67		S						
68		S						
69		S						
70		S						
71		IR	K	S				
72		IR	X					
73		Sq tail	S					
74		Sq tail	S					
75		SD	S					
76		Sq tail	S					
77		Sq tail	S					
78		S	S					
79		S						
80		S						
81		CW	Sq tail	S				
82		S						

. 4: Line-Point Int.

Site: _____

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site).

Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LiC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

"Write an "X" in the cell after basal hits.

"Place a flag for soil stability measurements at all points at which height is measured.

State: _____

Sample #: 35-316

Rep: Sec 19

Line (circle one):

N-S W-E

Observer: _____

Pt.	Ht. Ft Tenths	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
83		S							
84		S							
85		S							
86		S							
87		S							
88		S							
89		S							
90		S							
91		S							
92		S							
93		S							
94		SAW	S						
95		SAD	X						
96		SAD	S						
97		RT	WW	S					
98		RT	L	S					
99		RT	L	S					
100		LT	Soil Crust	S					
101									
102									
103									
104									
105									
106									
107									
108		Other species not in line Intercept hit							
109		in area							
110									
111		Blue grama, Four wing saltbush, Globemallow							
112		Aster, Yellow sweet Clover							
113									
114									
115		Subtotal	Rock			0%			
116			Soil			47%			
117			Perennial species			26%			
118			Annual species			24%			
119			Litter			3%			
120			(Annual + Perennial species =			50%			
121									
122		Total for Transect =	100%						
123									

Form 4: Line-Point Int.

Date: 7/27/..
State: NM
Sample #: 21-53
Rep: Sec 19
Line (circle one):
N-S W-E
Observer: R. Montoya
P. Luthi-Jones

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree
DS = Dead Shrub (incl. succul)
DG = Dead Graminoid
DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb
PPFFxx = Perrenial Forb
AAGGxx = Annual Grass
PPGGxx = Perennial Grass
SSSSxx = Shrub
TTTTxx = Tree

Additional Codes

L = litter
R = rock (>0.2 inch diameter)
LIC = Lichen on soil
M = Moss
C = Cyanobacterial soil crust
W = water
S = soil

***Write an "X" in the cell after basal hits.**
****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____
Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		RT	S						
2		S							
3		S							
4		S							
5		S							
6		RT	S						
7		RT	S						
8		S							
9		RT	CW	S					
10		K	IR	S					
11		K	RT	S					
12		S							
13		S							
14		S							
15		S							
16		S							
17		S							
18		CW	S						
19		S							
20		L	S						
21		CW	S						
22		S							
23		CW	S						
24		CW	S						
25		S							
26		S							
27		S							
28		BG	S						
29		S							
30		S							
31		S							
32		S							
33		S							
34		S							
35		AS	CW	S					
36		S							
37		SD	S						
38		S							
39		S							
40		S							
41		S							

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: 19-21-58

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft. Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
								v:5/27/99
42		S						
43		S						
44		CW	S					
45		S						
46		S						
47		S						
48		CW	S					
49		CW	S					
50		S						
51		CW	S					
52		S						
53		S						
54		RT	S					
55		S						
56		S						
57		S						
58		CW	S					
59		CW	S					
60		CW	S					
61		S						
62		CW	S					
63		S						
64		S						
65		S						
66		CW	S					
67		S						
68		S						
69		S						
70		IR	S					
71		SD	S					
72		S						
73		S						
74		S						
75		CW	S					
76		BY	SD	S				
77		S						
78		S						
79		S						
80		S						
81		S						
82		CW	S					

orm 4: Line-Point Int.

Date: ____________

N-S W-E

Observer: __________

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

Write an "X" in the cell after basal hits.

*****Place a flag for soil stability measurements at all points at which height is measured.***

State: __________

Sample #: 21-58

Rep: Sec 19

Line (circle one):

N-S W-E

Observer: __________

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code v:5/27/99
83		S						
84		BG						
85		S						
86		S						
87		CW	S					
88		S						
89		S						
90		S						
91		CW	S					
92		S						
93		S						
94		S						
95		CW	S					
96		S						
97		S						
98		CW	S					
99		/						
100		IL	S					
101								
102								
103								
104								
105		Other species	not in	line intercept	but			
106		in area:						
107		Gramma	Snake weed		Fringed	sage		
108		AP FF	Four winged	saltbush		Globe mallow		
109		clover						
110								
111								
112								
113		Subtotals	Rock			0%		
114			Soil			65%		
115			Perennial Species			27%		
116			Annual Species			7%		
117			Litter			1%		
118			(Annual + Perennial Species =			34%)		
119								
120		Total	For Transect		= 100	%		
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/97

State: NM

Sample #: 29-316

Rep: Sec 22-

Line (circle one):

N-S W-E

Observer: K. Montoya
P. Lutkegard

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		L	S						
2		K	L	S					
3		K	L	S					
4		K	S						
5		K	L	S					
6		K	S						
7		S							
8		S							
9		S							
10		S							
11		K	S						
12		K	L	S					
13		K	Aster	S					
14		Aster	S						
15		S							
16		S							
17		S							
18		S							
19		S							
20		AAFF	S						
21		SD	S						
22		SD	L	S					
23		WW	S						
24		K	L	S					
25		SD	L	S					
26		WW	L	S					
27		GM	L	S					
28		L	S						
29		RT	L	S					
30		GM	S						
31		GM	S						
32		S							
33		S							
34		WW	X						
35		S							
36		S							
37		S							
38		L	S						
39		S							
40		S							
41		S							

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: 22-29-316

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code
42		S					
43		S					
44		WW	S				
45		L	S				
46		S					
47		S					
48		FT	L	S			
49		S					
50		FT	S				
51		L	S				
52		S					
53		L	S				
54		L	S				
55		FT	L	S			
56		S					
57		S					
58		WW	S				
59		S					
60		L	S				
61		WW	L	S			
62		WW	L	S			
63		WW	L	S			
64		WW	L	S			
65		WW	X				
66		WW	S				
67		WW	X				
68		S					
69		L	S				
70		S					
71		WW	S				
72		L	S				
73		WW	S				
74		WW	FWS	L	S		
75		WW	L	S			
76		WW	X				
77		S					
78		WW	S				
79		S					
80		WW	L	S			
81		S					
82		WW	K	L	S		

ne-Point Int.

W-E

ver:

ead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacteriacal soil crust

W = water

S = soil

"Write an "X" in the cell after basal hits.

""Place a flag for soil stability measurements at all points at which height is measured.

State: _____

Sample #: 29-316

Rep: Sec 22

Line (circle one):

N-S W-E

Observer: _____

Pt.	Int. Ft. Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		L	S					
84		K	S					
85		RMB	WW	L	S			
86		RMB	L	S				
87		RMB	RT	L	S			
88		L	S					
89		L	S					
90		K	L	S				
91		K	S					
92		K	L	S				
93		K	L	S				
94		L	S					
95		WW	S					
96		L	S					
97		AAFF	L	S				
98		WW	AAFF	S				
99		WW	S					
100		AAFF	S					
101								
102								
103								
104								
105								
106		Lower Species not in line intercept but in						
107		area:						
108		Plantago, Broom snakeweed, Indian Ricegrass,						
109		Sage, Pepper Grass, Mentzelia						
110								
111								
112								
113		Subtotal	Rock			5%		
114			Soil			31%		
115			Perennial Species			30%		
116			Annual Species			24%		
117			Litter			15%		
118			(Annual + Perennial species = 54%)					
119								
120			Total For Transect = 100%					
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/99

State: NM

Sample #: 12-177

Rep: Sec 22

Line (circle one):

N-S W-E

Observer: R. Montoya
P Luthiger

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		Sand Dropseed	Litter	Soil					
2		Dead Shrub	Soil						
3		L	S						
4		Western W.	X						
5		Saltbush	Western	Litter	S				
6		Salt	L	Soil					
7		L	S						
8		Aster	Kochia	Litter	S				
9		K	RT	S					
10		RT	S						
11		S							
12		S							
13		S							
14		S							
15		S							
16		S							
17		S							
18		Cr	S						
19		RT	S						
20		S							
21		RT	S						
22		L	S						
23		S							
24		Must.	S						
25		RT	S						
26		S							
27		S							
28		K	S						
29		S							
30		S							
31		S							
32		RT	S						
33		RT	S						
34		RT	S						
35		S							
36		S							
37		Snow	S						
38		Globe	L	S					
39		Globe	Sand	X					
40		Water	S						
41		Sand drop	Litter	Soil					

Form 4: Line-Point Int. v:5/27/99

Date: _____

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt)

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: _____

Sample #: 12-177

Rep: Sec 22

Line (circle one):

N-S W-E

Observer: _____

Pt.	Ht. Ft. Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		S						
84		S						
85		L	S					
86		S						
87		L	S					
88		Crested	Saltbush	Litter	Soil			
89		Saltbush	Litter	Soil				
90		Crested	Saltbush	Litter	Soil			
91		Saltbush	Crested	Litter	Soil			
92		Saltbush	Crested	Litter	Soil			
93		Saltbush	Aster	Litter	Soil			
94		Aster	Saltbush	crested	Litter	Soil		
95		Aster	Saltbush	Soil				
96		Aster	Soil					
97		L	S					
98		S						
99		RT	S					
100		S						
101								
102								
103		Subtotal:	Rock			0%		
104			Soil			42%		
105			Perennial Species			29%		
106			Annual Species			17%		
107			Litter			12%		
108			(Annual + Perennial Species =			46%)		
109								
110			Total For Transect = 100%					
111								
112								
113								
114								
115								
116								
117								
118								
119								
120								
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/99
State: NM
Sample #: 9-166
Rep: Sec 22
Line (circle one):
N-S W-E
Observer: R Montoya
P. Luthiger

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree
DS = Dead Shrub (incl. succul)
DG = Dead Graminoid
DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb
PPFFxx = Perrenial Forb
AAGGxx = Annual Grass
PPGGxx = Perennial Grass
SSSSxx = Shrub
TTTTxx = Tree

Additional Codes

L = litter
R = rock (>0.2 inch diameter)
LIC = Lichen on soil
M = Moss
C = Cyanobacterial soil crust
W = water
S = soil

**Write an "X" in the cell after basal hits.*
***Place a flag for soil stability measurements at all points at which height is measured.*

State: _____
Sample #: _____

Pt.	Ht. Ft.Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		K	S						
2		S							
3		R	S						
4		WW	S						
5		S							
6		WW	S						
7		S							
8		WW	X						
9		S							
10		S							
11		WW	X						
12		S							
13		S							
14		L	S						
15		S							
16		S							
17		Aster	S						
18		S							
19		S							
20		S							
21		IR	L	S					
22		S							
23		S							
24		S							
25		G	S						
26		S							
27		S							
28		G	S						
29		S							
30		L	S						
31		S							
32		S							
33		S							
34		G	S						
35		S							
36		S							
37		S							
38		WW	S						
39		SD	S						
40		SD	S						
41		S							

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: 22-9-166

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft.Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
42		BBS	S						
43		BS	S						
44		SD	L	S					
45		SD	S						
46		Groundsel	WW	S					
47		SD	S						
48		SD	S						
49		SD	Spurge	Litter	S				
50		L	S						
51		S							
52		SD	L	S					
53		BS	L	S					
54		BS	S						
55		S							
56		SD	L	S.					
57		Wild Tomato Solanum	S						
58		L	S						
59		SD	X	-					
60		Tumblegrass	S						
61		SD	S						
62		S							
63		L	S						
64		L	S						
65		S							
66		L	S						
67		WW	AAFF	S					
68		S							
69		SD	S						
70		SD	S						
71		S							
72		S							
73		WW	S						
74		S							
75		L	S						
76		Bindweed	S						
77		Bindweed	S						
78		S							
79		L	S						
80		Bindweed	S						
81		WW	Bindweed	S					
82		WW	S						

Form 4: Line-Point Int.

Date: ____________

N-S W-E

Observer: ________

Dead Canopy Codes (use only if no live canopy at pt)

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: ____________

Sample #: 9-166

Rep: Sec 22

Line (circle one):

N-S W-E

Observer: ________

v:5/27/99

Pt.	Ht. Ft.Tenths	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		S						
84		BW	S					
85		BW	S					
86		BW	S					
87		WW	S					
88		S						
89		BW	WW	S				
90		S						
91		S						
92		S						
93		L	S					
94		PPFF	S					
95		L	S					
96		S						
97		L	S					
98		S						
99		BW	S					
100		S						
101								
102								
103								
104								
105		Other species, not in line Intercept; but						
106		in Area:						
107		Aster, Mares tail, Blue Grama, Helianthus spp.,						
108		Annual Sunflower, RM Bee Plant, Fox Tail,						
109		Curley Dock, Mustard, Saltbush, Alkali Sacaton						
110								
111								
112		Subtotal:	Rock			0%		
113			Soil			42%		
114			Perennial Species			43%		
115			Annual Species			2%		
116			Litter			12%		
117			Annual + Perennial Species =			45%		
118								
119		Total	For Transect = 100%					
120								
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/99

State: NM

Sample #: 4-239

Rep: sec 24

Line (circle one):

N-S W-E

Observer: T. Luthiger
R. Montoya

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
1		S						
2		K	S					
3		K	S					
4		S						
5		SD	K	S				
6		K	S					
7		K	SD	S				
8		S						
9		S						
10		L	S					
11		L	S					
12		RT	S					
13		RT	S					
14		S						
15		S						
16		CW	S					
17		S						
18		S						
19		S						
20		S						
21		S						
22		S						
23		RT	S					
24		S						
25		CW	S					
26		S						
27		L	S					
28		L	S					
29		S						
30		RT	S					
31		SD	S					
32		S						
33		AAFF	S					
34		S						
35		S						
36		RT	S					
37		S						
38		RT	S					
39		S						
40		RT	S					
41		S						

v:5/27/99

...t 4: Line-Point Int.

Date: _____

N-S W-E

Observer:_____

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site).

Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: _____

Sample #: 4-239

Rep: Sec 24

Line (circle one):

N-S W-E

Observer:_____

Pt.	Ht.	Top Canopy	Lower Layers (Canopy and Soil Surface)						v:5/27/99
	Ft.Tenth	Sp. Code	Code	Code	Code	Code	Code	Code	
83		S							
84		S							
85		S							
86		S							
87		S							
88		S							
89		CW	S						
90		RT	S						
91		S							
92		RT	S						
93		S							
94		S							
95		S							
96		S							
97		S							
98		SM	S						
99		S	GM	S					
100		S							
101									
102									
103									
104									
105		Dead Species not in line intercept but							
106		in area:							
107		Blue mustard, Aster, Mustard, Indian Ricegrass							
108		Western wheatgrass, Rm Bee Plant							
109									
110									
111		Subtotal:	Rock			0%			
112			Soil			61%			
113			Perennial	Species		12%			
114			Annual	Species		20%			
115			Litter			7%			
116			(Annual + Perennial species = 32%)						
117									
118		Total For	Transect	100%					
119									
120									
121									
122									
123									

Form 4: Line-Point Int.

Date: 8/27/99

State: NM

Sample #: 51-115

Rep: Sec 24

Line (circle one):

N-S W-E

Observer: R. Markus
P. Luthiger

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		S							
2		RT	S						
3		RT	S						
4		CW	S						
5		S							
6		S							
7		CW	S						
8		CW	S						
9		CW	S						
10		S							
11		CW	GM	S					
12		S							
13		S							
14		S							
15		S							
16		RT	S						
17		CW	S						
18		S							
19		GM	S						
20		S							
21		S							
22		S							
23		S							
24		S							
25		S							
26		RT	S						
27		S							
28		RT	S						
29		S							
30		S							
31		S							
32		IR	S						
33		S							
34		RT	S						
35		S							
36		L	S						
37		CW	S						
38		S							
39		S							
40		S							
41		L	S						

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: 24-55-115

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft.Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
42		Cw	S					
43		S						
44		S						
45		S						
46		S						
47		S						
48		S						
49		S						
50		K	S					
51		K	S					
52		K	S					
53		K	S					
54		K	S					
55		K	S					
56		K	S					
57		K	S					
58		K	S					
59		S		-				
60		S						
61		S						
62		S						
63		S						
64		S						
65		K	S					
66		K	S					
67		K	S					
68		S						
69		S						
70		S						
71		K	L	S				
72		K	L	S				
73		K	S					
74		K	S					
75		K	S					
76		S						
77		S						
78		S						
79		K	S					
80		FWS	S					
81		K	FWS	S				
82		K	S					

v:5/27/99

+: Line-Point Int.

Date: _____

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site).

Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: _____

Sample #: 51115

Rep: Sec 24

Line (circle one):

N-S W-E

Observer: _____

Pt.	Ht. Ft.Tenths	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
								v:5/27/99
83		K	S					
84		K	S					
85		K	S					
86		K	S					
87		K	S					
88		K	S					
89		K	AAFF	S				
90		K	S					
91		S						
92		S						
93		K	S					
94		S						
95		S						
96		K	S					
97		K	S					
98		K	S					
99		S						
100			S					
101								
102								
103								
104								
105								
106								
107		Dibo sparsa	not in	line intercept	but			
108		area:						
109		squirrel tail, Fox tail, western wheatgrass						
110		Dibo sparsa						
111								
112								
113		Subtotal	Rock			0%		
114			Soil			48%		
115			Perennial	Species		11%		
116			Annual	Species		39%		
117			L. Ho.			2%		
118			(Annual +	Perenial	species =	50%)		
119								
120			Total for	transect =		100%		
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/99

State: NM

Sample #: 62-256

Rep: Sec 24

Line (circle one):

N-S W-E

Observer: P. Luthiger
R. Madrigal

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
								v:5/27/99
1		L	S					
2		RT	S					
3		S						
4		S						
5		S						
6		S						
7		CW	S					
8		S						
9		S						
10		CW	S					
11		S						
12		S						
13		S						
14		S						
15		S						
16		S						
17		S						
18		S						
19		S						
20		S						
21		S						
22		RT	S					
23		RT	S					
24		RT	S					
25		GM	S					
26		K	GM	S				
27		S						
28		S						
29		S						
30		RT	S					
31		CW	S					
32		K	CW	S				
33		S						
34		S						
35		S						
36		CW	S					
37		CW	S					
38		CW	S					
39		S						
40		CW	S					
41		CW	S					

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: 24-62-256

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
42		CW	S						
43		S							
44		S							
45		S							
46		S							
47		RT	S						
48		RT	S						
49		RT	S						
50		S							
51		S							
52		RT	S						
53		K	S						
54		S							
55		S							
56		K	S						
57		K	S						
58		S							
59		RT	S						
60		RT	S						
61		RT	S						
62		K	S						
63		CW	S						
64		K	S						
65		K	S						
66		K	S						
67		K	S						
68		K	S						
69		S							
70		S							
71		K	RT	S					
72		L	S						
73		S							
74		K	S						
75		RT	S						
76		RT	S						
77		RT	S						
78		S							
79		S							
80		S							
81		S							
82		RT	S						

4: Line-Point Int.

v:5/27/99

Site: _____

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site).

Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: _____

Sample #: 62-256

Rep: Sec. 24

Line (circle one):

N-S W-E

Observer: _____

Pt.	Ht. (ft: Tens)	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		DT	S					
84		RT	S					
85		S						
86		S						
87		RT	S					
88		DT	S					
89		S						
90		L	S					
91		RT	S					
92		K	RT	S				
93		S						
94		S						
95		K	S					
96		>						
97								
98		S						
99		L	S					
100		L	S					
101								
102								
103								
104								
105								
106	Other species not in line intercept but in							
107	Cactus							
108	Blue Grama, Western wheatgrass, Bottle brush							
109	Annual forb, Annual Scarlet							
110								
111								
112								
113	Subtotal:	Rock			0%			
114		Soil			48%			
115		Perennial	Species		11%			
116		Annual	Species		37%			
117		Litter			4%			
118		Annual + Perennial Species =			48%			
119								
120	Total For Transect =			100%				
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/19

State: NM

Sample #: 7-15

Rep: Sec 33

Line (circle one):

N-S W-E

Observer: R. Mathys
K. Luthiger

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
1		R	S					
2		R	S					
3		K	S					
4		R	S					
5		R	S					
6		AS	X					
7		AS	X					
8		R	C					
9		R	S					
10		R	S					
11		S						
12		R	S					
13		K	S					
14		R	S					
15		R	S					
16		R	S					
17		R	S					
18		R	S					
19		R	S					
20		R	S					
21		R	S					
22		R	S					
23		R	S					
24		R	S					
25		R	S					
26		R	C					
27		R	C					
28		R	S					
29		R	S					
30		R	S					
31		R	S					
32		R	S					
33		R	S					
34		R	S					
35		AS	X					
36		R						
37		R						
38		AS	R	S				
39		AS	S					
40		WW	S					
41		WW	S					

v:5/27/99

…rm 4: Line-Point Int.

Date: ____________

N-S W-E

Observer: __________

Dead Canopy Codes (use only if no live canopy at p…

DT = Dead Tree
DS = Dead Shrub (incl. succul)
DG = Dead Graminoid
DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb
PPFFxx = Perennial Forb
AAGGxx = Annual Grass
PPGGxx = Perennial Grass
SSSSxx = Shrub
TTTTxx = Tree

Additional Codes

L = litter
R = rock (>0.2 inch diameter)
LIC = Lichen on soil
M = Moss
C = Cyanobacterial soil crust
W = water
S = soil

"Write an "X" in the cell after basal hits.

***Place a flag for soil stability measurements at all points at which height is measured.*

State: __________

Sample #: 7-15

Rep: Sec 32

Line (circle one):

N-S W-E

Observer: __________

v:5/27/99

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
83		K	S					
84		AS	S					
85		AS	X					
86		[illegible]	X					
87		K	S					
88		S						
89		S						
90		S						
91		K	S					
92		K	S					
93		AS	X					
94		S						
95		S						
96								
97		S						
98		S						
99		SP	S					
100		SP	S					
101								
102								
103								
104								
105		Other	Associated	species	not	in [illegible]		
106		intercept	but	in area:				
107								
108		Pepper	Grass	Rm Bee	Plant,	aster		
109								
110								
111		Subtotal	: Rock			31%		
112			Soil			18%		
113			Perennial	Species		20%		
114			Annual	Species		31%		
115			Litter			0%		
116			(Annual +	Perennial	species =	51%)		
117								
118		Total	For	Transect	= 100%			
119								
120								
121								
122								
123								

Form 4: Line-Point Int.

Date: 8/27/99

State: NM

Sample #: 46-13

Rep: Sec 33

Line (circle one):

N-S W-E

Observer: R. Montoya
P. Luthiger

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: _____

Pt.	Ht. Ft. Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code	v:5/27/99
1		WW	S						
2		K	W N	S					
3		S							
4		K	S						
5		K	S						
6		S							
7		S							
8		S							
9		SD	S						
10		SD	S						
11		SD	S						
12		Aster	S						
13		S							
14		S							
15		S							
16		S							
17		K	S						
18		Aster	K	S					
19		SD	S						
20		SD	RT	S					
21		AS	X						
22		AS	RT	S					
23		K	S						
24		K	S						
25		K	S						
26		K	S						
27		K	S						
28		K	S						
29		K	S						
30		S							
31		S							
32		K	S						
33		K	S						
34		K	S						
35		K	S						
36		S							
37		K	S						
38		K	S						
39		K	S						
40		K	S						
41		K	S						

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: 33-46-10

Sample #: _____

Rep: _____

Line (circle one):

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
42		K	S					
43		K	S					
44		K	S					
45		K	S					
46		K	S					
47		SD	S					
48		SD	S					
49		SD	S					
50		K	S					
51		S						
52		GM	S					
53		S						
54		S						
55		WW	S					
56		S						
57		GM	WW	S				
58		GM	S					
59		WW	GM	- S				
60		WW	GM	S				
61		S						
62		K	S					
63		K	S					
64		K	S					
65		K	S					
66		S						
67		S						
68		S						
69		K	S					
70		WW	S					
71		K	S					
72		K	S					
73		K	S					
74		K	S					
75		S						
76		K	S					
77		K	S					
78		K	S					
79		S						
80		S						
81		S						
82		K	S					

v:5/27/99

Form 4: Line-Point Int.

Date: ________

N-S W-E

Observer: ________

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: ________

Sample #: 46-10

Rep: Sec 33

Line (circle one): N-S W-E

Observer: ________

Pt.	Ht. Ft.Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code v:5/27/99
83								
84		K	S					
85		K	S					
86		K	S					
87		K	S					
88		K	S					
89		S						
90		S						
91		K	S					
92		K	S					
93		S						
94		ww	K	[illegible]				
95		-	ww	S				
96		S						
97		S						
98		K						
99		ww	S					
100		ww	K	S				
101								
102								
103								
104								
105								
106								
107								
108		Other species not in line intercept but						
109								
110		4 wing saltbush, RM Bee Plant, Annual						
111		sunflower, crested wheatgrass, Russian						
112		snake weed						
113								
114								
115		Subtotal:	Soil			23%		
116			Perennial	Species		23%		
117			Annual	Species		49%		
118			Litter			0		
119			(Annual +	Perennial	species =	72%)		
120								
121		Total	For	Transect	= 100%			
122								
123								

v:5/27/99

Form 4: Line-Point Int.

Date: 8/27/99

State: NM

Sample #: 8-329

Rep: sec 33

"Correct Alt." Line (circle one):

N-S W-E

Observer: [illegible]
[illegible]

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
1		S						
2	[redacted]	IR	S					
3	[redacted]	S						
4	[redacted]	S						
5	[redacted]	S						
6	[redacted]	IR	S					
7	[redacted]	S						
8	[redacted]	S						
9	[redacted]	S						
10	[redacted]	SD	S					
11	[redacted]	SD	S					
12	[redacted]	S						
13	[redacted]	S						
14	[redacted]	S						
15	[redacted]	S						
16	[redacted]	S						
17	[redacted]	IR	S					
18	[redacted]	S						
19	[redacted]	S						
20		S						
21	[redacted]	S						
22	[redacted]	S						
23	[redacted]	S						
24	[redacted]	S						
25	[redacted]	S						
26	[redacted]	S						
27	[redacted]	S						
28	[redacted]	IR	S					
29	[redacted]	IR						
30	[redacted]	IR	S					
31	[redacted]	IR	S					
32	[redacted]	SD	S					
33	[redacted]	S						
34	[redacted]	S						
35	[redacted]	SD	S					
36	[redacted]	S						
37	[redacted]	S						
38	[redacted]	S						
39	[redacted]	L	S					
40		S						
41	[redacted]	IR	S					

Dead Canopy Codes (use only if no live canopy at pt

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perrenial Forb

AAGGxx = Annual Grass

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

**Write an "X" in the cell after basal hits.*

***Place a flag for soil stability measurements at all points at which height is measured.*

State: ________

Sample #: ________

Form 4: Line-Point Int.

Date: _____

Rep: _____

Line (circle one):

N-S W-E

Observer: _____

Dead Canopy Codes (use only if no live canopy at pt

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S = soil

***Write an "X" in the cell after basal hits.**

****Place a flag for soil stability measurements at all points at which height is measured.**

State: _____

Sample #: 33-8-329

Rep: _____

Line (circle one):

v:5/27/99

Pt.	Ht. Ft Tenth	Top Canopy Sp. Code	Lower Layers (Canopy and Soil Surface) Code	Code	Code	Code	Code	Code
42		S						
43		IR	S					
44		S						
45		S						
46		S						
47		S						
48		IR	S					
49		S						
50		IR	S					
51		S						
52		S						
53		S						
54		S						
55		IR	S					
56		IR	S					
57		IR	X					
58		S						
59		S		-				
60		S						
61		IR	X					
62		IR	SD	X				
63		S						
64		IR	S					
65		S						
66		S						
67		IR	S					
68		S						
69		IR	S					
70		S						
71		S						
72		S						
73		IR	S					
74		S						
75		S						
76		S						
77		S						
78		S						
79		S						
80		S						
81		IR	S					
82		S						

Line-Point Int.

N-S W-E

Observer:

Dead Canopy Codes (use only if no live canopy at p

DT = Dead Tree

DS = Dead Shrub (incl. succul)

DG = Dead Graminoid

DF = Dead Forb

Functional Group (number (xx) consecutively, consistent within site). Use if plant cannot be identified to species.

AAFFxx = Annual Forb

PPFFxx = Perennial Forb

PPGGxx = Perennial Grass

SSSSxx = Shrub

TTTTxx = Tree

Additional Codes

L = Litter

R = rock (>0.2 inch diameter)

LIC = Lichen on soil

M = Moss

C = Cyanobacterial soil crust

W = water

S = soil

*"Write an "X" in the cell after basal hits.

**Place a flag for soil stability measurements at all points at which height is measured.

State:

Sample #: 8-329

Rep: Sec 33

Line (circle one):

N-S W-E

Observer:

Pt.	Pt. Int. Ft.Tenths	Top Canopy Sp. Code	Code	Code	Code	Code	Code	Code
83		S						
84		S						
85		S						
86		S						
87		S						
88		K	S					
89		IP	S					
90		S						
91		S						
92		S						
93		S						
94		IP	S					
95		IP	K	S				
96		S						
97		S						
98		S						
99		IP	S					
100		IP	K	S				
101								
102								
103								
104								
105		Other species not in line intercept but						
106		in area:						
107								
108		Four using Soil Hand						
109								
110								
111								
112		Subtotal: Rock				0%		
113		Soil				68%		
114		Perennial Species				30%		
115		Annual Species				1%		
116		Litter				1%		
117		(Annual + Perennial Species = 31%)						
118								
119		Total For Transect = 100%						
120								
121								
122								
123								

PHOTO PAGE

DATE 10/5/99
MINE SITE Quivira

Photo Description: >

See 19
AgAr - (Sacaton)
very weedy around
drill hole
Snakeweed

Photo Description: >

Sec 19
Bogr, Sacaton
very sandy

Quivira Mining Company

P.O. Box 218, Grants, NM USA 87020 (505)287-8851

September 9, 1998

Mr. Robert Pine
Mining Act Reclamation Bureau
Mining and Minerals Division
Energy, Minerals, and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Re: **Quivira Mining Company**
Prior Reclamation Acreage

Dear Mr. Pine,

Listed below are approximate acreage for each of the prior reclamation sites. These numbers were obtained from the maps contained in a September 1, 1995 letter from Quivira to Dr. Robyn Tierney and the September 29, 1995 inspection report from MMD to Quivira.

Mine Site	Acreage
17	22
19	19
22	37
24	26
~~30~~	~~44~~
~~30 West~~	~~26~~
33	28

leaves 132 ac. to permit

If you have any questions, please contact me at (505) 287-8851, extension 205.

Regards,

QUIVIRA MINING COMPANY

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

xc: file

BEFORE THE NEW MEXICO MINING COMMISSION

In the Matter of the Mining And Minerals Division's Determination on Quivira's Prior Reclamation

No. 99-05

MINING AND MINERAL'S DIVISION'S RESPONSE TO PETITION FOR REVIEW OF DIRECTOR'S ORDER ON PRIOR RECLAMATION

Prior reclamation under the New Mexico Mining Act.

The fundamental purpose of the New Mexico Mining Act is reclamation. NMSA 1978, Section 69-36-2. Reclamation requires "measures designed to mitigate the disturbance of affected areas," protection of air and water, and return of mine sites "to a condition that allows for the re-establishment of a self-sustaining ecosystem." Section 69-36-7(U); 19 NMAC 10.2, Section 506.J.3. Typically, reclamation involves revegetation of a disturbed area, and that is what is involved in this case.

As the Commission knows, the Mining Act, enacted in 1993, required existing mines to submit a permit application to the Director of the Mining and Minerals Division (MMD) by December 31, 1994. NMSA 1978, Section 69-36-11(A). A closeout plan, describing anticipated reclamation, was due a year later, December 31, 1995. Id.

The legislature made an exception, however, for existing mines and new mines that had already begun some reclamation, and did not require such mines to obtain permits or submit closeout plans. Section 69-36-7(U). The legislature required the Commission to:

> Adopt regulations providing that the owner or operator of an existing mining operation or a new mining operation who has completed some reclamation Measures prior to the date of the regulations adopted pursuant to the New Mexico Mining Act may apply for inspection of those reclamation measures and a release from further requirements pursuant to that act for the reclaimed areas if, after an inspection, the director determines that the reclamations measures satisfy the requirements of that act and the substantive requirements for reclamation....

Section 69-36-7(U).

The prior reclamation exception recognizes that there is no point in requiring an operator to deal with the administrative permitting requirements of the Act if he was already reclaiming a site voluntarily. The exception also encouraged operators who no longer wished to mine a site to speedily reclaim it and avoid the permitting process. Even though an operator seeking prior reclamation status did not have to obtain a permit, the reclamation had to meet the approval of the Director before an operator would be released from the permitting requirements of the Act.

The Commission adopted a rule requiring the director to make a decision on prior reclamation applications by September 30, 1995. 19 NMAC 10.2, 510.B. Under that rule, if the director does not find the reclamation adequate, the operator has six months to submit a permit application and closeout plan.

Although two of Quivira's sites have sufficient plant cover to warrant release under the prior reclamation provision, the director determined that five others have insufficient cover, four years after they were seeded, to meet reclamation standards. The Director's determination that five of the sites have not been sufficiently reclaimed is supported by substantial evidence, and is in accordance with law.

As indicated by Exhibit A to Quivira's petition, the Director's Determination on Prior Reclamation, Quivira's sites were seeded in 1994. MMD granted Quivira multiple extensions from the September 30, 1995 deadline imposed by Rule 510.B.

MMD staff inspected Quivira's mine sites in August, 1995, and granted Quivira an extension until 1997. In October, 1997, MMD returned to inspect the sites. The Director of MMD again extended the deadline to 1998 to allow more time for the reclamation to show results. MMD inspected the sites a year later, in October, 1998.

After the most recent inspection, the director concluded that two sites, Section 30 and Section 30W, showed sufficient improvement and released those sites from the permitting requirements of the Act.

One other site, Section 19, was marginal, but in the director's view was insufficient to warrant release. The director gave Quivira the option of resampling Section 19 by November, 1999, and said he would reconsider his decision if resampling showed that Section 19 had improved. To date, Quivira has not exercised this option.

The director would not release Sections 17, 22, 24, and 33, because the sites did not demonstrate "reestablishment of a self sustaining ecosystem on the permit area following closure, appropriate for the life zone of the surrounding area." 19 NMAC 10.2, Section 506.J. The Prior Reclamation Inspection Report, attached to Quivira's petition shows that MMD painstakingly conducted inspections according to generally accepted scientific principles. The director reached his conclusion that five sites were inadequate after years of watching and waiting for plant cover to grow sufficiently, and extended deadlines as much as he believed was warranted. At some point, the director must make the determination that reclamation has not progressed as hoped, and act accordingly.

Here, four years after seeding, and after multiple extensions to see if the vegetation would grow sufficiently, the director determined that although two sites were sufficiently reclaimed, five other sites were not sufficiently reclaimed. Consequently,

under the Commission's rule, Quivira must submit a permit application and closeout plan by November 6, 1999 for the five sites deemed inadequately reclaimed. 19 NMAC 10.2, Section 510.B

Conclusion.

Here, the director released two sites, recognized that one site could be resampled, and concluded that several other sites did not show sufficient cover. MMD staff and the director carefully sifted and reviewed the sites, and the director made a reasoned decision. This decision was supported by substantial evidence, within the Director's discretion, and in accordance with law.

Respectfully submitted:

Bruce Rogoff
Asst. General Counsel
New Mexico Energy, Minerals
And Natural Resources Department
2040 S. Pacheco
Santa Fe, NM 87505
(505) 827-5950

Received
JUL 06 1999
New Mexico Mining Commission

BEFORE THE NEW MEXICO MINING COMMISSION

In the Matter of the Mining And Minerals Division's Determination on Quivira's Prior Reclamation	))))))	PETITION FOR REVIEW OF DIRECTOR'S ORDER ON PRIOR RECLAMATION

Quivira Mining Company ("Quivira"), pursuant to N.M.S.A. 1978 § 69-36-15.A and the Mining Act Rules Subpart 907.A and 1112.A hereby petitions the New Mexico Mining Commission for review of the "order" and other determinations made by the Mining and Minerals Division ("MMD") of the Energy, Minerals, and Natural Resources Department that the reclamation measures at the mines identified in the order fail to satisfy the requirements of the New Mexico Mining Act (the "Act") and the substantive requirements for reclamation pursuant to the Mining act Regulations; and requiring that Quivira permit these sites according to Rule 5 of the NMMA Rules. A true and correct copy of the May 6, 1999 letter containing the "order" is attached to this Petition as Exhibit A.

This Petition is filed within 60 days following the issuance of the "order," and is therefore timely pursuant to N.M.S.A. 1978 § 69-36-15.A and the Mining Act Rules Subpart 907.A and 1112.A.

Quivira requests that a hearing be set before a hearing officer following the Commission's receipt of this Petition, as provided by N.M.S.A. 1978 § 69-36-15.B and

the Mining Act Rules Subpart 907.B and 1112.B. Quivira requests a plenary hearing on all legal and factual issues whenever that hearing date is established.

Submitted July 6, 1999

6JULY99

Peter Luthiger
Quivira Mining Company

State of New Mexico
ENVIRONMENT DEPARTMENT
Ground Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone (505) 827-2918
Fax (505) 827-2965

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

Certified Mail - Return Receipt Requested

June 29, 1999

Mr. Peter Luthiger
Quivira Mining Company
P.O. Box 218
Grants, New Mexico 87020

RE: Environmental Determination, Quivira Mining Company - Old Stope Leaching Closeout Plan, Permit No. MK009RE

Dear Mr. Luthiger:

The permit application and closeout plan for Old Stope Leaching was received by the New Mexico Environment Department (NMED) from the Mining and Minerals Division (MMD) of the Energy, Minerals and Natural Resources Department on July 10, 1998. NMED reviewed the permit application and closeout plan for ground water, surface water, and air quality issues and provided comments to MMD on August 10, 1998 for the permit application, and on September 8, 1998 for the closeout plan. Pursuant to §501 of the New Mexico Mining Act (NMMA) Rules, MMD has required that a NMMA closeout plan for Old Stope Leaching be approved by August 31, 1999. As you are probably aware, Section 69-36-11.B.(4) of the NMMA requires that the operator obtain and provide to MMD a written determination from the Secretary of Environment that environmental standards are expected to be met if activities are carried out as described in your NMMA closeout plan and all other applicable environmental permits. This written "determination" from the Secretary of Environment is required prior to MMD approval of the NMMA closeout plan for your facility.

In NMED's comments to MMD dated September 8, 1998, NMED described the requirements necessary for you to obtain the written determination. These requirements were addressed, in part, by your submittal to MMD dated May 18, 1999, and entitled "Response to Agency Comments on the Closeout Plan for Mine Permit MK009RE." This document was received by NMED on May 28, 1999. Quivira also provided additional site characterization information to NMED via e-mail on

June 28, 1999. Based on a review of these submittals, the following remaining information needs to be included in the Mining Act Closeout Plan for NMED to provide the environmental compliance determination:

1. NMED previously commented that Quivira needed to provide a description of all waste rock/ore stockpile areas and former dewatering ponds within the permit area, including a description of how these areas were closed or reclaimed. According to your May 18, 1999 submittal, this information has not been provided because these areas have been released from further reclamation requirements, excluding revegetation, in accordance with §510 of the NMMA Rules. However, based on a May 6, 1999 letter from MMD to Quivira, it is NMED's understanding MMD has determined that Sections 17, 19, 22, 24, and 33 do not meet prior reclamation requirements and must be permitted according to Rule 5 of the NMMA. Descriptions of stockpiles and former ponds in the permit area must be provided to ensure protection of water resources in accordance with Subpart 5 of the NMMA and §107.HH.

   To address NMED concerns, Quivira needs to identify on a site map the locations of all reclaimed/partially reclaimed waste rock/low grade ore stockpiles and former dewatering ponds. The area and volume of the stockpiles and ponds need to be identified. For stockpiles, a geologic/mineralogical description and the results of any tests indicating the chemical composition of stockpile materials needs to be provided. The June 28, 1999 submittal indicates that extensive sampling and analysis of various uranium mines by EPA and NMED have indicated a low potential for leachate generation and degradation of ground water quality. In order for NMED to evaluate if the results of these studies adequately address NMED concerns, Quivira must submit analytical data results from the studies described and demonstrate that the waste rock/low grade ore geology of Quivira stockpiles is the same as stockpiles sampled for the studies. If Quivira cannot provide sufficient data or demonstrate similar geology, Quivira must perform sufficient analyses of stockpile materials to ensure protection of water resources. As requested by NMED for the Section 35 stockpile, the ore grade for percent uranium remaining in the stockpiles should be indicated. Additional testing that would address NMED concerns includes leachate tests such as the Nevada Metoric Water Mobility Test or the Synthetic Precipitation Leaching Procedure (EPA Method 1312). Leachate analyses should include parameters of concern at the site including sulfate, TDS, pH, arsenic, uranium, radium-226, cadmium, chromium, iron, lead, molybdenum, selenium, and zinc. NMED does not require that every stockpile be sampled if documentation can be provided indicating similar geology/mineralogy between Quivira stockpiles. A minimum of three stockpiles, however, should be sampled. In addition to the analytical results, Quivira needs to provide to NMED a description of sample collection methods and locations, analytical methods, and copies of analytical data sheets.

   Quivira must also provide a description of how stockpiles and ponds were reclaimed in the

permit area, including depth of any cover soils or backfill. The basis for determining cover thicknesses should also be provided. As noted in previous NMED comments, evidence of significant erosion has been observed on the covers of some of the reclaimed stockpiles during NMED field inspections. Quivira needs to address how covers on waste rock/low grade ore stockpiles will be maintained until they are stable.

2. A commitment to establish appropriate erosion control practices and suitable inspection and maintenance activities to ensure the long term erosional stability and usability of permanent roads using professionally recognized standards (e.g., NRCS and/or US Forest Service standards).

3. A commitment to use properly constructed and maintained check dams, water bars, terracing along the contour, installation of armored channels, slope reduction and/or use of other erosion control practices, where required for successful establishment of vegetation, and erosion control measures that are designed, constructed and maintained using professionally recognized standards (e.g., NRCS standards). A further commitment that closure of the site will include removal and reclamation of all temporary runoff control measures (including ditches, berms, dikes, contour furrows, etc.) once the site has been finally stabilized with vegetation, or equivalent permanent stabilization measures.

4. On page 6 of the May 18, 1999 submittal, Quivira states that "[s]urface reclamation associated with DP-362 activities will be addressed within the mining permit closeout plan." A description of these areas and reclamation methods to be utilized to ensure protection of water resources needs to be provided.

It is your responsibility to provide MMD with the written environmental determination from the Secretary of Environment prior to the August 31, 1999 deadline. NMED is committed to working with you so that the environmental compliance determination can be provided in a timely manner, but it will require commitment and responsiveness on your part. If the written determination is not provided to MMD by the August 31, 1999 deadline and the NMMA closeout plan is therefore not approved, MMD may determine that you are in violation of the NMMA Rules. Please provide the information necessary to obtain the written environmental determination to NMED by **July 23, 1999** so that NMED has adequate time to review the information and so that you can meet the required NMMA deadline.

Additionally, NMED is working with Quivira to resolve outstanding ground water quality issues associated with old stope leaching as part of the DP-363 renewal process. Renewal of DP-362 must be approved by NMED at least 30 days prior to the NMMA closeout plan approval deadline in order for the written determination to be provided.

If you have any questions or comments concerning this matter, please contact me at 827-2944 or Rich Powell at 827-2798.

Sincerely,

Mary Ann Menetrey
Mining Act Team Leader
New Mexico Environment Department

xc: Kerrie Neet, Chief, Regulatory Programs Bureau
James H. Davis, Ph.D., Chief, SWQB
Dale Doremus, HPM, GWQB
Katherine Yuhas, GWQB

Karen - for your file here

Peter Williges
6/9/99

PRIOR RECLAMATION STATUS

With the denial of 5 prior reclamation sites on May 6, 1999, the disposition of these sites needs to be addressed. Options include:

1. permit as separate entity;
2. combine with existing permit; or
3. appeal decision/order

Land Status

✗ MMD released all components of the prior reclamation work with the sole exception of revegetation (March 15, 1996)

✗ Prior reclamation variance addressed disturbance of these areas whether before or after release (April 21, 1997)

✗ Prior reclamation sites were discussed/included within the design limit portion of the initial permit application for old stope leaching (page OSL-28) stating that all reclamation was released except for revegetation (May 23, 1997)

✗ Approved permit for leaching (permit MK009RE) incorporates the design limit and permit area from the permit application (December 29, 1998)

Quivira Interpretation

1. As a result of obtaining the approved permit for leaching which incorporates the prior reclamation areas into the approved permit by means of the permit application, Quivira believes that the prior reclamation areas are already incorporated into the existing mine permit. The prior reclamation areas were just maintained under the "prior reclamation" process until the final inspection/decision was made. As a result of the decision, the prior reclamation release request went away and these areas would require permitting if no permit was already submitted and/or approved. Because these areas are in an existing permit, the issue of permitting should be moot.

2. Because the decision was made on May 6, 1999, the order becomes final after 60 days in the event of any appeal to the order. At this time (July 6, 1999), if no appeal is requested, the issue of the prior reclamation areas is resolved by finalizing their incorporation into the existing mine permit MK009RE. At this time, these lands become designated as disturbed area within the existing permit and subject to the fee schedule for annual fees.

3. Because the prior reclamation areas were described within the initial permit application, the public notice process does not need to be revisited as proper notice was provided during the review and approval phase of the permit application.

4. The determination of how the new acreage from the prior reclamation sites (~125 acres) is incorporated into the permit needs to be resolved. Quivira believes that this issue is also moot as the permit application envisioned this scenario as described within the *design limit* section (OSL-28). This section discussed the prior reclamation sites and what occurs if any future disturbance occurs in these areas. More importantly, Quivira also indicated that it "anticipates no more than 5 acres of **undisturbed** land will be disturbed annually as a result of old stope leaching activities."

   Because the prior reclamation lands were not released due to unsatisfactory revegetation, they are technically designated as disturbed acreage. The permit places a 50 acre threshold on whether a modification/revision is required on previously undisturbed lands. However, these disturbances are described as actual disturbances (injection holes, pipelines, sheds, pump stations or roads). The prior reclamation areas consists of completely reclaimed areas in compliance with the Mining Act with the sole exception of satisfactory revegetation.

   Because of this, the prior reclamation land should be simply added to the total disturbed acreage under the existing permit.

5. The status of the prior reclamation land needs to be consistent with past approvals. MMD has previously released these lands as meeting all the requirements of the New Mexico Mining Act except for the successful revegetation of these areas. This release must remain in effect for these areas.

Solution

Quivira believes that no action is needed by Quivira or MMD provided that no appeal is submitted by any party. This resolution occurs since the prior reclamation areas will automatically be incorporated into the approved leaching permit as disturbed land that meets all the requirements of the Mining Act except for vegetation. This land will also become subject to the annual fee schedule stipulated within the Regulations at the time of incorporation which will occur when the 60 day period provided by the appeal process is passed.

DESIGN LIMITS

To ensure Quivira has the ability to effectively utilize and develop the old stope leaching program, the design limit of the old stope leaching unit has been established to encompass all land areas above potential old stope leaching areas. This results in the design limit for the old stope leaching unit to be, at a minimum, the extent of the existing underground workings projected to the ground surface.

The ability to potentially disturb any area within this design limit is necessary so that Quivira can efficiently develop any prospective stope. Although the old stope leaching unit design limit consists of a large area, the majority of the land will remain undisturbed as surface disturbance occuring as a result of leaching activities is expected to impact less than one (1) percent of the total surface area. Appendix G contains Quivira's proposed design limit for old stope leaching unit.

Contained within this design limit are specific areas associated with past conventional uranium mining operations which are involved with the prior reclamation process pursuant to Section 510 of the New Mexico Mining Act Regulations. These areas, which have been granted a variance, include conventional mining areas located at the Section 17, 19, 22, 23, 24, 30, 30West, and 33 mines. All these *"prior reclamation areas"* have been previously released from all requirements of the New Mexico Mining Act except for the successful revegetation determination.

In the event that Quivira utilizes these areas within the old stope leaching program before or after a site is released from prior reclamation, those portions of the prior reclamation site redisturbed as a result of old stope leaching activities will be subject to existing mine reclamation requirements specified within Section 507.A of the Mining Act Regulations as well as the financial assurance requirements of Subpart 12 of the Mining Act Regulations.

Quivira's project design limit reflects the approximate extent of the underground workings

projected to the surface. Although Quivira has essentially designated the entire proposed permit area as the design limit for old stope leaching activities, actual disturbances will be far less than the design limit. Quivira anticipates that no more than 5 acres of undisturbed land will be disturbed annually as a result of old stope leaching activities. However, due to the irregular shaped mine workings along with the ore body characteristics, accurate delineation of where future disturbances will occur is not feasible.

Quivira is taking a very conservative position in this regard by designating almost the entire permit area as the old stope leaching design limit; and thereby allowing Quivira to potentially disturb any area within the proposed design limit, to give Quivira the flexibility it needs to install additional drill holes in an effective and efficient manner. This design limit will encompass any future potential disturbance. All existing and future disturbances associated with old stope leaching operations within the proposed design limit will be subject to existing mine reclamation requirements specified within Section 507.A of the Mining Act Regulations as well as the financial assurance requirements of Subpart 12 of the Mining Act Regulations.

For Old Stope Leaching operations, expansion or addition of injection holes, pipelines, equipment sheds, pump stations or roads within the approved design limits for the purpose of old stope leaching, up to a maximum of 50 acres of disturbance of previously undisturbed land as indicated on the Old Stope Leaching Operations Maps submitted May 13, 1998, will not require a permit modification or revision if it does not change the closeout plan. Expansion or addition of injection holes, pipelines, equipment sheds, pump stations or roads within the approved design limits for the purpose of old stope leaching beyond a total of 50 acres of disturbance of previously undisturbed land as indicated on the Old Stope Leaching Operations Maps submitted May 13, 1998, or beyond the approved design limits will require a permit modification or revision and will be subject to the new unit standards specified in §507.C. The Permittee will submit an update annually to MMD describing all additional disturbance for the previous year. The update will include a map showing all disturbance at the time of permit approval, as indicated on the Old Stope Leaching Operations Maps submitted May 13, 1998, and highlight all subsequent disturbance.

Section 5. FINDINGS OF FACT

A. The application contains all the information required, as required by §503.F.1 of the Rules. The Permittee has submitted a permit revision to incorporate a closeout plan, which must be approved by August 31, 1999.

B. The Permittee has provided written information stating the name and official business address of the Permittee and its agent for service, as required by §503.F.2 of the Rules.

C. The Permittee has provided the required signature and certification, as required by §503.F.3 of the Rules.

D. Permit application fees have been paid in the amount of $4,748.50 for Old Stope Leaching and in the amount of $1,500.00 for the Section 35 Mine, as required by §503.F.4 of the Rules.

E. Public notice was given on November 6, 1997 for Old Stope Leaching and on February 17, 1995 for the Section 35 Mine, as required by Subpart 9 and §503.F.5 of the Rules. There were no requests for a public hearing.

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

MINING AND MINERALS DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-5970

Jennifer A. Salisbury
CABINET SECRETARY

Douglas M. Bland
DIVISION DIRECTOR

May 6, 1999

Peter Luthiger
Quivira Mining Company
P.O. Box 218
Grants, NM 87020

Re: Determination on Prior Reclamation Sites Sections 17, 19, 22, 24, 30, 30W and 33

Dear Mr. Luthiger:

In accordance with New Mexico Mining Act (NMMA) § 69-36-7U, and § 510 of the NMMA Rules (Rules), the Mining and Minerals Division has made a decision regarding release of the above sites from further requirements of the NMMA.

In order for a site to be released from further requirements of the NMMA under prior reclamation, the standards set in the NMMA Rules § 510.B must be met. The Rule states, "The director shall release the owner or operator from further requirements of the Act and of this Part if, after an inspection of the reclaimed areas, he determines that the reclamation measures satisfy the requirements of the Act and the substantive requirements for reclamation pursuant to this Part." The substantive requirements for reclamation in Part 5 of the Rules in part can be found in § 506.J.3. which states, "the work to be done will reclaim disturbed areas within the permit area to a condition that allows for re-establishment of a self sustaining ecosystem on the permit area following closure, appropriate for the life zone of the surrounding area..."

Inspections including vegetative sampling have been conducted on 3 different occasions: August 1995, October 1997, and October 1998. A variance was granted in April of 1997 until the end of 1998, to allow more time to for the reclamation efforts to show results because the sites were not deemed releasable in 1997. Each inspection was conducted in the presence of a representative from Quivira Mining Company. A summary report of the August 1995, and October 1997 inspections were sent to your office. The summary report for the October 1998 inspection is attached.

Information from all 3 inspections was taken into account, however the results from the October 1998 inspection were more heavily weighed. The sampling technique used in October 1998 was conducted in accordance with scientifically accepted methodologies. The results were compared to the agreed upon standard that perennial cover in the sample

must average at least 75% of perennial cover from the range site description (RSD) for Sandy WP-2 (see attached). The RSD lists an 18% cover value for grasses and forbs, this would mean the average value for each site sampled must be at least 13.5% cover. The only two sites which met or exceeded this criteria for the October 1998 inspection were Section 30, with a value of 15.3 average percent cover and Section 30W with a value of 14.6 average percent cover for grasses and forbs. In both Section 30 and 30W, Crested Wheatgrass is the dominant grass, which is not necessarily desirable, however, it does provide cover and stability to the site. Four other grass species were observed as well as two shrub species. Considering both vegetative cover and diversity, MMD has determined that a self-sustaining ecosystem is likely to be achieved at both sites. In accordance with the agreed upon cover performance standards set and NMMA Rules, Section 30 and Section 30W are deemed released from further requirements of the N M MA.

The remaining Sections 17, 19, 22, 24, and 33, do not meet the criteria for release (see attached 10/98 report), and therefore will need to be permitted according to Rule 5 of the NMMA. Quivira may opt to incorporate these sections into the Old Stope Leach permit revision for a closeout plan which must be approved by August 30, 1999.

If you are not in agreement with this determination, you have the option of re-sampling Section 19. This site had an average percent cover value within 2 percentage points of meeting the RSD criteria, therefore, there is a reasonable possibility that upon re-sampling, the results may meet the criteria. Section 33 also had results within 2 percentage points of 13.5%, however, the southern portion of the site is in such poor condition that it is not eligible of re-sampling. The sampling must be conducted in accordance with approved sampling methodologies, by an experienced range scientist, and our staff must be given an opportunity to attend the sampling. Our office must be contacted at least 2 weeks prior to sampling dates. Also, proposed sampling methodologies should be provided at that time. You will have until November 1, 1999 to provide your own sampling results to our office for review. If you do not choose to exercise this option or we do not receive sampling results by November 1st, the determination that these sites are not releasable will be deemed a final order.

Your interests and efforts in voluntary reclamation are appreciated. If you have any questions regarding this decision please feel free to call Fernando Martinez at (505) 827-1173.

Sincerely,

Douglas M. Bland
Division Director

PRIOR RECLAMATION INSPECTION REPORT

QUIVIRA MINING COMPANY

Section 17, Section 19, Section 22, Section 24, Section 30, Section 30W, Section 33

Submitted in Partial Fulfillment of the New Mexico Mining Act Section 69-36-7 U, Prior Reclamation

New Mexico Energy, Minerals and Natural Resources Department
Mining and Minerals Division
Mining Act Reclamation Program

October 30, 1998

INTRODUCTION

On October 1st and 2nd of 1998, inspections were conducted at Quivira Mining Company's seven unreleased prior reclamation sites. These sites, their locations and the dates of their inspections are presented in Table 1.

MINE	LOCATION	INSPECTION DATE
Section 17	T14N R9W	October 2, 1998
Section 19	T14N R9W	October 2, 1998
Section 22	T14N R10W	October 1, 1998
Section 24	T14N R10W	October 1, 1998
Section 30	T14N R9W	October 1, 1998
Section 30W	T14N R9W	October 2, 1998
Section 33	T14N R9W	October 2, 1998

Table 1: Quivira Mining Company Prior Reclamation Sites

These sites had first been seeded in 1994. Each of these sites had been granted a variance from the September 30, 1995 deadline found in Section 510.B of the New Mexico Mining Act Rules (the Rules) for a determination of whether the site should be released. The deadlines for all seven sites had been extended to the end of 1998. The inspections described in this report are in fulfillment of the requirements of the New Mexico Mining Act (NMMA), Section 69-36-7U, and Section 510 of the Rules to determine if these sights qualify for release.

METHODS

All inspections were conducted by Holland Shepherd, Rob Pine and Sandra Maes of MMD. Peter Luthiger of Quivira was present during the inspections. For each prior reclamation site, the sampling locations were selected as follows: a uniform 100 foot grid was drawn on a map of the site, each intersection was numbered and, using a Lotus spreadsheet, a random number generator was used to randomly order the grid points and to select a random direction for each transect. This was done in the presence of Peter Luthiger prior to the actual field inspections.

Due to time constraints, sampling adequacy was not attained at any of the prior reclamation sites. It was decided that somewhere between 7 and 10 transects would be run at each site. If Quivira did not agree with the decision that was based on this number of transects for a particular site, then the site could be reevaluated and sampling adequacy could then be attained.

The Line Intercept method was used to evaluate cover. Each transect was 50 feet long with a sampling interval of one foot, thus there were 50 points per transect. The species was identified at each point where a living plant was sampled. Species was not identified in the case of litter. Each point represents 2% of the cover for a given transect.

The standard for cover for a particular site must be based on either i) a known or predicted cover value for an ecologically comparable and reasonably undisturbed area; ii) direct comparison with a minimally disturbed reference area; or iii) test plots. The area surrounding the Quivira sites has been heavily grazed for some time and so does not provide a suitable reference area. The basis for a cover standard that has been accepted by MMD at the permitted Quivira sites is the appropriate Natural Resource Conservation Service (NRCS) Range Site Description (RSD). The one that best applies to the Quivira prior reclamation sites is the Sandy (WP-2) RSD.

The cover requirements that MMD has adopted for the Quivira prior reclamation sites is that perennial cover must average at least 75% of the perennial cover in the Sandy RSD. The average perennial ground cover for a potential natural plant community in the Sandy (WP-2) RSD is 18%. 75% of this is 13.5%. Because of the small sample size, the data was not analyzed statistically (in terms of confidence limits) so the average cover was expected to equal or exceed 13.5%. The visual inspection of the site factored into the decision making process as well.

The diversity requirement was that there should be at least 4 different grass species, including both warm season and cool season, found at the site. Since shrubs were not part of the original seed mix, there was no shrub requirement.

Because past inspections involved such a small number of transects (4 or less per prior reclamation site) that were apparently not randomly selected, it s not reasonable to compare the results of prior inspections with the 1998 inspection results. In addition. 1998 was a very dry year. Thus, it is difficult to look at trends in vegetation based on previous inspections and so trend was not considered in this evaluation.

SECTION 17

Eight transects were run at Section 17. The results are summarized in Table 2 below.

COVER TYPE	TRNS 1	TRNS 2	TRNS 3	TRNS 4	TRNS 5	TRNS 6	TRNS 7	TRNS 8	AVG	STD DEV
GRASS & FORB	4	14	12	8	16	2	4	8	8.5	5.1
PERENNIAL	4	14	12	8	16	2	4	8	8.5	5.1
ANNUAL	2	2	2	2	8	4	22	0	5.3	7.2
LITTER	18	20	16	10	12	26	16	22	17.5	5.2
BARE GROUND	76	58	70	80	64	68	58	70	68.0	7.9

Table 2. Percent Cover, Section 17 Transects

The average percent perennial cover from the 8 transects in Section 17 is 8.5%. The majority of the Section 17 prior reclamation site consisted of large areas of bare ground with small amounts of grass and Kochia. The overall range condition was poor. A substantial portion of the site is sloping to the south and some erosion was evident in the form of rills and gullies.

The relative frequency of grass types sampled in all 8 transects are shown in Figure 1 below. In this graph, CWG = Crested Wheatgrass (Agropyron cristatum); WWG = Western Wheatgrass (Agropyron smithii); IRG = Indian Ricegrass (Oryzopsis hymenoides); SPOR = Sporobolus, either Sand Dropseed (S. cryptandrus) or Alkali Sacaton (S. airoides); BG = Blue Gramma (Bouteloua gracilis); and FB = Foxtail Barley (Hordeum jubatum).

Percent cover of non-grass perennials can be determined from the table by subtracting the grass percent cover from the perennial percent cover. As can be seen, there were no non-grass perennial plants sampled along the transects. However, in the southwest portion of the site, there were stands of Tamarisk and Russian Olive. Some Rubber Rabbitbrush also occurred at the southern portion of the site.

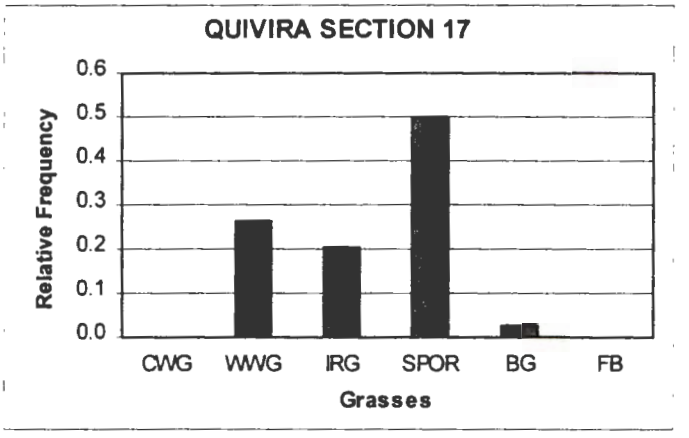

Figure 1. Relative Frequency of Grass Types, Section 17

SECTION 19

Seven transects were run at Section 19. The results are summarized in Table 3 below.

COVER TYPE	TRNS 1	TRNS 2	TRNS 3	TRNS 4	TRNS 5	TRNS 6	TRNS 7	AVG	STD DEV
GRASS & FORB	20	8	18	12	16	12	6	13.1	5.1
PERENNIAL	20	8	18	12	16	14	6	13.4	5.1
ANNUAL	0	12	0	0	0	0	0	1.7	4.5
LITTER	22	44	28	26	24	26	18	26.9	8.2
BARE GROUND	58	36	54	62	60	60	76	58.0	11.9

Table 3. Percent Cover, Section 19 Transects

The average percent perennial cover from the 7 transects in Section 19 is 13.4 % (12.9% being grasses), just at the minimum for release, with a standard deviation of 5.1%. The site overall looked good and fairly uniform in terms of cover, though there were some areas with less cover.

The relative frequency of grass types sampled in all 8 transects are shown in Figure 2 below. Five different grass species were encountered at the site with crested wheatgrass being the dominant species. Rubber rabbitbrush, four-wing saltbush and purple aster were observed at the site (rubber rabbitbrush was sampled once in Transect 6). There was a low occurrence of kochia and russian thistle at the site.

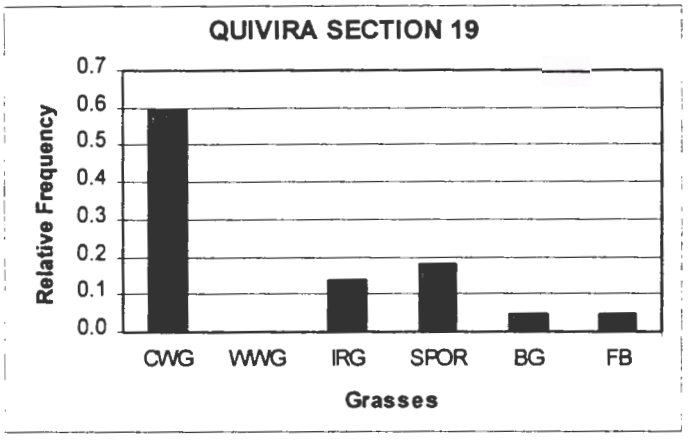

Figure 2. Relative Frequency of Grass Types, Section 19

SECTION 22

Seven transects were run at Section 22. The results are summarized below in Table 4.

COVER TYPE	TRNS 1	TRNS 2	TRNS 3	TRNS 4	TRNS 5	TRNS 6	TRNS 7	AVG	STD DEV
GRASS & FORB	6	8	8	12	14	18	14	11.4	4.3
PERENNIAL	6	8	8	12	14	34	20	14.6	9.8
ANNUAL	6	20	8	8	2	6	0	8.9	6.5
LITTER	30	34	30	34	32	14	32	29.4	7.0
BARE GROUND	58	38	54	46	52	46	48	48.9	6.5

Table 4. Percent Cover, Section 22 Transects

The relative frequency of grass types sampled in all 7 transects are shown in Figure 3 below. Five different grass species were encountered at the site fairly uniformly distributed between the species. Rubber rabbitbrush, four-wing saltbush and purple aster were observed at the site.

This average perennial cover from the 7 transects is 14.6%. However, the average was skewed to the right because Transect 6, had a perennial cover of 34% due to a large clump of four-wing saltbush, (without Transect 6, the average would be 11.3%). Based on the visual inspection of Section 22, Transect 6 was not representative of Section 22 which is generally in poor condition with some areas of good perennial growth.

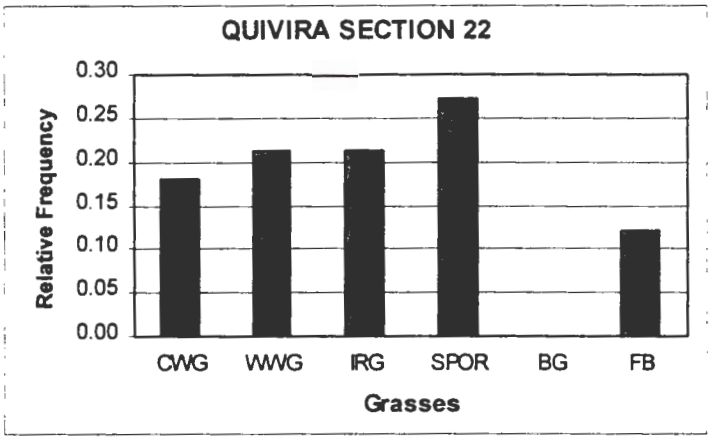

Figure 3. Relative Frequency of Grass Types, Section 22

SECTION 24

Seven transects were run at Section 24. The results are summarized below in Table 5.

COVER TYPE	TRNS 1	TRNS 2	TRNS 3	TRNS 4	TRNS 5	TRNS 6	TRNS 7	AVG	STD DEV
GRASS & FORB	12	0	6	18	0	0	2	5.4	7.1
PERENNIAL	12	0	16	18	0	0	2	6.9	8.2
ANNUAL	4	16	0	6	20	14	10	10.0	7.1
LITTER	32	20	30	12	18	48	40	28.6	12.8
BARE GROUND	52	64	54	64	62	38	48	54.6	9.6

Table 5. Percent Cover, Section 24 Transects.

The relative frequency of grass types sampled in all 7 transects are shown in Figure 4 below. Only two different grass species were encountered along the transects. Indian ricegrass and sand dropseed were encountered at the site, but crested wheatgrass was the dominant species. Four-wing saltbush and purple aster were also observed at the site.

Section 24 generally had poor perennial cover (average 6.9%) consisting primarily of crested wheatgrass. Kochia and russian thistle were the dominant plants in many areas. The overall range condition was poor.

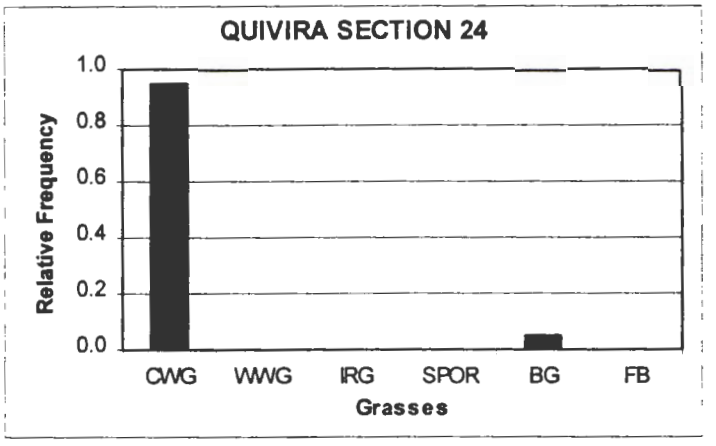

Figure 4. Relative Frequency of Grass Types, Section 24

SECTION 30

Nine transects were run at Section 30. The results are summarized below in Table 6.

COVER TYPE	TRNS 1	TRNS 2	TRNS 3	TRNS 4	TRNS 5	TRNS 6	TRNS 7	TRNS 8	TRNS 9	AVG	STD DEV
GRASS & FORB	12	14	6	8	26	18	14	18	22	15.3	6.4
PERENNIAL	16	16	6	8	30	18	14	18	30	15.4	7.8
ANNUAL	2	2	8	14	12	12	10	4	0	8.6	4.9
LITTER	10	18	6	16	14	22	24	26	20	15.7	6.4
BARE GROUND	72	64	80	62	44	48	52	52	50	60.3	13.1

Table 6. Percent Cover, Section 30 Transects

The relative frequency of grass types sampled in all 9 transects are shown in Figure 5 below. Five different grass species were encountered at the site with crested wheatgrass being the dominant species. Four-wing saltbush, sage, snakeweed and purple aster were also observed at the site.

Section 30 had an average perennial cover of 15.4%. The visual inspection showed this site to generally be in fair to good range condition with some portions in poor condition.

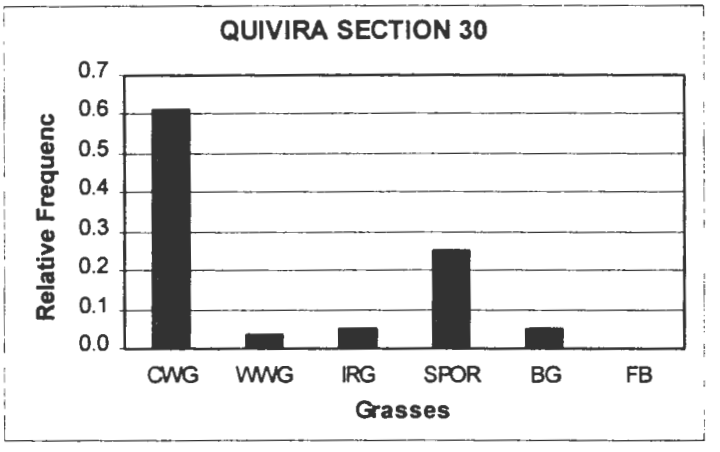

Figure 5. Relative Frequency of Grass Types, Section 30.

SECTION 30W

Seven transects were run at Section 30W. The results are summarized below in Table 7.

COVER TYPE	TRNS 1	TRNS 2	TRNS 3	TRNS 4	TRNS 5	TRNS 6	TRNS 7	AVG	STD DEV
GRASS & FORB	20	26	10	10	10	14	12	14.6	6.2
PERENNIAL	20	26	10	10	10	14	12	14.6	6.2
ANNUAL	0	0	12	14	10	22	0	8.3	8.6
LITTER	30	14	16	18	10	16	14	16.9	6.3
BARE GROUND	50	60	62	58	70	48	74	60.3	9.6

Table 7. Percent Cover, Section 30W

The relative frequency of grass types sampled in all 7 transects are shown in Figure 6 below. Five different grass species were encountered at the site with crested wheatgrass being the dominant species. Rubber rabbitbrush, salt cedar and purple aster were also observed at the site.

Section 30W had an average perennial cover of 14.6%. The visual inspection showed the range condition of this site to generally be fair to good with some portions in poor condition.

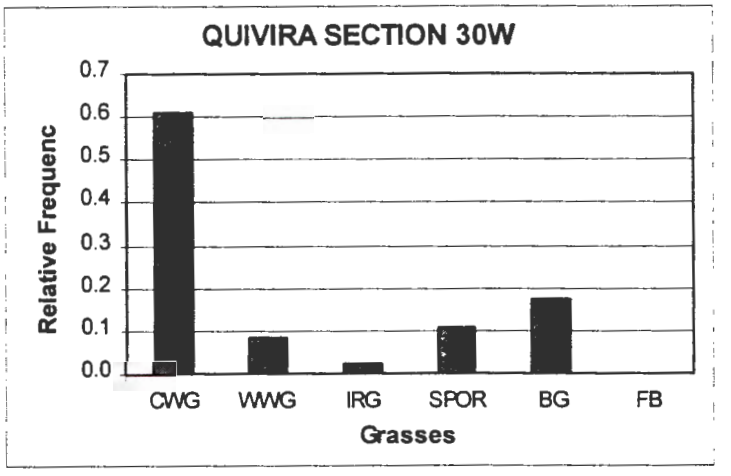

Figure 6. Relative Frequency of Grass Types, Section 30W

SECTION 33

Eight transects were run at Section 33. The results are summarized below in Table 8.

COVER TYPE	TRNS 1	TRNS 2	TRNS 3	TRNS 4	TRNS 5	TRNS 6	TRNS 7	TRNS 8	AVG	STD DEV
GRASS	0	6	10	28	0	12	34	6	12.0	12.6
PERENNIAL	0	6	10	28	0	12	34	6	12.0	12.6
ANNUAL	4	12	8	6	24	12	22	10	12.3	7.2
LITTER	6	32	20	44	24	22	18	44	26.0	13.0
BARE GROUND	90	50	62	22	52	54	26	40	49.5	21.5

Table 8. Percent Cover, Section 33

The relative frequency of grass types sampled in all 8 transects are shown in Figure 7 below. Only two different grass species, western wheatgrass and sand dropseed, were encountered along the transects, though blue grama was also observed. Four-wing saltbush and rubber rabbitbrush were also observed at the site.

The northern portion of Section 33 appeared to be in fair to good condition while the southern portion was in poor condition. The average perennial cover was 12.0% with a standard deviation of 12.6%. Those transects with good perennial cover were found in the northern portion of the site while the transects with inadequate cover were found in the southern portion.

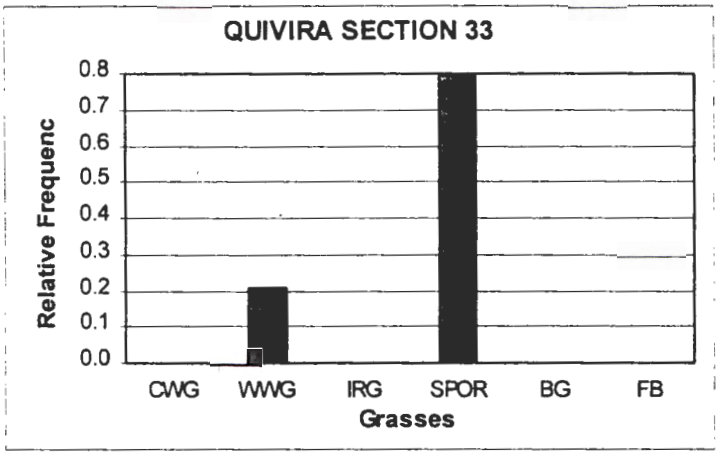

Figure 7. Relative Frequency of Grass Types, Section 33

CONCLUSIONS

None of Quivira's prior reclamation sites can be considered to be in excellent condition. However, some of the sites meet the criteria established for prior reclamation release. All the sites were interseeded by broadcast method in August of 1998 and, if moisture conditions are adequate, this should further improve the condition at all the sites.

Based on the above information, the following prior reclamation sites are recommended for release: Section 30 and Section 30W. The remaining sections, Section 19,17, Section 22, Section 24 and Section 33 are not recommended for release due to inadequate cover and, in some cases, inadequate diversity. Section 17 and the southern portion of Section 33 are in such poor condition that the sites should be reseeded by drill seeding.

RANGE SITE DESCRIPTION

Section II E, Technical Guide

A. SITE NO. D36-113-N Sandy (WP-2)

B. PHYSIOGRAPHIC FEATURES

This site usually occurs on level to gently sloping or undulating topography of upland plains. Slopes average less than 10 percent. Elevations range from about 6,000 feet to just over 7,200 feet.

C. CLIMATIC FEATURES

1. Average annual precipitation varies from about 10 inches to just over 16 inches. Fluctuations ranging from about 5 inches to 25 inches are not uncommon. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. As much as half or more of the annual precipitation can be expected to come during the period of July through September. Thus, fall conditions are often more favorable for good growth of cool-season perennial grasses, shrubs, and forbs than are those of spring.

2. The average frost-free season is about 120 days and extends from approximately mid-May to early or mid-September. Average annual air temperatures are 50° F. or lower, and summer maximums rarely exceed 100° F. Winter minimums typically approach or go below zero. Monthly mean temperatures exceed 70° F. for the period of July and August.

3. Rainfall patterns generally favor warm-season perennial vegetation, while the temperature regime tends to favor cool-season vegetation. This creates a somewhat complex community of plants on a given range site which is quite susceptible to disturbance and is at or near its productive potential only when both the natural warm- and cool-season dominants are present.

D. SOILS

1. The soils of this site are moderately deep to deep, well drained, and may or may not be calcareous throughout. Typically, the surface layer is a sandy loam, fine sandy loam, or loamy fine sand at least 5 or 6 inches thick over sandy loam to clay loam subsoils. Permeability is moderately slow to moderately rapid, and the available water capacity is moderate to high.

The soils of this site are subject to soil blowing.

2. Characteristic soils are:

Telescope loamy fine sand

3. Other soils included are:

Royosa fine sand

E. POTENTIAL NATURAL PLANT COMMUNITY

1. This site is characterized by both warm- and cool-season grasses, scattered shrubs, half-shrubs, and forbs. Blue grama and western wheatgrass are co-dominants, with Indian ricegrass and dropseed closely associated. Principal shrubs and half-shrubs include fourwing saltbush, winterfat, and sand sagebrush. Rocky Mountain beeplant is often the most noticeable forb. Broom snakeweed is most common in certain wet years and when the plant community deteriorates from its potential.

2. Composition of Potential Plant Community

Approximate percentage of total annual herbage production.

Grasses and Grasslike - 75-85%		(Shrubs, half-shrubs, vines and trees) Woody - 10-15%		Forbs - 5-10%	
Western wheatgrass	15-20	Fourwing saltbush)	5-10	Perennials	3-8
Blue grama	25-30	Winterfat)		Annuals	1-5
Indian ricegrass	5-10	Bigelow sagebrush	1-5		
Needleandthread)		Broom snakeweed)			
Bottlebrush squirreltail)	5-10	Rabbitbrush)	1-3		
New Mexico feathergrass)		Sand sagebrush)			
Sand dropseed)	10-15	Spineless horsebrush)			
Spike dropseed)					
Galleta	1-5				
Ring muhly)	3-5				
Sandhill muhly)					
False buffalograss)	1-5				
Threeawns spp.)					
Black grama	1-5				
Spike muhly	1-3				

3. Canopy Cover

Shrubs and half-shrubs - 5%

4. Ground Cover (Average Percent of Surface Area)

Grasses, grasslike, forbs	18
Bare ground	69
Surface gravel	1
Surface cobble and stones	0
Litter - percent of area	12
av. depth in cm.	2

F. TOTAL ANNUAL HERBAGE PRODUCTION (Air-dry, lbs./ac.)

Favorable years - 850 (Average)
Unfavorable years - 325 (Average)

G. SITE INTERPRETATIONS

1. Grazing

This site is suitable for grazing by most kinds and classes of livestock in all seasons of the year but is poorly suited for continuous year-long grazing if potential natural vegetation is to be maintained. Under such use, cool-season grasses, such as western wheatgrass, Indian ricegrass, and needleandthread, may decline or even disappear. If use is heavy and prolonged, many of the more palatable warm-season species will also decline. The site in a typically deteriorated condition may be characterized by low-vigor, sod-like blue grama and possibly some galleta. Further deterioration is characterized by increasing amounts of bare ground, increases in ring muhly, sandhill muhly, threeawns and rabbitbrush, and by certain annual forbs. Production in these instances may be cut to one-third or less of the potential, and soil blowing may become severe. The site, in certain instances, is subject to invasion by woody species such as pinyon pine and juniper.

2. Wood Products

This site has no significant value for wood products.

3. Habitat for Wildlife

This range site provides habitat which supports a resident animal community that is characterized by pronghorn antelope, kit fox, badger, desert cottontail, spotted ground squirrel, Ord's kangaroo rat, white-throated woodrat, Botta's pocket gopher, plains pocket mouse, Northern grasshopper mouse, ferruginous hawk, mourning dove, meadowlark, plains spadefoot toad, Eastern fence lizard, plateau whiptail, short-horned lizard and prairie rattlesnake.

Common raven and prairie falcon hunt over the site.

4. Hydrologic Interpretations

Soil Series	Hydrologic Groups
Telescope	B
Royosa fine sand	A

Runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups.

5. Recreation and Natural Beauty

This site offers fair potential for hiking, horseback riding, nature observation, photography, camping, and picnicking. It offers good to excellent potential for hunting of prongnorn antelope.

In years of favorable moisture, colorful wildflowers dot the landscape.

6. Endangered Plants and Animals

To be added as reliable information becomes available.

H. OTHER PERTINENT INFORMATION

1. Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Range Condition	Ac/Aum
Excellent (100-76)	3.6-4.7
Good (75-51)	4.5-7.0
Fair (50-26)	6.8-12.0
Poor (25-0)	12.0+

2. Relative Quality of Plants for Animal Use 1/

(a) Cattle

Primary	Secondary	Low Value
Western wheatgrass	Blue grama	Broom snakeweed
Indian ricegrass	Galleta	Rabbitbrush
Needleandthread	Bigelow sagebrush	Spineless horsebrush
New Mexico feathergrass	Sand dropseed	Sandhill muhly
Winterfat	Threeawns spp.	Ring muhly
Fourwing saltbush	Most perennial forbs	False buffalograss
Black grama		
Bottlebrush squirreltail		

(b) Antelope and Sheep

Primary	Secondary	Low Value
Winterfat	Blue grama	Broom snakeweed
Bigelow sagebrush	New Mexico feathergrass	Rabbitbrush
Western wheatgrass	Needleandthread	Sand sagebrush
Indian ricegrass	Threeawns spp.	Sandhill muhly
Fourwing saltbush	Dropseeds	Spineless horsebrush
Most perennial forbs		

I. IDENTIFICATION AND AUTHORIZATION

1. USDA SCS
   Albuquerque, NM
   MLRA 36

2. Field Offices:
   Reserve
   Magdalena/Quemado

3. Field Office Sample Location

4. Approved:

D. Sylvester 2/15/80
State Range Conservationist Date

Durwood E. Ball 3/27/80
WTSC Range Conservationist Date

Site Name Quinera Data Sheet No. 1 of 7 Sec 19 Rng Twp

Date 6-2-98 Location McKinley County

Line Length 50' Investigators R.P/H.S./SM/MMD P.L-Q

GRID 35 @ 316° Photo # 6 & 7

1 BG	21 CWG	41 CWG		
2 BG	22 BG	42 BG		
3 BG	23 BG	43 BG		
4 BG	24 BG	44 BG		
5 BG	25 BG	45 BG		
6 BG	26 BG	46 BG		
7 L	27 BG	47 BG		
8 BG	28 Sporo	48 BG		
9 BG	29 L	49 CWG		
10 L	30 BG	50 CWG		
11 CWG	31 L			
12 L	32 CWG			
13 L	33 L			
14 L	34 BG			
15 L	35 BG			
16 L	36 BG			
17 BG	37 BG			
18 BG	38 CWG			
19 BG	39 CWG			
20 CWG	40 L			

Total Rock (Rck) % _____

Total Bare Ground (BG)% 58

Total Plant Cover % 20 per

Total Litter (L)% 22

- Crested Wht grass
- Pi Aster
- Indian Rice Grass
- Sporobolus
- Chamisa
- Bottle brush Squirrel tail (BBST)
- Annuy

Site Name Quinera Data Sheet No. 2 of 7 Sec 19
Rng
Twp

Date 10.2.98 Location McKinley County

Line Length 50' Investigators RP/HS/SM/MMD PL-Q

GRID 42 @ 87°

1 BG	21 IND. RGGLS	41 L		
2 Sporo	22 BG	42 Kochia		
3 L	23 L	43 Kochia		
4 L	24 BG	44 L		
5 L	25 Kochia	45 BG		
6 L	26 BG	46 BG		
7 L	27 L	47 BBST		
8 L	28 L	48 L		
9 BG	29 BG	49 BBST		
10 BG	30 BG	50 L		
11 BG	31 L			
12 L	32 BG			
13 Kochia	33 BG			
14 L	34 BG			
15 Kochia	35 L			
16 Kochia	36 L			
17 L	37 BG			
18 L	38 BG			
19 L	39 L			
20 BG	40 BG			

Total Rock (Rck) %
Total Bare Ground (BG)% 36
Total Plant Cover % 8 per 12 annual
Total Litter (L)% 44

Site Name Quinera Data Sheet No. 3 of 7 Sec 19
Rng
Twp

Date 10.2.98 Location Mckinley County

Line Length 50' Investigators RP/SM/HS- LMD P.L. -Q

GRID 29 @ 250'

1 B	21 B	41 B		
2 L	22 L	42 B		
3 L	23 L	43 IR		
4 Aster	24 L	44 IR		
5 Spor	25 B	45 L		
6 B	26 B	46 B		
7 CWG	27 L	47 B		
8 IR	28 Spor	48 L		
9 L	29 L	49 B		
10 B	30 B	50 L		
11 B	31 L			
12 B	32 L			
13 B	33 B			
14 Spor	34 L			
15 B	35 B			
16 B	36 CWG			
17 B	37 B			
18 B	38 B			
19 B	39 B			
20 B	40 B			

Total Rock (Rck) %
Total Bare Ground (BG)% 54
Total Plant Cover % 18 per 16 grass
Total Litter (L)% 28

Site Name Quivera Data Sheet No. 4 of 7

Sec 19
Rng
Twp

Date 10.2.98 Location Mckinley County

Line Length 50' Investigators

grid 21 @ 58°

1 L	11 L	21 B	31 B	41 B
2 B	12 L	22 B	32 L	42 B
3 B	13 CWG	23 L	33 B	43 B
4 L	14 L	24 B	34 B	44 B
5 B	15 B	25 L	35 B	45 Blue G
6 B	16 B	26 B	36 B	46 L
7 B	17 CWG	27 L	37 L	47 Blue G
8 B	18 L	28 B	38 B	48 B
9 B	19 B	29 B	39 CWG	49 B
10 CWG	20 B	30 B	40 L	50 B

Total Rock (Rck) %

Total Bare Ground (BG)% 62

Total Plant Cover % 12 per

Total Litter (L)% 26

Site Name Quivera Data Sheet No. 3 of 7

Sec 19
Rng
Twp

Date 10.2.98 Location McKinley County

Line Length 50' Investigators RP/HS/SM - MMD F.L-Q

GRID 20 @ 310°

1 L	11 L	21 L	31 BG	41 Sporo
2 L	12 BG	22 BG	32 BG	42 BG
3 BG	13 BG	23 BG	33 BG	43 CWG
4 CWG	14 L	24 BG	34 BG	44 BG
5 Sporo	15 L	25 BG	35 BG	45 CWG
6 BG	16 Ind. Rc	26 BG	36 BG	46 BG
7 BG	17 L	27 BG	37 BG	47 BG
8 BG	18 L	28 Ind. Rc	38 BG	48 L
9 BG	19 CWG	29 BG	39 BG	49 L
10 BG	20 L	30 BG	40 BG	50 L

Total Rock (Rck) %
Total Bare Ground (BG)% 60%
Total Plant Cover % 16%
Total Litter (L)% 24%

CWG - 4%
Sporo - 2%
IndRc - 2%

8 x 2

Site Name Quivera Data Sheet No. 6 of 7 Sec 19
Rng
Twp
Date 10.2.98 Location McKinley County
Line Length 50' Investigators RP/SM/HS - MMP RL-Q
GRID 30 @ 228° Photo 8

1 BG	11 CWG	21 CWG	31 BG	41 BG
2 CWG	12 BG	22 CWG	32 BG	42 BG
3 L	13 CWG	23 BG	33 BG	43 BG
4 BG	14 BG	24 BG	34 L	44 BG
5 BG	15 BG	25 L	35 L	45 BG
6 BG	16 BG	26 BG	36 L	46 BG
7 L	17 L	27 CWG	37 L	47 BG
8 BG	18 BG	28 BG	38 RBrush	48 BG
9 L	19 BG	29 L	39 BG	49 BG
10 L	20 L	30 L	40 BG	50 BG

RBrush - 1
CWG - 6
7 x 2

Total Rock (Rck) % _____
Total Bare Ground (BG)% 60%
Total Plant Cover % 14% 12 grass
Total Litter (L)% 26%

Site Name Quivera Data Sheet No. 7 of 7 Sec 19
Rng
Twp

Date 10.2.98 Location Mckinley County

Line Length 50' Investigators RP | HS | SM - MMD P.L - (2)

GRID II @ 278°

1 spor	11 B	21 B	31 B	41 B
2 spor	12 B	22 B	32 L	42 B
3 B	13 B	23 B	33 CWG	43 B
4 L	14 B	24 B	34 L	44 B
5 B	15 L	25 B	35 B	45 B
6 B	16 L	26 B	36 B	46 B
7 B	17 B	27 B	37 B	47 B
8 L	18 L	28 L	38 L	48 B
9 B	19 B	29 B	39 B	49 B
10 B	20 B	30 B	40 B	50 B

Total Rock (Rck) %
Total Bare Ground (BG)% 76
Total Plant Cover % 6 per
Total Litter (L)% 18%

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

MINING AND MINERALS DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-5970

Jennifer A. Salisbury
CABINET SECRETARY

Kathleen A. Garland
DIVISION DIRECTOR

October 31, 1997

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs
Quivira Mining Company
P.O. Box 218
Grants, NM 87020

Re: Status of Prior Reclamation Sites Sections 17, 19, 22, 23, 24, 30, 30W and 33

Dear Mr. Luthiger:

The letter addresses the current status of Quivira's prior reclamation sites identified above. Quivira's approved variance requested that the regulatory deadline of September 30, 1995, for MMD's determination, be extended to allow for further evaluation of revegetation success. The next evaluation of the prior reclamation sites was planned for the 1997 growing season. This evaluation was conducted by Robyn Tierney and Doug Romig from MMD's Coal Mine Reclamation Bureau on October 7, 1997.

We have determined that prior reclamation sites Sections 17, 19, 22, 23, 24, 30, 30W and 33 do not qualify for prior reclamation release, while Section 23 does qualify for release. I have summarized our findings and recommendations below and have attached a copy of the field data collected during the evaluation.

Findings and Recommendations:

Section 23 may be released based on the fact that this section had a diverse species composition, including several native grass species that were not in the original seed mix; shrub establishment including winterfat, sage and fourwing saltbush was excellent; and vegetation cover was 25% with no crested wheatgrass.

Grazing is a problem on Section 17. This area lacked an acceptable vegetation cover for reclamation release and also contained major rill and gully erosion. We recommend the cows be removed at this time, because of the lack of adequate cover. There is very little vegetation to support this type of use on this section. However, controlled grazing in the spring and fall may help to reduce competition from the crested wheatgrass, russian thistle and kochia.

A significantly lower species diversity from that observed in 1995, was observed on all of the mines evaluated with the exception of the Section 23 mine. Also of concern is the apparent loss

of many of the shrub seedlings such as winterfat and fourwing saltbush; and the native perennial

grasses such as blue grama, alkali sacaton, sand dropseed, sideoats grama, and galleta grass previously observed during the 1995 inspection. These species have largely been replaced by crested wheatgrass. Crested wheatgrass acts much like cheatgrass in that it aggressively competes for early spring and fall moisture. The preponderance of weeds including russian thistle and kochia poses a problem to satisfactory revegetation. One way of overcoming this problem is by burning, reseeding or interseeding when these weeds persist for more than 2-3 years on reclaimed lands.

Finally, this survey was concluded in the fall of the fourth growing season for all of the Quivira mines. In spite of the excellent precipitation received in the Grants/Milan area this year, these results are disappointing. Our conclusion is that the sites are not likely to improve over time.

Conclusion:

Since the variance has expired for the extension of MMD's determination for these sites, Quivira must apply for another variance or bring these sites under a Mining Act permit. If you choose to request another variance MMD will require a plan to address the reclamation on these sites and the establishment of another time frame to perform a follow-up evaluation. We would also advise that prior to submittal of the plan you discuss proposed approaches with staff who will be able to provide you with options for addressing the reclamation.

Please let us know how Quivira would like to approach this decision and how we can assist you in making it. I can be contacted directly at 505/827-5974.

Sincerely,

Kathleen Garland
Director
Mining and Minerals Division

attachments

cc: Holland Shepherd, MARB
Robyn Tierney, MMD
Doug Romig, MMD

Percent Relative Cover at Quivira Mines, October 1997

First hit data collected by Robyn Tierney and Douglas Romig (on October 7, 1997) from each mine, based on averages of four 15 meter point intercept transects. Numbers in parentheses are averages from the MMD surveys conducted in 1995.

Mine No.	Bareground	Litter	Kochia	Salsola	Crested Wheatgrass	Native/Other Species[1]	Rock
17	.38 (.53)	.10 (.11)	.33	.10	0	.08 (0)	.01
19	.47 (–)[2]	.17 (–)	.07	.18	.11	0 (0)	0
22	.37 (.49)	.13 (.16)	.15	.13	.07	.15 (0)	0
23[3]	.23 (.29)	.10 (0)	.42	0	0	.25 (0)	0
24	.23 (.53)	.12 (.06)	.28	.20	.16	.01 (.03)	0
30	.30 (.55)	.11 (.11)	.13	.17	.27	.02 (.06)	0
33	.40 (.35)	.13 (.08)	.31	.09	.07	0 (.03)	0
30W	.35 (.41)	.07 (.08)	.28	.09	.11	.10 (.08)	0

1 Includes both introduced and native annual, biennial, and perennial species
2 Data from 1995 inspection not available
3 Formerly, Homestake's Section 23 mine. Possible candidate for release

Codes for vegetation recorded on transects at Quivira's mines
Inspected by Robyn Tierney and Doug Romig on October 7, 1997

	Common Name	Scientific Name	Code
bg	bare ground		1
litter			2
kocr	ragweed	*Kochia scoparia* (L.) Schrad.	3
agsm	western wheatgrass	*Agropyron smithii* Rydb.	4
saka	russian thistle	*Salsola kali* (L.)	5
spai	alkali sacaton	*Sporobulus airoides* (Torr.) Torr.	6
atca	fourwing saltbush	*Atriplex canescens* (Pursh) Nutt.	7
sihy	bottlebrush squirreltail	*Sitanion hystrix* (Nutt.) J.G. Sm.	8
hija	galleta	*Hillaria jamesii* (Torr.) Benth.	9
agcr	crested wheatgrass	*Agropyron cristatum* (L.) Gaertn.	10
muhl	Muhlenbergia species	*Muhlenbergia* sp.	11
bogr	blue grama	*Bouteloua gracilis* (Willd. ex Kunth) Lag. ex Griffiths	12
mabi	purple aster	*Macaranthera bigelovii* (Gray) Greene	13
orhy	indian ricegrass	*Oryzopsis hymenoides* (Roemer & J.A. Schultes) Ricker ex Piper	14
depu	yellow mustard	*Descurainia pinnata* (Walt.) Britt.	15
yelclover	yellow clover	*Meliotus officinalis* (L.) Lam.	16
spcr	sand dropseed	*Sporobulus cryptandrus* (Torr.) Gray	17
arfr	fringed sage	*Artemisia frigida* Willd.	18
rock			19
grsq	curly cup gumweed	*Grindelia squarosa* (Pursh) Dunal	20
crpt	cryptogram		21
gusa	snakeweed	*Guttierrezia sarothrae* (Pursh) Britt. & Rusby	22

quivkey.doc

MeterNo.	MineNo.	Transect	first	firstcode	second	seccode	third	thirdcode
1	33	1	bg	1				
2	33	1	litter	2				
3	33	1	bg	1				
4	33	1	kocr	3	litter	2		
5	33	1	kocr	3	bg	1		
6	33	1	agsm	4	bg	1		
7	33	1	saka	5	bg	1		
8	33	1	bg	1				
9	33	1	litter	2				
10	33	1	kocr	3	litter	2		
11	33	1	kocr	3	litter	2		
12	33	1	bg	1				
13	33	1	agsm	4	litter	2		
14	33	1	kocr	3	agsm	4	litter	2
15	33	1	bg	1				
1	33	2	kocr	3	bg	1		
2	33	2	bg	1				
3	33	2	saka	5	bg	1		
4	33	2	kocr	3	litter	2		
5	33	2	bg	1				
6	33	2	bg	1				
7	33	2	bg	1				
8	33	2	kocr	3	bg	1		
9	33	2	bg	1				
10	33	2	saka	5	bg	1		
11	33	2	bg	1				
12	33	2	kocr	3	bg	1		
13	33	2	kocr	3	bg	1		
14	33	2	bg	1				
15	33	2	kocr	3	bg	1		
1	33	3	bg	1				
2	33	3	bg	1				
3	33	3	kocr	3	bg	1		
4	33	3	litter	2				
5	33	3	kocr	3	bg	1		
6	33	3	kocr	3	bg	1		
7	33	3	bg	1				
8	33	3	litter	2				
9	33	3	bg	1				
10	33	3	bg	1				
11	33	3	bg	1				
12	33	3	bg	1				
13	33	3	bg	1				
14	33	3	bg	1				
15	33	3	bg	1				
1	33	4	spai	6	spai	6		
2	33	4	mabi	13	bg	1		
3	33	4	mabi	13	bg	1		
4	33	4	agcr	10	agcr	10		
5	33	4	agsm	4	agsm	4		
6	33	4	agsm	4	litter	2		
7	33	4	agsm	4	litter	2		
8	33	4	litter	2				
9	33	4	agsm	4	agsm	4		
10	33	4	litter	2				

11	33	4	bg	1					
12	33	4	agsm	4	agsm	4			
13	33	4	agsm	4	litter	2			
14	33	4	agsm	4	agsm	4			
15	33	4	bg	1					
1	19	1	saka	5	litter	2			
2	19	1	bg	1					
3	19	1	sihy	8	litter	2			
4	19	1	agcr	10	bg	1			
5	19	1	bg	1					
6	19	1	litter	2					
7	19	1	kocr	3	litter	2			
8	19	1	bg	1					
9	19	1	litter	2					
10	19	1	bg	1					
11	19	1	litter	2					
12	19	1	mabi	13	litter	2			
13	19	1	bg	1					
14	19	1	litter	2					
15	19	1	bg	1					
1	19	2	spai	6	bg	1			
2	19	2	bg	1					
3	19	2	yelclover	16	bg	1			
4	19	2	bg	1					
5	19	2	bg	1					
6	19	2	bg	1					
7	19	2	agcr	10	yelclover	16	bg	1	
8	19	2	spcr	17	bg	1			
9	19	2	bg	1					
10	19	2	bg	1					
11	19	2	yelclover	16	bg	1	bg	1	
12	19	2	spai	6					
13	19	2	litter	2					
14	19	2	bg	1					
15	19	2	litter	2					
1	19	3	bg	1					
2	19	3	bg	1					
3	19	3	yelclover	16	bg	1			
4	19	3	bg	1					
5	19	3	saka	5	bg	1			
6	19	3	saka	5	yelclover	16	bg	1	
7	19	3	bg	1					
8	19	3	bg	1					
9	19	3	bg	1					
10	19	3	saka	5	bg	1			
11	19	3	saka	5	bg	1			
12	19	3	bg	1					
13	19	3	saka	5	bg	1			
14	19	3	bg	1					
15	19	3	bg	1					
1	19	4	litter	2					
2	19	4	bg	1					
3	19	4	agcr	10	bg	1			
4	19	4	kocr	3	bg	1			
5	19	4	mabi	13	bg	1			
6	19	4	agcr	10	yelclover	16	litter	2	

7	19	4	agcr	10	agcr	10
8	19	4	bg	1		
9	19	4	bg	1		
10	19	4	litter	2		
11	19	4	bg	1		
12	19	4	bg	1		
13	19	4	saka	5	bg	1
14	19	4	bg	1		
15	19	4	saka	5	bg	1
1	17	1	kocr	3	bg	1
2	17	1	bg	1		
3	17	1	bg	1		
4	17	1	saka	5	bg	1
5	17	1	rock	19		
6	17	1	kocr	3	bg	1
7	17	1	kocr	3	litter	2
8	17	1	kocr	3	litter	2
9	17	1	litter	2		
10	17	1	saka	5	bg	1
11	17	1	bg	1		
12	17	1	kocr	3	bg	1
13	17	1	bg	1		
14	17	1	bg	1		
15	17	1	bg	1		
1	17	2	litter	2		
2	17	2	bogr	12	bg	1
3	17	2	silty	8	litter	2
4	17	2	kocr	3	litter	2
5	17	2	kocr	3	bg	1
6	17	2	bg	1		
7	17	2	kocr	3	litter	2
8	17	2	kocr	3	litter	2
9	17	2	kocr	3	litter	2
10	17	2	bg	1		
11	17	2	bg	1		
12	17	2	kocr	3	bg	1
13	17	2	saka	5	litter	2
14	17	2	bg	1		
15	17	2	agsm	4	litter	2
1	17	3	kocr	3	kocr	3
2	17	3	kocr	3	litter	2
3	17	3	bg	1		
4	17	3	bg	1		
5	17	3	kocr	3	litter	2
6	17	3	kocr	3	bg	1
7	17	3	bg	1		
8	17	3	bg	1		
9	17	3	litter	2		
10	17	3	kocr	3	litter	2
11	17	3	spai	6	litter	2
12	17	3	litter	2		
13	17	3	bg	1		
14	17	3	kocr	3	litter	2
15	17	3	litter	2		
1	17	4	kocr	3	litter	2
2	17	4	bg	1		

3	17	4	bg	1					
4	17	4	kocr	3	bg	1			
5	17	4	litter	2					
6	17	4	yelclover	16	bg	1			
7	17	4	bg	1					
8	17	4	bg	1					
9	17	4	bg	1					
10	17	4	kocr	3	bg	1			
11	17	4	bg	1					
12	17	4	bg	1					
13	17	4	bg	1					
14	17	4	yelclover	16	bg	1			
15	17	4	yelclover	16	bg	1			
1	30	1	saka	5	bg	1			
2	30	1	litter	2					
3	30	1	mabi	13	bg	1			
4	30	1	saka	5	bg	1			
5	30	1	spai	6	litter	2			
6	30	1	depu	15	litter	2			
7	30	1	kocr	3	bg	1			
8	30	1	bg	1					
9	30	1	kocr	3	litter	2			
10	30	1	bg	1					
11	30	1	depu	15	bg	1			
12	30	1	bg	1					
13	30	1	arfr	18	bg	1			
14	30	1	mabi	13	spcr	17	bg		1
15	30	1	litter	2					
1	30	2	agcr	10	bg	1			
2	30	2	agcr	10	crpt	21			
3	30	2	arfr	18	bg	1			
4	30	2	agcr	10	agcr	10			
5	30	2	spai	6	spai	6			
6	30	2	agcr	10	bg	1			
7	30	2	spcr	17	litter	2			
8	30	2	bg	1					
9	30	2	agcr	10	bg	1			
10	30	2	depu	15	litter	2			
11	30	2	depu	15	spcr	17	litter		2
12	30	2	spcr	17	spcr	17			
13	30	2	spcr	17	bg	1			
14	30	2	agcr	10	litter	2			
15	30	2	agcr	10	agcr	10			
1	30	3	bg	1					
2	30	3	bg	1					
3	30	3	bg	1					
4	30	3	bg	1					
5	30	3	bg	1					
6	30	3	litter	2					
7	30	3	bg	1					
8	30	3	bg	1					
9	30	3	mabi	13	bg	1			
10	30	3	bg	1					
11	30	3	bg	1					
12	30	3	agcr	10	litter	2			
13	30	3	bogr	12	litter	2			

14	30	3	mabi	13	litter	2
15	30	3	agcr	10	litter	2
1	30	4	gusa	22	bg	1
2	30	4	agcr	10	litter	2
3	30	4	bg	1		
4	30	4	sihy	8	litter	2
5	30	4	bg	1		
6	30	4	litter	2		
7	30	4	bg	1		
8	30	4	agcr	10	bg	1
9	30	4	agcr	10	litter	2
10	30	4	saka	5	bg	1
11	30	4	saka	5	saka	5
12	30	4	bg	1		
13	30	4	litter	2		
14	30	4	saka	5	litter	2
15	30	4	bg	1		
1	301	1	bogr	12	bg	1
2	301	1	saka	5	bg	1
3	301	1	litter	2		
4	301	1	bogr	12	bogr	12
5	301	1	bg	1		
6	301	1	bg	1		
7	301	1	kocr	3	bg	1
8	301	1	depu	15	litter	2
9	301	1	agcr	10	agcr	10
10	301	1	agcr	10	bg	1
11	301	1	kocr	3	bg	1
12	301	1	mabi	13	litter	2
13	301	1	bg	1		
14	301	1	bg	1		
15	301	1	agcr	10	bg	1
1	301	2	saka	5	saka	5
2	301	2	bg	1		
3	301	2	litter	2		
4	301	2	bg	1		
5	301	2	bg	1		
6	301	2	bg	1		
7	301	2	kocr	3	litter	2
8	301	2	kocr	3	bg	1
9	301	2	bg	1		
10	301	2	kocr	3	litter	2
11	301	2	sihy	8	sihy	8
12	301	2	agcr	10		
13	301	2	bg	1		
14	301	2	bg	1		
15	301	2	kocr	3	bg	1
1	301	3	bogr	12	bg	1
2	301	3	kocr	3	bg	1
3	301	3	saka	5	bg	1
4	301	3	kocr	3	bg	1
5	301	3	kocr	3	bg	1
6	301	3	saka	5	litter	2
7	301	3	bg	1		
8	301	3	bg	1		
9	301	3	bg	1		

10	301	3	agcr	10	agcr	10			
11	301	3	bogr	12	bg	1			
12	301	3	mabi	13	litter	2			
13	301	3	spcr	17	bg	1			
14	301	3	bg	1					
15	301	3	bogr	12	bg	1			
1	301	4	kocr	3	litter	2			
2	301	4	kocr	3	litter	2			
3	301	4	spai	6	bg	1			
4	301	4	bg	1					
5	301	4	kocr	3	bg	1			
6	301	4	kocr	3	litter	2			
7	301	4	kocr	3	bg	1			
8	301	4	bg	1					
9	301	4	kocr	3	bg	1			
10	301	4	kocr	3	bg	1			
11	301	4	bg	1					
12	301	4	bg	1					
13	301	4	bg	1					
14	301	4	bg	1					
15	301	4	kocr	3	litter	2			
1	24	1	litter	2					
2	24	1	bg	1					
3	24	1	saka	5	bg	1			
4	24	1	kocr	3	bg	1			
5	24	1	kocr	3	bg	1			
6	24	1	bg	1					
7	24	1	bg	1					
8	24	1	saka	5	bg	1			
9	24	1	kocr	3	bg	1			
10	24	1	agcr	10	agcr	10			
11	24	1	saka	5	bg	1			
12	24	1	kocr	3	bg	1			
13	24	1	agcr	10	bg	1			
14	24	1	bg	1					
15	24	1	spai	6	spai	6			
1	24	2	bg	1					
2	24	2	bg	1					
3	24	2	agcr	10	litter	2			
4	24	2	agcr	10	agcr	10			
5	24	2	litter	2					
6	24	2	kocr	3	bg	1			
7	24	2	agsm	4	bg	1			
8	24	2	kocr	3	bg	1			
9	24	2	bg	1					
10	24	2	bg	1					
11	24	2	saka	5	bg	1			
12	24	2	saka	5	bg	1			
13	24	2	saka	5	litter	2			
14	24	2	agcr	10	bg	1			
15	24	2	agcr	10	litter	2			
1	24	3	agsm	4	litter	2			
2	24	3	litter	2					
3	24	3	kocr	3	kocr	3			
4	24	3	kocr	3	saka	5	bg		1
5	24	3	litter	2					

6	24	3	kocr	3	bg	1			
7	24	3	bg	1					
8	24	3	kocr	3	litter	2			
9	24	3	yelclover	16	bg	1			
10	24	3	bg	1					
11	24	3	bogr	12	litter	2			
12	24	3	grsq	20	kocr	3			
13	24	3	litter	2					
14	24	3	kocr	3	litter	2			
15	24	3	litter	2					
1	24	4	bg	1					
2	24	4	bg	1					
3	24	4	depu	15	bg	1			
4	24	4	depu	15	bg	1			
5	24	4	depu	15	litter	2			
6	24	4	kocr	3	bg	1			
7	24	4	kocr	3	bg	1			
8	24	4	kocr	3	bg	1			
9	24	4	kocr	3	litter	2			
10	24	4	bg	1					
11	24	4	kocr	3	bg	1			
12	24	4	bg	1					
13	24	4	kocr	3	bg	1			
14	24	4	litter	2					
15	24	4	agcr	10	agcr	10			
1	22	1	bg	1					
2	22	1	saka	5	bg	1			
3	22	1	bg	1					
4	22	1	litter	2					
5	22	1	mabi	13	saka	5	bg		1
6	22	1	bg	1					
7	22	1	bg	1					
8	22	1	saka	5	bg	1			
9	22	1	bg	1					
10	22	1	kocr	3	litter	2			
11	22	1	litter	2					
12	22	1	orhy	14	bg	1			
13	22	1	bg	1					
14	22	1	agsm	4	bg	1			
15	22	1	orhy	14	bg	1			
1	22	2	agsm	4	bg	1			
2	22	2	agsm	4	bg	1			
3	22	2	agsm	4	agsm	4			
4	22	2	agsm	4	litter	2			
5	22	2	agsm	4	bg	1			
6	22	2	agsm	4	litter	2			
7	22	2	litter	2					
8	22	2	bg	1					
9	22	2	kocr	3	bg	1			
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2	22	3	litter	2					
3	22	3	bg	1					
4	22	3	litter	2					
5	22	3	orhy	14	bg	1			
6	22	3	litter	2					
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9	22	3	bg	1					
10	22	3	bg	1					
11	22	3	bg	1					
12	22	3	saka	5	bg	1			
13	22	3	kocr	3	litter	2			
14	22	3	bg	1					
15	22	3	kocr	3	bg	1			
1	22	4	kocr	3	bg	1			
2	22	4	saka	5	bg	1			
3	22	4	saka	5	bg	1			
4	22	4	kocr	3	litter	2			
5	22	4	bg	1					
6	22	4	saka	5	bg	1			
7	22	4	bg	1					
8	22	4	kocr	3	bg	1			
9	22	4	kocr	3	litter	2			
10	22	4	sihy	8	sihy	8			
11	22	4	agcr	10	litter	2			
12	22	4	agsm	4	litter	2			
13	22	4	atca	7	agcr	10	litter	2	
14	22	4	agsm	4	litter	2			
15	22	4	agsm	4	litter	2			
1	23	1	bogr	12	bogr	12			
2	23	1	muhl	11	muhl	11			
3	23	1	litter	2					
4	23	1	bogr	12	litter	2			
5	23	1	kocr	3	litter	2			
6	23	1	spai	6	litter	2			
7	23	1	kocr	3	litter	2			
8	23	1	hija	9	litter	2			
9	23	1	kocr	3	litter	2			
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11	23	1	bg	1					
12	23	1	bg	1					
13	23	1	kocr	3	bg	1			
14	23	1	bg	1					
15	23	1	kocr	3	litter	2			
1	23	2	bg	1					
2	23	2	bg	1					
3	23	2	bg	1					
4	23	2	kocr	3	bg	1			
5	23	2	atca	7	kocr	3	bg	1	
6	23	2	atca	7	litter	2			
7	23	2	kocr	3	bg	1			
8	23	2	agsm	4	agsm	4			
9	23	2	kocr	3	bg	1			
10	23	2	kocr	3	litter	2			
11	23	2	atca	7	litter	2			
12	23	2	bg	1					

13	23	2	kocr	3	bg	1
14	23	2	sihy	8	bg	1
15	23	2	litter	2		
1	23	3	kocr	3	bg	1
2	23	3	agsm	4	litter	2
3	23	3	hija	9	hija	9
4	23	3	agsm	4	bg	1
5	23	3	litter	2	kocr	3
6	23	3	kocr	3	kocr	3
7	23	3	bg	1		
8	23	3	kocr	3	bg	1
9	23	3	litter	2		
10	23	3	kocr	3	litter	2
11	23	3	agsm	4	bg	1
12	23	3	bg	1		
13	23	3	bg	1		
14	23	3	bg	1		
15	23	3	bg	1		
1	23	4	spai	6	bg	1
2	23	4	kocr	3	litter	2
3	23	4	litter	2		
4	23	4	kocr	3	bg	1
5	23	4	kocr	3	litter	2
6	23	4	kocr	3	bg	1
7	23	4	kocr	3	litter	2
8	23	4	kocr	3	bg	1
9	23	4	bg	1		
10	23	4	bg	1		
11	23	4	kocr	3	kocr	3
12	23	4	kocr	3	litter	2
13	23	4	litter	2		
14	23	4	kocr	3	litter	2
15	23	4	kocr	3	bg	1

QUIVIRA MINING COMPANY
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

August 18, 1997

Certified Mail
Return Receipt Requested (P 268 360 535)

Mr. Holland Shepherd, Chief
Mining Act Reclamation Bureau
Mining and Minerals Division
Energy Minerals and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Re: **Quivira Mining Company**
Prior Reclamation Inspections

Dear Mr. Shepherd,

Pursuant to the April 21, 1997 letter from Ms. Kathleen Garland, Director of the Mining and Minerals Division (MMD), approving Quivira's prior reclamation varaince request; please accept this letter as Quivira's request for MMD to conduct an inspection of the revegetation success in order to obtain final release at the sites listed below:

Section 17 T14N R9W
Section 19 T14N R9W
Section 22 T14N R10W
Section 23 T14N R10W (previous Homestake mine)
Section 24 T14N R10W
Section 30 T14N R9W
Section 30W T14N R9W
Section 33 T14N R9W

Quivira requests that these inspections occur prior to the end of August 1997; or very early in September 1997.

If you have any questions, please call me at (505) 287-8851.

Regards,

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

xc: T. Fletcher
M. Freeman
file

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

MINING AND MINERALS DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-6970

Jennifer A. Salisbury
CABINET SECRETARY

Kathleen A. Garland
DIVISION DIRECTOR

April 21, 1997

Mr. Marvin Freeman, Vice President
Quivira Mining Company
6305 Waterford Boulevard, Suite 325
Oklahoma City, OK 73118

Re: Approval of Variance Request for Prior Reclamation, Sections 17, 19, 22, 24, 30, 30W and 33, Quivira Mining Company, McKinely County, New Mexico

Dear Mr. Freeman:

This approval addresses the request for variance submitted by Quivira in a letter dated May 31, 1996; and a letter dated March 31, 1997 indicating that Quivira had completed public notice for the variance. The approval covers the following 7 mining units addressed under the requirements for prior reclamation of Section 510 of the Mining Act Reclamation Rules (Rules):

Section 17 T14N R9W
Section 19 T14N R9W
Section 22 T14N R10W
Section 24 T14N R10W
Section 30 T14N R9W
Section 30W T14N R9W
Section 33 T14N R9W

Quivira's request meets the requirements of Section 1002 of the Rules. MMD also finds that the request meets the requirements of Sections 1004.B.6 and 7 of the Rules.

The following conditions shall apply to the variance:

1. MMD will conduct an inspection of the sites, indicated above, during the late summer of 1997, to determine if conditions are present to meet revegetation criteria. If the results do not meet the release criteria, Quivira will develop and implement the appropriate program to meet the release criteria which may include reseeding and/or interseeding. Any areas that remain unreleased after the summer of 1997 will be reevaluated again during the summer of 1998.

2. If old stope leaching takes place on a prior reclamation site before or after the site is released from prior reclamation, those portions of the site redisturbed for mining will be addressed under an existing mine permit by Quivira.

Please contact me directly or Holland Shepherd of my Division if you have any questions concerning this approval letter.

Sincerely,

KATHLEEN GARLAND, Director
Mining and Minerals Division

cc: John McKay, Permit Coordinator
Fernando Martinez, Permit Manager Section 35 Mine

QUIVIRA MINING COMPANY
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

March 31, 1997

Mr. Holland Shepherd
Chief, Mining Act Reclamation Bureau
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

Re: **Quivira Mining Company**
Variance Request
Public Notice Requirements

Dear Mr. Shepherd:

Please accept the following information which demonstrates compliance with the public notice requirements of the Mining Act Rules.

Rule 9.3.A

Based on several conversations with County Assessor's Office staff in both Cibola County and McKinley County, the necessary information was obtained on all property owners within a ½ mile of areas associated with the variance request. A sample letter and notice is attached. Owners of record who were notified via certified mail on December 2, 1996 are:

Property Owner
United Nuclear Corporation
Mr. Jerry Elkins
Mr. Dave Elkins
State of New Mexico
Bureau of Land Management
Isabel Marquez

Rule 9.3.B

Based on several conversations with County Assessor's Office staff in both Cibola County and McKinley County, the necessary information was obtained on all municipalities, counties and tribal organizations within a ten mile radius of areas associated with the variance request. Entities meeting this condition and who were notified via certified mail are:

Entity
McKinley County
Cibola County
Navajo Nation

Rule 9.3.C

The public notice, approved by the Mining and Minerals Division, appeared in the *Gallup Independent* on December 12, 1996, in both english and spanish. The notice appeared in the legal section as well as within the local section of the newspaper. The pertinent sections of the December 12, 1996 edition of the *Gallup Independent* as well as the affidavit of publication are attached.

Rule 9.3.D

The public notice, in both english and spanish, was posted in four (4) publicly accessible locations in the vicinity of the proposed permit area. As a result of the entrance to the mining operation not being accessible to the public due to locked gates, posting at the entrance to the mine was not performed. Listed below are the public places where the notice was posted.

Posting Location
Post Office - Grants, NM
Post Office - Milan, NM
Post Office - Prewitt, NM
Post Office - Thoreau, NM

Rule 9.3.E

As a result of Quivira holding the mineral leases on the areas associated with the variance, no notification was necessary.

Rule 9.3.F and 9.3.G

Notice was provided via certified mail to those individuals and entities on the list provided by MMD. This list is attached.

If you have any questions regarding this information, please do not hesitate to contact me at (505) 287-8851, extension 205.

Regards,

Peter Luthiger

Attachments: As Stated

xc: file

QUIVIRA MINING COMPANY
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

December 2, 1996

Certified Mail
Return Receipt Requested [P 268 360 568]

Ms. Maxine Goad
P.O. Box 2503
Santa Fe, NM 87504

Dear Ms. Goad,

Pursuant to the New Mexico Mining Act [NMSA 1978, § 69-36-7.K] and Subpart 903 of the New Mexico Mining Act Rules, Quivira Mining Company is providing you with public notice that Quivira Mining Company has submitted a variance request to the Mining and Minerals Division and is requesting approval of the variance request. The public notice sheet enclosed with this letter shall be published once in the *Gallup Independent* by December 20, 1996.

Regards,

QUIVIRA MINING COMPANY

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

Enclosure: As Stated

xc: file

PUBLIC NOTICE
(To be published in the Gallup Independent on or before December 20, 1996)

Pursuant to the New Mexico Mining Act Regulations [19 NMAC 10.2 Subpart 10], Quivira Mining Company, P.O. Box 218, Grants, NM, 87020, has submitted an application for a variance and requests approval of the variance for lands within mining units located on Section 17 T14N R9W, Section 19 T14N R9W, Section 22 T14N R10W, Section 24 T14N R10W, Section 30 T14N R9W, and Section 33, T14N R9W.

The purpose of Quivira Mining Company submitting a variance request is to provide two (2) additional growing seasons before the determination is made by the Mining and Minerals Division that the site meets the criteria for release from additional vegetation requirements.

Quivira's above referenced mining units were conventional underground uranium mines in the Ambrosia Lake mining district. Reclamation measures completed at these mine units have successfully satisfied all of the other requirements of the New Mexico Mining Act and the substantive requirements for reclamation pursuant to the Mining Act Regulations.

A copy of the variance request is available for public viewing during normal business hours at the address listed below. Individuals may submit written comments regarding this variance request to:

Ms. Kathleen Garland, Director
Energy, Minerals, and Natural Resources Department
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

Any interested person may request that the Director conduct a public hearing on the variance request. Such request must be made within 30 days of the date of the newspaper publication of the notice of application. If a hearing is timely requested, the Director shall set a hearing unless the request is clearly frivolous. The Director may hold a public hearing absent any request.

Affidavit of Publication

STATE OF NEW MEXICO
) SS
COUNTY OF McKINLEY

HUBBARD, Freida being duly sworn upon oath, deposes and says:

As Legal Clerk of The Independent, a newspaper published in and having a general circulation in McKinley County, New Mexico and in the City of Gallup, New Mexico and having a general circulation in Cibola County, New Mexico and in the City of Grants, New Mexico and having a general circulation in Apache County, Arizona and in the City of St. Johns and in the City of Window Rock, Arizona therein: that this affiant makes this affidavit based upon personal knowledge of the facts herein sworn to. That the publication, a copy of which is hereto attached was published in said newspaper during the period and time of publication and said notice was published in the newspaper proper, and not in a supplement thereof,

for one time, the first publication being on the 12th day of December, 19 96 the second publication being on the _____ day of _____, 19_____ the third publication on the _____ day of _____, 19_____.

and the last publication being on the _____ day of _____, 19_____.

That such newspaper, in which such notice or advertisement was published, is now and has been at all times material hereto, duly qualified for such purpose, and to publish legal notices and advertisements within the meaning of Chapter 12, of the statutes of the State of New Mexico, 1941 compilation.

Freida Hubbard
Affiant.

Sworn and subscribed to before me this 20th day of December, A.D., 19 96.

Karen Armstrong
Notary Public

My commission expires
November 27, 2000

2715 2M BUTLER'S Gallup

LEGAL NOTICE
Grants New Mexico
Cibola County

Pursuant to the New Mexico Mining Act Regulations (19 NMAC 10.2 Subpart 10), Quivira Mining Company, P.O. Box 218, Grants, NM 87020, has submitted an application for a variance and requests approval of the variance for lands within mining units located on Section 17 T14N R9W, Section 19 T14N R9W, Section 22 T14N-R10W, Section 24 T14N R10W, Section 30 T14N R9W, and Section 33, T14N R9W.

The purpose of Quivira Mining Company submitting a variance request is to provide two (2) additional growing seasons before the determination is made by the Mining and Minerals Division that the site meets the criteria for release from additional vegetation requirements.

Quivira's above reference mining units were conventional underground uranium mines in the Ambrosia Lake mining district. Reclamation measures completed at these mine units have successfully satisfied all of the other requirements of the New Mexico Mining Act and the substantive requirements for reclamation pursuant to the Mining Act Regulations.

A copy of the variance request is available for public viewing during normal business hours at the address listed below. Individuals may submit written comments regarding this variance request to:

Ms. Kathleen Garland, Director
Energy, Minerals, and
Natural Resources Department
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

An interested person may request that the Director conduct a public hearing on the variance request. Such request must be made within 30 days of the date of the newspaper publication of the notice of application. If a hearing is timely requested, the Director shall set a hearing unless the request is clearly frivolous. The Director may hold a public hearing absent any request.

AVISO PUBLICO

De acuerdo a la Acta Minera de Nuevo Méxco (19 NMSA 10.2 Subpaite 10), Quivira Mining Company, P.O. Box 218, Grants, NM, 87020 ha sometido una petición para una variación y solicita consentimiento para una varicion para los terreno mineros localizados en sección 17 T14N R9W, sección 19 T14N R9W, sección 22 T14N R10W, sección 24 T14N R10W, sección 30 T14RN R9W, sección 33 T14N R9W.

El propósito de Quivira Mining Company sometiendo esta petición para disponer dos (2) estacions de vegetación antes de que se determine por la ágencia Mining and Minerals Division que el sitio cumple con los requisitos y exonera de requisitos adicionales de vegetación.

Los minas mencionados fueron minas de uranio clasicas del districto minero de Ambrosia Lake. Los recuros de restauración en las dichas minas han cumplido con todos los otros requistos de la Acta Minera de Nuevo Mexico Y los requistos substantivos de aquerdo con los relamentos de la acta minera de restauración.

Una copia de la solicituda para esta variación está disponible para que el pueblo inspeccione durante las horas de trabajo en el domicilio indicado. Los interesados pueden someter comentarios pertinentes a esta petición a:

Ms. Kathleen Garland, Director
Energy, Minerals, and
Natural Resources Department
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

Personas interesadas pueden solicitar que el Director haga una audiencia pública concerniente a esta petición. Esta solicitud debe sea se dentro de 30 días de la fecha de esta periódico en que está públicado el annúncio de esta petición. El Director fechará una audiencia pública solamente si la solicitud se hace a tiempo y es seria. El Director puede hacer una audiencia sin una solicitud.

Legal #13571 Published in The Independent December 12, 1996.

QUIVIRA MINING COMPANY

POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

CERTIFICATE OF POSTING

This is to certify that on the date identified below, Mr. Peter Luthiger of Quivira Mining Company posted the public notice sheet for the prior reclamation variance request in the United States Post Office. The notice was provided in both English and Spanish.

Jeremiah per Burk
POSTMASTER

Milan Station
POST OFFICE BRANCH

Terri L Burk
SIGNATURE

MILAN NM 87021
NOV 26 1996
USPS

DATE

MILAN NM 87021
NOV 26 1996
USPS

QUIVIRA MINING COMPANY

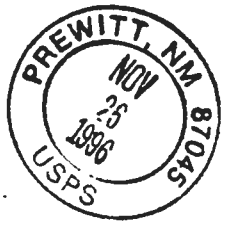
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

CERTIFICATE OF POSTING

This is to certify that on the date identified below, Mr. Peter Luthiger of Quivira Mining Company posted the public notice sheet for the prior reclamation variance request in the United States Post Office. The notice was provided in both English and Spanish.

Barbara J Walter - Clerk
POSTMASTER

Prewitt NM 87045
POST OFFICE BRANCH



Barbara J Walter
SIGNATURE

DATE

QUIVIRA MINING COMPANY
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

CERTIFICATE OF POSTING

This is to certify that on the date identified below, Mr. Peter Luthiger of Quivira Mining Company posted the public notice sheet for the prior reclamation variance request in the United States Post Office. The notice was provided in both English and Spanish.

Roy Jaquez
POSTMASTER

Thoreau, N.M. 87323
POST OFFICE BRANCH

Roy Jaquez
SIGNATURE

THOREAU NM 87323
NOV 26 1996
USPS

DATE

QUIVIRA MINING COMPANY
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

CERTIFICATE OF POSTING

This is to certify that on the date identified below, Mr. Peter Luthiger of Quivira Mining Company posted the public notice sheet for the prior reclamation variance request in the United States Post Office. The notice was provided in both English and Spanish.

POSTMASTER

POST OFFICE BRANCH

SIGNATURE

NOV 25 1996

DATE

State of New Mexico
Mining and Minerals Division
2040 South Pacheco St.
Santa Fe, NM 87505

Fax Cover Sheet

Date: 11/15/96

To: Peter Luthiger	From: Fernando Martinez
Company:	Agency: Mining and Minerals Division
Telephone:	Telephone: (505) 827-5970
Fax #: 243-0418	Fax #: (505) 827-7195

Number of Pages: 3 (including cover sheet)

Message:

I think this list should cover the folks you need to provide notice to. If you have any questions, give me a call.

Original will be sent by mail ___ yes X no

STATE AGENCIES

Dr. Glenna Dean, Staff Archeologist
Office of Cultural Affairs
228 E. Palace Ave.
Santa Fe, NM 87503

Mrs. Maxine Goad, Mining Coordinator
Environment Department
PO Box 26110
Santa Fe, NM 87502

Mr. Toby Martinez, State Forester
State Forestry Division
PO Box 1948
Santa Fe, NM 87504-1948

Mr. Bob Rogers
State Engineer's Office
PO Box 844
Deming, NM 88031

Mr. Andrew V. Sandoval, Chief
Conservation Services Division
Villagra Building
PO Box 25112
Santa Fe, NM 87504

PERSONS REQUESTING NOTICE

Ms. Maxine Goad
PO Box 2503
Santa Fe, NM 87504

Mr. Grove Burnett/Mr. Eric Ames
Western Environmental Law Center
PO Box 1507
Taos, NM 87571

Mr. Doug Meiklejohn/Mr. Doug Wolf
N.M. Environmental Law Center
103 Cienega St.
Santa Fe, NM 87501

Mr. Paul Robinson
Research Director
Southwest Research & Information Center
PO Box 4524
Albuquerque, NM 87106

Rio Grande Chapter of the Sierra Club
945 Camino De Chelly
Santa Fe, NM 87501

Rio Algom Mining Corp.

Marvin D. Freeman
Vice President

May 31, 1996

Certified Mail
Return Receipt Requested P 144 785 062

Dr. Kathleen Garland, Director
Mining and Mineral Division
Energy, Minerals and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Re: Application For Prior Reclamation Variance
Petition For Review

Dear Dr. Garland:

Enclosed please find Quivira Mining Company's Application for Variance. This Application is being submitted by Quivira pursuant to and in reliance upon your letters of September 29, 1995, and January 31, 1996, as clarified in later discussions and negotiations between us which are summarized in Quivira's letter of February 13, 1996, MMD's letter of March 15, 1996, Quivira's letter of May 1, 1996, and MMD's letter of May 23, 1996.

We have not had an opportunity since receiving your May 23 letter (facsimile received on May 29), to make a full review of all issues on seeking early dismissal of Quivira's Petition to Review Order relating to your September 29, 1995 letter. This review is now in progress and should be completed shortly.

Quivira has appreciated the opportunity to meet with MMD to discuss and mutually resolve the issues relating to this matter. If you have questions regarding the letter, please call myself (405) 848-1187 or Mr. Bill Ferdinand at (405) 842-1773.

Sincerely,

Marvin D. Freeman
Vice President

Attachments: As Stated

cc: B. Ferdinand
T. Fletcher
R. Luke
P. Luthiger
J. Robb
File

APPLICATION FOR VARIANCE
(19 NMAC 10.2 Subpart 10)

Applicant's Name and Address

Quivira Mining Company
P.O. Box 218
Grants, New Mexico 87020

Contact person: Mr. Terry Fletcher

Telephone (505) 287-8851 ext. 200
Facsimile (505) 287-8851 ext. 295

Date of Application

May 31, 1996

Mining Operation For Which Variance Is Sought

Quivira Mining Company
Ambrosia Lake Facility

Location of Property

Lands Within Mining Units:
Section 17 T14N R9W
Section 19 T14N R9W
Section 22 T14N R10W
Section 24 T14N R10W
Section 30 T14N R9W
Section 30W T14N R9W
Section 33 T14N R9W

Section of Part Which Variance Is Sought

19 NMAC 10.2 Subpart 5, Section 510.B

Extent To Which The Applicant Wants To Vary From Applicable Part

Pursuant to 19 NMAC 10.2 Subpart 5, Section 510.B, MMD representatives conducted inspections on previously reclaimed lands contained within the mining units described above. MMD determined by letters dated September 29, 1995 (received November 17, 1995), and as amended by letter dated January 16, 1996, that insufficient time had elapsed since re-vegetation of the reclaimed lands to determine whether these areas meet the environmental conditions for successful re-vegetation to allow for their release. All other reclamation aspects at these areas satisfactorily meet the reclamation requirements of the New Mexico Mining Act as confirmed by MMD letter dated March 15, 1996.

The conclusions of MMD's letter dated September 29, 1995, read:

"Based on oral and written communication (letter from Quivira, September 14, 1995) with the operator, and on the condition of these seven remaining reclaimed sites as documented by this inspection report, it is clear that the operator has made a good effort to complete all of the required reclamation. It is recommended that the Director of MMD give a variance to Quivira Mining Company from meeting the deadline of September 30, 1995 for prior reclamation under the New Mexico Mining Act and Rules for the Section 17, 19, 22, 24, 30, 30W, and 33 mine sites. This variance would stipulate that inspections will be conducted by MMD during the late summer of 1997 at each of the remaining sites to determine if the conditions necessary for development of a 'sustainable ecosystem' are then present on-site, and if any further actions including (but not limited to) reseeding or interseeding by the operator are necessary."; [emphasis added]

Therefore, consistent with these MMD conclusions, Quivira proposes that MMD conduct an inspection at each applicable site, during the late summer of 1997, to determine if conditions are present to meet the release criteria. If the results do not meet the release criteria, Quivira would develop and implement the appropriate program to meet the release criteria which may include reseeding and/or interseeding.

Evidence To Prove That Failure To Grant Variance Will Impose Undue Economic Burden

If the requested variance is not granted, Quivira will be forced to apply for a permit pursuant to Subpart 5. The economic burden that could potentially be imparted to Quivira as a result is estimated to be approximately $390,000. These costs are presented below.

• Permit Application/Closeout Plan	
Rule 201.A.1	$ 1,000
Rule 201.A.2	$ 2,000
Rule 201.A.4	$ 4,500
Rule 205.A	$ 338
Total Permit Costs	$ 7,838
• Annual Fee	
Rule 202.A.1	$ 1,000
Rule 202.A.2	$ 4,000
Rule 205.A	$ 225
Annual Costs	$ 5,225
Total Annual Cost for potentially 12 years	$62,700

- Associated Costs

Performance Bond - Based on re-vegetation @ $246/acre (3/1996$) at 8% of bond face amount for potentially 12 years	$70,848
Management/Oversight Costs ($5,000 per year)	$60,000
Initial Permit Preparation/Submittal Costs	$40,000
Sub-total costs	$241,386
Loss of Investment $241,386 * 0.05 (return of investment) * 12 years	$144,832
TOTAL OVERALL POTENTIAL COSTS	**$386,218**

Quivira believes these costs would be an undue economic burden on Quivira which is unnecessary given current conditions at the site which come near to meeting release criteria, the recommendations of MMD, and realizing that the expenditure would not expedite the establishment of vegetation cover.

Evidence To Prove That Granting A Variance Would Not Result In Significant Threat To Human Health, Safety or the Environment

As documented by the MMD inspection report of September 29, 1995, and MMD's letter dated March 15, 1996, all reclamation requirements other than re-vegetation, have been approved as satisfactorily meeting all reclamation requirements of the New Mexico Mining Act that include health, safety and environmental concerns. Approval of this variance application would not alter this conclusion.

Rather, the granting of the variance as requested, would continue to provide assurance that the area addresses and meets health, safety and the environment concerns through on-going MMD inspection of the re-vegetation success. Therefore, granting of this variance would not result in a significant threat to human health, safety or the environment.

Variance Application Fee

Please find enclosed the variance application fee in accordance with 19 NMAC 10.2 Subpart 2, Sections 201.K and 205.A in the amount of $522.50.

Marvin D. Freeman
Vice President

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

MINING AND MINERALS DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-5970

Jennifer A. Salisbury
CABINET SECRETARY

Kathleen A. Garland
DIVISION DIRECTOR

July 1, 1996

Mr. Marvin Freeman
Rio Algom Mining Corp.
6305 Waterford Boulevard, Suite 325
Oklahoma City, OK 73118

Re: Public Notice for Prior Reclamation Variance Application

Dear Mr. Freeman:

Pursuant to my conversation with Bill Ferdinand on June 26, 1996 and your letter dated May 31, 1996, please go ahead with public notice of ~~Calvaria~~ Quivira's prior reclamation variance application. Please follow the public notice requirements as outlined in Subpart 9 of the Mining Act Rules. I have attached a list of entities that have requested notification concerning public notice type actions. Please include these names with the others that you will be notifying.

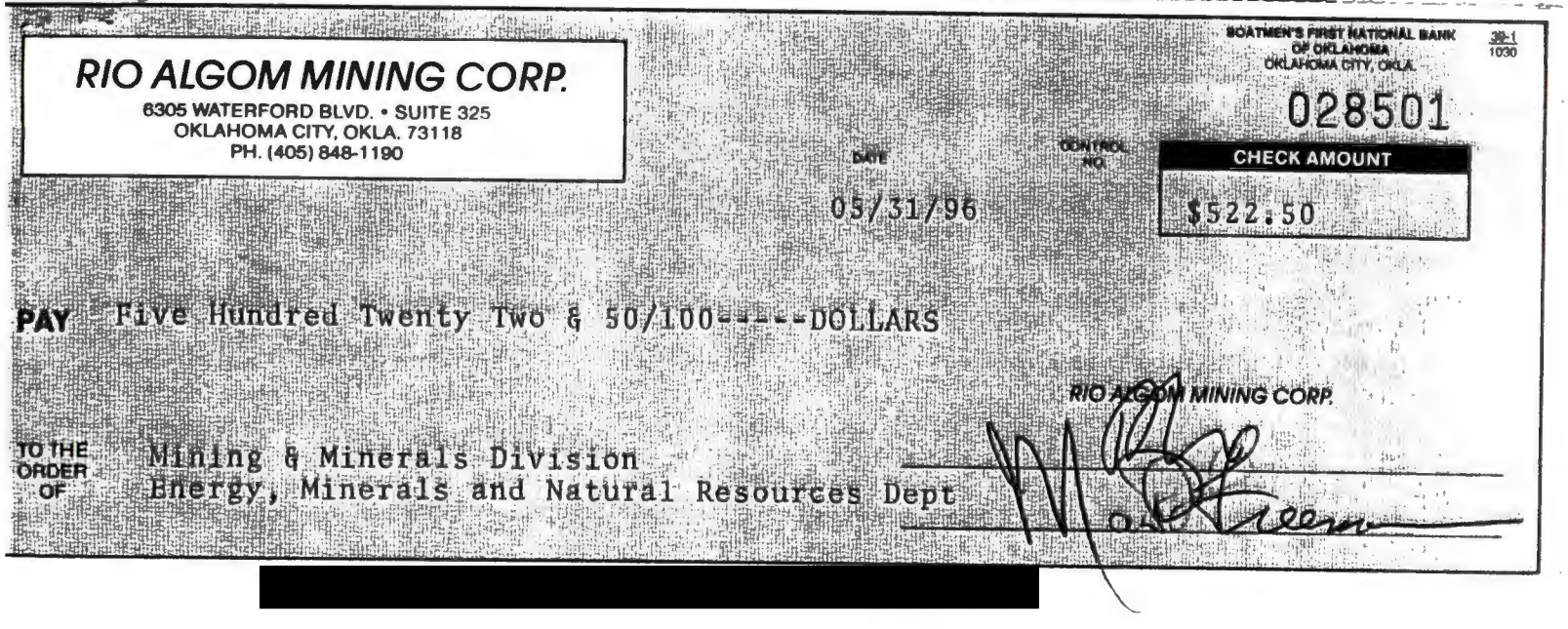
Thank you for your attention to this procedure.

Sincerely,

HOLLAND SHEPHERD, Bureau Chief
Mining Act Reclamation Bureau
Mining and Minerals Division

HS/fg

Attachment



RIO ALGOM MINING CORP.
6305 WATERFORD BLVD. • SUITE 325
OKLAHOMA CITY, OKLA. 73118
PH. (405) 848-1190

BOATMEN'S FIRST NATIONAL BANK OF OKLAHOMA
OKLAHOMA CITY, OKLA.
39-1
1030

028501

DATE
05/31/96

CONTROL NO.

CHECK AMOUNT
$522.50

PAY Five Hundred Twenty Two & 50/100-----DOLLARS

RIO ALGOM MINING CORP.

TO THE ORDER OF
Mining & Minerals Division
Energy, Minerals and Natural Resources Dept

Quivira Mining Company

Marvin D. Freeman
Vice President

May 1, 1996

Certified
Return Receipt Requested P 144 785 021

Dr. Kathleen Garland, Director
Mining and Mineral Division
Energy, Minerals and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Dear Dr. Garland:

Thank you for meeting with us on April 18, 1996 to discuss the remaining concerns regarding Quivira's Ambrosia Lake Old Stope Leaching program. The purpose of this letter is to state our understanding of MMD's position regarding old stope leaching and to request that MMD confirm this understanding is correct, if that is the case.

Specifically in regards to our uranium old stope leaching program and the applicability of the MMD regulations to this program, we understand MMD's conclusion to be:

1. All of Quivira's present, past and future old stope leaching areas and its unreclaimed conventional underground mine sites can be included in a single mine permit as an existing mine.

2. Installation and operation of the old stope leaching wells are permitted under New Mexico Environmental Department (NMED) regulations and not by MMD; however, MMD is required to ensure that all surface disturbances within a MMD permit area, due to mining related activities, are properly reclaimed prior to permit release.

3. As part of MMD bonding requirements, MMD would require bonding for recontouring, if applicable, and revegetation of the disturbed surface, but not for the plugging and capping of the old stope leaching production/injection wells permitted by NMED.

4. After a MMD permit was issued, the only requirement of Quivira under the MMD permit, relative to the operation of its old stope leaching program would be the annual updating of its reclamation bond and reclamation of the related surface disturbances.

5. Areas under "prior reclamation variances" can be included within the mine permit area but would be restricted from Quivira access for old stope leaching purposes, until the prior reclamation is accepted and released by MMD. At that time, however, such released areas would be considered undisturbed areas under the MMD mine permit. These areas would be subject to the existing mine reclamation and bonding requirements if they are subsequently disturbed by mining activities

new units

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6. Quivira could include the areas on which it controls the minerals, but which were formerly operated by Homestake, within its permit area as part of its "existing mining permit" including Homestake's "prior reclamation variances" areas and those areas approved by MMD meeting prior reclamation standards. Quivira would only be responsible for new surface disturbances caused by its mining activities. These areas would otherwise be administered under the permit in the same manner as Quivira's other existing mine properties.

We appreciated the opportunity to meet with you and discuss how these concerns might be resolved in a mutually satisfactory manner such that Quivira might withdraw the appeals it has filed with the Mining Commission. Your response is important to us as we would incorporate these understandings as stipulations in a withdrawal of the appeals should this course be taken. We look forward to hearing from you soon.

Sincerely,

Martin D. Freeman

MDF:kb

cc: Bill Ferdinand
Terry Fletcher
Rob Luke
John Robb
File

DF

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OFFICE OF THE SECRETARY
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-5950

Jennifer A. Salisbury
CABINET SECRETARY

RECEIVED
MAR 21 19[illegible]

March 15, 1996

Marvin D. Freeman, Vice President
Quivira Mining Company
6305 Waterford Boulevard, Suite 325
Oklahoma City, Oklahoma 73118

RE: **Prior Reclamation/Old Stope Leaching Permit Requirements for Quivira's Ambrosia Lake Operations**

Dear Mr. Freeman:

Thank you for your letter dated February 13, 1996. I apologize for my delay in replying, and hope we will now be able to move forward expeditiously to resolve our permitting dilemma at your Ambrosia Lake sites.

In regards to the prior reclamation, your letter accurately restates the Division's position. As stated in our prior reclamation inspection reports, were unable to determine that the plant community at these sites had achieved a viable or self-sustaining condition. I will consider a variance request to the September, 1995 deadline for completion of prior reclamation for these sites. That variance request may contain inspection schedules and mitigation plans to address plant re-establishment at these sites. MMD concurs with a 2-3 year time period to evaluate these sites, with annual inspections to be conducted by MMD personnel.

In regards to old stope leaching, the Division's position is as follows:

1. Areas disturbed by conventional mining, whether in use for old stope leaching or not, are subject to the Mining Act unless they have been reclaimed and released under the prior reclamation requirements of the Mining Act Rules.

2. Disturbances covered by an NRC license that includes a reclamation plan for the disturbances, including items such as closure of shafts, regrading, and revegetation, are excluded from the Mining Act. Well fields and portions of old stope leaching sites are excluded if they are covered by such a reclamation plan under an NRC license.

3. Quivira's disturbed areas not excluded from the Act by

virtue of NRC license requirements may be permitted as one existing mine. This permit would exclude areas under a variance for prior reclamation release.

I believe we may disagree slightly in our understanding of how well fields will be handled. If we do, please contact me at (505) 827-5974 so we can discuss and, I hope, resolve any differences. If we are in agreement, I recommend that Quivira proceed with the permitting process for the areas covered by the Act.

I sincerely appreciate Quivira's willingness to negotiate these issues with the Division, and hope you will not need to pursue your appeals.

Sincerely,

Kathleen A. Garland
Director
Mining and Minerals Division

cc: Carol Leach, General Counsel, EMNRD
Holland Shepherd, Chief, MARB

Fletcher

Quivira Mining Company

Marvin D. Freeman
Vice President

February 13, 1996

Certified Mail
Return Receipt Requested Z 271 353 324

Dr. Kathleen Garland, Director
Mining and Mineral Division
Energy, Minerals and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Re: Prior Reclamation/Old Stope Leaching
MMD/Quivira Meeting of January 30, 1996

Dear Dr. Garland:

We recognize this is a very busy time for you and we appreciate your meeting with us on January 30 to discuss our questions on the Mining and Minerals Division (MMD) letters dated September 29 and November 9, 1995. These letters were in regards to prior reclamation and old stope leaching at Quivira's Ambrosia Lake operations.

This letter is to confirm our understanding of the issues based on the discussions with MMD regarding our Ambrosia Lake prior reclamation and old stope leaching.

Specifically, in regards to the prior reclamation, we understand MMD's conclusion to be:

1. All reclamation requirements at Quivira's mining units, specifically Section 17, 19, 22, 24, 30, 30W and 33, satisfactorily meet the reclamation requirements of the New Mexico Mining Act with the sole exception of re-vegetation.

2. It is MMD's position that although these units were re-vegetated, it was too early to make a determination on the viability of the perennial grasses. Thus, because the viability of these grasses is the only open issue, Quivira could request a variance to extend the time frame for the re-vegetation and for release under its prior reclamation request.

3. Quivira could request a two or three-year extension with annual inspections by MMD. In that case, MMD would conduct annual inspections and a site would be released as soon as an inspection shows the site meets MMD's re-vegetation criteria.

4. MMD, as part of the variance approval, would include language specifically indicating that all reclamation requirements of the New Mexico Mining Act, with the exception of re-vegetation, had been met. The variance would also specify the inspection time frames and the further actions that Quivira might have to initiate to meet the re-vegetation requirements, such as re-seeding or interseeding as indicated by MMD's letter of September 29.

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In regards to the old stope leaching issues and the letter of November 9, the following is Quivira's understanding of MMD's conclusions.

1. The letter of November 9, 1995, states "The Division has come to the conclusion that portions of the in-situ or old stope leaching facilities operated by Quivira Mining Company fall under the New Mexico Mining Act. Such portions would consist of those sections of a leaching operation developed during conventional mining and not currently addressed under a U.S. Nuclear Regulatory Commission (NRC) License."

   This language means that those areas which were developed and used for the conventional underground mining operations such as the shafts and ventholes are subject to permitting under the Act, but old stope leaching wellfields and areas not associated with the conventional mining operation are not subject to MMD permitting requirements. It was MMD's position, however, that if there were any future surface disturbances by Quivira within an area permitted under the Act, MMD would require re-vegetation of those areas.

2. All areas or disturbances that are covered by a NRC license that includes a reclamation plan for the disturbances, including items such as the closure of shafts, re-grading, and re-vegetation are excluded from the Act.

3. Quivira's conventional underground mining disturbance areas at the seven mining units not covered by a NRC license may be permitted as one existing mine should Quivira decide to do so. The permit area would need to exclude areas on which Quivira is requesting release under prior reclamation and those areas covered by the NRC license.

In closing, we sincerely appreciate the opportunity to meet with you and your staff to better understand MMD's concerns and to discuss how the issues might be resolved in a mutually satisfactory manner. Quivira's understanding of the issues is as stated above, however, we are requesting MMD's confirmation that this understanding is correct so that we may proceed in trying to properly address the items of concern.

As per our discussion, Quivira has filed appeals to the Mining Commission on both of the above items to preserve Quivira's rights under the appeal process. As I think you know, we feel strongly about our position in the appeals. We are hopeful, however, that the concerns of both Quivira and MMD can ultimately be addressed such that our appeals can be withdrawn.

Sincerely,

Marvin Freeman

MDF:kb

xc: B. Ferdinand (QMC-OKC)
T. Fletcher (QMC-Ambrosia Lake)
R. Luke (QMC-OKC)
J. Robb (Rodey, Dickason, Sloan, Akin & Robb)
File

RODEY, DICKASON, SLOAN, AKIN & ROBB, P. A.
COUNSELORS AND ATTORNEYS AT LAW
ALBUQUERQUE PLAZA
201 THIRD STREET NW, SUITE 2200
ALBUQUERQUE, NEW MEXICO 87102

P. O. BOX 1888
ALBUQUERQUE, NEW MEXICO 87103

TELEPHONE (505) 765-5900

FACSIMILE (505) 768-7395

January 31, 1996

WRITER'S DIRECT NUMBER

768-7216

Dr. Kathleen A. Garland, Director
Energy Minerals and Natural
Resources Department
Mining and Minerals Division
P.O. Box 6429
Santa Fe, New Mexico 87505-6429

Re: Letters of September 29, 1995 and November 9, 1995 Re: No Release for Sections 17, 19, 22, 24, 30, 30W and 33, Quivira Mining Company, McKinley County, New Mexico and the Status of In-Situ Leaching Facilities, Ambrosia Lake

Dear Ms. Garland:

Our client, Quivira Mining Company has this date filed Petitions to Review the above letters and the determinations or "orders" contained within them. Quivira Mining Company respectfully requests the Mining and Minerals Division to enter a stay of these orders or for an extension of time to comply pending completion of that review by the Commission and if necessary, by the New Mexico Court of Appeals.

In support thereof, Quivira Mining Company states that the preparations necessary to file either a petition for a variance or for an existing mining permit will be required under the terms of those letters while the petitions are pending before the Commission; that this will require substantial effort and cost on the part of Quivira which may prove to be unnecessary should the requirements of that letter either be reversed or substantially modified on appeal; that the Mining and Minerals Division has already inspected the properties and operations involved; that no significant damage will result to the environment from the granting of stays or extension orders and that it would be unfair to require Quivira Mining Company to expend this time and effort until it has been first determined on review that the requirements of those letters are proper or valid.

Sincerely yours,

RODEY, DICKASON, SLOAN, AKIN & ROBB, P.A.

By [signature]
John D. Robb

CSD/jdr

NMMNM
MMD

RODEY, DICKASON, SLOAN, AKIN & ROBB, P. A.
COUNSELORS AND ATTORNEYS AT LAW
ALBUQUERQUE PLAZA
201 THIRD STREET NW, SUITE 2200
ALBUQUERQUE, NEW MEXICO 87102

P. O. BOX 1888
ALBUQUERQUE, NEW MEXICO 87103

TELEPHONE (505) 765-5900

FACSIMILE (505) 768-7395

January 31, 1996

WRITER'S DIRECT NUMBER

768-7216

Mr. Doug Bland, Clerk
New Mexico Mining Commission
2040 South Pacheco
Santa Fe, NM 87505

Re: Petition of Quivira Mining Company

Dear Mr. Bland:

Enclosed please find an original and 12 copies of two Petitions of Quivira Mining Company to the New Mexico Mining Commission, together with a check for $25 for each petition. We do not know whether either of the letters from the Mining and Minerals Division constitute appealable rulings, but we are filing these petitions out of an abundance of caution. Hard copies of petitions and filing fees have been placed in overnight mail. Please acknowledge receipt of same.

Sincerely yours,

RODEY, DICKASON, SLOAN, AKIN & ROBB, P.A.

By John D. Robb

John D. Robb

JDR:erl

encs.

NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
MINING AND MINERALS DIVISION

January 16, 1996

Mr. John D. Robb
Rodey, Dickason, Sloan, Akin & Robb, P.A.
P. O. Box 1888
Albuquerque, NM 87103

Re: Letters Dated September 29, 1955 and November 9, 1995 Addressed To Quivira Mining Company Regarding Prior Reclamation Release For Section 36 Mine, No Release For Sections 17, 19, 22, 24, 30, 30W and 33 And The Status Of In-situ Leaching Facilities, Ambrosia Lake, Quivira Mining Company, McKinley County, New Mexico.

Dear Mr. Robb:

This letter is addressed to you as attorney for Quivira Mining Company. The effective date of the above letters from the Director of the Mining and Minerals Division to your client, Quivira Mining Company and the Notice of the Determinations or Orders contained therein are extended to December 2, 1995 so that appeals, if any, from such determinations or Orders may be taken to the Mining Commission to and including January 31, 1996.

Acting Director
Mining and Minerals Division

EXHIBIT C

November 9, 1995

Mr. Bill Ferdinand
Manager of Regulatory Compliance
Quivira Mining Company
6305 Waterford Boulevard, Suite 325
Oklahoma City, OK 73118

Re: Status of In-situ Leaching Facilities, Ambrosia Lake, Quivira Mining Company, McKinley County, New Mexico

Dear Mr. Ferdinand:

The Division has come to the conclusion that portions of the in-situ or old stope leaching facilities operated by Quivira Mining Company fall under the New Mexico Mining Act. Such portions would consist of those sections of a leaching operation developed during conventional mining and not currently addressed under a U.S. Nuclear Regulatory Commission (NRC) License.

The site currently under license is Section 24 in Section 24, T14N, R10W. Other Quivira sites which may be brought into the in-situ leaching process include:

Section 17	Section 17, T14N, R9W
Section 19	Section 19, T14N, R9W
Section 22	Section 22, T14N, R10W
Section 30	Section 30, T14N, R9W
Section 30 West	Section 30, T14N, R9W
Section 33	Section 33, T14N, R9W

Until the sites listed above are brought under an NRC license, they have to be permitted. If the NRC license is extended, those portions of a site which it addresses can be removed from an established Mining Act permit.

Quivira sent this Division a letter dated August 28, 1995 indicating that an NRC licenses currently addresses the environmental regulation of the Section 24 mine. The Division has contacted the NRC and spoken to Mr. Ken Hooks of that agency regarding the question of the Section 24 license (#SUA-1473). According to Mr. Hooks, the Section 24 license only covers that portion of the operation impacted by the leaching solutions to be injected and circulated in the underground mine workings. The license does not require reclamation of the surface facilities associated with conventional mining. Such items as closing shafts, regrading, retopsoiling, and revegetation of those facilities are not addressed in the NRC license. The Division will exclude any portion of the mining operation covered by an NRC permit, but must require compliance with the Mining Act for the remaining disturbance.

In previous correspondence you have indicated to us that these sites should be exempt because all environmental permitting issues would be addressed under an NRC license or a UIC permit administered by the New Mexico Environment Dept. (ED). ED has indicated that ED does not have jurisdiction over surface reclamation as intended by the Mining Act. In addition, ED regards this situation as not unlike other operations which have existing environmental permits but are also in the process of obtaining Mining Act permits.

Quivira has requested that the sites listed above be considered under the prior reclamation section of the Mining Act. The Division has inspected these sites and concluded that we are not yet able to release them. We have advised Quivira that the sites can be permitted under the Mining Act or Quivira can request a variance from the September 30, 1995 deadline established by the Mining Act Rules. Areas eligible for release involve only those portions which have been reclaimed prior to the effective date of the Mining Act Rules. Areas that would not be eligible include: roads, staging areas, ponds, buildings, shafts, boreholes, etc., which have not been reclaimed, or areas reclaimed after the effective date of the Mining Act Rules.

We suggest that Quivira consider permitting the seven sites above as one site under a regular existing mining operation permit. Quivira will need to specifically exclude those areas which can be addressed under prior reclamation or an NRC license from such a permit.

Please contact us to discuss a schedule for permitting these sites.

Sincerely,

Kathleen Garland
Director
Mining and Minerals Division

cc: Holland Shepherd, Bureau Chief, Mining Act Reclamation Bureau
John McKay, Permit Coordinator, Mining Act Reclamation Bureau
Maxine Goad, New Mexico Environment Dept.
Ken Hooks, Nuclear Regulatory Commission

September 29, 1995

Mr. Peter Luthiger
Supervisor, Radiation Safety and Environmental Affairs
Quivira Mining Company
P.O. Box 218
Grants, NM 87020

RE: Prior Reclamation Release for Section 36 Mine, No Release for Sections 17, 19, 22, 24, 30, 30W and 33, Quivira Mining Company, McKinley County, New Mexico

Dear Mr. Luthiger:

The Mining and Minerals Division (MMD) has completed inspection of reclamation measures as requested by Quivira Mining Company.

Based on findings in the enclosed inspection reports, reclamation measures at the Section 36 Mine satisfy the requirements of the New Mexico Mining Act (NMMA) and the substantive requirements for reclamation pursuant to the NMMA Rules. Therefore, Quivira is hereby released from further requirements of the NMMA on the Section 36.

Based on findings in the enclosed inspection reports, reclamation measures at the following mines do not satisfy the requirements of the New Mexico Mining Act (NMMA) and the substantive requirements for reclamation pursuant to the NMMA Rules. However, since Quivira has completed most reclamation measures at the following mines, Quivira may apply for variances from the provisions of the NMMA Rules pursuant to Rule 10. Otherwise, pursuant to NMMA Rule 5.10.B Quivira must submit permit applications and closeout plans for existing mining operations within six months of receipt of this letter:

Section 17 T14N R9W
Section 19 T14N R9W
Section 22 T14N R10W
Section 24 T14N R10W
Section 30 T14N R9W
Section 30W T14N R9W
Section 33 T14N R9W

The enclosed prior reclamation inspection report details the findings of the inspection but does not include the photos/slides contained in the MMD file copy.

MMD appreciates your efforts to comply with the NMMA and commends you for your safeguarding and reclamation efforts. If you have any questions please contact Holland Shepherd of the Mining Act Bureau, (505) 827-5971.

Sincerely,

Dr. Kathleen A. Garland, Director
Mining and Minerals Division

cc: Ms. Maxine Goad, Environment Department
Mr. Mark Schmidt, New Mexico State Land Office

Enclosure

PRIOR RECLAMATION INSPECTION REPORT
AND
RECOMMENDATION FOR RELEASE OR PERMIT REQUIREMENT

Quivira Mining Company

Section 17 (T 14N, R 9W), Section 19 (T 14N, R 9W), Section 22 (T 14N, R 10W), Section 24 (T 14N, R 10W), Section 30 (T 14N, R 9W), Section 30W (T 14N, R 9W), Section 33 (T 14N, R 9W), and Section 36 (T 14N, R 9W) Mines

Submitted in Partial Fulfillment of the New Mexico Mining Act
Section 69-36-7 U., Prior Reclamation

New Mexico Energy, Minerals and Natural Resources Department
Mining and Minerals Division
Mining Act Reclamation Bureau

September 25, 1995

Introduction

The purpose of these inspections was to determine if reclamation measures at Quivira Mining Company's Section 17, Section 19, Section 22, Section 24, Section 30, Section 30W, Section 33, and Section 36 Mines satisfy the requirements of the New Mexico Mining Act (Section 69-36-7, Prior Reclamation) and other substantive requirements for prior reclamation pursuant to the New Mexico Mining Act Rules. The sites, their locations, and dates of inspections by the New Mexico Mining and Minerals Division are presented in Table 1.

Table 1. Quivira Mining Company's Prior Reclamation Sites.

Name of Mine	Location of Mine	Date of Inspection
Section 17	T 14N, R 9W	August 30, 1995
Section 19	T 14N, R 9W	August 29, 1995
Section 22	T 14N, R 10W	August 30, 1995
Section 24	T 14N, R 10W	August 30, 1995
Section 30	T 14N, R 9W	August 30, 1995
Section 30W	T 14N, R 9W	August 30, 1995
Section 33	T 14N, R 9W	August 29, 1995
Section 36	T 14N, R 9W	August 29, 1995

Inspection Procedures

Inspections by the Mining and Minerals Division of prior reclamation sites were conducted on the following mine sites: Section 17 (T 14N, R 9W), Section 19 (T 14N, R 9W), Section 22 (T 14N, R 10W), Section 24 (T 14N, R 10W), Section 30 (T 14N, R 9W), Section 30W (T 14N, R 9W), Section 33 (T 14N, R 9W), and Section 36 (T 14N, R 9W). All inspections were conducted and completed on August 29 and 30, 1995. Persons present during the August 29, 1995 inspection of the Section 36 Mine included: Mr. Peter Luthiger, representing Quivira Mining Company; Mr. Jim Nordstrom, Mr. Mark Schmidt, and Mr. Michael Landon, all of the New Mexico State Land Office; Ms. Mary Ann Menetery and Mr. Dennis Slifer of the New Mexico Environment Department; and, Ms. Robyn Tierney and Mr. Robert Young of the New Mexico Mining and Minerals Division. Mr. Peter Luthiger of Quivira Mining Company, Ms. Mary Ann Menetery and Mr. Dennis Slifer of the New Mexico Environment Department; and, Ms. Robyn Tierney and Mr. Robert Young of New Mexico Mining and Minerals Division were present during the August 29, 1995 inspections of the Section 33 and Section 19 Mines. Mr. Terry Anderson of Quivira Mining accompanied Ms. Robyn Tierney and Mr. Robert Young on the August 30, 1995 inspections of the Section 17, Section 22, Section 24, Section 30, and Section 30W Mines. The author of this inspection report was Ms. Robyn Tierney.

Inspections of each mine site consisted of a review of information submitted by the mine operator, subsequent discussion with the operator pertaining to mining and reclamation at each site, inspection of the condition of the reclaimed mine sites, line-intercept sampling for estimates of vegetative cover, compilation of plant species lists, measurement of reclaimed soil depths, and photo-documentation. Each of the mine sites were visually inspected for erosion features and hydrologic stability. During a walkover of each site, all slopes, areas of water concentration (ponds, diversions and areas where disturbed areas enter undisturbed lands) were visually inspected for stability. Topsoil placement and distribution also was evaluated at each site. Sampling for topsoil depth consisted of randomly digging a series of holes to identify the depth of topsoil and the presence or absence of potentially toxic wasterock at rooting depth. Grading of all wasterock piles and borrow areas was visually inspected. Placement and closure of portals and vent shafts was verified in the field. Structures (including concrete pads, buildings, shaft collars, and pump houses) remaining at each site were also identified during the course of the inspections.

The establishment and relative percent cover of reseeded and native plant species were evaluated in randomly placed transects. Four 50' transects were evaluated at each mine site using the line intercept method (Bonham 1989). These transects were used to estimate the relative percent cover of each plant species intercepted at 3' intervals along a transect. A total of 17 points per transect were recorded. In addition, a list of species present within a 50' X 6' belt transect adjacent to each transect was compiled. These sampling procedures, however, do not meet sample adequacy. Rather, these procedures were conducted to estimate the relative percent cover and to evaluate the diversity of species present at each of the eight mine sites. Additional resources would be needed to fully evaluate the vegetation of these prior reclamation sites to a level of sample adequacy and would require at least 24 additional man-hours of inspection time per site.

Results and Discussion

Maps of the eight mine sites were submitted by Quivira. The detail in these maps is sufficient to describe conditions and facilities that were present on each site prior to reclamation. Details of the reclamation activities at each site were further verified in discussions with Mr. Luthiger and Mr. Fletcher of Quivira Mining Company and by the on-site inspections conducted on August 29 and August 30, 1995.

Section 36, T 14N, R 9W

This section was reclaimed in 1990. At the request of the surface owner, the New Mexico State Land Office, the seed mixture used in the reclamation of the Section 36 Mine contained a large percentage of crested wheatgrass (*Agropyron cristatum*). Although this introduced species has achieved near co-dominance with the native sand dropseed (*Sporobolus cryptandrus*), portions of the mine site are still covered with ragweed (*Kochia scoparium*) and Russian thistle (*Salsola kali*). The following table (Table 2) contains a list of all species identified on the reclaimed Section 36 mine site. This list is not inclusive of all the plant species that may be present on this site at other times of the year.

Table 2. List of Species at Quivira's Section 36 Mine

COMMON NAME	*Genus & species*[1]
Alkali sacaton	*Sporobolus airoides*
Crested wheatgrass	*Agropyron cristatum*
Western wheatgrass	*Agropyron smithii*
Blue grama grass	*Bouteloua gracilis*
Indian ricegrass	*Oryzopsis hymenoides*
Bigelow's Aster	*Aster bigelovii*
Beeweed	*Cleome serrulata*
Ragweed	*Kochia scoparium*
Golden crownbeard	*Verbesina encelioides*
Annual sunflower	*Helianthus annuus*
Hairy goldenaster	*Heterotheca villosa*
Russian thistle	*Salsola kali*

COMMON NAME	*Genus & species*[1]
Winterfat	*Ceratoides lanata*
Blue Gilia	*Ipomopsis sp.*
Yellow clover	*Meliotus sp.*
Stickleaf	*Mentzelia albicaulis*
Fringed Sage	*Artemisia frigida*
Fourwing saltbush	*Atriplex canescens*
Yellow snakeweed	*Gutierrezia sarothrae*

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. **A Flora of New Mexico**. J. Cramer, Vaduz, Germany. Welsh, S.L. *et al.* 1987. **A Utah Flora**. Great Basin Naturalist Memoir No. 9.

Facilities remaining on the middle portion of the site included three cased vent holes. These will remain on the site as monitoring wells. The collars and casing of these wells appear to be stable. Although there was some evidence of sheet and debris flow on the southeast corner of the mine permit area, the overall site appeared to be stable. Concerns about surface water quality have been addressed with the adequate topdressing (average depth of four test pits was 2 feet) over the tailings and wasterock pads and with extensive seeding over the entire disturbance area. Further, the entire site had been graded with slopes configured to minimize soil loss. The large depression area in the north area of the permit held some standing water, but there was no evidence of rill or gully formation on any of the slopes rimming this impoundment.

While the data presented above indicates that the Section 36 (T 14N R 9W) Mine has been revegetated with a sufficient species diversity, there was considerable evidence of grazing -- both by domestic cattle and elk. The site has been fenced from grazing and has sufficient vegetative cover (Table 3) to be stabilized. There is also a good mix of perennial plant species appearing throughout the site (Table 2) .

Table 3. Summary of Relative Cover Data at Quivira's Section 36 Mine.

Transect #1	Value (%)
Perennial Cover:	0
Litter Cover	6
Rock Cover	0
Bare Ground	53
Number of perennial species present in belt transect	0

Transect #2	Value (%)
Perennial Cover:	18
Litter Cover	12
Rock Cover	0
Bare Ground	59
Number of perennial species present in belt transect	2

Transect #3	Value (%)
Perennial Cover:	12
Litter Cover	12
Rock Cover	0
Bare Ground	41
Number of perennial species present in belt transect	1

Transect #4	Value (%)
Perennial Cover:	0
Litter Cover	35
Rock Cover	0
Bare Ground	35
Number of perennial species present in belt transect	0

Maintenance Items:

None.

Photographs of Quivira's Section 36 Mine

The following photographs were taken during the site inspection on August 29, 1995 to document the condition of the Section 36 Mine.

#1: This photograph was taken from east of the shaft area. Looking north across the topsoiled tailings pad, this photograph identifies the tie-in between the undisturbed (left and right margins of photo) and the disturbed (midground of photo) portions of the mine site. The natural vegetation and areas adjacent to the mine site remain largely undisturbed as seen at the margins of the site.

#2 #3: These photographs also were taken east of the shaft area. The photographs are panoramic views across the topsoiled tailings pad looking northwest (#2, right photograph) and west (#3, left photograph). Mr. Dennis Slifer and Mary Ann Menetery of the New Mexico Environment Department are at right in photograph #3.

#4 #6: These photographs also were taken east of the shaft area, and provide a panoramic view of the southwest (#4, right photograph) and south (#6, left photograph) quadrants of the mine permit area. The large shrub in the foreground of the photograph is saltbush (*Atriplex canescens*).

#5: This photograph is of the west-southwest quadrant of the mine permit area in the vicinity of the reclaimed ore pad.

Section 33, T 14N, R 9W

This section was reclaimed in June of 1994. The seed mixture used in the reclamation of the Section 33, the Section 30, Section 30W, Section 24, Section 22, Section 19 and Section 17 mine sites is presented in Appendix A of this report. Most of the reclaimed Section 33 mine site is covered with the annual weeds, ragweed (*Kochia scoparium*) and Russian thistle (*Salsola kali*). However, these weeds are characteristic of early succession and typically found on newly disturbed sites. The following table (Table 4) contains a list of all the species identified on the reclaimed Section 33 mine site. This list is not inclusive of all the plant species that may be present on this site at other times of the year.

Table 4. List of Species at Quivira's Section 33 Mine

COMMON NAME	*Genus & species*[1]
Western wheatgrass	*Agropyron smithii*
Crested wheatgrass	*Agropyron cristatum*
Indian ricegrass	*Oryzopsis hymenoides*
Bigelow's Aster	*Aster bigelovii*
Beeweed	*Cleome serrulata*
Ragweed	*Kochia scoparium*
Composite species	*Unknown Aster? sp.*
Russian thistle	*Salsola kali*
Conyzia	*Conyza sp.*
Evening primrose	*Oenothera caespitosa*
Pepperweed	*Lepidium sp.*
Curlycup gumweed	*Grindelia squarosa*
Fringed Sage	*Artemisia frigida*
Fourwing saltbush	*Atriplex canescens*
Threadleaf groundsel	*Senecio longilobus*
Yellow snakeweed	*Gutierrezia sarothrae*

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. **A Flora of New Mexico**. J. Cramer, Vaduz, Germany. Welsh, S.L. *et al.* 1987. **A Utah Flora**. Great Basin Naturalist Memoir No. 9.

Facilities remaining on the north edge of the site included a transformer unit and a shaft. The shaft had recently been reinforced with concrete (Luthiger, pers. comm.). The Department of Energy (DOE) had borrowed topsoil materials from the northern portion of the mine permit, then reseeded that area in February-March of 1994. DOE used this borrow material to topdress portions of their mill tailings site located directly north (across the road) of the Section 33 Mine. Concerns about surface water quality have been addressed with the adequate topdressing (average depth of two test pits was 6 inches) over the orebody stockpile area and the equipment storage area with extensive seeding over the entire disturbance area. Further, the entire site had been graded to minimize soil loss and is largely flat with no slopes or depressions.

The data presented in Table 5 indicates that the reclamation of the Section 33 (T 14N R 9W) Mine is beginning to develop with an average of 3% perennial vegetative cover in the disturbed areas. The species diversity of the surrounding and on-site vegetation (Table 4), and the relative isolation from grazing are indicative of the good growth potential at this site.

Table 5. Summary of Relative Cover Data at Quivira's Section 33 Mine.

Transect #1	**Value (%)**
Perennial Cover	**0**
Litter Cover	**0**
Rock Cover	**0**
Bare Ground	**29**
Number of perennial present in belt transect	**1.00**
Transect #2	**Value (%)**
Perennial Cover	**6**
Litter Cover	**6**
Rock Cover	**0**
Bare Ground	**24**
Number of perennial species present in belt transect	**0**
Transect #3	**Value (%)**
Perennial Cover	**6**
Litter Cover	**12**
Rock Cover	**0**
Bare Ground	**41**
Number of perennial species present in belt transect	**1**

Transect #4	Value (%)
Litter Cover	12
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	0

Maintenance Items:

None.

Photographs of Quivira's Section 33 Mine

The following photographs were taken during the site inspection on August 29, 1995 to document conditions at the Section 33 Mine.

#1, #2: These two photographs form a panoramic view spanning the north quadrant (#1 or right photograph) to the west-northwest quadrant (#2 or left photograph). The photographs were taken from the reclaimed pad of the wasterock pile.

#3, #4, #5: Photographs #3, #4, and #5 were taken from the same wasterock pad and span the west quadrant (#3 or right photograph), the west-southwest quadrant (#4 or middle photograph) to the south quadrant (#5 or left photograph).

#6: This photograph is of the permit area in the vicinity of the ore pad.

Section 30, T 14N, R 9W

This section also was reclaimed in June of 1994. The seed mixture used in the reclamation of the Section 30 Mine is presented in Appendix A of this document. Table 6 contains a list of other species identified on the reclaimed Section 30 mine site. The list is not inclusive of all the plant species that may be present on the site at other times of the year.

Table 6. List of Species at Quivira's Section 30 Mine

COMMON NAME	*Genus & species*[1]
Sand dropseed	*Sporobolus cryptandrus*
Indian ricegrass	*Oryzopsis hymenoides*
Bigelow's Aster	*Aster bigelovii*
Beeweed	*Cleome serrulata*
Ragweed	*Kochia scoparium*
Composite species	*Unknown (Aster? sp.)*
Russian thistle	*Salsola kali*
Scarlet globemallow	*Sphaeralcea coccinea*
Hairy goldenaster	*Heterotheca villosa*
Yellow clover	*Meliotus sp.*
Evening primrose	*Oenothera caespitosa*
Fourwing saltbush	*Atriplex canescens*
Yellow snakeweed	*Gutierrezia sarothrae*

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. **A Flora of New Mexico**. J. Cramer, Vaduz, Germany. Welsh, S.L. *et al.* 1987. **A Utah Flora**. Great Basin Naturalist Memoir No. 9.

Average perennial vegetative cover at this site is 6% -- twice that of the Section 33 site (Table 7). As in the case of the Section 33 Mine, however, vegetative cover is still dominated by the annual weeds, ragweed (*Kochia scoparium*) and Russian thistle (*Salsola kali*). Permanent facilities remaining on the Section 30 site include an electrical substation, a pumping pad and a reclaimed wasterock pile. Quivira owns the both surface and mineral rights on this section.

Table 7. Summary of Relative Cover Data at Quivira's Section 30 Mine.

Transect #1	Value (%)
Perennial Cover	12
Litter Cover	0
Rock Cover	0
Bare Ground	53
Number of perennial species present in belt transect	2
Transect #\2	Value (%)
Perennial Cover	0
Litter Cover	24
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	0
Transect #3	Value (%)
Perennial Cover	0
Litter Cover	6
Rock Cover	0
Bare Ground	77
Number of perennial species present in belt transect	0
Transect #4	Value (%)
Perennial Cover	12
Litter Cover	12
Rock Cover	0
Bare Ground	41
Number of perennial species present in belt transect	2

Maintenance Items:

None.

Photographs of Quivira's Section 30 Mine

The following photographs were taken during the site inspection on August 29, 1995 to document the condition of the Section 30 Mine.

Section 30W, T 14N, R 9W

A single pumping pad is the only permanent facility remaining on the Section 30W mine site. Quivira Mining Company owns both surface and mineral rights. Grading and reclamation on this site was generally similar to that on the Section 30 mine. Water from recent rains has collected in small depression over portions of the wasterock pad. Although vegetative cover is dominated by the annual weeds, Russian thistle and ragweed (Table 8 and Table 9) there is good establishment of perennial species at this site. Average percent perennial vegetative cover (Table 9) was 12% -- the highest percent cover of these seven recently reclaimed sites. Part of this success may be attributed to the fenced exclosure of the entire site from grazing.

Table 8. List of Species at Quivira's Section 30W Mine

COMMON NAME	*Genus & species*[1]
Sand dropseed	*Sporobolu cryptandrus*
Crested wheatgrass	*Agropyron cristatum*
Western wheatgrass	*Agropyron smithii*
Indian ricegrass	*Oryzopsis hymenoides*
Bigelow's Aster	*Aster bigelovii*
Beeweed	*Cleome serrulata*
Ragweed	*Kochia scoparium*
Blanket flower	*Gaillardia pulchella*
Russian thistle	*Salsola kali*
Blue Gilia	*Ipomopsis sp.*
Yellow clover	*Melilotus sp.*

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. **A Flora of New Mexico**. J. Cramer, Vaduz, Germany. Welsh, S.L. *et al.* 1987. **A Utah Flora**. Great Basin Naturalist Memoir No. 9.

Table 9. Summary of Relative Cover Data at Quivira's Section 30W Mine.

Transect #1	Value (%)
Perennial Cover	6
Litter Cover	6
Rock Cover	0
Bare Ground	59

Transect #1	Value (%)
Number of perennial species present in belt transect	**2**
Transect #\2	Value (%)
Perennial Cover	24
Litter Cover	6
Rock Cover	0
Bare Ground	12
Number of perennial species present in belt transect	**2**
Transect #3	Value (%)
Perennial Cover	12
Litter Cover	6
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	**2**
Transect #4	Value (%)
Perennial Cover	6
Litter Cover	12
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	**2**

Maintenance Items.

None.

Photographs of Quivira's Section 30W Mine

The following photographs were taken during the site inspection of the Section 30W Mine on August 29, 1995.

Section 24 Mine, T 14N R10W

Quivira owns the mineral rights, while Homestake Mining Company of California owns the surface rights to the Section 24 Mine. Permanent structures on the Section 24 Mine include an active mixing facility (regulated by the Nuclear Regulatory Commission), a pump substation, and approximately 1000 feet of graded dirt road to these facilities. The diversity of forbs and grasses on this site was low (Table 10). The perennial vegetative cover of 3% also was lower (Table 11) than that at the other mines. Much of this site had evidence of compacted soils. Average soil depth (based on three test pits) was 12 inches.

Table 10. List of Species at Quivira's Section 24 Mine

COMMON NAME	*Genus & species*[1]
Crested wheatgrass	*Agropyron cristatum*
Indian ricegrass	*Oryzopsis hymenoides*
Ragweed	*Kochia scoparium*
Russian thistle	*Salsola kali*
Winterfat	*Ceratoides lanata*

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. A Flora of New Mexico. J. Cramer, Vaduz, Germany. Welsh, S.L. et al. 1987. A Utah Flora. Great Basin Naturalist Memoir No. 9.

Table 11. Summary of Relative Cover Data at Quivira's Section 24 Mine.

Transect #1	Value (%)
Perennial Cover	0
Litter Cover	12
Rock Cover	0
Bare Ground	65
Number of perennial species present in belt transect	0.00
Transect #\2	Value (%)
Perennial Cover	0
Litter Cover	12
Rock Cover	0
Bare Ground	65
Number of perennial species present in belt transect	0

Transect #3	Value (%)
Perennial Cover	6
Litter Cover	0
Rock Cover	0
Bare Ground	53
Number of perennial species present in belt transect	0
Transect #4	Value (%)
Perennial Cover	6
Litter Cover	12
Rock Cover	0
Bare Ground	29
Number of perennial species present in belt transect	1

Maintenance Items.

None.

Photographs of Quivira's Section 24 Mine

The following photographs were taken during the site inspection of the Section 24 Mine on August 29, 1995.

Section 22, T 14N, R 9W

Surface and minerals rights for the Section 22 mine site are owned by Quivira Mining Company. A pump house, approximately 1000 feet of graded dirt road, and a H_2SO_4 lixiviant tank remain as permanent features at this site. A small subsidence area approximately 15 feet in width and 20 feet in length was observed in the south central portion of the mine area. Average soil depth over the reclaimed ore pile and wasterock areas was 11 inches. Although some rill formation was observed on the slopes of the wasterock pile, these rills appeared to be armored with coarsely fragmented sandstone materials. There was some evidence of encroachment from the surrounding native vegetation (Table 12), but perennial vegetative cover on the reclaimed portions of this site was very low (Table 13). This site, however, is currently being grazed by approximately 13 head of cattle (Terry Fletcher, pers. comm.). The cattle appear to be feeding mainly on new vegetative growth and regrowth.

Table 12. List of Species at Quivira's Section 22 Mine

COMMON NAME	*Genus & species*[1]
Alkali sacaton	*Sporobolus airoides*
Crested wheatgrass	*Agropyron cristatum*
Foxtail barley	*Hordeum jubatum*
Indian ricegrass	*Oryzopsis hymenoides*
Western wheatgrass	*Agropyron smithii*
Beeweed	*Cleome serrulata*
Ragweed	*Kochia scoparium*
Mustard	*Brassica sp.*
Russian thistle	*Salsola kali*
Nightshade	*Solanum sp.*
Morning glory	*Convolvulus sp.*
Stickleaf	*Mentzelia albicaulis*
Fourwing saltbush	*Atriplex canescens*
Yellow snakeweed	*Gutierrezia sarothrae*

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. **A Flora of New Mexico**. J. Cramer, Vaduz, Germany. Welsh, S.L. et al. 1987. **A Utah Flora**. Great Basin Naturalist Memoir No. 9.

Transect #1	Value (%)
Perennial Cover	0
Litter Cover	29
Rock Cover	0
Bare Ground	35
Number of perennial species present in belt transect	0
Transect #\2	Value (%)
Perennial Cover	0
Litter Cover	18
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	0
Transect #3	Value (%)
Perennial Cover	0
Litter Cover	12
Rock Cover	6
Bare Ground	35
Number of perennial species present in belt transect	1
Transect #4	Value (%)
Perennial Cover	0
Litter Cover	6
Rock Cover	0
Bare Ground	82
Number of perennial species present in belt transect	0

Maintenance Items:

None.

Photographs of Quivira's Section 22 Mine

The slides contained in the following page were taken during the site inspection on August 29, 1995.

Section 19, T 14N R 9W

The Section 19 mine site is an open flat area (approximately 50-60 acres in size). A headframe, 2 explosives magazines, 1 vent shaft, and a pumping station with a large gravelled parking area on the southwest corner of the property remain as permanent features. A large wasterock pile was topsoiled and revegetated in June 1994. Average soil depth on this site was 14 inches.

Table 14. List of Species at Quivira's Section 19 Mine

COMMON NAME	*Genus & species*[1]
Alkali sacaton	***Sporobolus airoides***
Crested wheatgrass	***Agropyron cristatum***
Blue grama grass	***Bouteloua gracilis***
Indian ricegrass	***Oryzopsis hymenoides***
Bigelow's Aster	***Aster bigelovii***
Ragweed	***Kochia scoparium***
Composite species	***Unknown (Aster? sp.)***
Russian thistle	***Salsola kali***
Rubber rabbitbrush	***Chrysothamnus nauseous***
Conyza	***Conyza sp.***
Yellow clover	***Meliotus sp.***
Stickleaf	***Mentzelia albicaulis***
Fourwing saltbush	***Atriplex canescens***
Yellow snakeweed	***Gutierrezia sarothrae***

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. A Flora of New Mexico. J. Cramer, Vaduz, Germany. Welsh, S.L. et al. 1987. A Utah Flora. Great Basin Naturalist Memoir No. 9.

Table 15. Summary of Relative Cover Data at Quivira's Section 19 Mine.

Transect #1	Value (%)
Perennial Cover	12
Litter Cover	6
Rock Cover	0

Transect #1	Value (%)
Bare Ground	65
Number of perennial species present in belt transect	1
Transect #\2	Value (%)
Perennial Cover	18
Litter Cover	6
Rock Cover	0
Bare Ground	35
Number of perennial species present in belt transect	1
Transect #3	Value (%)
Perennial Cover	12
Litter Cover	0
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	0
Transect #4	Value (%)
Perennial Cover	6
Litter Cover	6
Rock Cover	0
Bare Ground	77
Number of perennial species present in belt transect	0

Maintenance Items:

None.

Photographs of Quivira's Section 19 Mine

The photographs contained in the following pages were taken during the site inspection on August 29, 1995 of the Section 19 Mine. The below numbered descriptions identify the current condition of the site.

Section 17, T 14N, R 9W

Table 16. List of Species at Quivira's Section 17 Mine

COMMON NAME	*Genus & species*[1]
Crested wheatgrass	*Agropyron cristatum*
Galleta	*Hilaria jamesii*
Indian ricegrass	*Oryzopsis hymenoides*
Beeweed	*Cleome serrulata*
Ragweed	*Kochia scoparium*
Scarlet globemallow	*Sphaeralcea coccinea*
Russian thistle	*Salsola kali*
Yellow clover	*Meliotus sp.*
Rubber rabbitbrush	*Chrysothamnus nauseosus*

1 Nomenclature after: Martin, W. C. and C. R. Hutchins. 1980. A Flora of New Mexico. J. Cramer, Vaduz, Germany. Welsh, S.L. et al. 1987. A Utah Flora. Great Basin Naturalist Memoir No. 9.

Table 17. Summary of Relative Cover Data at Quivira's Section 17 Mine.

Transect #1	Value (%)
Perennial Cover	0
Litter Cover	12
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	1
Transect #\2	Value (%)
Perennial Cover	0
Litter Cover	12
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	1

Transect #3	Value (%)
Perennial Cover	0
Litter Cover	6
Rock Cover	0
Bare Ground	59
Number of perennial species present in belt transect	2
Transect #4	Value (%)
Perennial Cover	0
Litter Cover	12
Rock Cover	0
Bare Ground	59
Number of perennial species present in belt transect	0

Maintenance Items:

None.

Photographs of Quivira's Section 17 Mine

The following photographs of the Section 17 Mine were taken during the site inspection on August 29, 1995.

Transect #\2	Value (%)
Bare Ground	47
Number of perennial species present in belt transect	1
Transect #3	**Value (%)**
Perennial Cover	0
Litter Cover	6
Rock Cover	0
Bare Ground	59
Number of perennial species present in belt transect	2
Transect #4	**Value (%)**
Perennial Cover	0
Litter Cover	12
Rock Cover	0
Bare Ground	59
Number of perennial species present in belt transect	0

Maintenance Items:

None.

Photographs of Quivira's Section 17 Mine

The following photographs of the Section 17 Mine were taken during the site inspection on August 29, 1995.

Summary and Conclusions

Based on the inspection of the Sections 17, 19, 22, 24, 30, 30W, 33 and 36 mine sites, review of inspection information with Mining and Minerals Division staff and MMD's resources to conduct these inspections, it is recommended that the Section 36 Mine site operated by Quivira Mining Company (Quivira) be released from further requirements of the New Mexico Mining Act. The other mine sites (*i.e.* Sections 17, 19, 22, 24, 30, 30W, and 33) were reclaimed in June-July of 1994 and cannot be released at this time. Staff has concluded that is too early to determine whether or not these sites meet the environmental conditions that allow for the development of a 'self-sustaining ecosystem' as defined in Rule 1. and put forth in Rule 5.7A of the New Mexico Mining Act. Annual weeds such as ragweed and Russian thistle predominate on these sites , while perennials are much less numerous. Such plant communities are characteristic of early succession, but do not

provide enough information to make the determination that the site will one day become self-sustaining.

Based on oral and written communication(letter from Quivira, September 14, 1995) with the operator, and on the condition of these seven remaining reclaimed sites as documented by this inspection report, it is clear that the operator has made a good effort to complete all of the required reclamation. It is recommended that the Director of MMD give a variance to Quivira Mining Company from meeting the deadline of September 30, 1995 for prior reclamation under the New Mexico Mining Act and Rules for the Section 17, 19, 22, 24, 30, 30W, and 33 mine sites. This variance would stipulate that inspections will be conducted by MMD during the late summer of 1997 at each of the remaining sites to determine if the conditions necessary for development of a 'sustainable ecosystem' are then present on-site, and if any further actions including (but not limited to) reseeding or interseeding by the operator are necessary.

Literature Cited

Bonham, C. D. 1989. Measurement of Terrestrial Vegetation. Wiley-Interscience. 338 pp.

Craft, Fred. 1995. Resident Manager, Homestake Mining Company, Personal Communication

Martin, P. C., and C. R. Hutchins. 1980. A Flora of New Mexico. J. Cramer Press, Vaduz, Germany. 2591 pp.

Welsh, S. L. et al. 1989. A Utah Flora. Great Basin Naturalist Memoir No. 9. Brigham Young University Press. 898 pp.

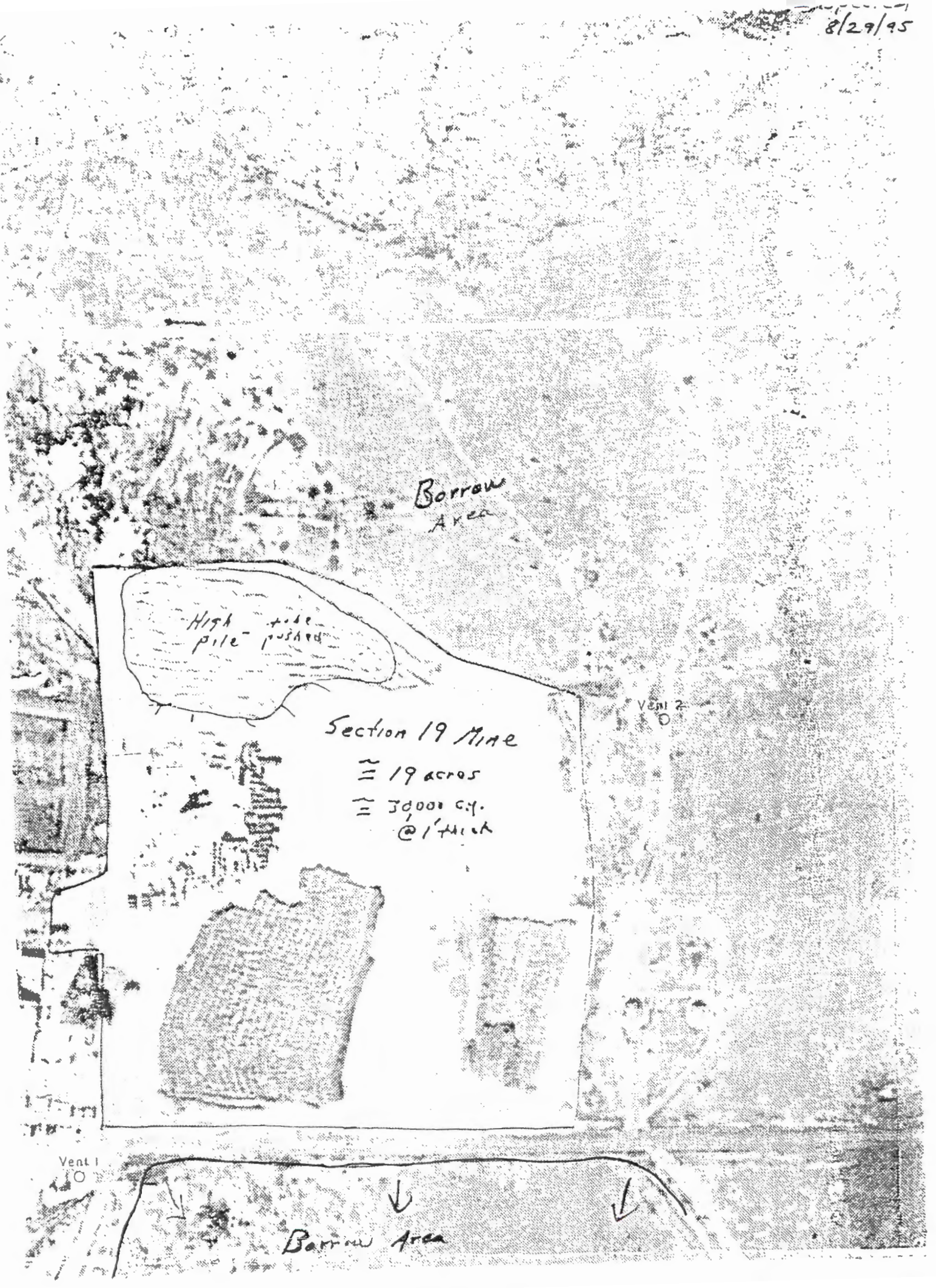
Quivira
Section 19 Mine
#1

Quinlan Section
17 Mine
#2

Quivira Section
17 Mine
#3

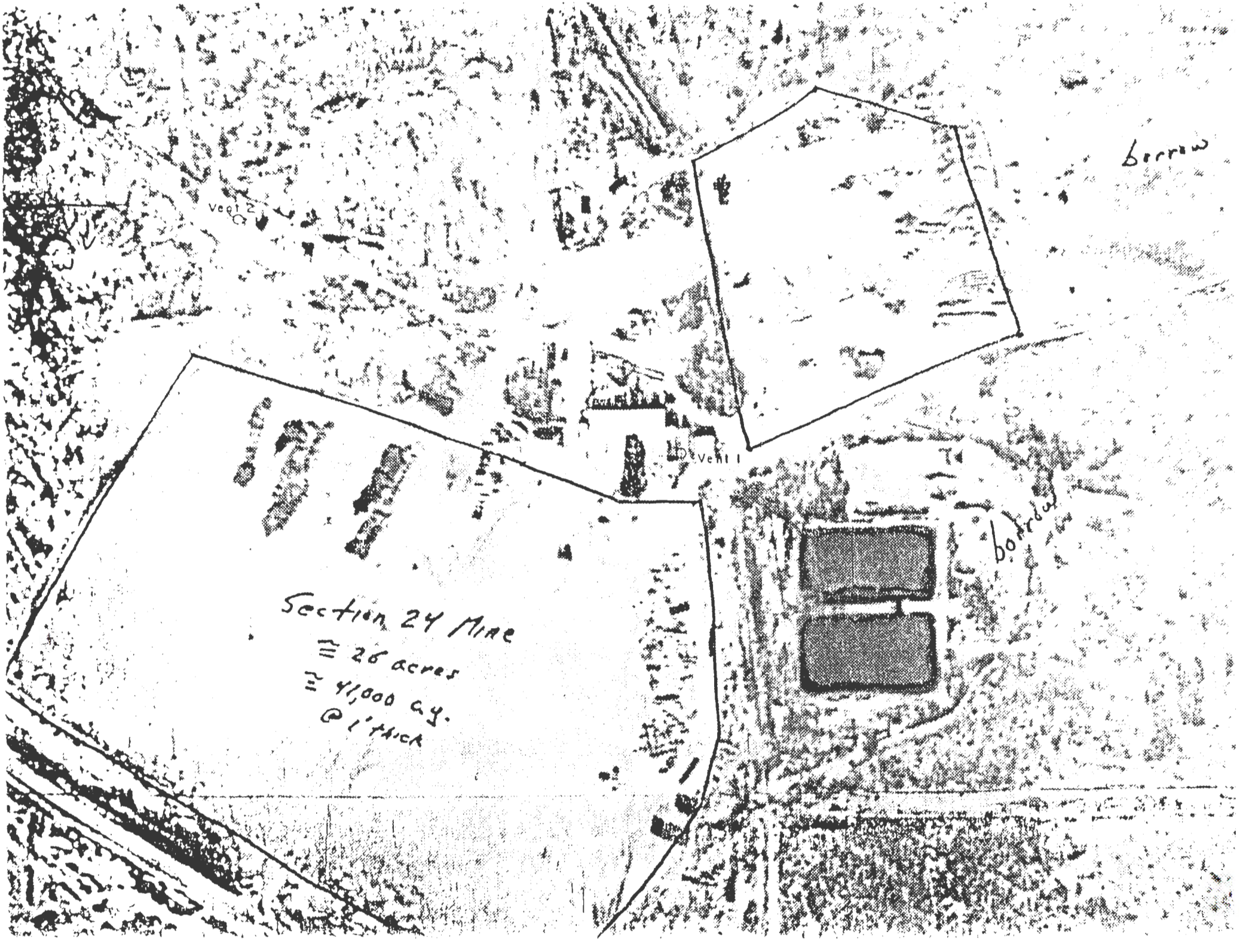
Uncovered Section
17 Mine
#4

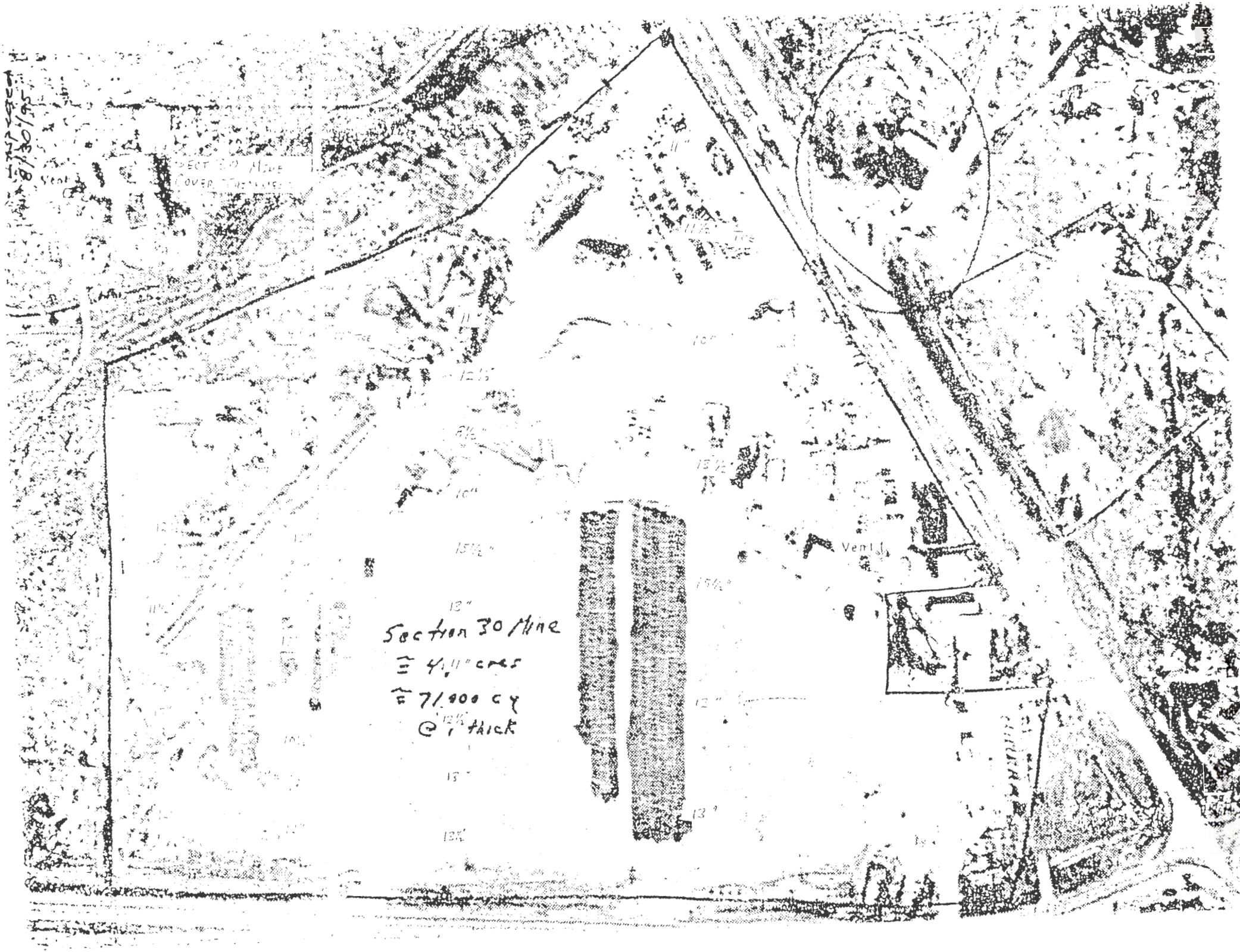
8/29/95


Borrow Area
High pile - pushed
Section 19 Mine
≅ 19 acres
≅ 30000 c.y.
@ 1' thick
Vent 2
Vent 1
Borrow Area

Quivira's Section
19 Mine
#4

Quivira's Section 19 Mine
#1 (R), #2 (M)
#3 (L)


Vent 2
Vent 1
Borrow
borrow
Section 24 Mine
≅ 26 acres
≅ 41,000 c.y.
@ 1' thick


Section 30 Mine
≅ 4.11 acres
≅ 71,900 cy
@ 7' thick

Quivira's Section
30 Mine

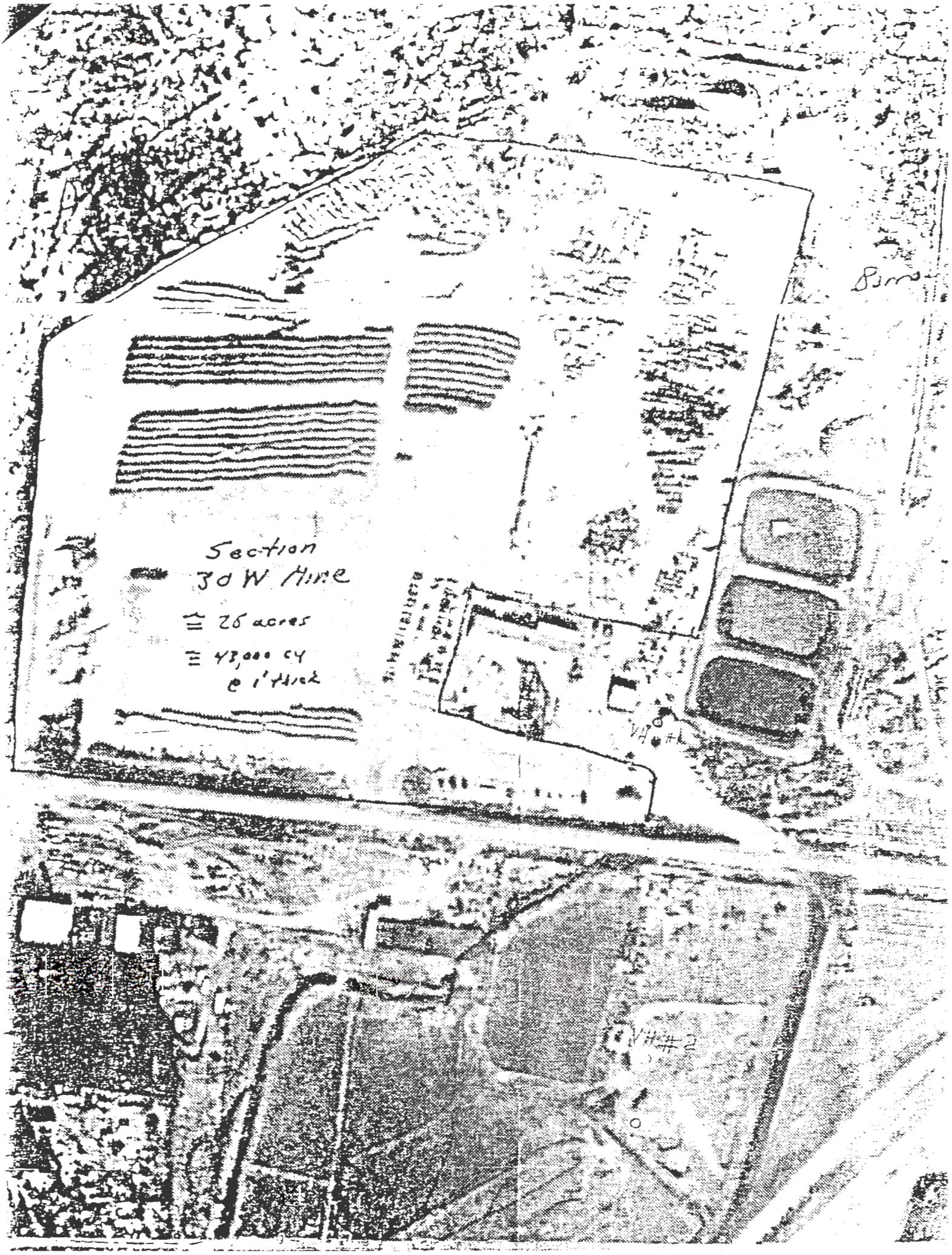
Quirra's Section 30
Mine
#2

Quivira's Section
30 Mine
#3

Overview Section
30 Mine

#4

Quivira's Section
30 Mile
#5


Section
30 W Mine
≅ 26 acres
≅ 43,000 cy
@ 1' thick
VH #1
VH #2

Chivitas section
30 W Mine
#1

Quinlan Section
30W Mine
#2

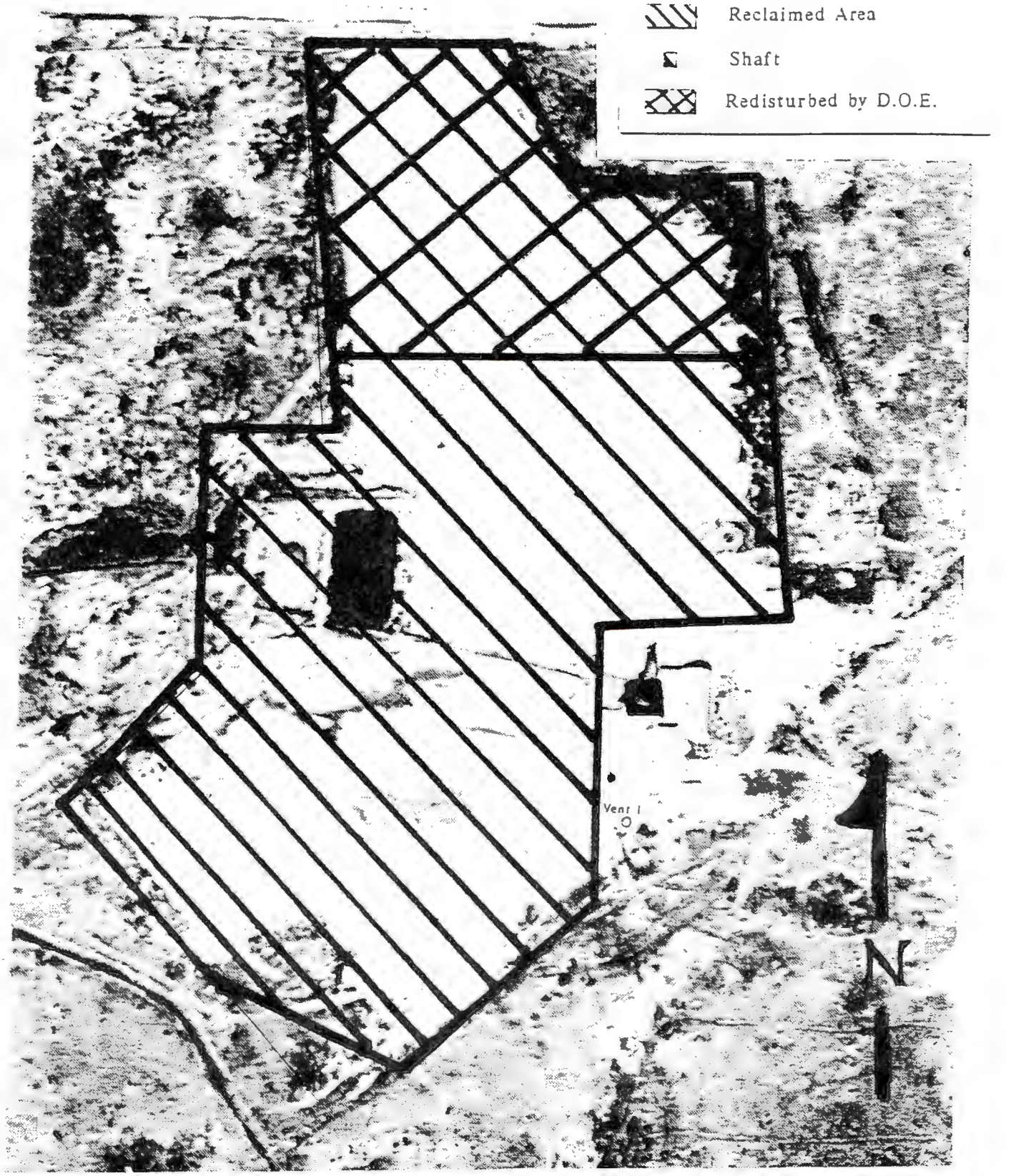
Quivira's Section
30 W Mine
#3

Quivira's Section
30W Mine
#4

Quivira
Inspected
8/29/9:

SECTION 33 MINE

Figure 6 –



Pajaritas
Section 33 Mine
#1 & 2

Quiviras Section 36
Pipe
#2 & 3

Quintus Section
35 Mine
#3,485

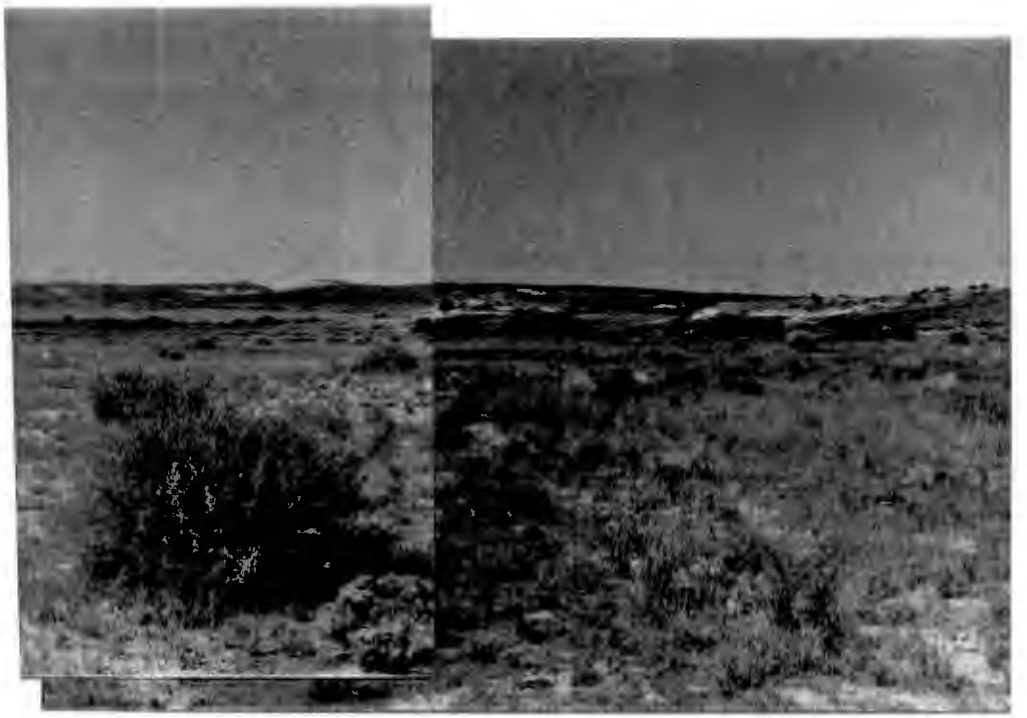
Quivira
Inspected
8/29/95

SECTION 36 MINE

Figure 5

Quivira's Section 36 Mine
#1

Quivira Section 36
Mine
986



Quivira Mining Company

September 14, 1995

Certified Mail
Return Receipt Requested (P 762 964 259)

Dr. Robin Tierney
Mining and Minerals Division
Energy, Minerals and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Re: **Quivira Mining Company**
Prior Reclamation Request

Dear Dr. Tierney,

This letter represents a confirmation of our telephone conversation on September 14, 1995 regarding prior reclamation at the Ambrosia Lake site. As we discussed, although the areas have been successfully reclaimed and revegetated consistent with the requirements of the Act and Rules, due to the time period that has transpired since the areas were re-vegetated, the Mining and Minerals Division (MMD) would like to subsequently re-verify the successful reclamation efforts.

Therefore, pursuant to our discussion, Quivira's prior reclamation application would be approved by MMD; and in conjunction with this approval, the area would receive a one-time field re-verification review.

The objective of this one time field review would be to re-verify that the conditions to allow for establishment of a self sustaining ecosystem consistent with the surrounding area has been met for the post mining land use of grazing. This one time review would be conducted after two (2) additional growing seasons. Upon re-verification, the area would again be acknowledged by MMD as meeting the prior reclamation requirements. If the result of this review is contrary to this, then Quivira would develop and implement a program to address the issues raised by MMD.

P.O. Box 218, Grants, New Mexico 87020 • (505) 287-8851 • FAX (505) 287-8851 Ext. 295

I would like to thank you for your effort and cooperation in this matter. If you have any questions, please do not hesitate to contact me at (505) 287-8851, extension 205.

Sincerely,

QUIVIRA MINING COMPANY

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

xc: B. Ferdinand
T. Fletcher
file

Quivira Mining Company

September 14, 1995

SEP 15

Certified Mail
Return Receipt Requested (P 762 964 259)

Dr. Robin Tierney
Mining and Minerals Division
Energy, Minerals and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Re: **Quivira Mining Company**
Prior Reclamation Request

Dear Dr. Tierney,

This letter represents a confirmation of our telephone conversation on September 14, 1995 regarding prior reclamation at the Ambrosia Lake site. As we discussed, although the areas have been successfully reclaimed and revegetated consistent with the requirements of the Act and Rules, due to the time period that has transpired since the areas were re-vegetated, the Mining and Minerals Division (MMD) would like to subsequently re-verify the successful reclamation efforts.

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P.O. Box 218, Grants, New Mexico 87020 • (505) 287-8851 • FAX (505) 287-8851 Ext. 295

I would like to thank you for your effort and cooperation in this matter. If you have any questions, please do not hesitate to contact me at (505) 287-8851, extension 205.

Sincerely,

QUIVIRA MINING COMPANY

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

xc: B. Ferdinand
T. Fletcher
file

QUIVIRA MINING COMPANY
POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

September 1, 1995

Dr. Robin Tierney
Mining and Minerals Division
Energy, Minerals and Natural Resources Department
2040 South Pacheco
Santa Fe, NM 87505

Re: **Prior Reclamation Request**

Dear Dr. Tierney,

Pursuant to your request, I have enclosed the remaining maps of Quivira Mining Company's prior reclamation sites that you visited on August 29-30, 1995.

If you have any questions regarding this matter, please do not hesitate to contact me at (505) 287-8851, extension 205.

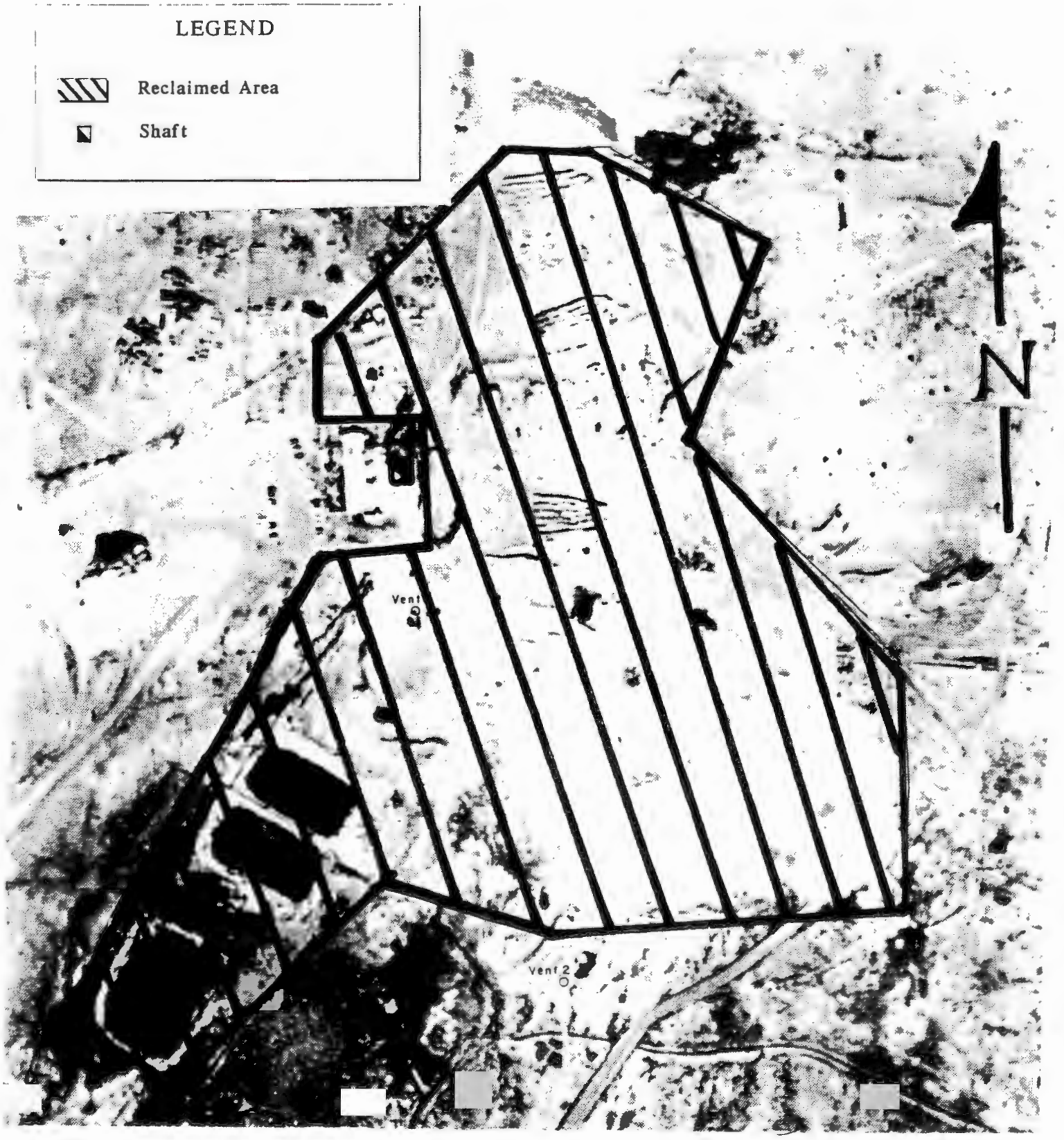
Regards,

QUIVIRA MINING COMPANY

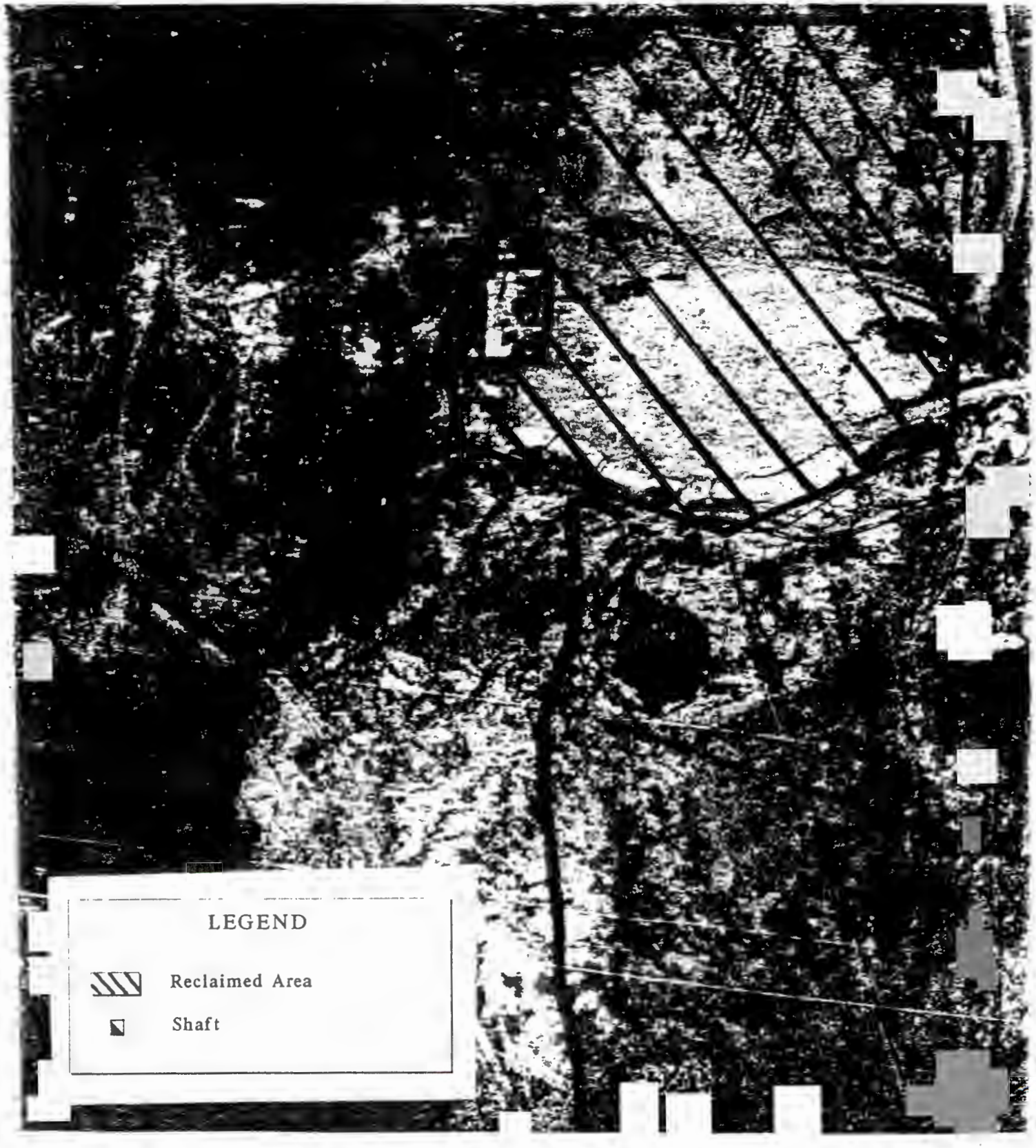
Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

xc: B. Ferdinand
T. Fletcher
file

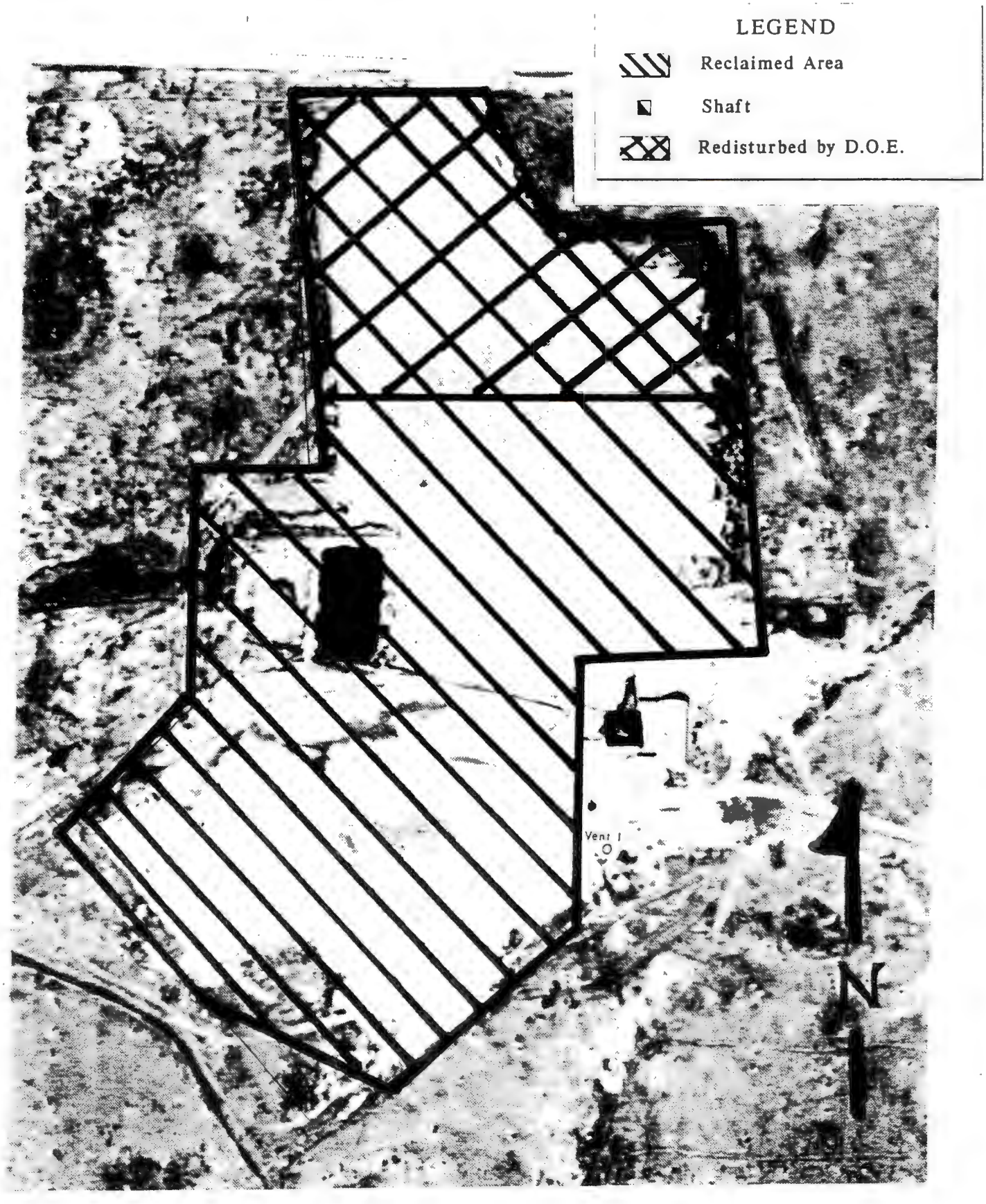
SECTION 17 MINE



SECTION 22 MINE



SECTION 33 MINE



SECTION 36 MINE

PRIOR RECLAMATION INSPECTION

DATE: 8/29

CONDITIONS: 11:30 A.M open site area w/ shaft, 1 vent hole still in place, 2 explosive magazine (↗ groundwater monitoring), May-June 1994 seeding ~50-60 acres size, covered vent, headframe and 2 explosive's magazines still present on site, a pump station also w/ large gravelled parking area on SW corner, wasterock pile was reclaimed

SITE: Section 19

OPERATOR: Quivira

PRESENT: P. Luthiger, R. Young, Mary Ann, Dennis

Visual / Belt	Wasterock Pile Transect #1	N end of site pond area Transect #2	NW of hd frame Transect #3	SW of hd frame Transect #4
Yellow Clover	bg	Litter	Saka	BG
Kosc, Mepo	BG	BG	Saka	BG
Aster bigelovii	sweet clover	BG	yel. clover	Rock
Orhy	BG	Saka	BG	BG
Gusa	BG	Yellow clover	BG	BG
Bogr	kosc	Saka	BG	BG
Aster ericoides Dithyrea	BG	Yellow clover	BG	BG
soil #1 wasterock S. slope pile. 18" sandy loam.	Litter	BG	Saka	BG
Conyza	BG	Saka	yel clover	Litter
soil #2 waste N slope pile 16" to wasterock	BG	BG	BG	Saka
Atriplex canescens	BG	Yellow clover	BG	BG
soil #3 20" to wasterock	BG	" "	BG	yel. clover
Atca	Saka	" "	Kosc	BG
Chryso. nauseos.	BG	Saka	Saka	BG
Soil #4 8" to grey wasterock	sweet clover	kosc	BG	BG
Hoju	BG	BG	Kosc	BG
	kosc	BG	Saka	BG

c:\priorec.tab

#12 to N
#13 to NW
#14 to W
#15 to SW

Quivira Mining Company

File with Section 17 Maps
for
Paternity County

RECEIVED
FEB 17 1995
MINING & MINERALS DIVISION

February 14, 1995

Certified Mail
Return Receipt Requested (P 762 964 235)

Mr. Holland Shepherd
Chief, Mining Act Reclamation Bureau
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

Re: **Quivira Mining Company**
Prior Reclamation Application

Dear Mr. Shepherd:

In response to your January 22, 1995 request regarding Quivira Mining Company's prior reclamation application, please find attached a map identifying the land sections where the shafts of Quivira's various mining units are located. These units, referred to as Section 17, 19, 22, 24, 30, 30 West, 33, and 36, comprise Quivira's Ambrosia Lake mining operation included within the prior reclamation application. As clearly indicated on the map, these units are all in close proximity to each other and should be treated as a single mining entity.

The legal section, township, and range for these mining units are as follows:

Mining Unit	Specific Location
Section 17	Section 17, T14N, R9W
Section 19	Section 19, T14N, R9W
Section 22	Section 22, T14N, R10W
Section 24	Section 24, T14N, R10W
Section 30	Section 30, T14N, R9W
Section 30 West	Section 30, T14N, R9W
Section 33	Section 33, T14N, R9W
Section 36	Section 36, T14N, R9W

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Mr. Holland Shepherd
February 14, 1995

If you have any questions regarding this information, please do not hesitate to contact me at (505) 287-8851, extension 205.

Regards,

QUIVIRA MINING COMPANY

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

Attachment: As stated

xc: B. Ferdinand
T. Fletcher
file

Quivera

DP-362	Sec. 24, et all
67	Sec. 36
71	Sec. 4 Evap. Ponds
169	Tailings (NRC)
264	Sec. 35 + 36 (mine dewater)

DP-362 Exp. Oct. 5, 1977
Incl. Sec. 19, 22, [illegible],
17, 30, 30W, 35,
$NaHCO_3$, H_2O_2, H_2SO_4

Quivira Mining Company

December 14, 1994

Certified Mail
Return Receipt Requested (762 964 212)

Mr. Holland Shepherd
Chief, Mining Act Reclamation Bureau
Energy, Minerals, and Natural Resources Department
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

Re: **Quivira Mining Company**
Prior Reclamation Application

Dear Mr. Shepherd,

Quivira Mining Company is in receipt of the letter dated September 13, 1994 from the Mining and Minerals Division (MMD) regarding the prior reclamation application submitted by Quivira on August 30, 1994.

However, Quivira disagrees with MMDs interpretation of Rule 2.1.I of the Mining Act Regulations that the fee adopted by the New Mexico Mining Commission applies to each mine site. Rule 2.1.I states,

> *"The application fee to determine whether a mine or a portion of a mine qualifies for prior reclamation shall not exceed $250 and shall be determined by the Director based on the estimated cost for investigation and issuance."*

Quivira interprets this as each application submitted for a mine operation requires a $250 fee. Quivira believes this to be the correct interpretation considering other interrelated portions of the Mining Act regulations, specifically Rule 5.2.F. This rule states:

> *"Where physically separate but interrelated mining operations are located in close proximity to each other and are under the control of the same owner or operator, the applicant may request or the Director may determine to issue one permit for all of the operations and require only*

P.O. Box 218, Grants, New Mexico 87020 • (505) 287-8851 • FAX (505) 287-8851 Ext. 295

one permit application and closeout plan."

Additionally, recognizing that Quivira's facilities are either adjacent to or in very close proximity to each other and were operated as a single mining unit, Quivira believes a single application fee for its operation is prudent and justified.

Quivira believes that since its properties meet the requirements as a single operation, and has in fact operated the facilities as a single operation, one fee for the mining unit is applicable. Further, although reclamation has been completed at these sites, a single permit will be sought if, for some reason, Quivira must permit any of these areas. As such, Quivira maintains its position that the proper application fee for the August 30, 1994 prior reclamation application has been submitted to MMD.

Quivira is currently compiling the additional information requested by MMD in order to assist the Director in determining release pursuant to Rule 5.10 of the Mining Act Regulations.

If you have any questions, please contact me at (505) 287-8851, extension 246.

Regards,

QUIVIRA MINING COMPANY

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

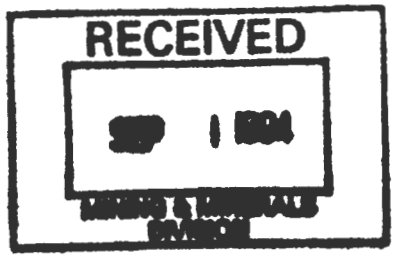
xc: B. Ferdinand
T. Fletcher
M. Freeman
file

Quivira Mining Company

August 30, 1994

Certified Mail
Return Receipt Requested (P 340 643 879)

Mr. Holland Shepherd
Chief, Mining Act Reclamation Bureau
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505



Re: **Quivira Mining Company**
Prior Reclamation Application

Dear Mr. Shepherd:

Pursuant to Section 5 of the New Mexico Mining Act [NMSA 69-36-5.E] and Rule 5.10.A of the New Mexico Mining Act Rules dated July 12, 1994, Quivira hereby submits this application for prior reclamation and requests approval of the prior reclamation application for the Section 17, 19, 22, 24, 30, 30 West, 33, and 36 mining areas.

In addition to this, please find attached a check in the amount of $250.00 as required by Rule 2.1.I of the New Mexico Mining Act Rules dated July 12, 1994.

Pursuant to Section 7.J of the New Mexico Mining Act [NMSA 1978, 69-36-7.J] and Rule 13.3 of the New Mexico Mining Act Rules dated July 12, 1994, all areas and facilities under the jurisdiction of other federal or state regulatory entities are exempt from regulation by the Mining and Minerals Division under the New Mexico Mining Act and therefore, are not included within this prior reclamation application.

The submittal of this prior reclamation application by Quivira Mining Company does not alter Quivira's contention as presented during the May 12, 1994 New Mexico Mining Commission hearings, that uranium mines may not be subject to the New Mexico Mining Act pursuant to the definition of "Mineral" and/or "Mining" because uranium is a commodity, byproduct material or waste that is regulated by the Nuclear Regulatory Commission (NRC) and/or involves the extraction, processing or disposal of same or of

P.O. Box 218, Grants, New Mexico 87020 • (505) 287-8851 • FAX (505) 287-8851 Ext. 295

activities regulated by NRC; and also because of the extensive federal and state duplicative regulations and preemption of regulatory power over uranium and over the above listed activities. With this submittal, Quivira does not waive or prejudice its position that its operations may be excluded from the applicability of the Act.

If you have any questions, please call me at (505) 287-8851.

Regards,

QUIVIRA MINING COMPANY

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

Attachment: As stated

xc: B. Ferdinand
T. Fletcher
M. Freeman
file

TO: FIRST NATIONAL BANK OF GRANTS
GRANTS, NEW MEXICO

95-220
1022

QUIVIRA MINING COMPANY
P.O. BOX 218
GRANTS, NEW MEXICO 87020

No. 2556

MO.	DAY	YEAR		DOLLARS	CENTS
08	30	94	**PAY EXACTLY** **********250******* DOLLARS **00** CENTS	250	00

QUIVIRA MINING COMPANY
GENERAL ACCOUNT

Terry L Fletcher
Kathy J Lovato

TO THE ORDER OF

State of New Mexico
Mining and Minerals Division

[redacted]

Rio Algom

Quivira Mining Company
P.O. Box 218
Grants
New Mexico 87020

505.287.8851 tel
505.285.5550 fax

September 1, 2000

Ms. Karen W. Garcia
Vegetation Specialist
Mining and Minerals Division
2040 South Pacheco
Santa Fe, NM 87505

Re: **Mining Permit MK009RE**
Section 19 Vegetation Survey

Dear Ms. Garcia,

Please find attached a report of the vegetation sampling survey conducted by Quivira on August 31, 2000. In summary, the survey results indicated a 22% average coverage density for the 13 transects. The objective for the site was established at 13.5% cover. Additionally, visual observation of the site indicated that grass shoots were cropping up throughout the site. There were some small isolated areas where grasses were having difficulty in becoming established.

Based on the results, Quivira believes that the reclamation objective has been achieved for the prior reclamation site at the Section 19 mine and requests that it be released from the Mining Act requirements.

If you have any questions, please contact me at (505) 287-8851, extension 205.

Regards,

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

As stated

xc: P. Goranson
File

Prior Reclamation Release Survey - Section 19 Mine Site

Quivira's approved mine permit, Permit MK009RE, required resampling of the Section 19 prior reclamation area to determine revegetation success for the site. The resampling was performed on August 31, 2000 with representatives of the U.S.D.A. Natural Resource Conservation Service, Mining Act Reclamation Bureau, and Quivira were present for the sampling.

Sampling Methodology

The sampling methodology that was utilized for the survey was consistent with the methods that were used on the October 1998 prior reclamation inspection performed by MMD. This was done to allow for direct comparison to the past results.

The vegetation surveys were performed under the direction of Mr. Richard Montoya, district conservation with the U.S.D.A. Natural Resource Conservation Service, Grants Office, Mr. Montoya has extensive experience in evaluating range conditions similar to those in the vicinity of Quivira's mining operation. Two representatives with the Mining Act Reclamation Bureau (Ms. Karen W. Garcia and Mr. Mike Thompson) present during the transect surveys.

A uniform 100 foot grid pattern was overlain on a map of the subject area with each node identified by a discrete whole number. Microsoft Excel was used to generate a random number table that identified the sampling locations and directions. Sampling locations were selected in sequential order from the numbers generated. The only restrictions placed on transect selection were: 1)only one transect would be run from any one node; and 2)if the transect path veered outside the subject area. Three additional transect locations were selected by Mining Act Reclamation Bureau representatives on a random basis to provide better spatial distribution over the prior reclamation area. Figure 1 depicts the grid system and transect locations. Sample nodes selected for transects at the Section 19 mine site are shown in Table 1.

Sampling was performed via the Line Intercept method to evaluate cover. Each transect was 50 feet in length with a sampling interval every foot, thereby obtaining 50 points per transect. Each point along the transect represented 2% of the cover for a given transect. Species data was collected at each sampling point along the transect. Data was tabulated on survey sheets to allow for percent cover and species diversity to be determined.

Sampling Objectives

The cover requirements that were used to determine success for this survey was that perennial cover must average at least 75% of the perennial cover in the Sandy (WP-2) range site description. The average perennial ground cover for a potential natural plant community in the Sandy (WP-2) RSD is 18%. 75% of this is value is 13.5%. Therefore, the cover requirements that were used to determine success for this survey was that perennial cover must average 13.5%.

The diversity requirement was that at least four (4) different grass species, including both warm season and cool season species, be found at the site.

Survey Results

Results of the thirteen transects surveyed indicated that the proposed revegetation objectives were successfully achieved with an average of 22.3% cover. Table 2 below presents the results for percent cover for each of the transects surveyed.

Diversity of grass species observed during the transect survey indicated that numerous grasses species are present on the reclaimed area. Table 3 presents the seven varieties of grasses that were observed within the transect surveys.

Visual observation of the area indicated improved conditions from previous surveys as demonstrated by the percent cover and species diversity results obtained from the surveys, Additionally, it was noted that new shoots of various grass species were sprouting throughout the reclaimed area. Some isolated areas did appear to indicate minimal re-establishment of desired species (see transects 13-58, 24-200). However, these areas were located along existing dirt roads which will most likely be included in future reclamation work associated with the old stope leaching activities. Contained within this report are some photographs of the reclaimed area.

Conclusion

Based on the results, Quivira believes that the reclamation objective has been achieved for the prior reclamation site at the Section 19 mine and requests that it be released from the Mining Act requirements.

Table 1

Section 19 Vegetation Survey
Random Transect Selection Table

random number	node	Direction	transect run
18.896	18	89	yes
56.174	56	174	yes
43.515	43	51	yes
43.586	43	58	no[1]
30.789	30	78	yes
7.307	7	6	no[2]
83.705	83	70	yes
71.114	71	114	yes
17.245	17	244	yes
40.814	40	81	yes
13.586	13	58	yes
69.078	69	7	yes
76.252	76	252	no[3]
2.517	2	51	no[3]
13.780	13	78	no[3]
80.787	80	78	no[3]
76.927	76	92	no[3]
42.973	42	97	no[3]
79.175	79	175	no[3]
34.782	34	78	no[3]
random selection	53	92	yes
random selection	24	200	yes
random selection	38	51	yes

notes:

1 - Not selected as node 43 previously used.

2 - Not selected - sample on border of survey zone

3 - Not selected since sufficient samples already run

Table 2

Transect Results - Percent Cover

Transect	Percent Cover (%)
18-89	30
56-174	32
43-51	30
30-78	28
83-70	36
71-114	12
17-244	22
40-81	18
13-58	0
69-7	30
53-92	20
24-200	2
38-51	30
Average	22.3
Objective	13.5

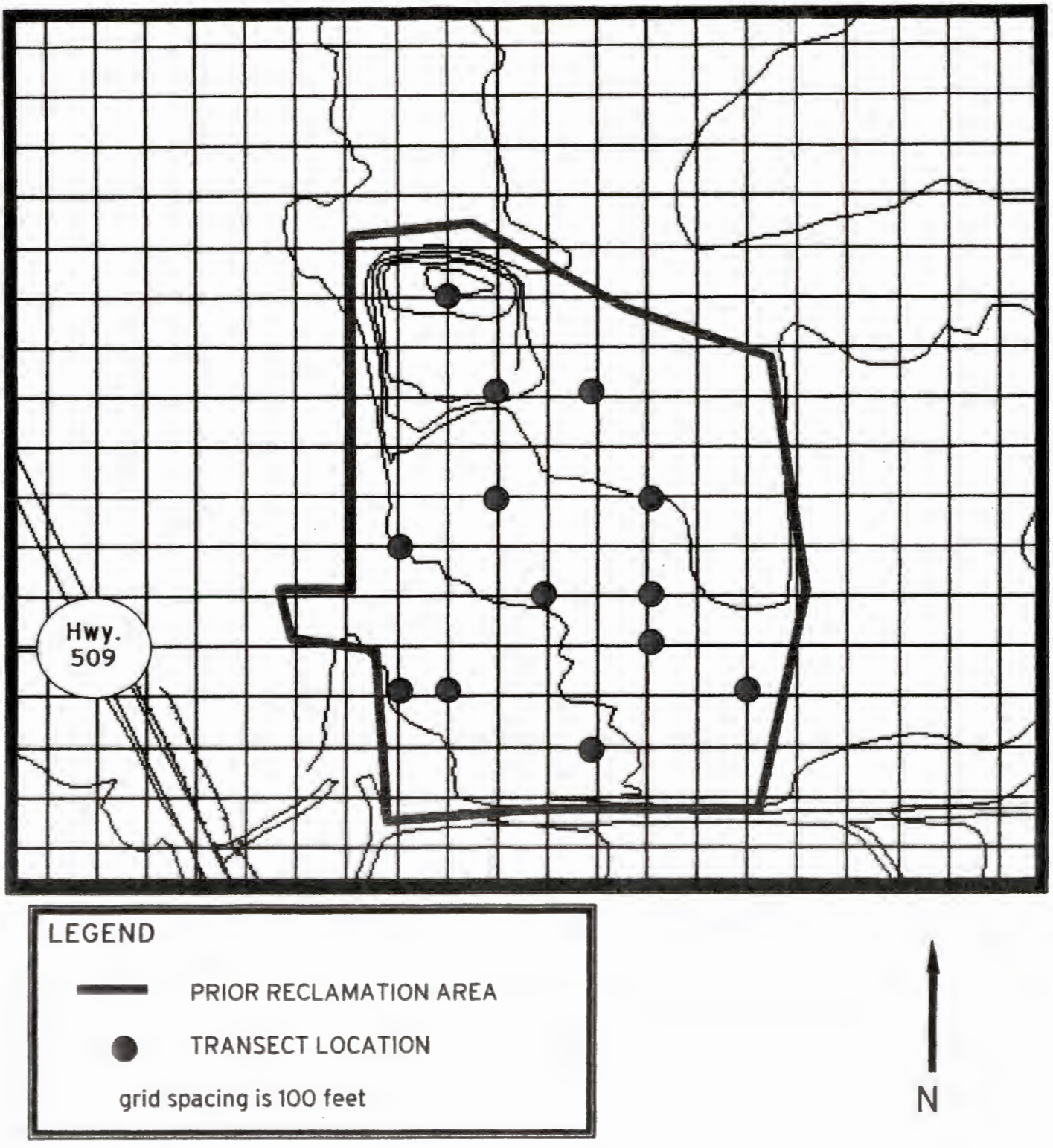
Table 3

Section 19
Transect Surveys - Grass Species Present

Common Name	Scientific Name[1]
Blue Grama	Bouteloua gracilis
Western wheatgrass	Pascopyrum smithii
Indian Ricegrass	Achnatherum hymenoides
Alkali Sacaton	Sporobolus airoides
Sand Dropseed	Sporobolus cryptandrus
Crested Wheatgrass	Agrpyron cristatum
Bottlebrush Squirreltail	Elymus elymoides

Note:
1 - Scientific names obtained from Granite Seed Company.

Figure 1
SECTION 19
VEGETATION SURVEY



Survey conducted on August 31, 2000 by NRCS, MARB, and Quivira representatives.

Photographs of Section 19 Vegetation Survey

Performing 50 foot transect on reclaimed area.

Example of numerous new grass shoots developing on reclaimed area.

Photographs of Section 19 Vegetation Survey

General view of reclaimed area (view is to the southwest)

Number cells
53

Section 17

CELL	DIRECTION
46	326
10	168
17	247
10	286
24	319
14	134
17	72
50	128
32	354
46	113
52	275
7	317
3	4
16	171
32	81
46	256
3	352
7	10
26	92
4	28
51	290
11	267
37	87
6	106
33	141
33	194
39	107

Number cells
45

Section 19

CELL	DIRECTION
3	228
21	58
42	87
29	250
20	310
35	316
11	278
16	4
41	124
21	337
6	286
24	40
34	50
6	357
33	246
29	99
4	323
35	218
22	288
22	78
28	224
27	209
24	65
24	112
10	16
45	275
33	132

Number cells
53

Section 17

Number cells
45

Section 19

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

Douglas M. Bland
Director
Mining and Minerals Division

October 19, 2000

Peter Luthiger
Supervisor, Radiation Safety and
Environmental Affairs
Quivira Mining Company
P.O. Box 218
Grants, NM 87020

Re: Determination on Prior Reclamation Site Sections 19

Dear Mr. Luthiger:

The Mining and Minerals Division (MMD) is in receipt of your letter dated September 1, 2000, in which you request release of Section 19 from regulatory obligation under the New Mexico Mining Act (NMMA). Attached to your letter is a report of the vegetative sampling results offered to support your request for release.

Your cooperation in notifying MMD of the date you would be conducting vegetation sampling of Section 19 was appreciated. MMD staff were present during the sampling conducted on August 31, 2000. In addition to reviewing the vegetation sampling, MMD was also able to make an overall evaluation of the condition of the site.

The condition of the site has improved considerably over the last 5 years. The trend over time of the health of a vegetative community is an important component in MMD's determination of whether a site will allow for the establishment of a self-sustaining ecosytem. Comparing results of inspections conducted in 1995, 1997, 1999, and 2000, the trend appears to be heading in a positive direction, with percent cover of desirable plant species increasing.

The sampling methodology employed during the August inspection was consistent with standard scientific vegetative sampling techniques. An adequate number of transects was run to meet statistical adequacy. The results of the 13 transects conducted revealed a 22.3% relative cover value for the site.

Mr. Peter Luthiger
Section 19 Release
October 17, 2000

The agreed upon standard of 75% of the Range Site Description was met. Seventy five percent of the Sandy WP-2 Range Site was 13.5%, therefore, at 22.3%, the cover value of the site is well above the minimum required.

There was an adequate diversity of plant species as required by MMD. Six warm season and 2 cool season grass species as well as 2 species of forbs. Four wing saltbush, a native shrub, could be seen on the site though it was not picked up on any transect.

In accordance with Section 510.B of the Mining Act Rules, the director shall release the owner or operator from further requirements of the Act and this Part if, after an inspection of the reclaimed areas, he determines that the reclamation measures satisfy the requirements of the Act and the substantive requirements for reclamation pursuant to this Part. The substantive requirements for reclamation in subpart 5 of the Rules in part can be found in § 506.J.3. which states, "the work to be done will reclaim disturbed areas within the permit area to a condition that allows for re-establishment of a self sustaining ecosystem on the permit area following closure, appropriate for the life zone of the surrounding area…".

It is the decision of MMD that the site is in a condition that will allow for the establishment of a self-sustaining ecosystem as required by Section 510.B of the Mining Act Rules. By order of the Director, Quivira Mining Company's Section 19 is hereby released from further obligation under the New Mexico Mining Act.

By Order of the Director,

Douglas M. Bland
Division Director

cc: Kerrie E. Neet, Chief, Mine Regulatory Bureau
Fernando R. Martinez, Program Manager
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