

MK005PR
SECTION 15
MINE



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.

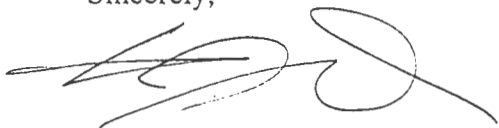
Finally, this survey was concluded in the fall of the fourth growing season for all of the Quivira mines. In spite of the excellent precipitation received in the Grants/Milan area this year, these results are disappointing. Our conclusion is that the sites are not likely to improve over time.

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)	.29	.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 20 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	<i>Kochia scoparia</i> (L.) Schrad.	3
agsm	western wheatgrass	<i>Agropyron smithii</i> Rydb.	4
saka	russian thistle	<i>Salsola kali</i> (L.)	5
spai	alkali sacaton	<i>Sporobulus airoides</i> (Torr.) Torr.	6
atca	fourwing saltbush	<i>Atriplex canescens</i> (Pursh) Nutt.	7
sihy	bottlebrush squirreltail	<i>Sitanion hystrix</i> (Nutt.) J.G. Sm.	8
hija	galleta	<i>Hilaria jamesii</i> (Torr.) Benth.	9
agcr	crested wheatgrass	<i>Agropyron cristatum</i> (L.) Gaertn.	10
muhl	Muhlenbergia species	<i>Muhlenbergia</i> sp.	11
bogr	blue grama	<i>Bouteloua gracilis</i> (Willd. ex Kunth) Lag. ex Griffiths	12
mabi	purple aster	<i>Macarantthera bigelovii</i> (Gray) Greene	13
orhy	indian ricegrass	<i>Oryzopsis hymenoides</i> (Roemer & J.A. Schultes) Ricker ex Piper	14
Jepu	yellow mustard	<i>Descurainia pinnata</i> (Walt.) Britt.	15
yelclove	yellow clover	<i>Melilotus officinalis</i> (L.) Lam.	16
spcr	sand dropseed	<i>Sporobulus cryptandrus</i> (Torr.) Gray	17
arfr	fringed sage	<i>Artemisia frigida</i> Willd.	18
rock			19
grsq	curly cup gumweed	<i>Grindelia squarosa</i> (Pursh) Dunal	20
c'pt	cryptogram		21
gusa	snakeweed	<i>Guttierrezia sarothrae</i> (Pursh) Britt. & Rusby	22

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	nabi	13	bg	1		
3	33	4	nabi	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 bng	12	bg	1
3	17	2 sily	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	spr	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 spr	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	spr	17	litter	2
12	30	2 spr	17	spr	17		
13	30	2 spr	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 ⁴ depu	15	litter	2
9	301	1 ⁴ 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	socr	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		
10	22	2 bg	1				
11	22	2 bg	1				
12	22	2 bg	1				
13	22	2 bg	1				
14	22	2 bg	1				
15	22	2 bg	1				
1	22	3 bg	1				

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			
7	22	3 kocr	3			
8	22	3 bg	1			
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 agr	10	litter	2	
12	22	4 agsm	4	litter	2	
13	22	4 atca	7	agr	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 muhi	11	muhi	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	
10	23	1 kocr	3	bg	1	
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

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

- Grazing (approximately 30 head) on Section 17. Cows should be removed immediately. Presently, there is no vegetation to support this use on this section. However, controlled grazing in the spring and fall (x number of cows/30 days) may reduce the competition from the crested wheatgrass, *Salsola*, and *Kochia*.
- Major rill and gully formation on Section 17 has exposed wasterock.
- Significantly lower species diversity was observed on all of the mines with the exception of the Section 23 mine. Also of concern is the apparent loss of many of the shrub seedlings (winterfat and fourwing saltbush) and native perennial grasses (blue grama, alkali sacaton, sand dropseed, sideoats grama, galleta) 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. It also looks like the reclamation seeding completed in June of 1994 for all of these sections (with exception to Homestake Section 23) may have drilled the seed mix too deeply into the soil. Consequently, the small seeded species contained in the Quivira seed mix (alkali sacaton, sand dropseed, bluegrama) were not expressed. The preponderance of weeds including *Salsola* and *Kochia* is also problematic. Lee Ranch Coal Mine has successfully overcome this problem by burning, reseeding, or interseeding when these weed species persist on reclaimed lands for more than two - three years.
- Crested wheatgrass is a very aggressive introduced species. Under the right conditions, it will persist for decades. There is some evidence to suggest that it is also allelopathic -- that is, its' root system and leaf litter contain chemicals that inhibit successful establishment of other species. Quivira may wish to disk the sections and interseed using broadcast methods, with a mix containing western wheatgrass, galleta, sideoats, bluegrama, indian ricegrass, winterfat, and fourwing saltbush.
- Finally, this survey was conducted in the fall of the fourth growing season for all of the Quivira mines (Section 23 was seeded in Fall, 1990). In spite of the excellent precipitation received in the Grants/Milan area this year, these results are disappointing. However, I did not discuss these concerns with Peter Luthiger at the time of the inspection. These sites are not likely to improve over time. I recommend that Section 23 be released based on the following:
 - 1) This section had a more diverse species composition, including several native grass species that were not in the original seed mix.
 - 2) Shrub establishment (including *Artemisia frigida*, winterfat and fourwing saltbush) was excellent.
 - 3) Vegetation cover (with no crested wheatgrass) was 25%.

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

Survey of Quivira Mines, conducted October 7, 1997

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				

Survey of Quivira Mines, conducted October 7, 1997

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

Survey of Quivira Mines, conducted October 7, 1997

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 sihy	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		

Survey of Quivira Mines, conducted October 7, 1997

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	spr	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 spr	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	spr	17	litter	2
12	30	2 spr	17	spr	17		
13	30	2 spr	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		

Survey of Quivira Mines, conducted October 7, 1997

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		

Survey of Quivira Mines, conducted October 7, 1997

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					

Survey of Quivira Mines, conducted October 7, 1997

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			
10	22	2 bg	1					
11	22	2 bg	1					
12	22	2 bg	1					
13	22	2 bg	1					
14	22	2 bg	1					
15	22	2 bg	1					
1	22	3 bg	1					

Survey of Quivira Mines, conducted October 7, 1997

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			
7	22	3 kocr	3			
8	22	3 bg	1			
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	
10	23	1 kocr	3	bg	1	
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			

Survey of Quivira Mines, conducted October 7, 1997

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

HOMESTAKE MINING COMPANY

P.O. BOX 98
GRANTS, NEW MEXICO 87020
(505) 287-4456



June 29, 1997

Mr. Holland W. Shepherd
Bureau Chief
Mining Act Reclamation Bureau
Energy, Minerals and Natural
Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

**RE: Section 23 Mine, Homestake Mining Company
Approval of Variance Request**

Dear Mr. Shepherd:

Pursuant to our telephone conversation on June 19th, I am formally informing you that in October 1996 Homestake Mining Company of California sold Sections 23, 24, and 25 in Township 14 North Range 10 West to Quivira Mining Company.

As part of the land transaction, Quivira Mining Company assumed the responsibility for final reclamation requirements for Section 23. Homestake therefore, requests that the reclamation variance that was granted on July 24, 1996 for Section 23 be transferred to Quivira Mining Company. I have attached a copy of Quivira's acceptance letter for your files.

I as mentioned to you on the phone I was reminded by our revegetation specialist that a variance was requested and granted. If you have any additional questions regarding this request please call me at 505-287-4456. Thank you for your prompt attention on this matter.

HOMESTAKE MINING COMPANY OF CALIFORNIA

Roy R. Cellan
Corporate Manager of Reclamation
Grants Reclamation Site

cc: Harold Barnes, SFO
Terry Fletcher, Quivira Mining Company

Quivira Mining Company

RECEIVED JUL 28 1996

July 25, 1996

Mr. Fred Craft
Resident Manager
Homestake Mining Company
P.O. Box 98
Grants, NM 87020

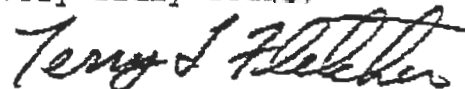
Dear Fred:

Quivira Mining Company is prepared to purchase Homestake's surface estate of Sections 23, 24 and 25 in Township 14 North, Range 10 West, for \$100,000 to be paid at closing.

We expect that the purchase will include all mine maps and other data available on these Sections. Quivira will assume responsibility for completing "prior reclamation" requirements associated with vegetation on Section 23.

This offer is subject to a title review by Quivira and acceptable warranty deed to be provided by Homestake Mining Company. We will appreciate your response to this offer by August 1, 1996.

Very Truly Yours,



Terry Fletcher
General Manager



BRUCE KING
GOVERNOR

December 14, 1994

ANITA LOCKWOOD
CABINET SECRETARY

Mr. Fred Craft
HomeStake Mining Co
P. O. Box 98
Grants, New Mexico 87020

RE: Evaluation Guidelines for Prior Reclamation Sites.

Dear Mr. Craft:

The Mining and Minerals Division (MMD) will be conducting inspections for the purposes of prior reclamation for the site(s) you have requested release. Based on Section 69-36-5 E. of the New Mexico Mining Act, the MMD has developed inventory of items to determine whether the completed reclamation satisfies the requirements of the New Mexico Mining Act and the substantive requirements for reclamation pursuant to the applicable regulatory standards.

This checklist is included for your use to determine if your site meets all of the ten criteria. Based on site-specific information, the MMD will be using this checklist to establish criterion based decisions to release the site from further responsibilities under the Act or not.

MMD will begin inspection of prior reclamation sites in early 1995 and will make a determination by September 30, 1995. If you have any questions regarding the checklist or questions regarding the inspection of your reclamation sites, please contact me or Joe DeAgüero at 505/827-5970.

Sincerely,

A handwritten signature in black ink, appearing to read "H. Shepherd".

Holland Shepherd
Bureau Chief
Mine Act Reclamation Bureau
Mining and Minerals Division

VILLAGRA BUILDING - 408 Gallisteo

Forestry and Resources Conservation Division
P.O. Box 1948 87504-1948
827-5830

Park and Recreation Division
P.O. Box 1147 87504-1147
827-7465

2040 South Pacheco

Office of the Secretary
827-5950

Administrative Services
827-5925

Energy Conservation & Management
827-5900

Mining and Minerals
827-5970

LAND OFFICE BUILDING - 310 Old Santa Fe Trail

Oil Conservation Division
P.O. Box 2088 87504-2088
827-5800

HOMESTAKE MINING COMPANY

P.O. BOX 98
GRANTS, NEW MEXICO 87020
(505) 287-4456

August 30, 1994



UPS TRACKING LABEL: 1078 5568 745

State of New Mexico
Energy, Minerals and Natural
Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Attn.: Mr. Holland W. Shepherd, Bureau Chief

Re: Prior Reclamation of Mine Sites

Dear Mr. Shepherd:

Enclosed are the five prior reclamation reports for Homestake Mining Company of California mines. The mines are Section 13, 15, 23, 25, all in Township 14 North, Range 10 West, and Section 32 in Township 14 North, Range 9 West. These reports comply with the New Mexico Mining Act to satisfy prior reclamation activities. Also enclosed is a check for \$1250 for fees at \$250 per mine site.

If you have any questions please contact me at the Grants office.

Sincerely,

HOMESTAKE MINING COMPANY

A handwritten signature in black ink, appearing to read "F. R. Craft".

F. R. Craft
Resident Manager

FRC:jg

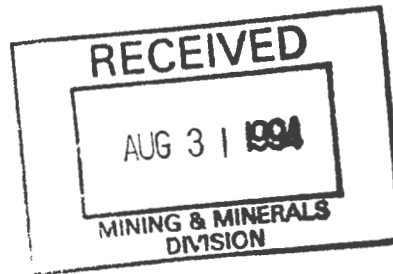
Enclosures

No. 0008959

DATE: 25-AUG-94 CUST. ACCT. NO.

VENDOR NAME State of New Mexico VENDOR NO: 3096

INVOICE NO.	INVOICE DATE	DESCRIPTION	DISCOUNT AMOUNT	NET AMOUNT
Inspection	19-AUG-94		.00	1,250.00



PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT. *Thank You*

.00 1,250.00

HOMESTAKE MINING COMPANY

650 CALIFORNIA STREET, 11th FLOOR
 SAN FRANCISCO, CALIFORNIA 94108-2788

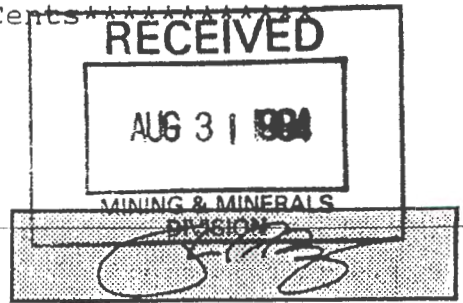
Drawn on
 Pittsburgh National Bank, Jeannette, Pennsylvania
 in Cooperation With Wells Fargo Bank, N.A.
 #4753-203618 60-1190-433

No. 0008959

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
25-AUG-94	8959	1,250.00

PAY One Thousand Two Hundred Fifty Dollars and No Cents*****

TO THE ORDER OF State of New Mexico
 Energy, Minerals & Natural Resource
 2040 South Pacheco Street
 Santa Fe NM 87505



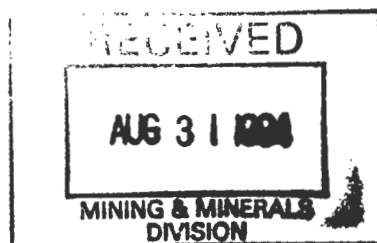
BY _____
 BY _____



BOX 27019 ALBUQUERQUE NEW MEXICO 87125
6200 UPTOWN BLVD NE. SUITE 400
ALBUQUERQUE NM 87110
TEL 505-880-5300 FAX 505-880-5435

A Santa Fe Pacific Company

August 31, 1994
HAND DELIVERED



Mr. John Lingo, Director
Mining & Minerals Division
Energy, Minerals & Natural
Resources Department
2040 Pacheco Street
Santa Fe, New Mexico 87505

Re: Santa Fe Pacific Gold Corporation's Requests for Approval of
Prior Reclamation

Dear Mr. Lingo:

On behalf of Santa Fe Pacific Gold Corporation, this letter is being hand-delivered along with a series of one-page submittals and accompanying maps identifying certain properties which it believes were previously mined by other companies for recovery of uranium ores. These submissions are made in a spirit of cooperation even though Santa Fe Pacific Gold Corporation believes it is not required to make the submittals or undertake any other action under the New Mexico Mining Act, if that Act is deemed to apply at all to the uranium operations conducted at the site. Further, these submissions are made with the expectation that they may overlap with submissions by companies which conducted or owned the operations causing any disturbances.

For each site, Santa Fe Pacific Gold Corporation would like to request that the Director of the Mining and Minerals Division approve prior reclamation efforts pursuant to the New Mexico Mining Act if the Director believes that the Mining Act may be applicable to the operations previously conducted thereon. Pursuant to our attorney's recent discussions with you, these submissions are made with the express understanding that Santa Fe Pacific Gold Corporation fully preserves and does not waive any of its positions that it has no obligations whatsoever under the Mining Act with respect to these sites including, but not limited to, the following positions:

Mr. John Lingo, Director
August 31, 1994
Page 2

1. That any commodities or other materials produced from the properties or activities thereon constitute commodities, materials or activities regulated by the Nuclear Regulatory Commission such that the Mining Act does not apply;

2. That minerals were not produced from the properties in marketable quantities for a total of two years since January 1, 1970;

3. That as mere owner of mineral interests and lessor under instrument(s) pursuant to which operations owned and conducted by others occurred on the properties, Santa Fe Pacific Gold Corporation was not and is not an operator or owner of the operations with responsibilities, if there be any, under the Mining Act; and

4. That Santa Fe Pacific Gold Corporation has no obligation whatsoever to request approval of prior reclamation or carry out other responsibilities, if there be any, pertaining to the properties in relation to the Mining Act.

Santa Fe Pacific Gold Corporation makes these submissions with the further understanding that neither the submissions themselves, nor anything stated therein, nor the fact of making the submissions shall be advanced in any context, form or respect by the State of New Mexico or any agency or subdivision thereof as evidence or as an admission of any kind on any issue which may exist or hereafter arise in relation to Santa Fe Pacific Gold Corporation or its mineral properties in connection with the Mining Act. The same understanding applies in all respects to this letter.

With the exception of two mines, Santa Fe Pacific Gold Corporation believes these submissions cover all of its New Mexico properties that might conceivably be argued as properties on which "existing mining operations" are situated. The first such exception is the Northeast Church Rock Mine in Section 35, Township 17 North, Range 16 West. The Northeast Church Rock Mine was operated by United Nuclear Corporation under a lease with Santa Fe Pacific Minerals Corporation, now Santa Fe Pacific Gold Corporation. That lease recently terminated after the adoption of the New Mexico Mining Act.

The second uranium mine for which submission is not made with this letter is the Old Church Rock Mine in Section 17, Township 16 North, Range 16 West. Santa Fe Pacific Gold Corporation believes that ongoing mining operations exist or are contemplated at that site by its most current lessee, Hydro Resources, Inc., and is informed that that company is already in contact with MMD

Mr. John Lingo, Director
August 31, 1994
Page 3

concerning any Mining Act responsibilities that may be applicable to the operations.

Santa Fe Pacific Gold Corporation's purpose for voluntarily submitting the enclosed requests for approval of prior reclamation, and for identifying in this letter the two leased uranium mine sites for which no submissions are made, is to cooperate fully and in a spirit of good faith so as to assist the Mining and Minerals Division in its tasks of identifying and narrowing down the potential Mining Act-regulated operations that may require a greater level of regulatory involvement.

If you have any questions concerning this letter, the enclosed submissions or the nonwaiver/preservation of rights language included, please do not hesitate to call.

Very truly yours,


Tim Leftwich for

Request For Approval Of Prior Reclamation

Name Of Mine: Unknown *Homestake*

Topographic Location Of Mine: Section 15, T.14N., R.10W.

Operator Name: Homestake - Sapin

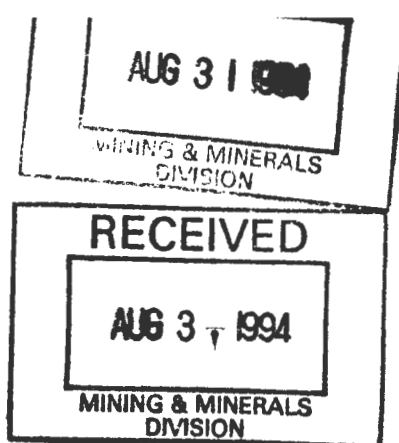
Description Of Site Condition: This section was mined by Homestake under a lease from Santa Fe Pacific Minerals Corporation. This section was reclaimed in 1992. Open mine features were backfilled and areas of surface disturbance revegetated with native plant species. Topography was returned to natural contour to the extent possible.

Date Of Request: August 31, 1994

Non-waiver/Preservation Of Rights: This request for approval of prior reclamation is made with the express understanding that Santa Fe Pacific Gold Corporation fully preserves and does not waive any of its positions that it has no obligations whatsoever under the Mining Act with respect to these sites including, but not limited to, the following positions:

1. That any commodities or other materials produced from the properties or activities thereon constitute commodities, materials or activities regulated by the Nuclear Regulatory Commission such that the Mining Act does not apply;
2. That minerals were not produced from the properties in marketable quantities for a total of two years since January 1, 1970;
3. That as mere owner of mineral interests and lessor under instrument(s) pursuant to which operations owned and conducted by others occurred on the properties, Santa Fe Pacific Gold Corporation was not and is not an operator or owner of the operations with responsibilities, if there be any, under the Mining Act; and
4. That Santa Fe Pacific Gold Corporation has no obligation whatsoever to request approval of prior reclamation or carry out other responsibilities, if there be any, pertaining to the properties in relation to the Mining Act.

Santa Fe Pacific Gold Corporation makes this submission with the further understanding that neither the submission itself, nor anything stated therein, nor the fact of making the submission shall be advanced in any context, form or respect by the State of New Mexico or any agency or subdivision thereof as evidence or as an admission of any kind on any issue which may exist or hereafter arise in relation to Santa Fe Pacific Gold Corporation or its mineral properties in connection with the Mining Act.



HOMESTAKE MINING COMPA..

P.O. BOX 98
GRANTS, NEW MEXICO 87020
(505) 287-4456

July 25, 1994



State of New Mexico
Energy, Minerals and Natural
Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Attn.: Mr. Holland W. Shepherd, Bureau Chief

Re: Prior Reclamation of Mine Sites

Dear Mr. Shepherd:

Homestake Mining Company of California is preparing to submit, by August 31, 1994, prior reclamation status for the following mine sites: Section 13, Section 15, Section 23, Section 25 and Section 32. The prior reclamation status reports will consist of the following elements: Introduction, History of Operation, Climatology, Ecology, Geology, Topography, Hydrology, Mine Operation Description, Reclamation, Reclamation Procedures, Achievement of Reclamation Requirements, and Reclamation Seed Mixture. I believe the outline will complete the prior reclamation requirements.

I reviewed the list of mine sites listed under Homestake Mining Company of California and found the following listings need to be removed: UN-HP Section 23, UNC Section 15, UNC Section 25, UNC Section 32, UN-HP Section 13, and Section 25 T12N Wayne Jacke R10W. ?

It was good to see you again and I'm looking forward to working with you.

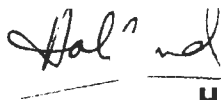
Sincerely,

HOMESTAKE MINING COMPANY

A handwritten signature in cursive script, appearing to read "F. R. Craft".

F. R. Craft
Resident Manager

FRC:jg



HOMESTAKE MINING COMPANY

P.O. BOX 98
GRANTS, NEW MEXICO 87020
(505) 287-4456

December 19, 1995

820

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

Re: Prior Reclamation Release, Sections 13, 15, 23, 25 and 32 Mines, McKinley
County

Dear Ms. Garland:

I received your Prior Reclamation Release letter dated September 29, 1995 on
November 16, 1995. In this letter I found some areas that need clarification or
changed to match the recorded documents already in the file. The following is a
list of the corrections:

Page	Paragraph	Comment
2	1st under Inspection Procedures	Inspections occurred on June 29 and July 13, 1995 not June 28
3	1st under Section 13, T14N, R10W	United Nuclear-Homestake Partners began operation of Section 13 Mine in October, 1977
5	1st under Section 15, T14N, R10W	Section 15 Mine had approximately 30 acres disturbed
7	1st under Section 23 (T14N, R10W)	This section was reclaimed in June of 1992
9	1st under Photograph of Homestake's Section 23 Mine	Site inspection on June 29, 1995
9	1st under Section 25, T14N, R10W	Inspection began on June 29, 1995
11	1st under Maintenance Item(s)	I did not receive report until November 16, 1995. A report will be sent to Director of MMD 60 days from November 16, 1995

Ms. Kathleen A. Garland, Director

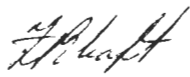
December 19, 1995

Page 2

14	1st under Summary and Conclusion	Staff recommends that Section 15, Section 13, Section 25 and Section 32 mine sites be released from further requirements of the New Mexico Mining Act.
----	----------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------

Should you have any questions please contact me at (505) 287-4456.

Sincerely,



F. R. Craft
Resident Manager

FRC:jg

September 29, 1995

Mr. Fred Craft, Resident Manager
Homestake Mining Company of California
P.O. Box 98
Grants, NM 87020

RE: Prior Reclamation Release, Section 13, 15, 23, 25 and 32 Mines, McKinley County, New Mexico

Dear Mr. Craft:

The Mining and Minerals Division (MMD) has completed the inspection of reclamation measures at the following mines as requested by Homestake Mining Company of California (HMC):

Section 13 T14N R10W
Section 15 T14N R10W
Section 25 T14N R10W
Section 32 T14N R9W

Based on findings in the enclosed inspection reports, reclamation measures at the above mines satisfy the requirements of the New Mexico Mining Act (NMMA) and the substantive requirements for reclamation pursuant to the NMMA Rules. Therefore, HMC is hereby released from further requirements of the NMMA on the mines listed above. However, the Section 25 Mine was identified by staff as having one maintenance item which will need to be addressed. The release for this site will be conditional on Homestake performing the work discussed in the Section 25 report and meeting the deadline provided in the report.

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.

The Section 23 Mine was identified by staff as having insufficient cover to meet release. However, since Homestake has completed most reclamation measures at the mine, Homestake may apply for a variance from the provisions of the NMMA Rules pursuant to Rule 10. Otherwise Homestake must apply for a permit under the provisions of Rule 5.10.B.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'K. Garland', with a large loop at the end.

Kathleen A. Garland, Director
Mining and Minerals Division

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

Enclosures

**PRIOR RECLAMATION INSPECTION REPORT
AND
RECOMMENDATION FOR RELEASE OR PERMIT REQUIREMENT**

Homestake Mining Company -- California

**Section 13, (T 14N R 10W), Section 15 (T 14N, R 10W), Section 23 (T 14N, R 10W),
Section 25 (T 14N, R 10W) and Section 32 (T 14N, R 10W) 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 26, 1995

Introduction

The purpose of these inspections was to determine if reclamation measures at Homestake Mining Company's Section 13, Section 15, Section 23, Section 25, and Section 32 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. Homestake Mining Company's Prior Reclamation Sites.

Name of Mine	Location	Date of Inspection
Section 13	T 14N, R 10W	July 13, 1995
Section 15	T 14N, R 10W	July 13, 1995
Section 23	T 14N, R 10W	June 28, 1995
Section 25	T 14N, R 10W	June 28, 1995
Section 32	T 14N, R 10W	July 13, 1995

Inspection Procedures

Inspections by the Mining and Minerals Division of prior reclamation sites were conducted on the following mine sites: Section 13 (T 14N, R 10W), Section 15 (T 14N, R 10W), Section 23 (T 14N, R 10W), Section 25 (T 14N, R 10W), and Section 32 (T 14N, R 10W). All inspections were conducted and completed on June 28 and July 13, 1995. Persons present during the June 28, 1995 inspections of the Section 23 and Section 25 mines included: Mr. Joe DeAgüero, Mr. Robert Garcia, Ms. Tacy Harling, and Ms. Robyn Tierney of the New Mexico Mining and Minerals Division; and Mr. Fred Craft, representing Homestake Mining Company (HMC). Persons present during the July 13, 1995 inspection of the Section 13, Section 15, and Section 32 mines included: Mr. Fred Craft, representing Homestake Mining Company; and Ms. Tacy Harling, and Mr. Robert Young of the New Mexico Mining and Minerals Division (MMD). The authors of this inspection report were Ms. Robyn Tierney and Mr. Robert Young.

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 was visually inspected for erosion features and hydrologic stability. During a walkover of each site, all slopes and areas of water concentration (ponds, diversions and areas where disturbed areas enter undisturbed lands) were visually inspected for stability. Topsoil placement and distribution were 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 were verified in the field.

The establishment and relative percent cover of reseeded and native plant species were evaluated in randomly placed transects. Fifty foot 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. Seventeen 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 and reports describing the conditions at the five mine sites were submitted by Homestake in 1994. The detail in these reports and maps is sufficient to describe conditions and facilities that were present on each site prior to reclamation and provide information on the reclamation of each site. Details of the reclamation activities at each site were further verified in discussions with Mr. Craft of Homestake Mining Company and by the on-site inspections conducted on June 29 and July 13, 1995.

Section 13, T 14N, R 10W

The present owner of the surface rights to Section 13 is Mr. Jerry Elkins. The owner of the mineral rights is Cerrillos Land Company (Santa Fe Pacific Railroad). Homestake-Sapin Partners began operation of the HMC Section 13 Mine in October 1977 as United Nuclear-Homestake Partners under a lease from Santa Fe Pacific Railroad. The partnership was dissolved February 1981 with Homestake Mining Company-Grants remaining as the operator. The company was later renamed Homestake Mining Company of California.

The Section 13 Mine lies within the Ambrosia Lake valley. Appendix A (Kelly 1963) depicts the stratigraphic column underlying the formations at this and the four other mine sites (Section 15, Section 23, Section 25, and Section 32) discussed in this report. Uranium ore was found in the "A" through "D" sandstone units of the Westwater Canyon member of the Morrison Formation (HMC, 1994). This mine was a dry mine (Craft, 1995). There are no surface water features in the section. Surface drainage is to an unnamed tributary of Arroyo del Puerto that, in turn, drains into San Mateo Creek. Structures which existed at the Section 13 Mine while it was in operation included an access road, a vertical shaft, a ventilation shaft, an equipment storage area, two waste rock piles, a compressor building and a office/hoist/compressor building. Homestake regraded and topsoiled the site in early 1992 and reseeded in June of the same year. The seed mixture used in the reclamation of the Section 13 Mine and the other mine sites is shown in Appendix B. Photographs of reclamation activities were provided in the request for prior reclamation inspection (HMC, 1994).

A barbed wire fence surrounded the site. All structures, trash or junk had been removed from the site. There were no visible piles or accumulations of toxic or waste material on the site. There were no apparent hazards

or erosion features that could affect public health and safety. The slopes of the reclaimed waste rock piles appeared stable with respect to erosion and mass movement. The reclaimed waste rock piles blended in with the surrounding terrain and provided topographic diversity. Shaft boreholes were backfilled with nontoxic mine waste material and capped with concrete slabs that were, in turn, covered with a foot of soil (HMC, 1994). Top soil depths across the site ranged from 5 to 14 inches. There was some evidence of grazing by wildlife. Perennial species identified on the site included blue grama, galleta, snakeweed, western wheatgrass, alkali sacaton and globemallow (Table 2). The area had had little precipitation during the course of the summer and vegetation was drought stressed. Line-intercept transects (Table 3) indicated that there was approximately 18 percent perennial vegetative cover and 30 percent litter cover (DeAgüero, 1995).

Table 2. List of Species at Homestake's Section 13 Mine

COMMON NAME	<i>Genus & species</i> ¹
Alkali sacaton	<i>Sporobolus airoides</i>
Western wheatgrass	<i>Agropyron smithii</i>
Crested wheatgrass	<i>Agropyron cristatum</i>
Blue grama grass	<i>Bouteloua gracilis</i>
Galleta	<i>Hilaria jamesii</i>
Ragweed	<i>Kochia scoparium</i>
Daisy fleabane	<i>Erigeron sp.</i>
Scarlet globemallow	<i>Sphaeralcea coccinea</i>
Yellow snakeweed	<i>Gutierrezia sarothrae</i>

	Value (%)
Perennial Cover:	6
Litter Cover	53
Rock Cover	0
Bare Ground	35
Number of perennial species present in belt transect	5
Transect #2	Value (%)
Perennial Cover:	24

Litter Cover	12
Rock Cover	0
Bare Ground	65
Number of perennial species present in belt transect	4
Transect #3	Value (%)
Perennial Cover:	24
Litter Cover	24
Rock Cover	6
Bare Ground	47
Number of perennial species present in belt transect	7

Maintenance Items:

None

Photographs of HMC's Section 13 Mine

1. This photograph is of the stockpile area following reclamation.
2. Photograph #2 documents the characteristic wasterock material found at the Section 13 mine site.
3. These two photographs (#3 and #4) are panoramic views of the borrow area.

Section 15, T 14N, R 10W

The Section 15 Mine prior reclamation site is located in the Ambrosia Lake valley, 27 miles northwest of Grants, New Mexico. Approximately 40 acres of Section 15 (where the headframe existed) were disturbed. The rest of the mine was restricted to underground workings. Homestake, however, has asked for release of the entire section and mine site from further requirements of the Act (Craft, 1995). The owner of the surface estate is Mr. Jerry Elkins. Mineral rights are owned by Cerrillos Land Company (Santa Fe Pacific Railroad).

Operation of the HMC Section 15 Mine was initiated by Homestake-Sapin Partners in February 1958 under a lease from Santa Fe Pacific Railroad. In 1968 Homestake-Sapin Partners became United Nuclear-Homestake Partners. This partnership was dissolved in February 1981 and Homestake Mining Company, later renamed Homestake Mining Company of California, became the operator. The Section 15 mine closed in 1981

(HMC, 1994). The mine was wet and water was pumped from the mine into a pond (Craft, 1995). There are no surface water features in the section. As in the case of Homestake's Section 13 Mine, surface drainage is to an unnamed tributary of Arroyo del Puerto which, in turn, drains into San Mateo Creek. Structures which existed while the Section 15 Mine was in operation included vertical shafts, a declined shaft, 3 ventilation boreholes, 2 waste rock piles, a dewatering pond and a office/hoist building. Homestake reclaimed this site in early 1992 and reseeded (Appendix B) it in June 1992. Photographs of the reclamation activities at this site are provided in the HMC report (1994).

The entire section and mine site have been fenced with barbed wire. All structures, trash, and debris have been removed from the mine site. There were no apparent accumulations of waste materials or hazards that could affect public health or safety on the site. The reclaimed wasterock piles were stable with no erosion or rill formation. These piles also blended in with the surrounding terrain and provided topographic relief. The mine and air shafts were backfilled with nontoxic mine waste materials, capped with concrete slabs, then covered with a foot of soil (HMC, 1994). Topsoil depths across the site ranged from 4.5 to 10 inches. There was some evidence of grazing by domestic cattle and wildlife. The vegetation (Table 4) also showed signs of drought stress. Litter cover and perennial vegetative cover (Table 5) were approximately 29 percent and 31 percent, respectively (DeAgüero, 1995).

Table 4. List of Species at Homestake's Section 15 Mine

COMMON NAME	<i>Genus & species¹</i>
Alkali sacaton	<i>Sporobolus airoides</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>
Western wheatgrass	<i>Agropyron smithii</i>
Blue grama grass	<i>Bouteloua gracilis</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>
Galleta	<i>Hilaria jamesii</i>
Foxtail barley	<i>Hordeum jubatum</i>
Yellow snakeweed	<i>Gutierrezia sarothrae</i>

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 5. Summary of Relative Cover Data at Homestake's Section 15 Mine

Transect #1	Value (%)
Perennial Cover	32
Litter Cover	29
Rock Cover	0

Bare Ground	32
Number of perennial species present in belt transect	5
Transect #2	Value (%)
Perennial Cover:	29
Litter Cover	29
Rock Cover	0
Bare Ground	35
Number of perennial species present in belt transect	8

Maintenance Items:

None.

Photographs of Homestake's Section 15 Mine

The photographs on the following page were taken during site inspection of the Section 15 Mine on July 13, 1995.

Section 23, (T 14N, R 10W)

This section was reclaimed in June of 1994. The seed mixture used in the reclamation of the Section 23 Mine is presented in Appendix A of this document. Most of the reclaimed mine site is covered with the annual weeds ragweed (*Kochia scoparium*) and Russian thistle (*Salsola kali*). The following table (Table 4) contains a list of all species identified on the reclaimed Section 23 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 6. List of Species at Homestake's Section 23 Mine

COMMON NAME	<i>Genus & species¹</i>
Alkali sacaton	<i>Sporobolus airoides</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>
Crested wheatgrass	<i>Agropyron cristatum</i>

COMMON NAME	<i>Genus & species¹</i>
Western wheatgrass	<i>Agropyron smithii</i>
Blue grama grass	<i>Bouteloua gracilis</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>
Galleta	<i>Hilaria jamesii</i>
Foxtail barley	<i>Hordeum jubatum</i>
Mountain brome	<i>Bromus mollis</i>
Cheatgrass	<i>Bromus tectorum</i>
Scarlet globemallow	<i>Sphaeralcea coccinea</i>
Winterfat	<i>Ceratoides lanata</i>
Mexican hat	<i>Ratibida columnifera</i>
Dock sp.	<i>Rumex sp.</i>
Fourwing saltbush	<i>Atriplex canescens</i>
Yellow snakeweed	<i>Gutierrezia sarothrae</i>

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 7. Summary of Relative Cover Data at Homestake's Section 23 Mine.

Transect #1	Value (%)
Perennial Cover	0
Litter Cover	0
Rock Cover	0
Bare Ground	29
Number of perennial present in belt transect	0

Maintenance Items:

Homestake may need to consider reseeding this site or wait to see if an adequate cover can be achieved in another season or two of growth.

Photographs of Homestake's Section 23 Mine

The following photographs were taken during the site inspection on June 28, 1995 to document conditions at the Section 23 Mine. These represent a panoramic view of the mine.

Section 25, T 14N, R 10W

Inspection of the Section 25 Mine reclaimed by Homestake Mining Company began on June 28, 1995, and concluded (due to inclement weather) on July 13, 1995. Persons present during both portions of the inspection included: Mr. Fred Craft representing Homestake; the lead inspector for this prior reclamation inspection was Joe DeAgüero. Other inspectors representing MMD included: Ms. Robyn Tierney, Mr. Robert Garcia, Mr. Robert Young, and Ms. Tacy Harling.

The Section 25 Mine sits on an a flat area southwest of the New Mexico highway 509 spur. A prior reclamation report submitted by Homestake in 1994 for the Section 25 mine, describes the reclamation activities completed at the mine. Included in the report are maps of the reclaimed features (photos and field surveys), a discussion of the geology, ecology, topography and hydrology, detailed description of the reclamation conducted at the site and a description of achievement of Reclamation Requirements. The prior reclamation report submitted by HMC is a comprehensive summary of the reclamation conducted at the site. There is sufficient detail contained in the report to describe conditions and facilities that occurred at the site prior to reclamation and where these facilities were located. Further, the details of the reclamation conducted on site were verified on site during the inspections.

Table 8 lists of all plant species identified on the reclaimed site. This list is not inclusive of all species that may be present at other times of the year. Many of the forb species are dormant during the drought season.

Table 8. List of Species at Homestake's Section 25 Mine

COMMON NAME	Genus & species'
Alkali sacaton	<i>Sporobolus airoides</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>
Western wheatgrass	<i>Agropyron smithii</i>
Blue grama grass	<i>Bouteloua gracilis</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>

COMMON NAME	Genus & species ¹
Tumblegrass	<i>Schedonnardus paniculatus</i>
Galleta	<i>Hilaria jamesii</i>
Curlycup gumweed	<i>Grindelia squarosa</i>
Bigelow's aster	<i>Aster bigelovii</i>
Scarlet globemallow	<i>Sphaeralcea coccinea</i>
Milkweed	<i>Aesclepias sp.</i>
Winterfat	<i>Ceratoides lanata</i>
Yellow snakeweed	<i>Gutierrezia sarothrae</i>

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.

The entire site was surveyed for erosion features. During a walkover of the mine site, slopes and areas of water concentration (ponds, diversions and areas where disturbed areas enter undisturbed lands) were evaluated for erosion. Most of the site appeared to be stable with little potential for development of erosion features. Disturbed portions of the section were graded and slopes were configured to minimize soil. This site, however, is largely flat with small, irregular undulations. The entire reclaimed area ties in well with the surrounding undisturbed landscape. Contoured slopes of the wasterock dumps have been designed, constructed and topsoiled. The south edge of the first (closest to highway 509) of two wasterock piles has some wind erosion damage. This area was regraded to reduce the slope and was re-topsoiled with alluvial soils from a local borrow area. The above mentioned disturbance will need to be reseeded in the fall of 1995 (see maintenance item #1). Sufficient topsoil for the establishment of vegetation has been borrowed and redistributed over the entire reclaimed area. A series of random and systematic sampling was conducted to identify the soil depth and the potential for any rooting or establishment problems. Random sampling of soil depth was done by digging soil pits approximately 18" deep to determine the depth of topsoil material acquired from a borrow site and distributed on the reclaimed site. Average topsoil depth was approximately 12 inches.

There are no perennial or intermittent streams near the site. All surface runoff drains to ephemeral drainages near the reclaimed site. Although the mine was situated in a geological strata that contained water, there should be no adverse effects to the hydrologic stability of the site. Concerns about surfacewater quality have been addressed by topsoiling, seeding and mulching the reclaimed shaft, stockpile and waste areas. With the exception of the retopsoiled area as discussed above, all of these areas are well covered with vegetation (Table 9), have achieved stability, and are configured to minimize erosion.

Table 9. Summary of Relative Cover Data at Homestake's Section 25 Mine.

Transect #1	Value (%)
Perennial Cover:	12
Litter Cover	29
Rock Cover	0
Bare Ground	59
Number of perennial species present in belt transect	9
Transect #2	Value (%)
Perennial Cover:	12
Litter Cover	41
Rock Cover	0
Bare Ground	47
Number of perennial species present in belt transect	7
Transect #3	Value (%)
Perennial Cover:	18
Litter Cover	18
Rock Cover	0
Bare Ground	65
Number of perennial species present in belt transect	7

Maintenance Item(s):

1. Reseed south portion of regraded and re-topsoiled wasterock pile (No. 1) no later than October 31, 1995. Please provide to the Director of the MMD, photographs and a description of work performed onsite, no later than November 15, 1995.

Photographs of Homestake's Section 25 Mine

No photographs were taken at this site.

Section 32, T 14N R10W

The Section 32 Mine prior reclamation site is located in the Ambrosia Lake valley, approximately 22 miles northwest of the City of Grants, New Mexico. The actual mine site consists of only 60 acres where the head frame existed -- the remaining mine workings were underground. Homestake, however, has asked for release of the entire mine site from further requirements of the Act (Craft, 1995). The owner of the surface estate and mineral rights is the State of New Mexico. Homestake operated and reclaimed the mine under a lease agreement with the State of New Mexico. The New Mexico Land Commission has officially terminated HMC's lease pending approval of reclamation by the Mining and Minerals Division (HMC, 1994).

Homestake-Sapin Partners began operation of the HMC Section 32 Mine November 1961. In 1968 this partnership became United Nuclear-Homestake partners. This partnership was, in turn, dissolved February 1981 and Homestake Mining Company-Grants (later renamed Homestake Mining Company of California) became the operator in February 1981. The mine was in operation from 1958 to 1979. The mine was wet and water was pumped from the mine into ponds (Craft, 1995). There are no surface water features in the section. Surface drainage is to an unnamed tributary of Arroyo del Puerto that, in turn, drains into San Mateo Creek. Structures which existed at the Section 32 Mine when it was in operation include an access road, vertical shaft, ventilation borehole, hoist house, office and change room building and a dewatering pond. Reclamation activities took place in August 1991 by independent contractors (HMC, 1994). Since then the site has been grazed as required by a lease agreement with the State of New Mexico (Craft, 1995).

This site was inspected for stability and the presence of permanent vegetation (Table 10). Although grazing has had a significant impact on the vegetation (Table 11) at this mine, the reclaimed areas are sufficiently stable with adequate vegetative cover.

Table 10. List of Species at Homestake's Section 32 Mine

COMMON NAME	<i>Genus and species¹</i>
Alkali sacaton	<i>Sporobolus airoides</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>
Western wheatgrass	<i>Agropyron smithii</i>
Blue grama	<i>Bouteloua gracilis</i>
Galleta	<i>Hilaria jamesii</i>
Scarlet globemallow	<i>Sphaeralcea coccinea</i>
Ragweed	<i>Kochia scoparium</i>
Snakeweed	<i>Gutierrezia sarothrae</i>

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 Homestake's Section 32 Mine

Transect #1	Value (%)
Perennial Cover:	12
Litter Cover	41
Rock Cover	0
Bare Ground	41
Number of perennial species present in belt transect	6
Transect #2	Value (%)
Perennial Cover:	0
Litter Cover	47
Rock Cover	0
Bare Ground	53
Number of perennial species present in belt transect	5

Maintenance Item(s):

None.

Photographs of Homestake's Section 32 Mine

The photographs on the following pages are panoramic views of the Section 32 Mine.

Summary and Conclusions

Based on the inspection of these sites, review of inspection information with Mining and Minerals Division staff and MMD's resources to conduct these inspections, staff recommends that the Section 15, Section 17, Section 25, and Section 32 mine sites operated by Homestake Mining Company (Homestake) be released from further requirements of the New Mexico Mining Act. These sites have perennial vegetation that is clearly becoming established. It is staff's conclusion that these sites meet the environmental conditions that allow for the reestablishment of a 'self-sustaining ecosystem' as defined in Rule 1 and put forth in Rule 5.7A of the New Mexico Mining Act.

Based on the outcome of these inspections, staff does not recommend the release of the Section 23 site. The vegetation at this site was too sparse to provide adequate information needed in making the determination that the site has been reclaimed to a condition that allows for a self-sustaining ecosystem. Staff recommends waiting to make this determination until the plant community onsite has become better established.

Literature Cited

- Bonham, C. D. 1989. *Measurement of Terrestrial Vegetation*. Wiley-Interscience. 338 pp.
- Craft, Fred. 1995. Resident Manager, Homestake Mining Company, Personal Communication
- DeAguero, Joseph C. 1995. Reclamation Specialist, Mining and Minerals Division, Field Notes
- Homestake Mining Company (HMC) 1994. Reclamation Reports, Section 13 Mine, Section 15 Mine, Section 23 Mine, Section 25 Mine, Section 32 Mine.
- Kelly, V. C. 1963. *Geology and Technology of the Grants Uranium Region*, Memoir 15, New Mexico Bureau of Mines and Minerals Resources, Socorro, New Mexico.
- 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.

Appendix A

Stratigraphy of the Ambrosia Lake District (Kelly 1963).

Appendix B

Reclamation Seed Mixture (HMC, 1994)

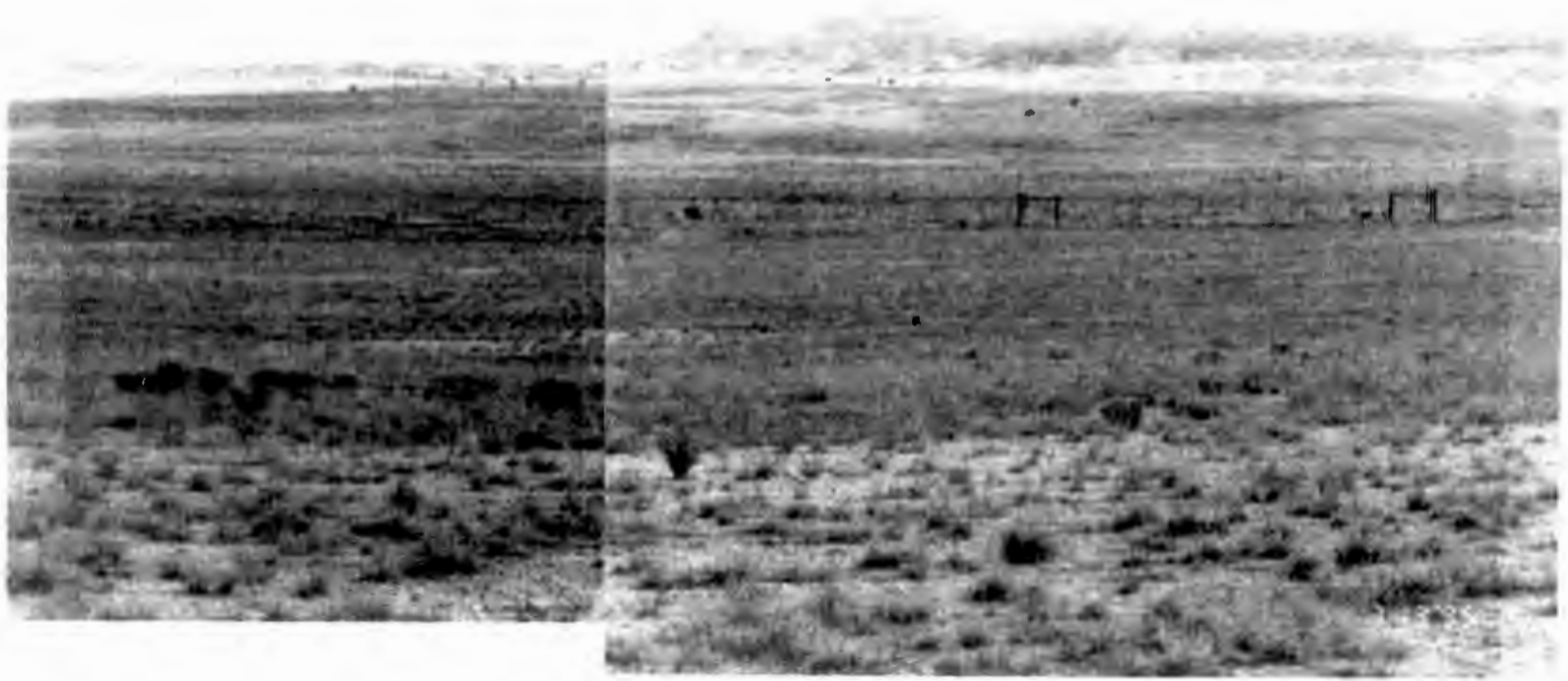
Common Name	Variety	Pounds Pure Live Seed per Acre
Western Wheatgrass	Arribu	3.2
Blue Grama	Lovington	0.5
Sand Dropseed		1.0
Galleta	Caryopsis	0.5
Galleta	Florets	1.2
Alkali Sacaton	Salado	1.5
	Total	7.9



*Section 13, T14N, R10W
From middle of site looking southwest*



*Section 13, T14N, R10W
from south side of site looking west*



*Section 13, T14N, R10W
From middle of site looking northeast*



Homestake Section 15 T14N R10W



Homestake Section 15 T14N R10W

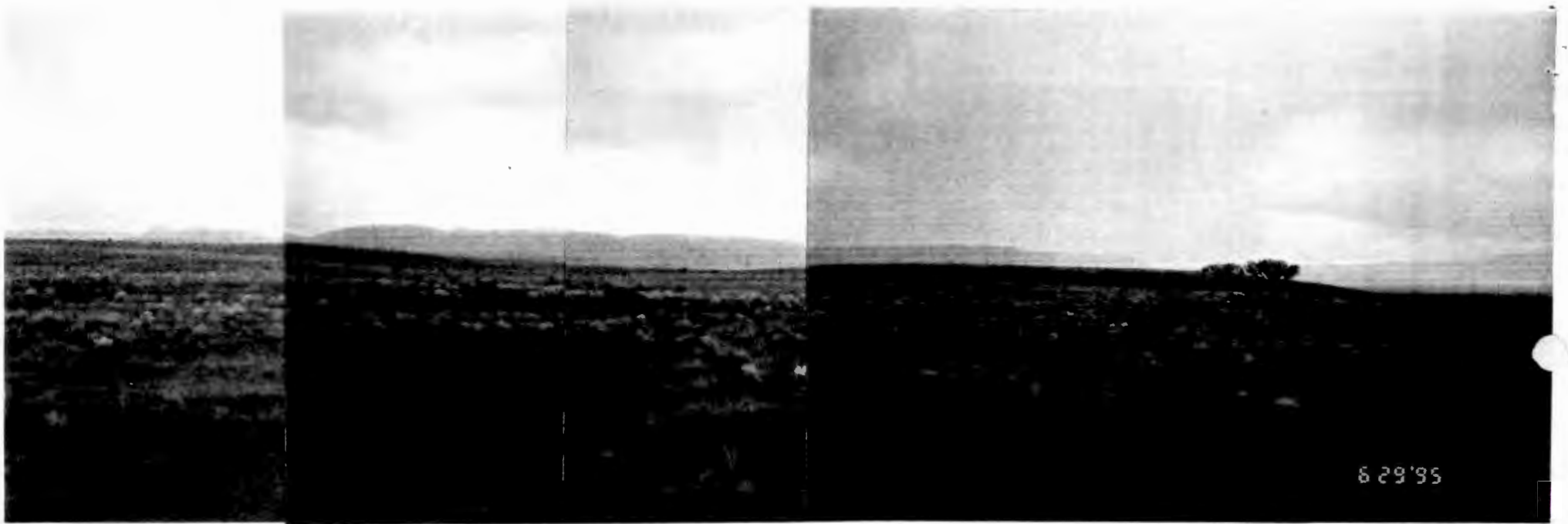


Homestake Section 15 T14N R10W

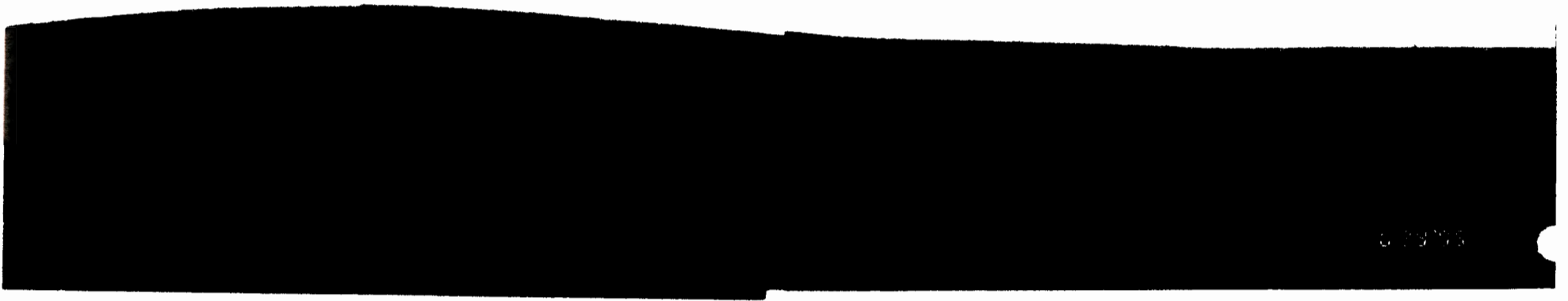


Homestake Section 15 T14N R10W





Homestake's Section 23 Mine (T 14N, R 10W).
Panoramic view. June 28, 1995.
Joe DeAguero Photographer



6-29-76

*Homestake Section 23 Mine (T14N, R10W)
From east side of site looking west*



*Section 32, T14N, R10W
From middle of site facing southeast*



*Section 32, T14N, R10W
From east side of site facing west*



Section 32, T14N, R10W

From north side of site facing northwest

(From left to right - Robert Young, Tacy Harling, Fred Craft)

Section B Dry Mine

20 Acres - 1992 Reclamation

Area is Fenced off to grazing

Waste Rock Pile top soil depth

1) 14" 2) 7.5" 3) 7" 4) 8" 5) 5"

Agam, N. Ja, SPAI, GUSA, Boyer

Photos

① Low grade stock pile area
after Reclaim

② Waste Rock Material

③^④ Borrow area Panoramic

Gas (natural) pipeline along Eastern
edge near road - Fence - pipe
approx 20' length - 9 pipes 3"
dia 6" Trench - GAS Co Pipe

#1

cover 2/17

litter 9/17

#2 cover 4/17

litter 2/17

#3 cover 4/17

litter 8/17

Transsect 1	Plot	Transsect # 2	Plot
1	Bare	Bare	BOGR
2	Litt	Litt	SPAI
3	Litt	Bare	HIJA
4	Bare	SPAI	KOSII
5	Spar	Bare	GUSK
6	Kosia	Litt	
7	Bare	Bare	
8	Bare	Bare	
9	Bare	HIJA	
10	Litt	Bare	
11	Litt	Bare	
12	Litt	Bare	
13	Litt	SPAI	
14	Litt	SPAI	
15	Litt	Bare	
16	Bare	Bare	
17	Litt	Bare	

MK005PR
SECTION 15
MINE

RECLAMATION REPORT
SECTION 15 MINE
HOMESTAKE MINING COMPANY OF CALIFORNIA

SUBMITTED TO

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

AUGUST 29, 1994

COMPILED BY
AK GeoConsult, Inc.

REPORT OF RECLAMATION OF AN EXISTING MINE PRIOR TO JUNE 18, 1994
HOMESTAKE MINING COMPANY OF CALIFORNIA
SECTION 15 MINE

1.0 INTRODUCTION

Homestake Mining Company of California (HMC) submits the following information on the closure of their Section 15 mine located in McKinley County, New Mexico (Figure 1). This information is provided to comply with Section 69-36-1B(3) of the New Mexico Mining Act and Section 5.10 of the new New Mexico Mining Rules and Regulations. The Section 15 mine is considered an "Existing Mining Operation" because it produced marketable minerals (uranium) for a total of at least two years between January 1, 1970 and the effective date of the act.

HMC Section 15 mine is located in the Ambrosia Lake valley in T14N, R10W as shown on Figure 1. The owner of the surface estate is Mr. Jerry Elkins. The owner of the mineral rights is Cerrillos Land Company (Santa Fe Pacific Railroad). The mine was in operation from 1958 to 1981.

1.1 History of Operation

The HMC Section 15 mine went into operation in February 1958 by Homestake-Sapin Partners under a lease from Santa Fe Pacific Railroad. In 1968 Homestake Sapin Partners became the United Nuclear-Homestake Partners. This partnership was subsequently dissolved in February 1981 and the operator became Homestake Mining Company - Grants, later renamed Homestake Mining Company of California.

1.2 Mine Site Description

1.2.1 Climatology

The climate is typical of High Sonoran Desert areas with average precipitation of about 9 to 10 inches at elevations of less than 6000 feet to more than 12 inches at elevations above 7000 feet. Annual air temperature range is about 54 degrees F at lower elevations and about 47 degrees F at higher elevations and the average frost-free period is 115 to 145 days. The prevailing wind is from the southwest. The rainy season is in the summer. About half of the annual precipitation falls during the period July through September, mostly during brief thunder storms (SCS, 1993).

1.2.2 Ecology

The soil and vegetation in and surrounding Section 15 were mapped and classified by the local Soil Conservation Service (SCS, 1994). Three basic soil complexes are within the site and surrounding areas. These are:

- A. Penistaja - Tintero complex, 1 to 10 percent slopes
- B. Sparank-San Mateo - Zia complex, 0 to 5 percent slopes
- C. Hagerman - Bond fine sandy loams, 1 to 8 percent slopes

These soil complexes are found at elevations of 6200-7100 feet on dip slopes of cuestras, fan terraces, valley sides, flood plains and drainage ways. The vegetation communities consist mainly of blue grama, western wheatgrass, sand dropseed and alkali sacaton, bottlebrush squirreltail, fourwing saltbush and indian ricegrass. The soil and vegetation types are favorable for livestock grazing and wildlife habitat (SCS, 1994). The wildlife in the area is limited to species of small mammals and bird species typical of grassland/desert shrub communities.

1.2.3 Geology

Section 15 is located in the Ambrosia Lake District of northwestern New Mexico. This district occupies a portion of the southern limb of the San Juan Basin, called the Chaco Slope (Figure 2), and is bordered on the south by the Zuni uplift and on the east by the Mt. Taylor Volcanic Plateau.

The stratigraphic unit underlying Section 15 is shown on Figure 3 (Kelley, 1963). This shows the Cretaceous system of Mancos shale and Dakota sandstone overlying the Jurassic System of the Morrison Formation. Uranium ore is found in the A through D sandstone units of the Westwater Canyon member of the Morrison Formation.

Two distinctly different types of ore occur in Section 15. These are the coffinite and uraninite minerals of which coffinite represents 99 percent of the ore. The primary ore bodies consist of uraniferous blankets of humic organic matter which fills the intergranular space in the host rock. The blanket occurs along several trends, like beads on a string.

1.2.4 Topography

The topography in Section 15 consists of very gentle slopes of about 0.5 to 5.0 percent. These gentle slopes have not been altered significantly by recontouring or borrow soil removal for reclamation purposes. The reclaimed waste pile recontouring, borrow excavation, and fill placement have left the site with topography very similar to the original surface.

1.2.5 Hydrology

There are no perennial or intermittent streams in the mine area. All surface runoff drains to ephemeral water courses. Drainage in the area flows southeast to the San Mateo Drainage.

2.0 MINING OPERATION DESCRIPTION

The Section 15 mine was a typical underground mine (Figure 4) which used the modified room and pillar method to recover the primary and redistributed ore. The mine began operation in 1958 and stopped in 1981 due to the declining uranium market. In addition to the modified room and pillar method it was common to blast an opening in the lower part of the ore body which left it unsupported. When the ore fell to the bottom of the opening or stope it was removed by the miner using a machine called a slusher. This ore then was transferred by truck to the main shaft for transport to the surface.

Originally, ore was removed through a vertical shaft. This shaft was later replaced by a decline (Figure 5). The shaft was backfilled and the decline was later reclaimed by removing the corrugated liner from ground surface to 75 feet linear depth and backfilling with waste rock and soil.

To support the underground mining operation, several support facilities were constructed on the surface. These included the hoist, headframe, administrative building, parking lot and various other small facilities. A layout of these facilities is shown on Figure 5. All these support facilities were removed during reclamation as discussed in Section 3.0.

3.0 RECLAMATION

HMC reclamation of Section 15 consisted of three phases conducted by independent contractors which included:

1. Removal of buildings, headframes, equipment; shaft, decline, and borehole sealing; and pond closure.
2. Earthwork for site and waste pile recontouring.
3. Revegetation.

3.1 Reclamation Procedures

Reclamation procedures began in August 1991 and included:

1. removal of office, shop, explosive storage building, pumphouse and change room buildings
2. vertical shaft and decline sealing
3. borehole sealing
4. scrap/trash removal

Some of the reclamation activities are shown in photos 15A-15F.

All buildings were removed down to the concrete foundations. All building material and equipment was buried on site, removed from the site for disposal in approved land fill, or salvaged by the contractor. Any trash on the site was also buried or removed.

Boreholes were backfilled to within five (5) feet of the surface and the casing was cut off 4-8 feet below original ground surface. Each borehole has a 2.0 foot thick, reinforced concrete cap (Figure 6). The vertical shaft was backfilled to within two (2) feet of the surface and capped with a reinforced concrete cap as shown in Figure 7. The decline was sealed by removing 75 feet of corrugated metal liner and backfilling to ground surface with compacted soil and waste rock. Fill compaction was tested. The surface area around the decline was graded to reestablish contours close to the original surface configuration.

The piping and valves of the ponds were removed and either disposed of on site or salvaged. The containment berms were pushed into the pond to fill the basin, and the fill surface was graded to create a smooth surface.

This work was completed in approximately four weeks after start-up.

The earthwork phase for the reconfiguration and cover of the waste piles began in May 1992. This work consisted of waste pile reshaping, placement of top soil from borrow area and recontouring for natural drainage. The cut and fill areas are shown on Figure 8. This work was completed in June 1992.

The third and final phase of reclamation was reseeding 30 acres in the disturbed area of the site. This began in late June 1992 and was completed the early part of July 1992. The area was reseeded using a drill seeder and mulched at 1000 pounds per acre with the mulch crimped into the soil. The seed mixture used is shown on Table 1. The reseeded area was fenced to prevent livestock entry and enhance the reclamation process. The post-reclamation conditions of the site are shown in photographs 15G-15J taken in June 1994. Additional color slides showing the reclamation procedures are available for the Division's review at HMC's Grants office.

The reclamation procedures described above have removed or sealed mine-related features that might pose hazards to the public health and safety. Plugging of the shaft, decline, and boreholes was successful, and in the time period since sealing there is no evidence of any subsidence. There are no known environmental impacts associated with ground or surface water from the reclamation procedures. The reseeding has established a vegetation cover that appears to be similar to that on surrounding undisturbed ground. The anticipated post-mining land use is grazing and wildlife habitat.

There are no other permits, licenses, or other regulatory requirements that affect this mine site.

HMC will continue to monitor the revegetation success until release by the MMD Director as outlined in Section 5.10 of the Rules.

3.2 Achievement of Reclamation Requirements

Through the procedures described above, HMC has achieved the reclamation requirements as outlined in Section 69-36-11B(3) of the New Mexico Act. In accordance with the provisions of 5.10, Prior Reclamation, of the Rules, HMC is requesting an inspection of the reclaimed area by the Division.

REFERENCES

Kelley, V.C., 1963; "Geology and Technology of the Grants Uranium Region", Memoir 15, New Mexico
Bureau of Mines and Mineral Resources

Soil Conservation Service, 1993; "Soil Survey, McKinley County, New Mexico", Grants, New Mexico

Soil Conservation Service, 1994; oral communication with W.E.Jenkins

TABLE 1
RECLAMATION SEED MIXTURE

Common Name	Variety	Pounds Pure Live Seed/Acre
Western Wheatgrass	Arribu	3.2
Blue Grama	Lovington	0.5
Sand Dropseed		1.0
Galleta	Caryopsis	0.5
Galleta	Florets	1.2
Alkali Sacaton	Salado	1.5
	Total	7.9

Seed obtained from Curtis & Curtis, Clovis, New Mexico.

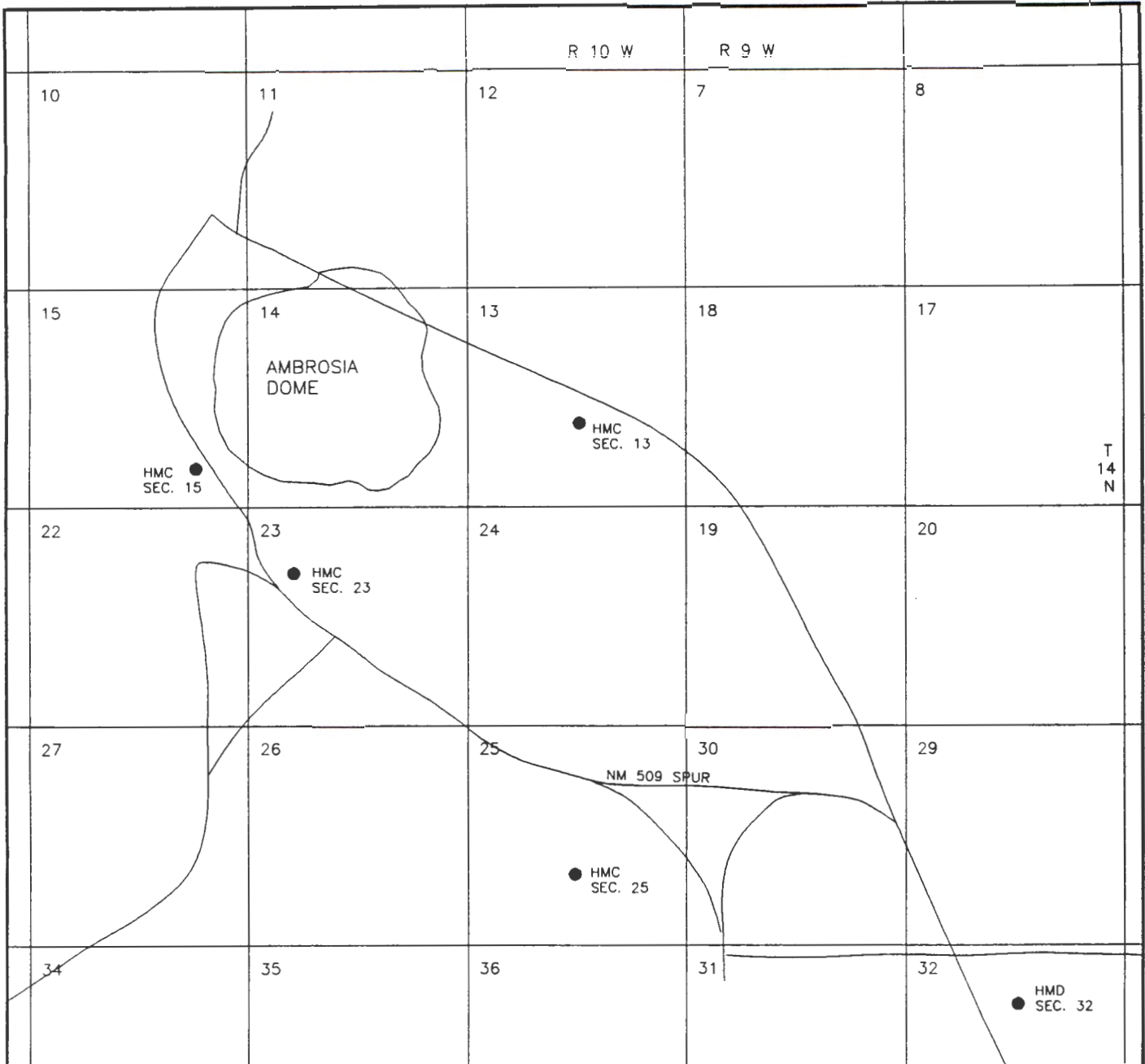
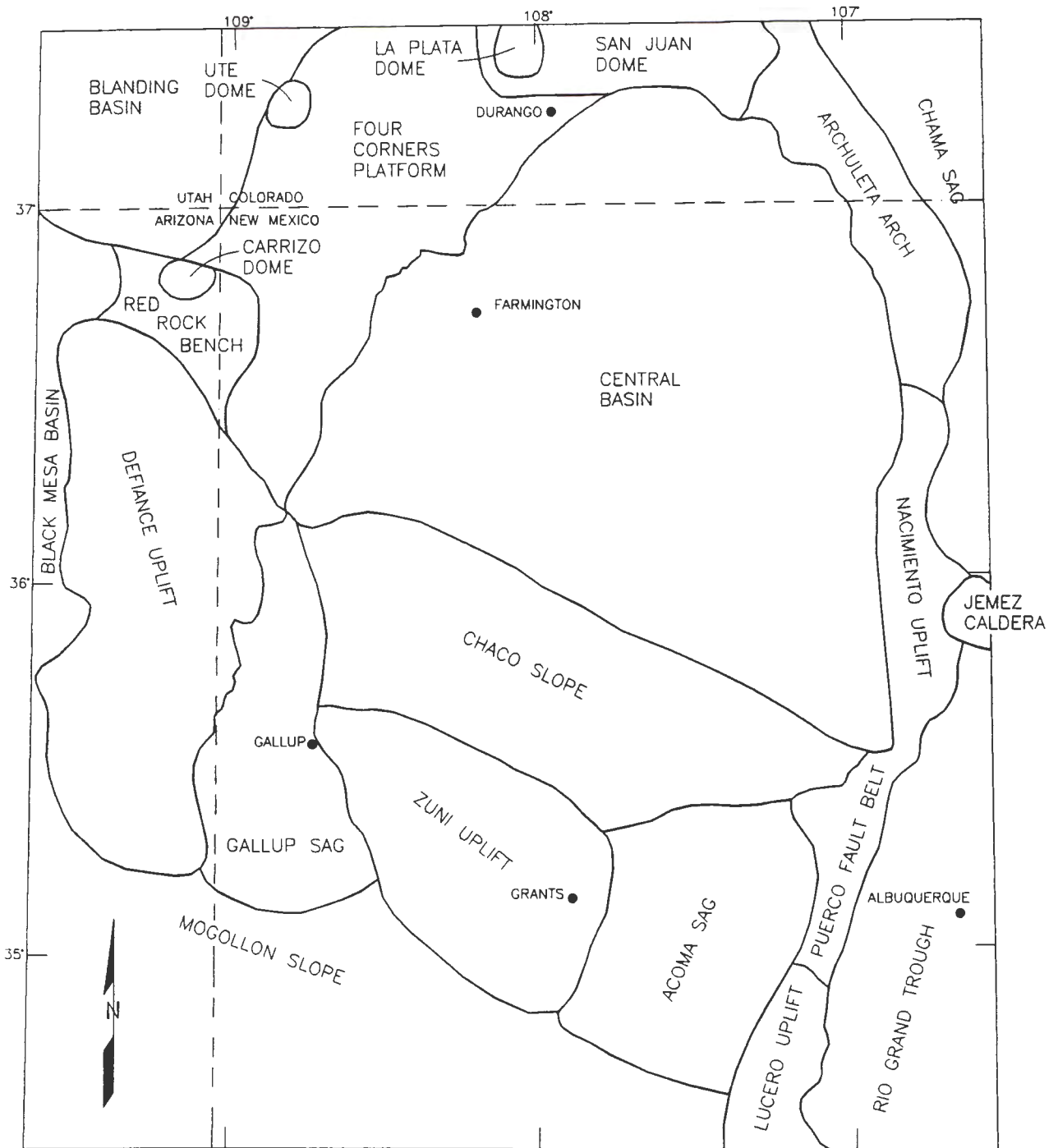


FIGURE 1

SITE MAP

HOMESTAKE MINING COMPANY
OF CALIFORNIA
GRANTS PROJECT



(from Kelly, et al, 1963)



FIGURE 2
TECTONIC MAP OF
SAN JUAN BASIN
AND ADJACENT AREAS
HOMESTAKE MINING COMPANY
OF CALIFORNIA
GRANTS PROJECT

SYSTEM	STRATIGRAPHIC UNIT	
CRETACEOUS	MANCOS SHALE	
	DAKOTA SANDSTONE	
JURASSIC	MORRISON FORMATION	BRUSHY BASIN MEMBER
		WESTWATER CANYON MEMBER
	"K" SHALE	
	"B" SANDSTONE	
	"K ₁ " SHALE	
	"C" SANDSTONE	
	"K ₂ " SHALE	
	"D" SANDSTONE	
	RECAPTURE MEMBER	

FIGURE 3
 DIVISIONS OF
 WESTWATER CANYON MEMBER
 HOMESTAKE MINING COMPANY
 OF CALIFORNIA
 GRANTS PROJECT

(from Kelly, et al, 1963)

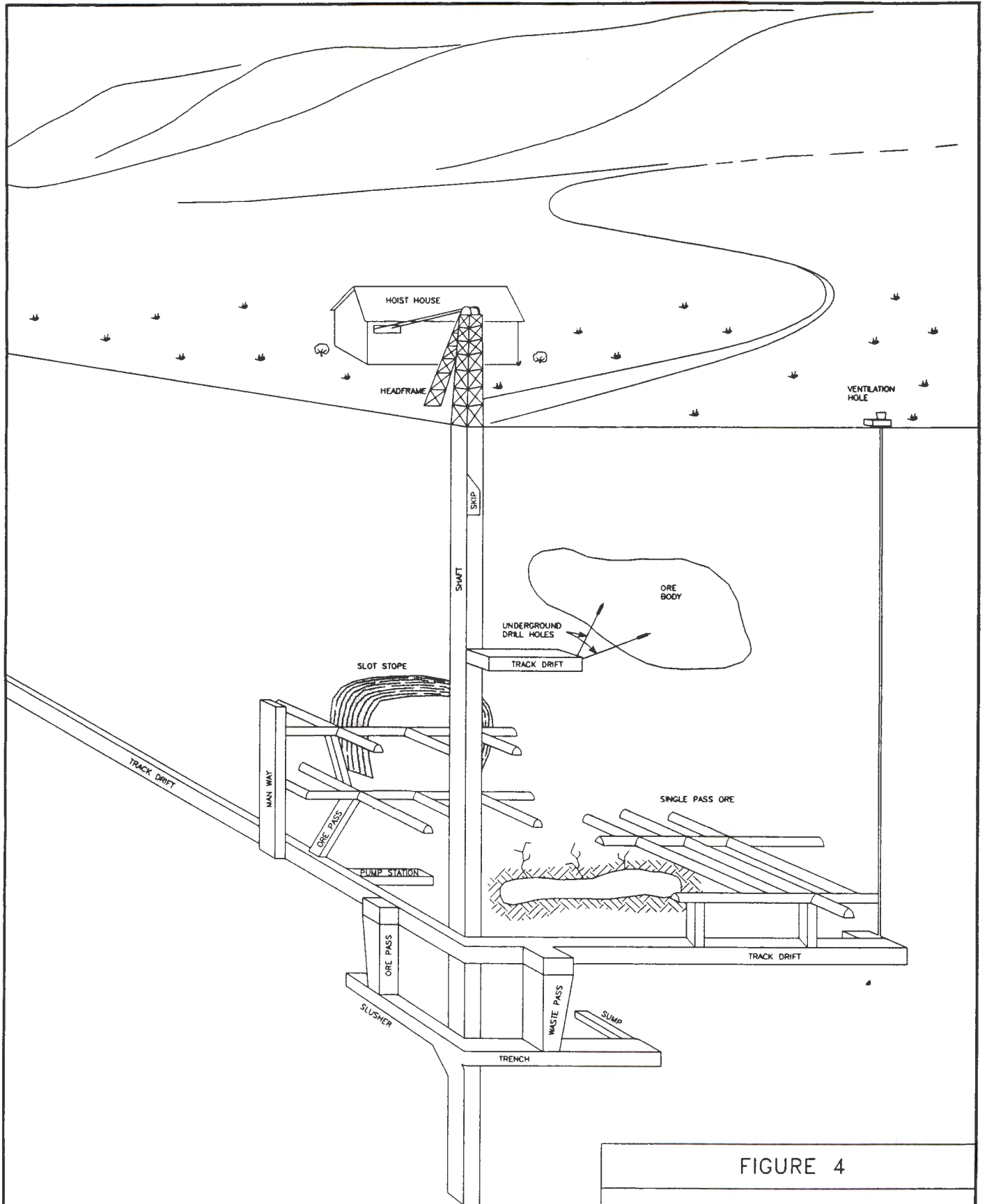
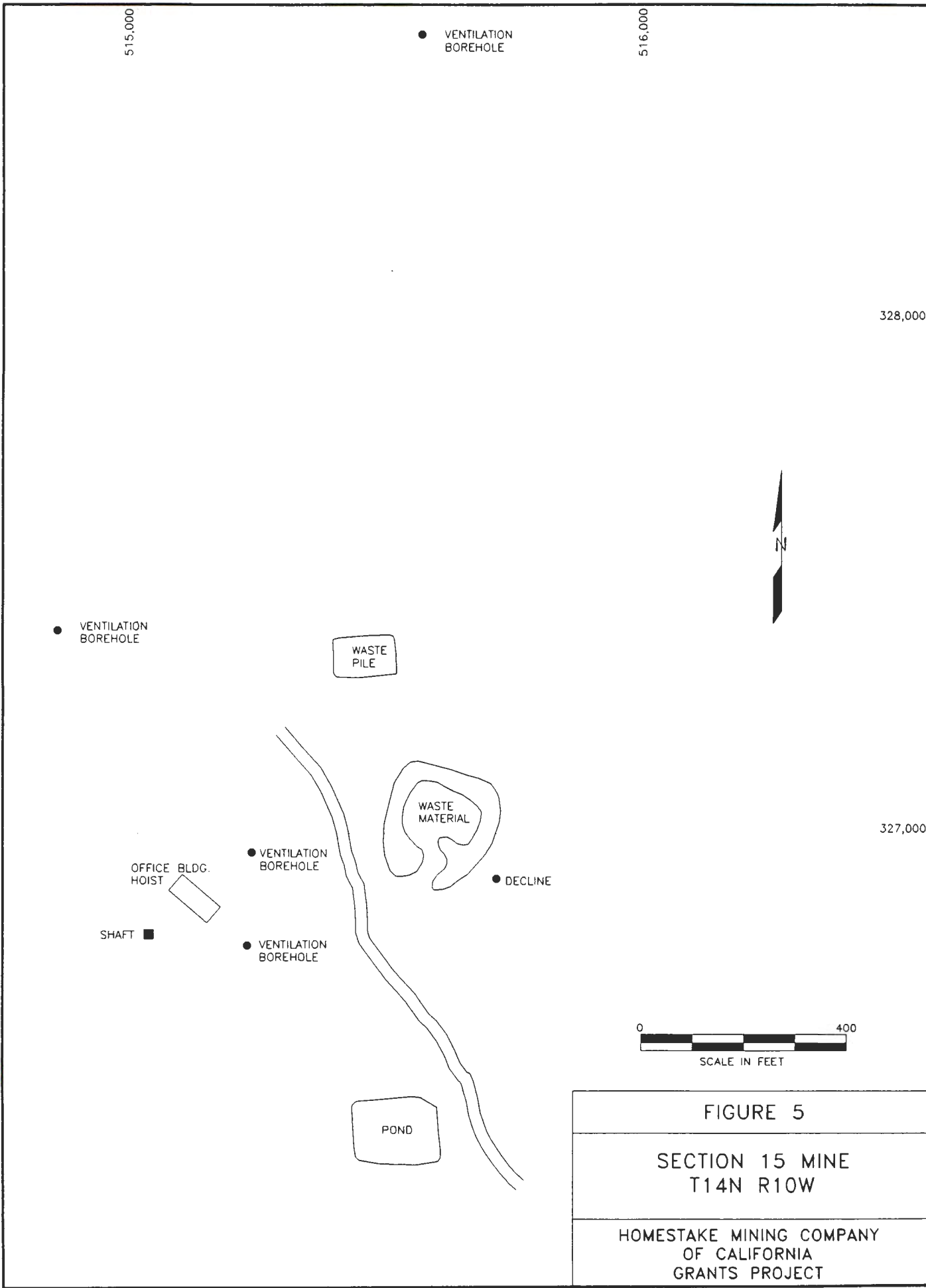


FIGURE 4

SCHEMATIC DIAGRAM
OF A MINE

HOMESTAKE MINING COMPANY
OF CALIFORNIA
GRANTS PROJECT



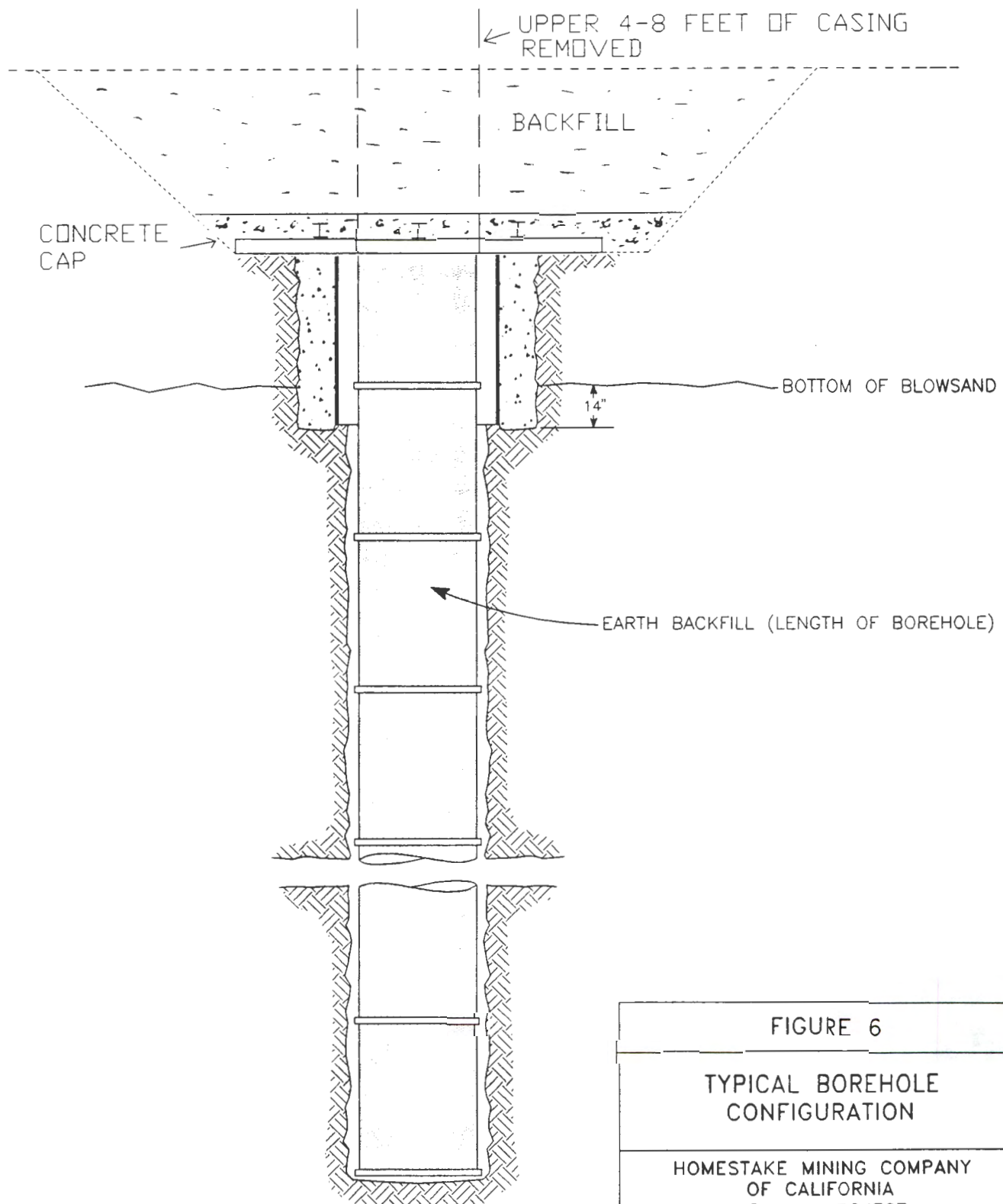


FIGURE 6

TYPICAL BOREHOLE
CONFIGURATION

HOMESTAKE MINING COMPANY
OF CALIFORNIA
GRANTS PROJECT

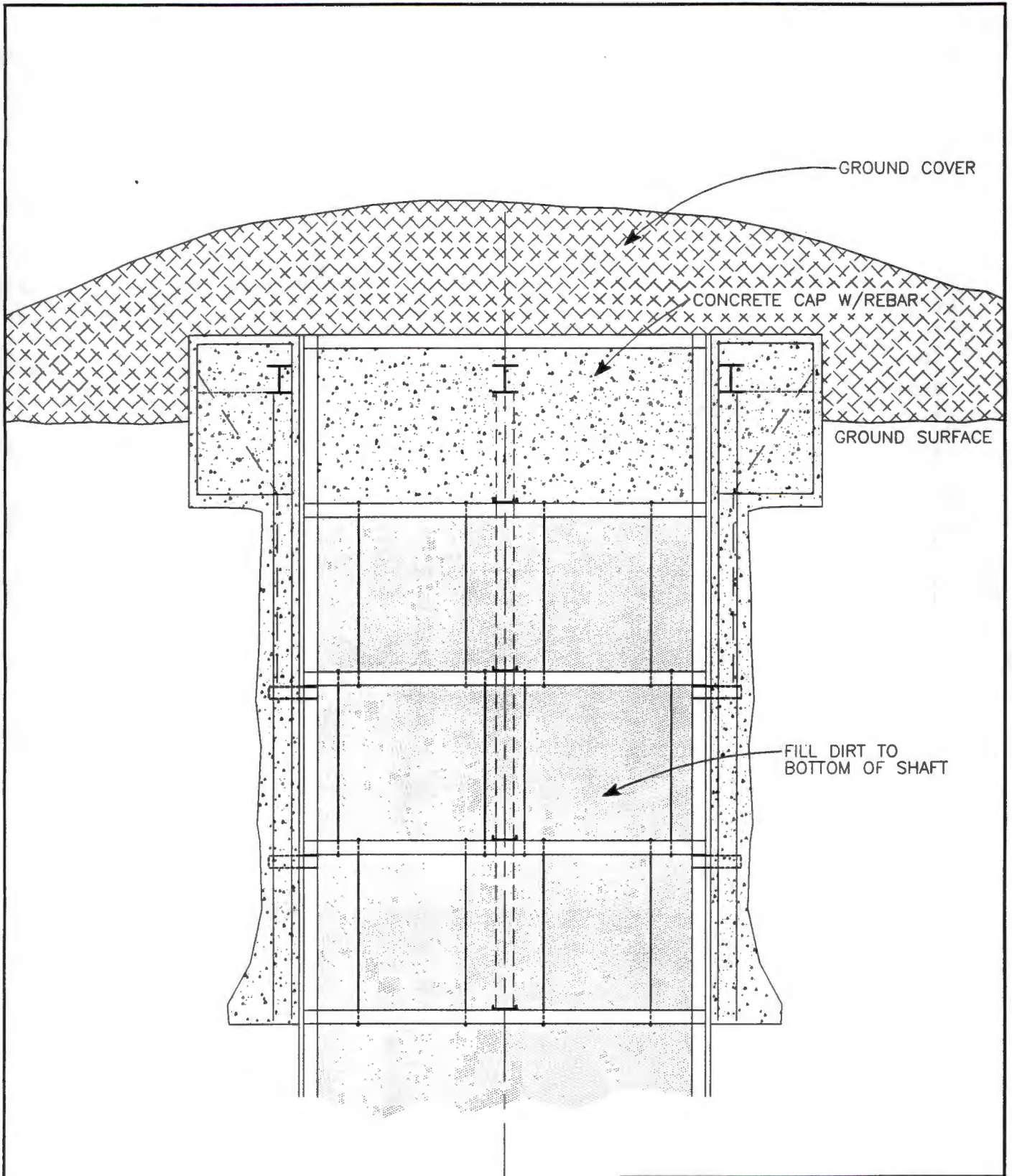


FIGURE 7
TYPICAL SHAFT CONFIGURATION
HOMESTAKE MINING COMPANY OF CALIFORNIA GRANTS PROJECT

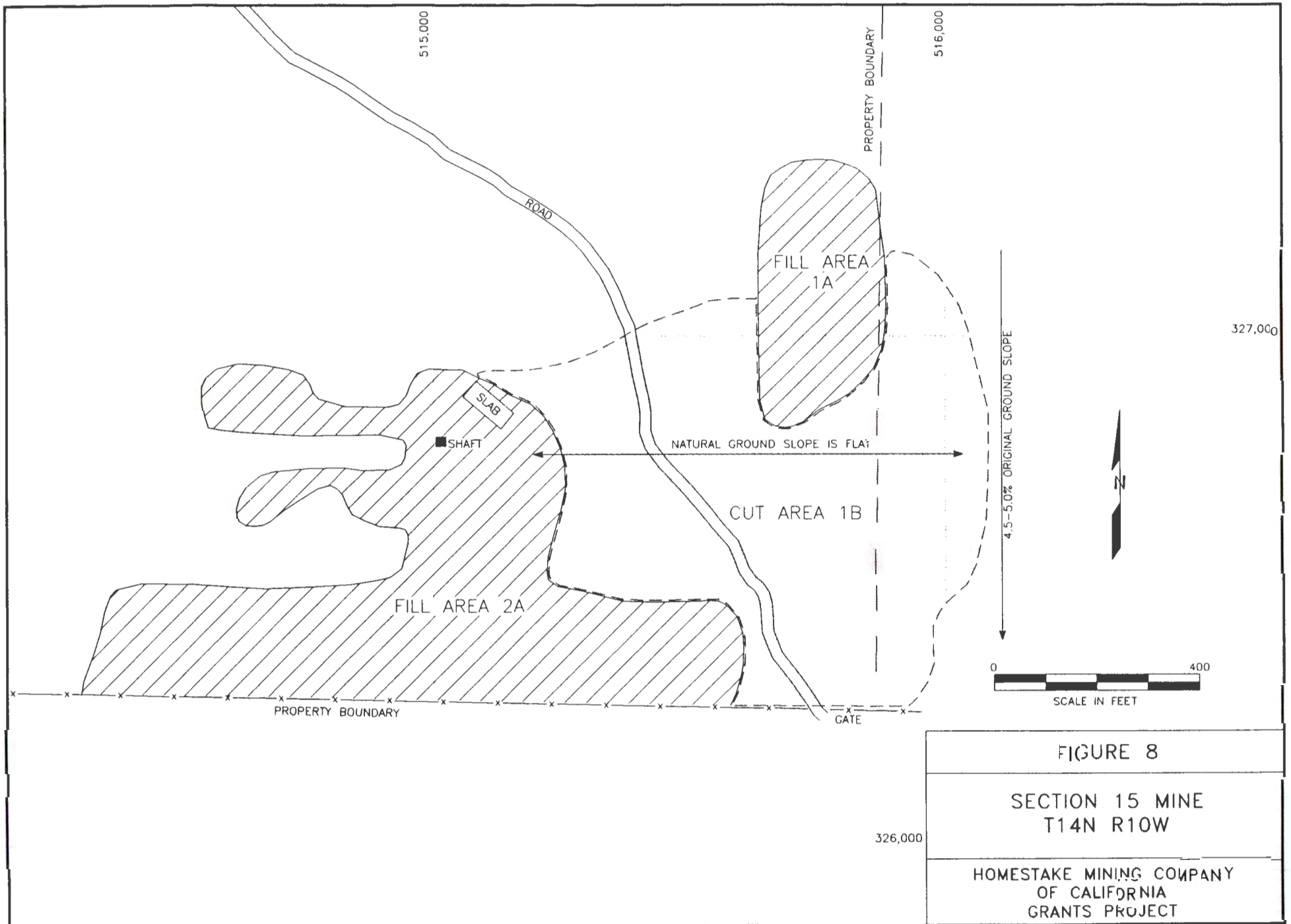


FIGURE 8

SECTION 15 MINE
T14N R10W

HOMESTAKE MINING COMPANY
OF CALIFORNIA
GRANTS PROJECT

PHOTO LOG - SECTION 15 MINE RECLAMATION

- 15A: Recontouring of waste pile.
- 15B: Backfilling of decline access below ground surface.
- 15C: Excavated ventilation borehole before removing exposed collar and plugging.
- 15D: Mine shaft cap showing reinforcement prior to placement of concrete.
- 15E: Mine shaft cap with concrete poured.
- 15F: Placement of cover soil over mine area.
- 15G: East portion of mine site after recontouring and revegetation.
- 15H: View across reclaimed mine site toward the covered waste pile (center background of picture).
- 15I: Reclaimed and revegetated storage pad and ore pad area.
- 15J: View of entire mine site after reclamation.



PHOTO 15A



PHOTO 15B



PHOTO 15C



PHOTO 15D



PHOTO 15E



PHOTO 15F



PHOTO 15G



PHOTO 15H



PHOTO 15I



PHOTO 15J