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40-8905

**QUIVIRA MINING COMPANY**

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December 16, 1992

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Mr. Ramon Hall, Director  
Uranium Recovery Field Office  
U.S. Nuclear Regulatory Agency  
P.O. Box 25325  
Denver, CO 80225

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Re: Supplemental Report, Groundwater Corrective Action Plan  
Ambrosia Lake Facility  
License SUA-1473, Docket No. 40-8905

Dear Mr. Hall:

Please find attached a supplemental Corrective Action Plan (CAP) report for the original CAP annual report submitted on August 1, 1992 for above referenced facility. As stated within the August 1, 1992 CAP submittal, this supplemental report contains the revised areal plume plots for those hazardous constituents which contained questionable analytical data at the time of the August 1, 1992 submittal.

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

Regards,

QUIVIRA MINING COMPANY

*Peter Luthiger*

Peter Luthiger  
Sr. Environmental Engineer

9302180223 921216  
PDR ADOCK 04008905  
C PDR

Attachments: As Stated

xc: B. Ferdinand (RAMC)  
A. Gebeau (QMC)  
R. Ohrbom (NMED)  
file

170041

DESIGNATED  
Certified By *Mary C. Hood*

93-0131

**QUIVIRA MINING COMPANY**  
**AMBROSIA LAKE FACILITY**

**CORRECTIVE ACTION PROGRAM**  
**ANNUAL REPORT - 1991**  
**(SUPPLEMENTAL)**

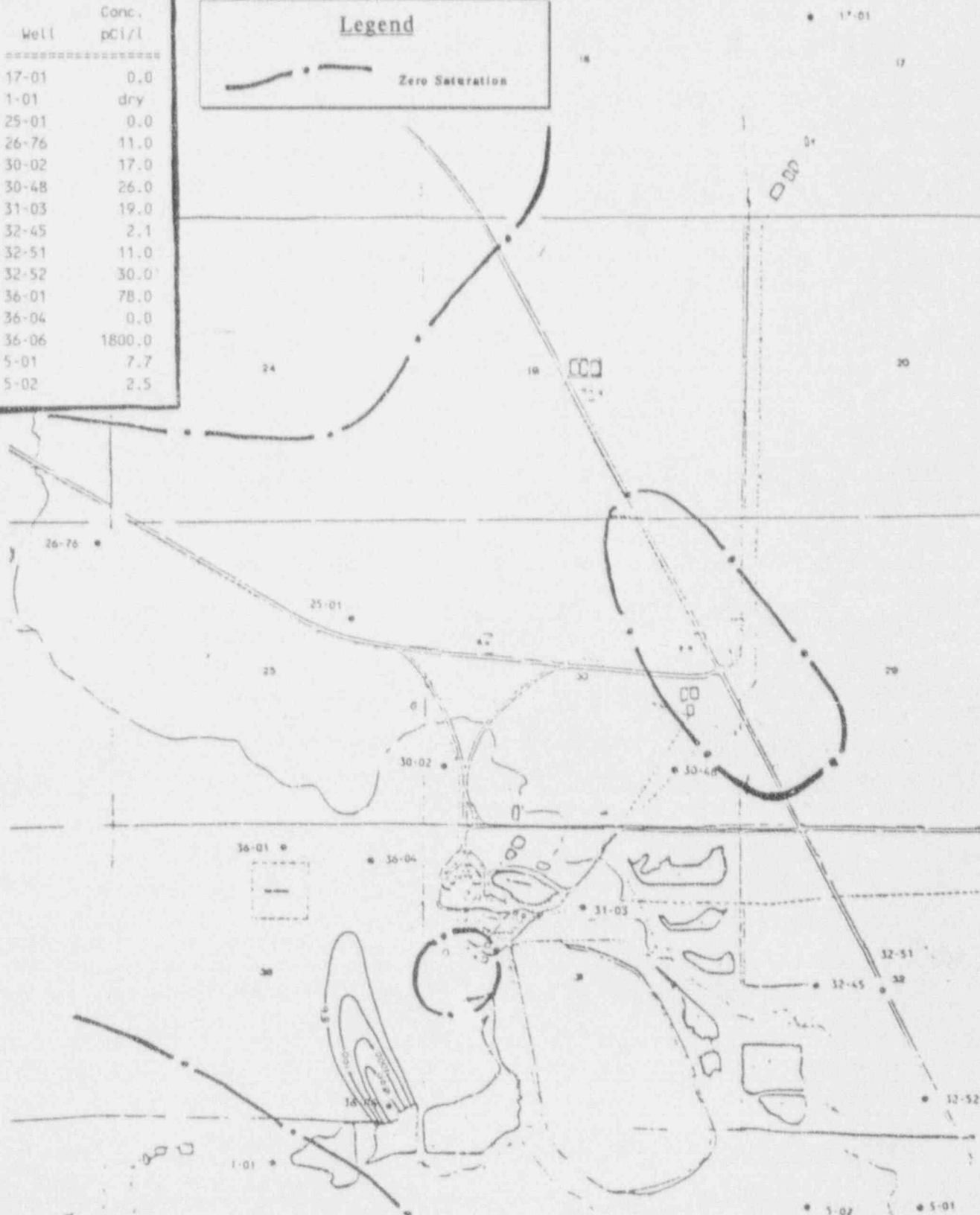
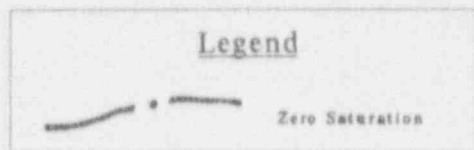
REVISED AREAL PLUME PLOTS

DAKOTA

# Gross Alpha

1992 Concentration Isopleth  
Groundwater Standard - 56.0 pCi/l

Well	Conc. pCi/l
17-01	0.0
1-01	dry
25-01	0.0
26-76	11.0
30-02	17.0
30-48	26.0
31-03	19.0
32-45	2.1
32-51	11.0
32-52	30.0
36-01	78.0
36-04	0.0
36-06	1800.0
5-01	7.7
5-02	2.5

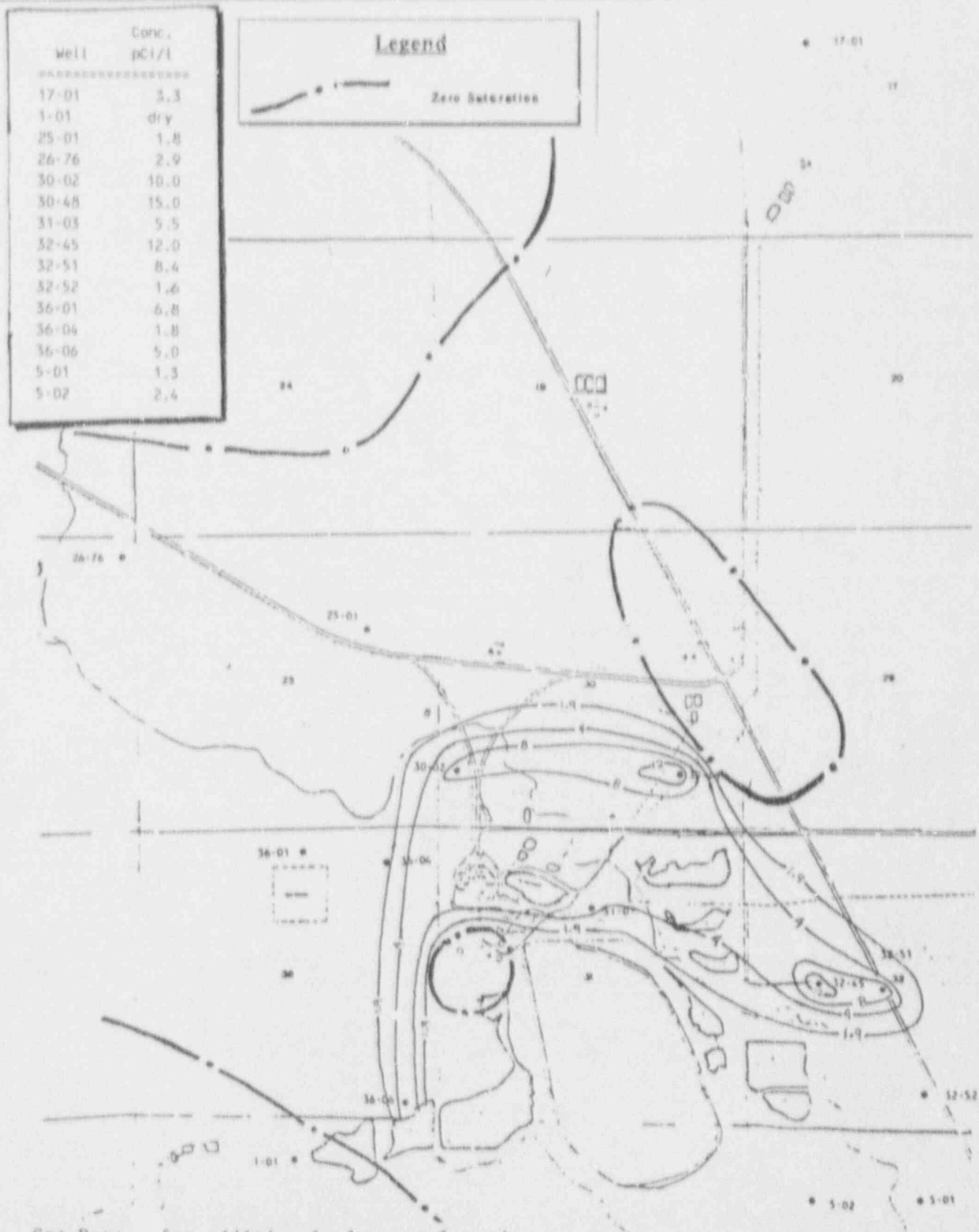


See Page '7 for additional plume explanation.

# Lead - 210

## 1992 Concentration Isopleth

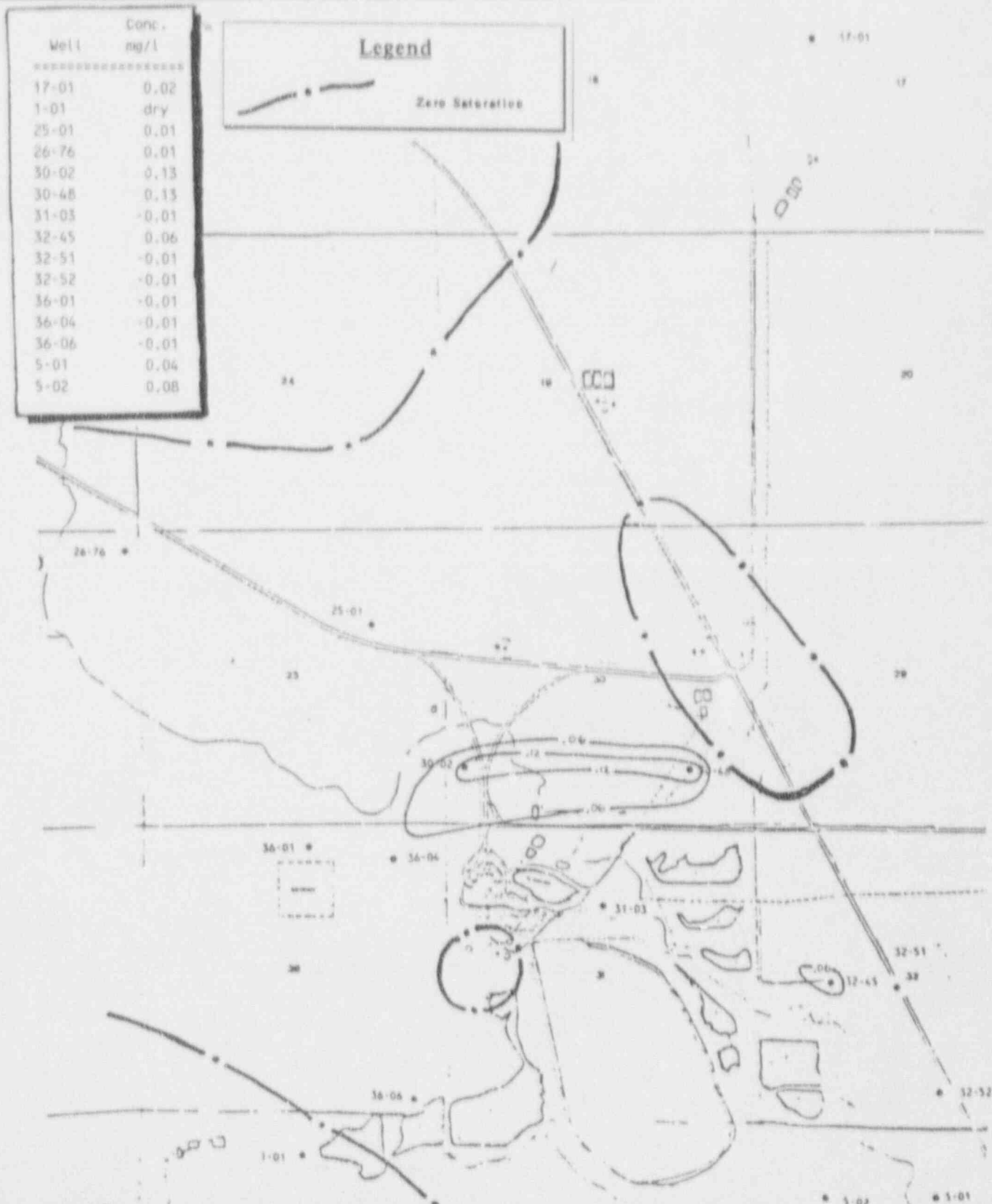
### Groundwater Standard - 1.9 pCi/l



# Molybdenum

## 1992 Concentration Isopleth

Groundwater Standard = 0.06 mg/l



See Page 7 for additional plume explanation.

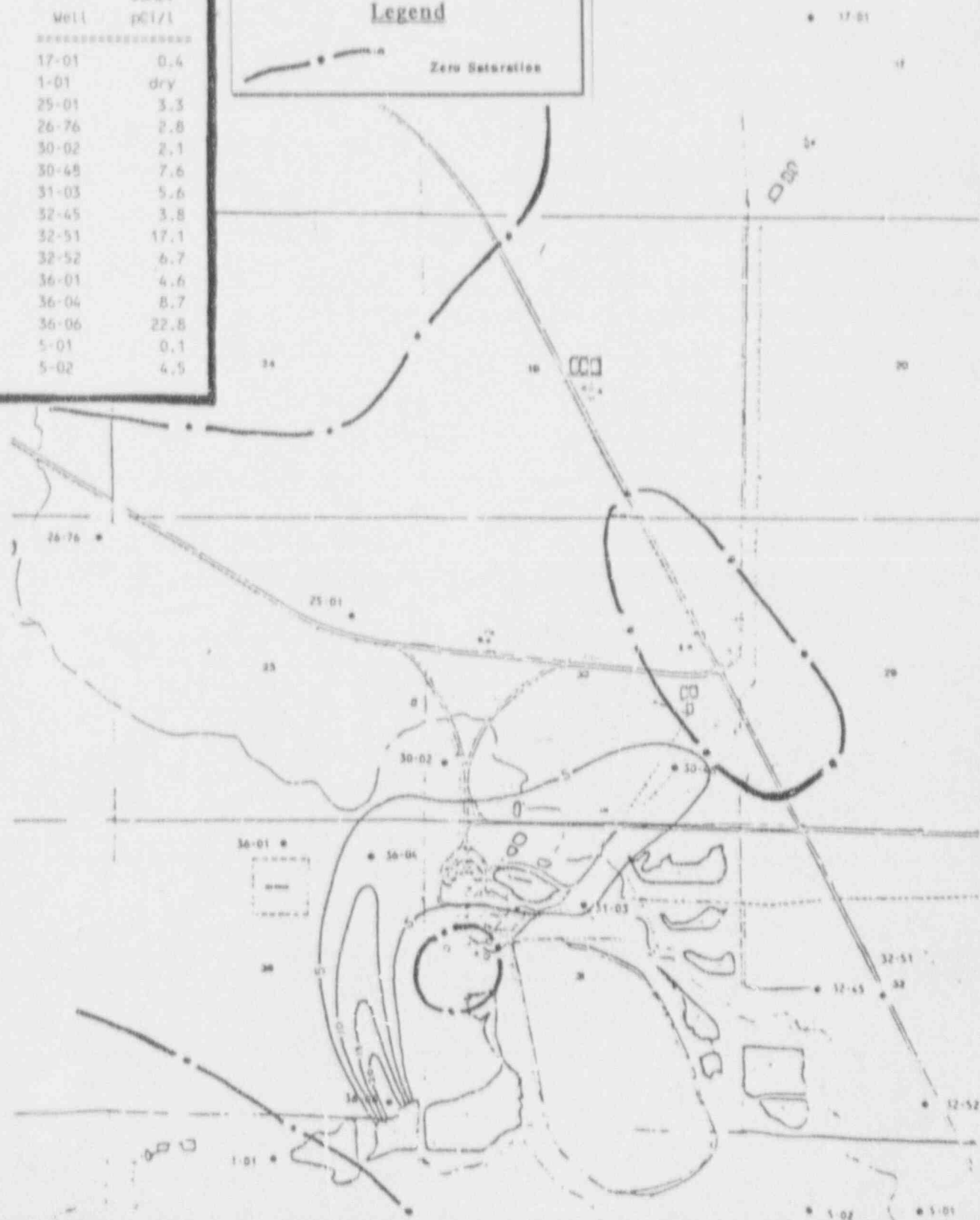
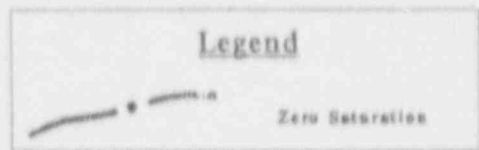


# Radium 226 & 228

## 1992 Concentration Isopleth

### Groundwater Standard - 5.0 pCi/l

Well	Conc. pCi/l
17-01	0.4
1-01	dry
25-01	3.3
26-76	2.8
30-02	2.1
30-45	7.6
31-03	5.6
32-45	3.8
32-51	17.1
32-52	6.7
36-01	4.6
36-04	8.7
36-06	22.8
5-01	0.1
5-02	4.5



See Page 7 for additional plume explanation.

## Dakota Formation Discussion of Areal Plume Plots

### Gross Alpha

Dakota well 36-01 not included in plume generation. Historically, the average concentration in well 36-01 has been approximately 5 pCi/l. Current concentration is reported as 78 pCi/l. Analytical error is suspected.

### Lead-210

NRC background well for the Dakota is 17-01 with a corresponding groundwater standard of 1.9 pCi/l for lead-210. Historical average lead-210 concentration at 17-01 since 1988 has been 4.2 pCi/l.

Monitor well 36-01 historical average lead-210 concentration is 1.2 pCi/l. Current concentration is reported at 6.8 pCi/l. Analytical error is suspected.

Current lead-210 concentrations for Dakota monitor wells 5-02 and 26-76 are reported as 2.4 and 2.9 pCi/l respectively. However, both wells are located up dip from the contamination source. The concentrations at these wells are considered to be background for the Dakota.

### Molybdenum

Current molybdenum concentration at monitor well 5-02 is reported as 0.08 mg/l. Since well 5-02 is up dip from the contamination source, this concentration is considered to be background for the Dakota.

### Radium-226 & 228

Dakota monitor wells 32-51 and 32-52 not included in plume generation. Historical average radium-226 & 228 concentrations for these wells are 2.7 and 2.6 pCi/l respectively. Current concentrations for these wells are reported as 17.1 and 6.7 pCi/l respectively. Analytical error is suspected.

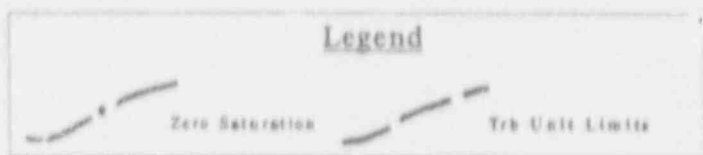


REVISED AREAL PLUME PLOTS

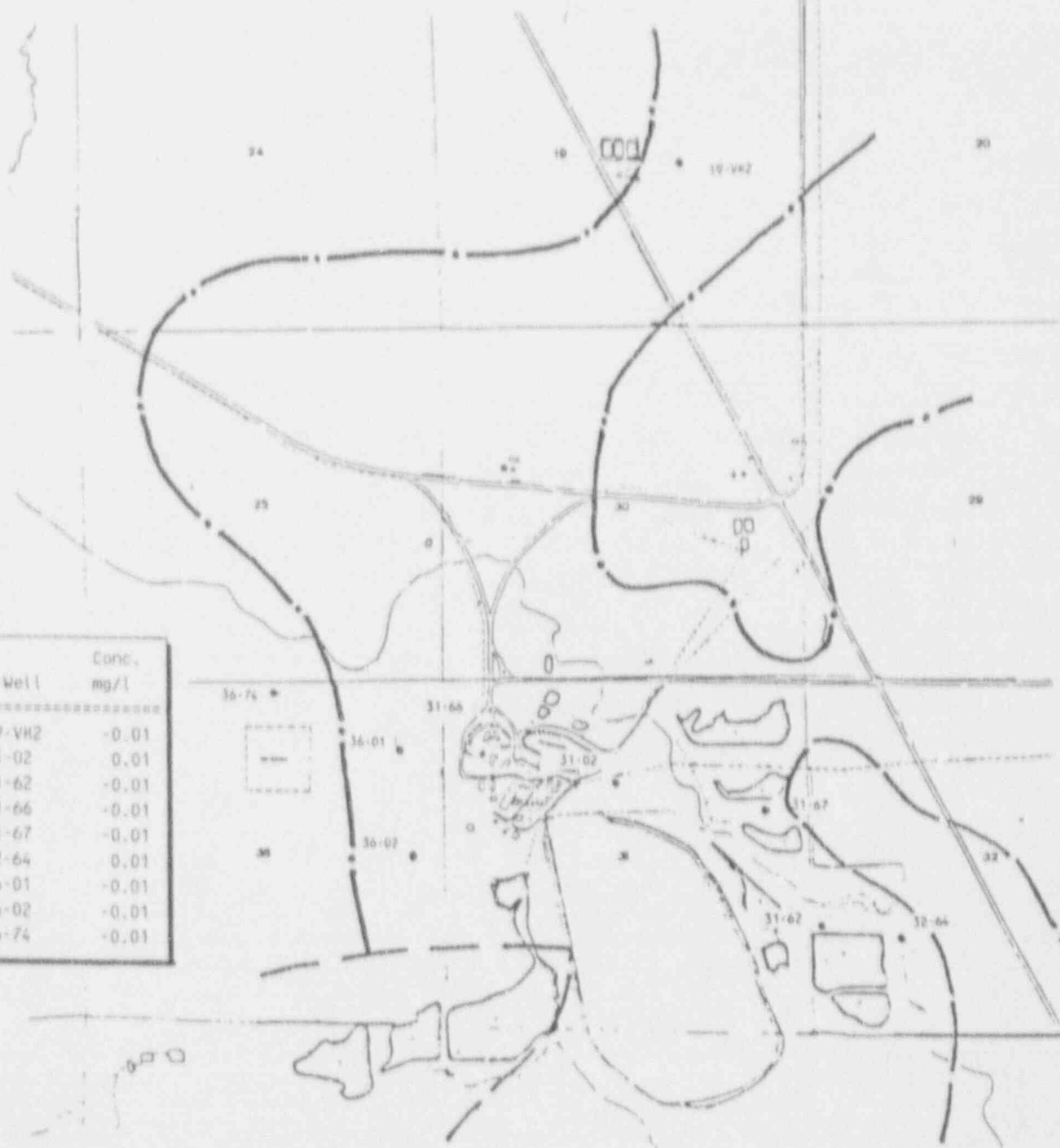
TRES HERMANOS B

# Cyanide

1992 Concentration Isopleth  
Groundwater Standard - 0.01 mg/l



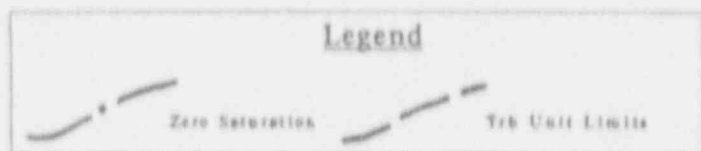
Well	Conc. mg/l
19-VH2	-0.01
31-02	0.01
31-62	-0.01
31-66	-0.01
31-67	-0.01
32-64	0.01
36-01	-0.01
36-02	-0.01
36-74	-0.01



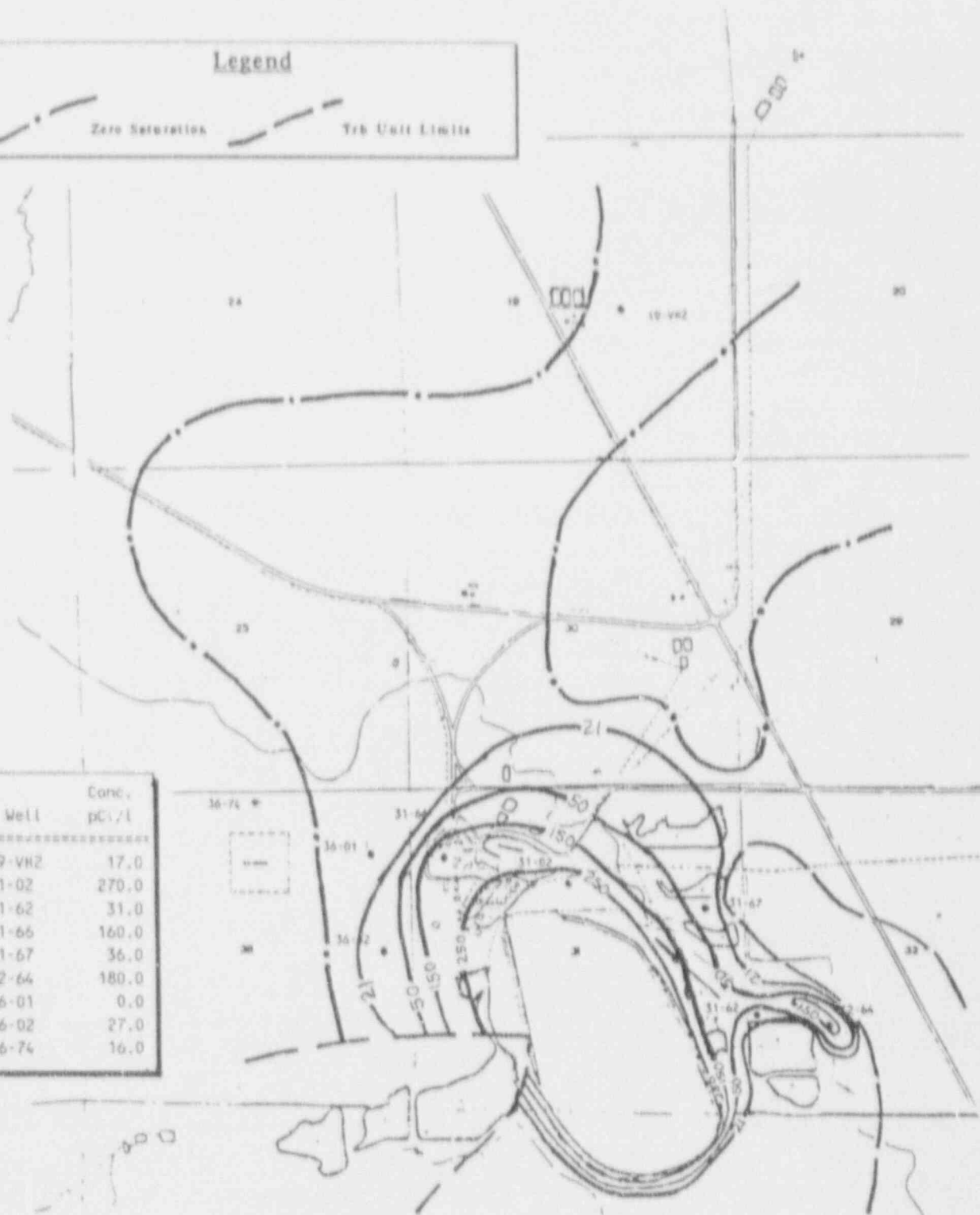
All well concentrations at or below the groundwater standard.

# Gross Alpha

1992 Concentration Isopleth  
Groundwater Standard - 21.0 pCi/l



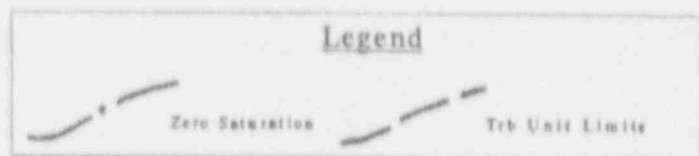
Well	Conc. pCi/l
19-VH2	17.0
31-02	270.0
31-62	31.0
31-66	160.0
31-67	36.0
32-64	180.0
36-01	0.0
36-02	27.0
36-74	16.0



See Page 14 for additional plume explanation.

# Lead - 210

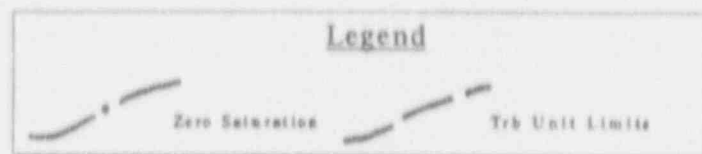
1992 Concentration Isopleth  
Groundwater Standard - 0.9 pCi/l



See Page 14 for additional plume explanation.

# Thorium - 230

1992 Concentration Isopleth  
Groundwater Standard - 2.2 pCi/l

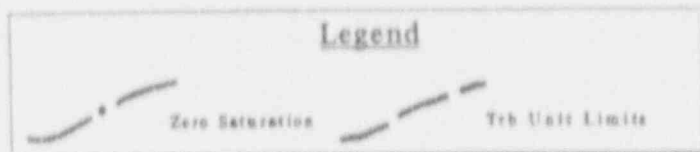


Well	Conc. pCi/l
19-VH2	0.0
31-02	2.3
31-62	1.4
31-66	3.0
31-67	6.4
32-64	8.2
36-01	0.6
36-02	1.6
36-74	1.9



# Uranium

1992 Concentration Isopleth  
Groundwater Standard = 0.02 mg/l



Well	Conc. mg/l
19-VH2	0.0207
31-02	0.2620
31-62	0.0082
31-66	0.1030
31-67	0.0029
32-64	0.3590
36-01	0.0093
36-02	0.0068
36-74	0.0097





## Tres Hermanos B Unit Discussion of Areal Plume Plots

### Gross Alpha

Monitor well 36-74 not included within Tres Hermanos B zone of saturation. Although 36-74 indicates water present within the Tres Hermanos B, geologic faulting just east of the well prevents groundwater impacted by milling activities to communicate to the Tres Hermanos B on the westside of the fault. The fault is well healed and has a vertical displacement of approximately 30-40 feet with Mancos shale interfacing each side of the Tres Hermanos B disjointed unit.

Non-communication is demonstrated by the conservative parameter chloride. The chloride concentration at well 36-01, which is located east of the fault, has a chloride concentration of 1240 mg/l; while west of the fault at 36-74, the chloride concentration is 16 mg/l.

Due to non-communication across this fault, the zone of saturation depicted on the plots indicates the extent of saturation for the unit which are in possible geologic communication with tailings solutions.

### Lead-210

NRC background well for the Tres Hermanos B unit is 19-VH2 with an established groundwater standard of 0.9 pCi/l for lead-210. However, historical average concentration at 19-VH2 is 6.6 pCi/l.

Monitor well 36-74 not included in lead 210 plume generation. Well 36-74 is also not included within Tres Hermanos B zone of saturation. Although 36-74 indicates water present within the Tres Hermanos B, geologic faulting in the area prevents groundwater impacted by milling activities within the Tres Hermanos B to communicate to the westside of the fault. This is discussed in further detail above in the note for gross alpha. The current reported lead 210 concentration is considered background for the Tres Hermanos B unit.

REVISED AREAL PLUME PLOTS

ALLUVIUM

# Arsenic

1992 Concentration Isopleth  
Groundwater Standard - 0.05 mg/l



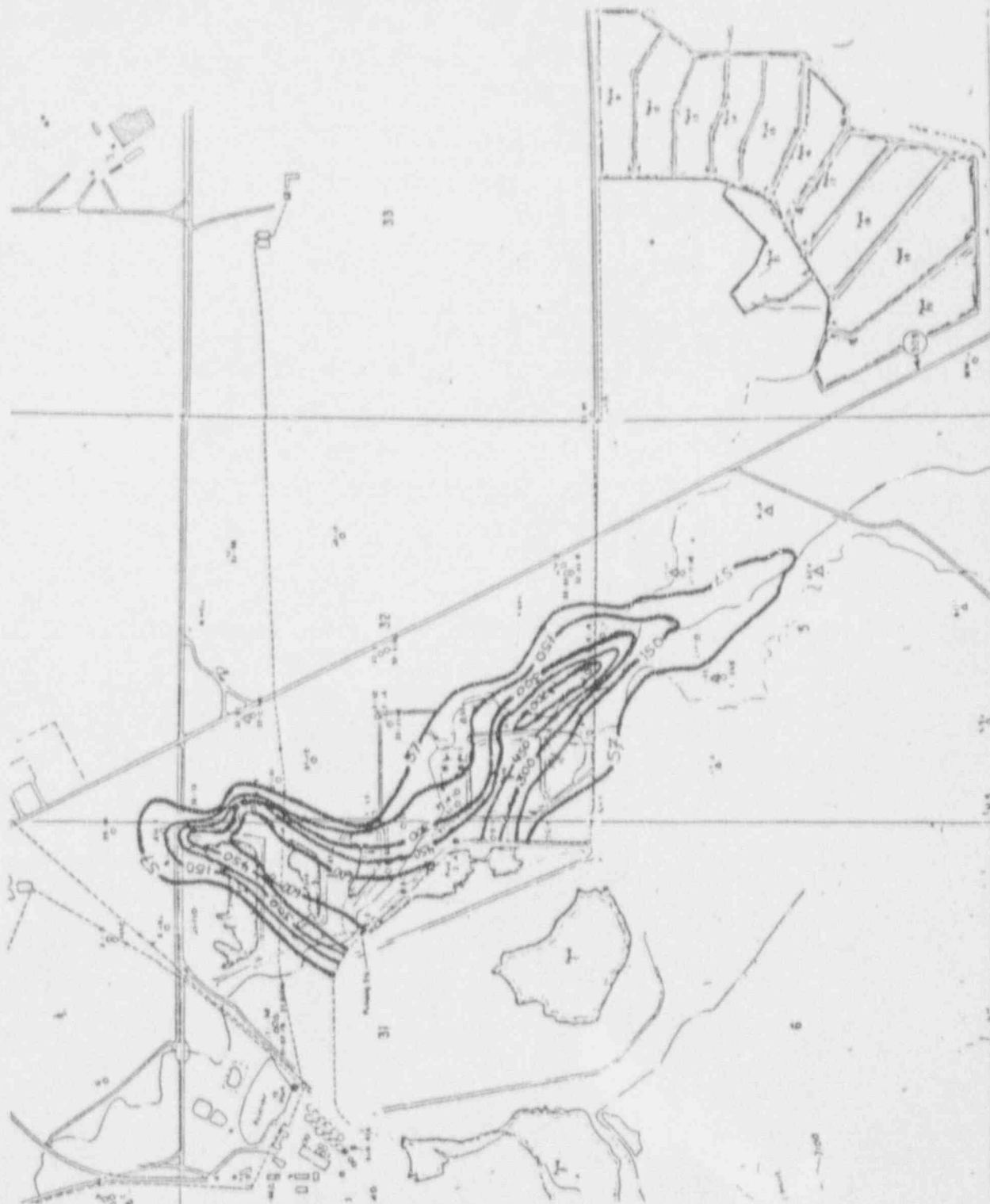
Well	Conc. mg/l
30-04	-0.001
30-47	-0.001
30-48	-0.001
30-49	-0.001
31-05	-0.001
31-61	-0.001
31-63	-0.001
31-65	0.003
31-70	0.002
31-71	0.003
32-01	-0.001
32-02	-0.001
32-41	-0.001
32-42	0.001
32-43	0.002
32-50	-0.001
32-51	-0.001
32-52	0.001
32-56	dry
32-57	-0.001
32-58	0.004
32-59	0.001
32-60	0.006
32-69	0.007
32-72	0.003
5-01	-0.001
5-02	0.001
5-03	-0.001
5-04	0.004
5-08	-0.001
5-73	-0.001
AW-1	0.001
AW-2	0.004
C-3	dry
D-4	dry
E-5	-0.001
MU-24	-0.001
S-12	-0.001
S-9	-0.001

All analytical results for all wells were below the groundwater standard as specified in License condition #34.

# Gross Alpha

## 1992 Concentration Isopleth

### Groundwater Standard - 57.0 pCi/l



**Molybdenum**  
1992 Concentration isopleth  
Groundwater Standard - 0.06 mg/l

1992 Concentration Isopleth

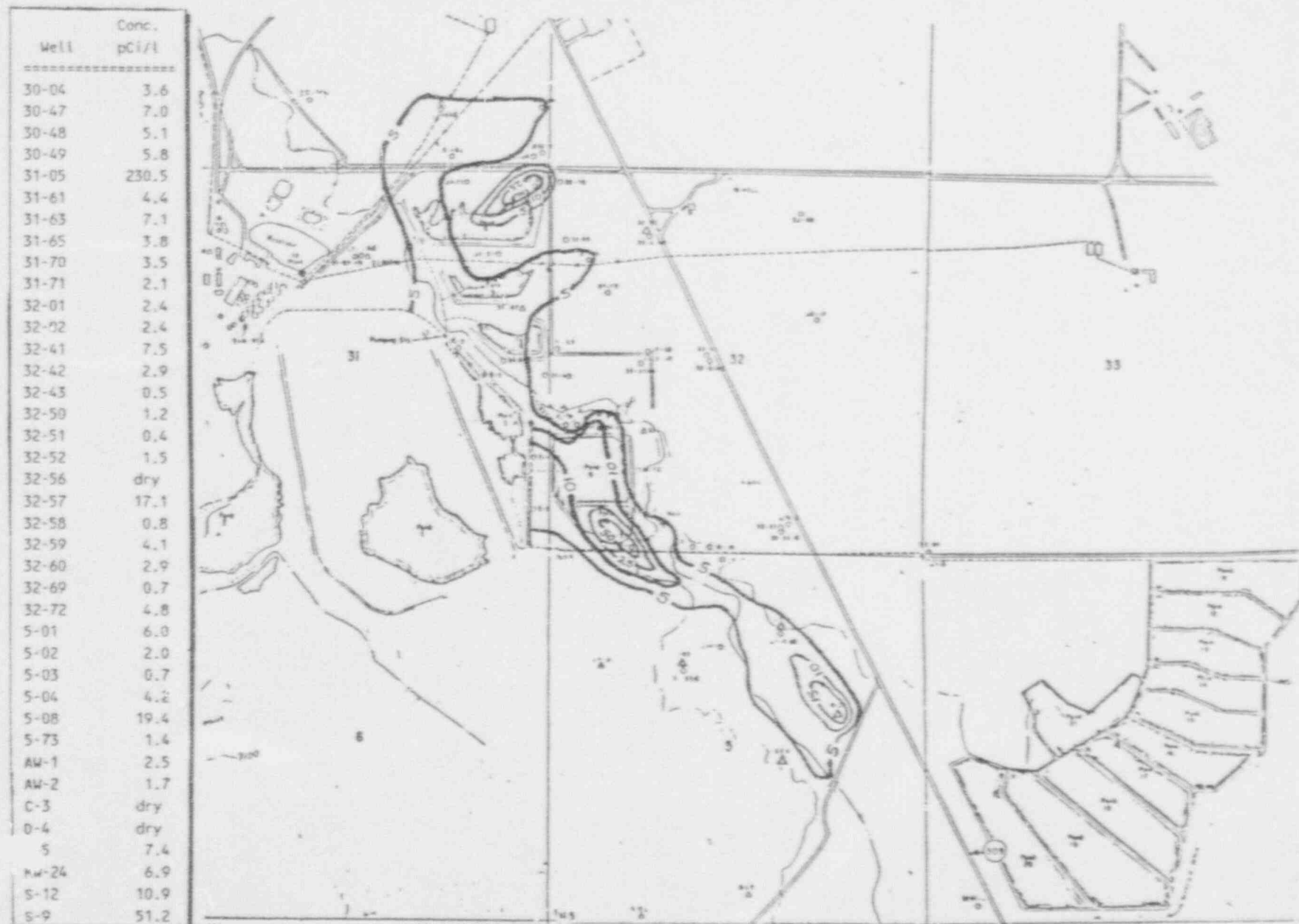
Groundwater Standard - 0.06 mg/l



# Radium 226 & 228

## 1992 Concentration Isopleth

### Groundwater Standard - 5.0 pCi/l



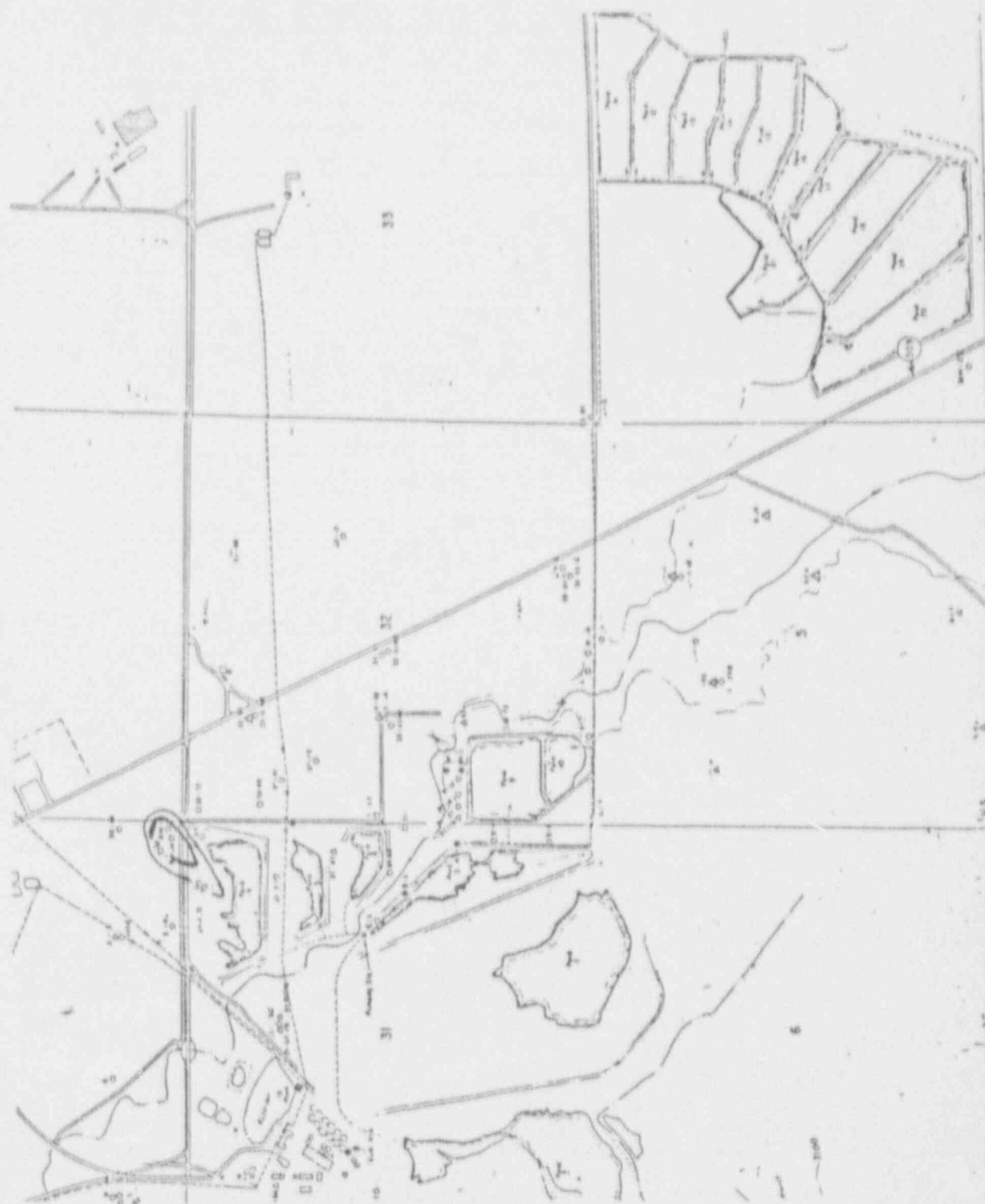
See Page 22 for additional plume explanation.



# Selenium

## 1992 Concentration Isopleth

### Groundwater Standard - 0.05 mg/l



Well	Conc. mg/l
30-04	-0.002
30-47	-0.002
30-48	-0.002
30-49	-0.002
31-05	-0.002
31-61	0.010
31-63	-0.002
31-65	0.004
31-70	0.008
31-71	0.002
32-01	-0.002
32-02	-0.002
32-41	-0.002
32-42	-0.002
32-43	0.016
32-50	-0.002
32-51	0.019
32-52	-0.002
32-56	dry
32-57	0.002
32-58	-0.002
32-59	0.008
32-60	0.003
32-69	0.034
32-72	-0.002
5-01	-0.002
5-02	-0.002
5-03	0.003
5-04	-0.002
5-08	-0.002
5-73	-0.002
AW-1	0.069
AW-2	0.003
C-3	dry
D-4	dry
E-5	-0.002
MJ-24	0.577
S-12	-0.002
S-9	-0.002

See Page 22 for additional plume explanation.

1992 Concentration Isopleth  
Groundwater Standard - 0.06 mg/l



Well	Conc. mg/l
30-04	0.0147
30-47	0.0098
30-48	0.0101
30-49	0.0151
31-05	0.0437
31-61	0.1700
31-63	0.8750
31-65	0.2150
31-70	1.0600
31-71	0.0803
32-01	0.0107
32-02	0.0064
32-41	0.0194
32-42	0.0477
32-43	0.0089
32-50	0.0075
32-51	0.0209
32-52	0.0080
32-56	dry
32-57	0.1540
32-58	1.1900
32-59	0.5940
32-60	0.2420
32-69	1.1400
32-72	0.9150
5-01	0.0054
5-02	0.0075
5-03	0.0051
5-04	0.0074
5-08	0.0053
5-73	0.1580
AW-1	0.0999
AW-2	0.0588
C-3	dry
D-4	dry
E-5	0.0304
MW-24	0.0283
S-12	0.1580
S-9	0.0829

See Data 73 for additional time over/under for

## Alluvial Unit Discussion of Areal Plume Plots

### Gross Alpha

Alluvial well 32-57 not included in gross alpha plume generation. Alluvial groundwater flow in the vicinity of the well is from the northeast to southwest. Concentration at well is due to drainage from previous mining/milling activities east of the facility (See Plate 1).

Alluvial monitor well MW-24 not included in gross alpha plume generation. Concentration at MW-24 due to drainage from previous mining/milling activities northeast of the area (See Plate 1).

### Radium 226 & 228

Alluvial well 32-57 not included in radium 226 & 228 plume generation. Alluvial groundwater flow in the vicinity of the well is from the northeast to southwest. Concentration at well is due to drainage from previous mining/milling activities east of the facility (See Plate 1).

Alluvial monitor well MW-24 not included in radium 226 & 228 plume generation. Concentration at MW-24 due to drainage from previous mining/milling activities northeast of the area (See Plate 1).

Alluvial monitor well 30-47 not included in radium 226 & 228 plume generation. Concentration at 30-47 due to drainage from previous mining/milling activities flowing from the northwest to the vicinity of well 30-47.

Current reported concentration for monitor well 31-05 indicates analytical error. Historic average radium 226 & 228 concentration at monitor well 31-05 is approximately 34 pCi/l. Current reported radium 226 & 228 concentration is 230.5 pCi/l.

### Selenium

Alluvial monitor well MW-24 not included in selenium plume generation. Concentration at MW-24 due to drainage from previous mining/milling activities northeast of the area (See Plate 1).

Alluvial Unit  
Discussion of Areal Plume Plots  
(continued)

Uranium

Alluvial well 32-57 not included in uranium plume generation. Alluvial groundwater flow in the vicinity of the well is from the northeast to southwest. Concentration at well is due to drainage from previous mining/milling activities east of the facility (See Plate 1).

Plate 1

Aerial Photograph - East of Quivira Facility

Photograph Date: July 1975

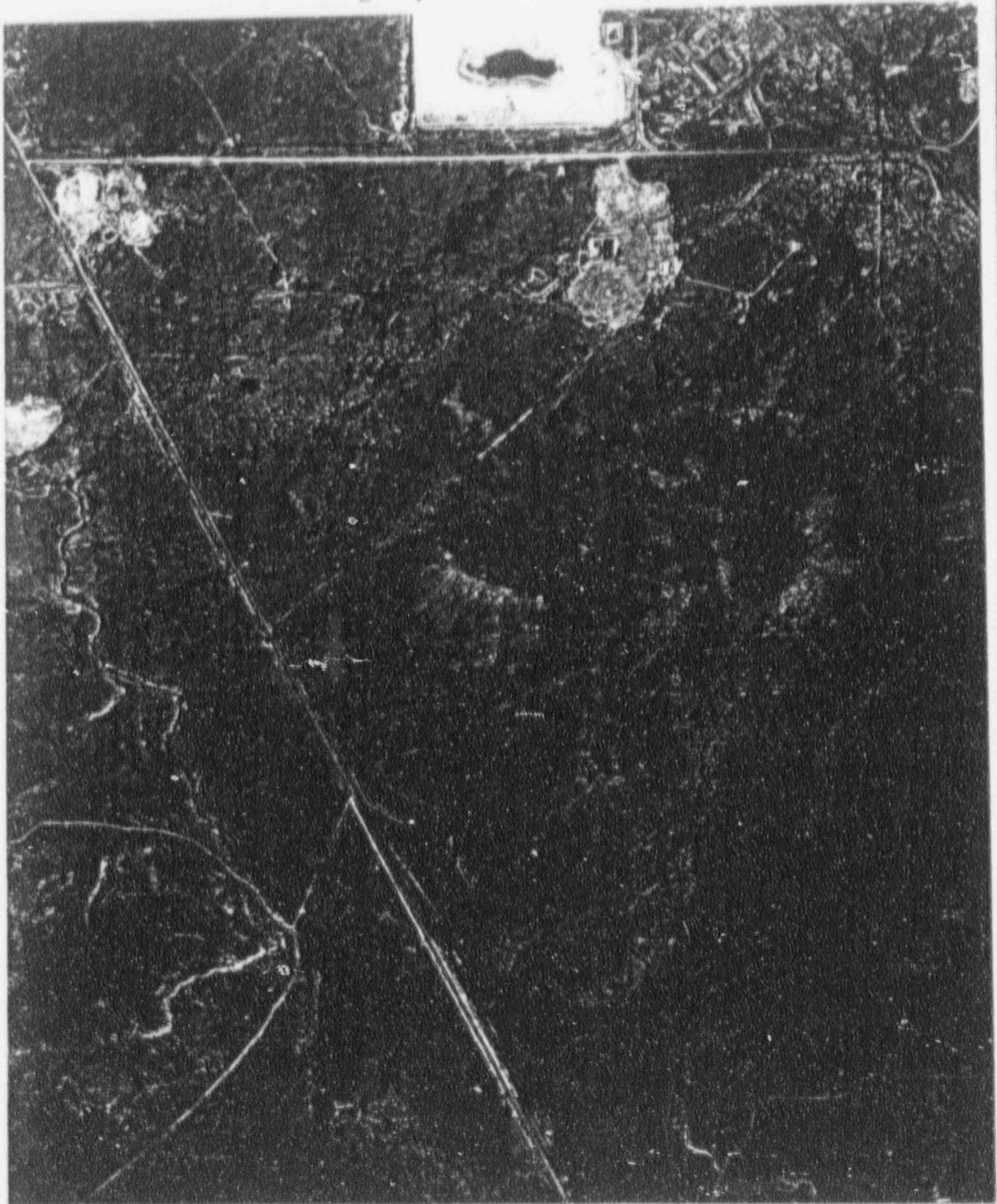




Plate 1

Aerial Photograph - East of Quivira Facility

Photograph Date: July 1975

