FIGURES

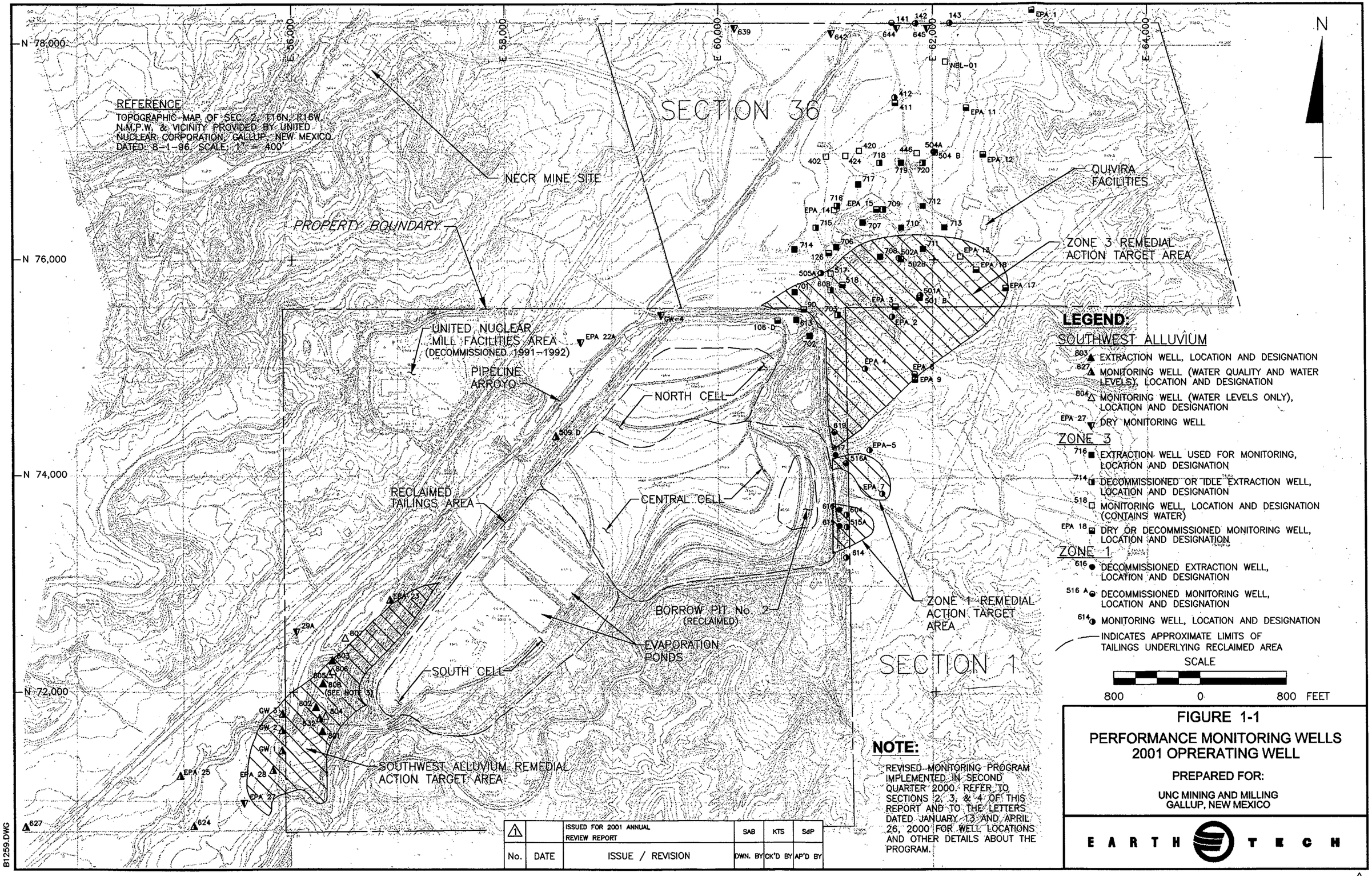

FIGURE 1-1

PERFORMANCE MONITORING WELLS 2001 OPRERATING WELL

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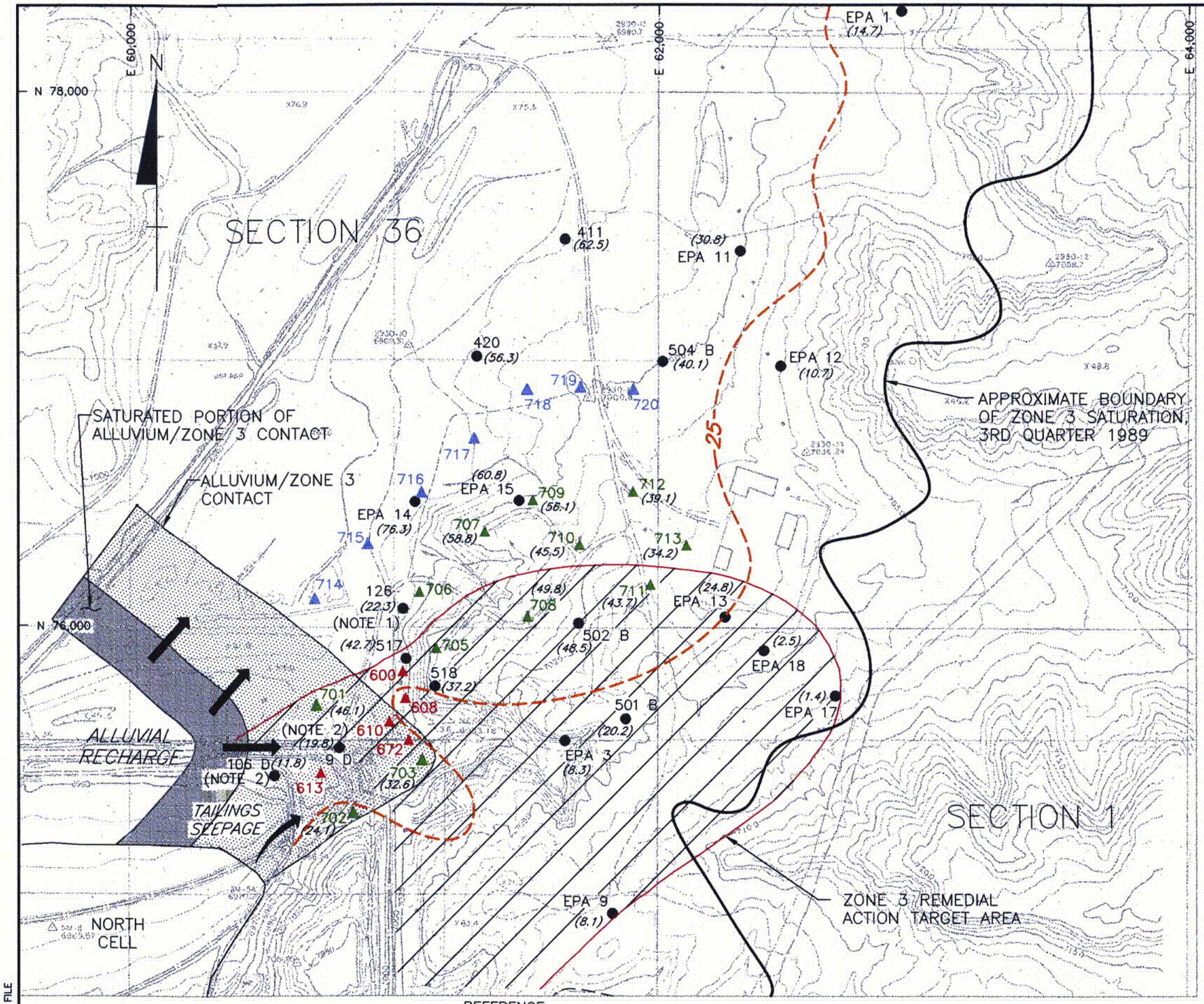
GALLUP, NEW MEXICO

EARTH TECH



LEGEND:

- 608▲ NORTHEAST PUMP–BACK WELL LOCATION AND DESIGNATION
- 708▲ ZONE 3–STAGE I EXTRACTION WELL LOCATION AND DESIGNATION
- 714▲ ZONE 3–STAGE II EXTRACTION WELL LOCATION AND DESIGNATION (NOTE 4)
- 420● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION
- *(56.3)* SATURATED THICKNESS, FEET 3RD QUARTER 1989
- —25— SATURATED THICKNESS OF ZONE 3 3RD QUARTER 1989 (DASHED WHERE INFERRED)

NOTES:

1. MONITORING WELL 126 WAS COMPLETED ABOVE THE BOTTOM OF ZONE 3. CONSEQUENTLY MEASUREMENTS OF SATURATED THICKNESS IN THIS WELL ARE LESS THAN ACTUAL CONDITIONS.
2. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
3. NORTHEAST PUMP–BACK WELLS WERE PUMPING AT THIS TIME. WATER LEVEL DATA NOT AVAILABLE.
4. NO WATER LEVEL DATA AVAILABLE IN 1989, STAGE II WELLS WERE INSTALLED IN 1991.

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SCALE
400 0 400 FEET

FIGURE 3-1

ZONE 3 REMEDIAL ACTION TARGET AREA vs SATURATED THICKNESS 1989

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C01

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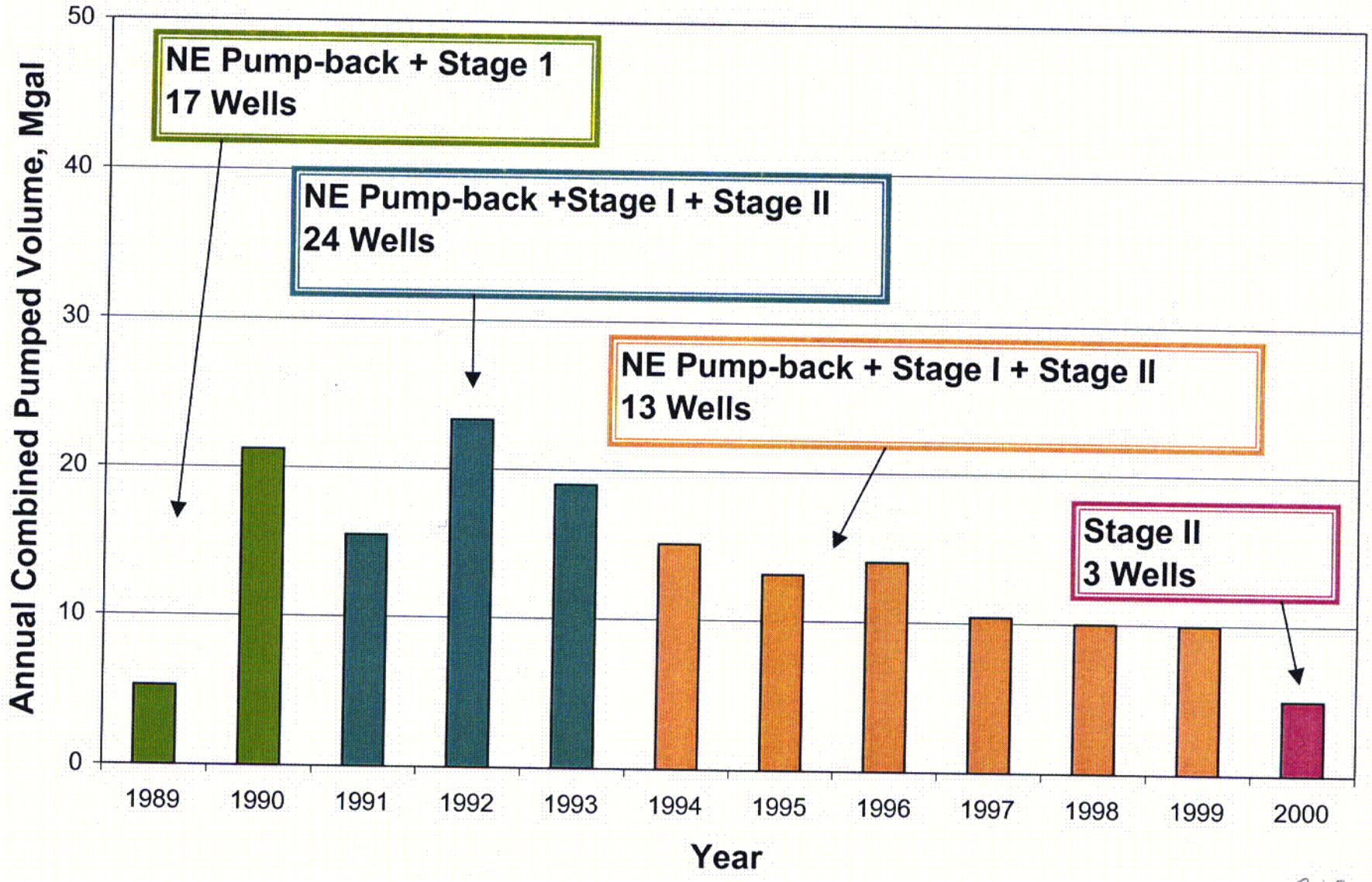
B1257.DWG FILE

1



C02

FIGURE 3-2
Zone 3 Annual Pumped Volumes

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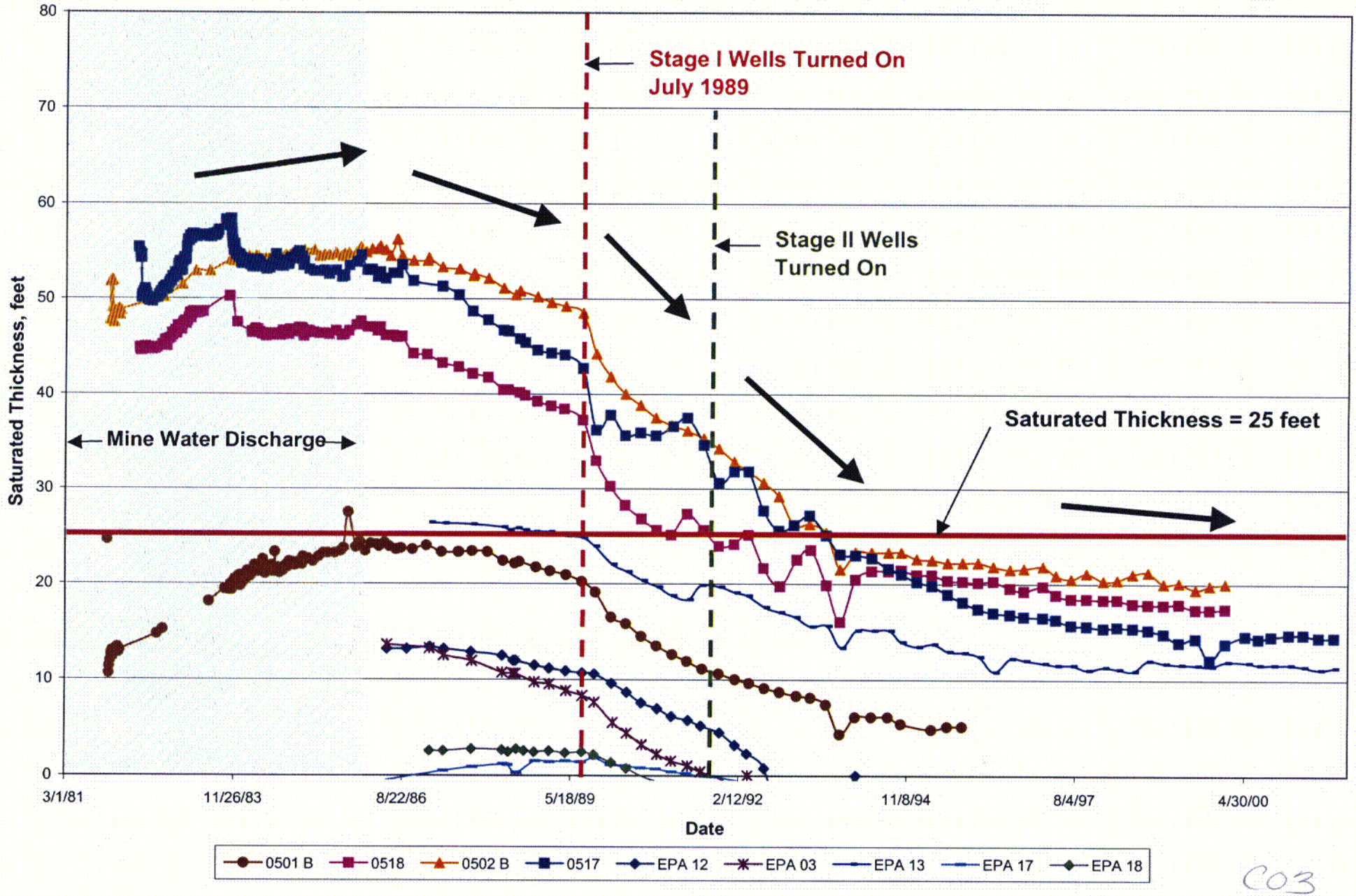
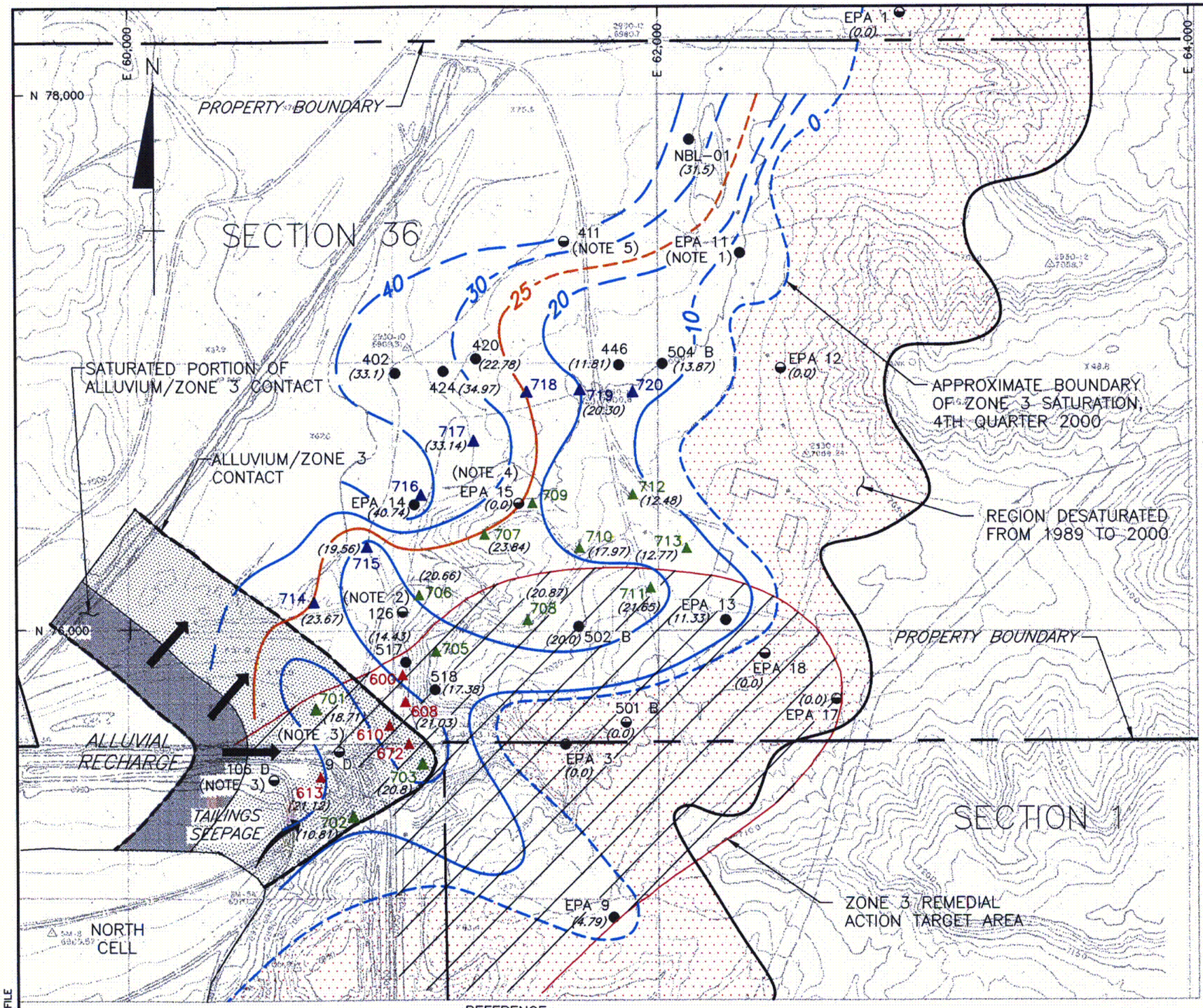


C03

FIGURE 3-3

L:\Work\32114\Work\Proj\Annual-2001\Sat Thick Memo\[File]\Effect of Pumping Figure Chart 2

Effect of Pumping to Enhance Natural Drainage in Zone 3



LEGEND:

- 608 ▲ NORTHEAST PUMP-BACK WELL LOCATION AND DESIGNATION
- 708 ▲ ZONE 3-STAGE I EXTRACTION WELL LOCATION AND DESIGNATION
- 714 ▲ ZONE 3-STAGE II EXTRACTION WELL LOCATION AND DESIGNATION
- 420 ● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17 ◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- (33.14) SATURATED THICKNESS, FEET 4TH QUARTER 2001
- —30— SATURATED THICKNESS OF ZONE 3, 4TH QUARTER 2001 (DASHED WHERE INFERRED)
- —25— MINIMUM SATURATED THICKNESS REQUIRED FOR GROUNDWATER EXTRACTION

NOTES:

1. MONITORING WELL EPA-11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
2. MONITORING WELL 126 WAS COMPLETED ABOVE THE BOTTOM OF ZONE 3. CONSEQUENTLY MEASUREMENTS OF SATURATED THICKNESS IN THIS WELL ARE LESS THAN ACTUAL CONDITIONS.
3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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SCALE
400 0 400 FEET

FIGURE 3-4

ZONE 3 SATURATED THICKNESS 4TH QUARTER 2001

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C04

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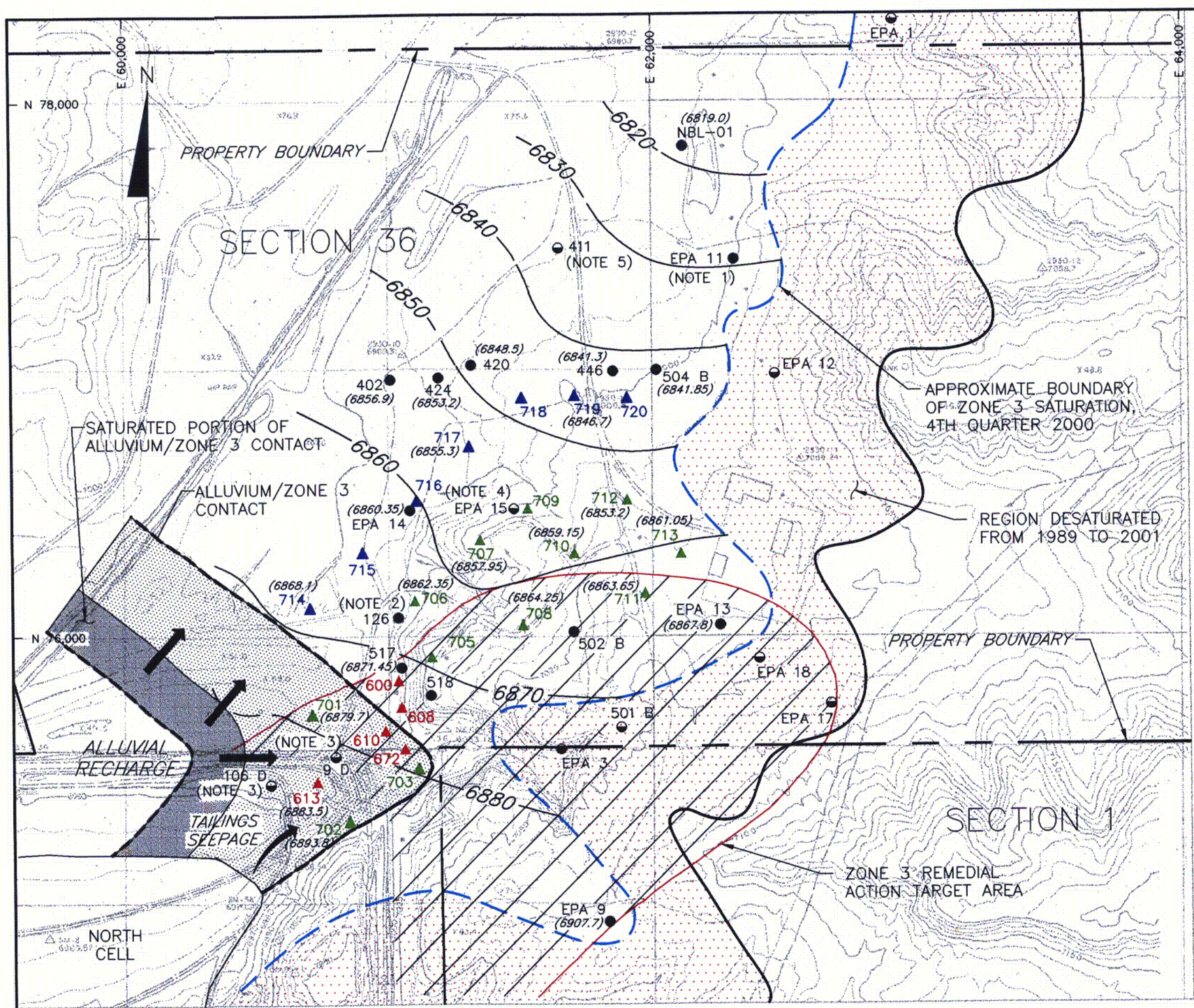
1



LEGEND:

- 608▲ — NORTHEAST PUMP-BACK WELL LOCATION AND DESIGNATION
- 708▲ — ZONE 3-STAGE I EXTRACTION WELL LOCATION AND DESIGNATION
- 714▲ — ZONE 3-STAGE II EXTRACTION WELL LOCATION AND DESIGNATION
- 420● — ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17 ◒ — ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- —6880— CONTOUR OF EQUAL WATER ELEVATION (DASHED WHERE INFERRED)
- (6841.85) WATER LEVEL ELEVATION, FEET (MSL)

NOTES:

1. MONITORING WELL EPA 11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
2. MONITORING WELL 126 WAS COMPLETED ABOVE THE BOTTOM OF ZONE 3. CONSEQUENTLY MEASUREMENTS OF SATURATED THICKNESS IN THIS WELL ARE LESS THAN ACTUAL CONDITIONS.
3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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SCALE
400 0 400 FEET

FIGURE 3-5
ZONE 3 PIEZOMETRIC SURFACE OCTOBER 2001

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C05

EARTH TECH

1

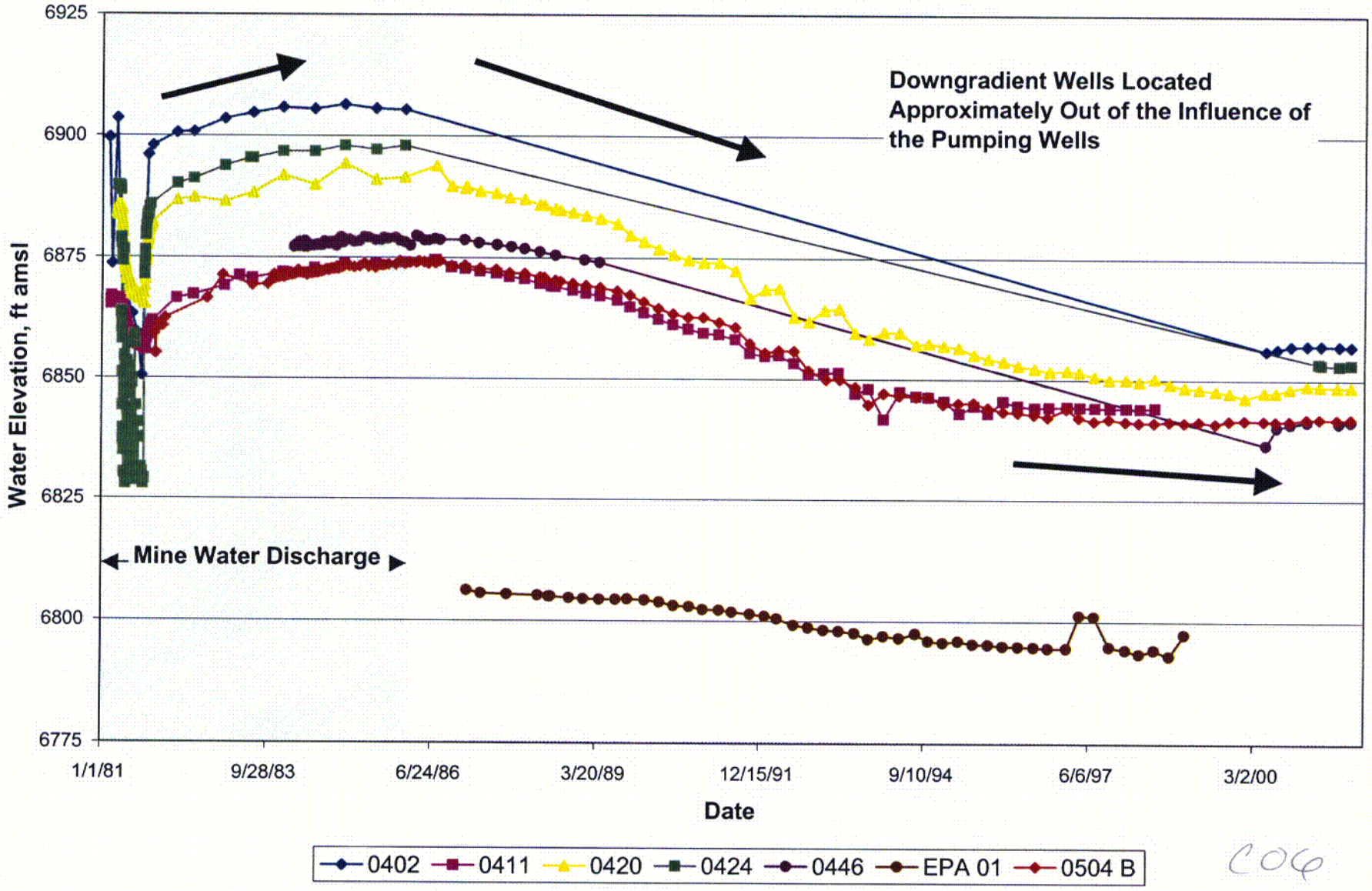

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FIGURE 3-6

Zone 3 Downgradient Water Levels Over Time

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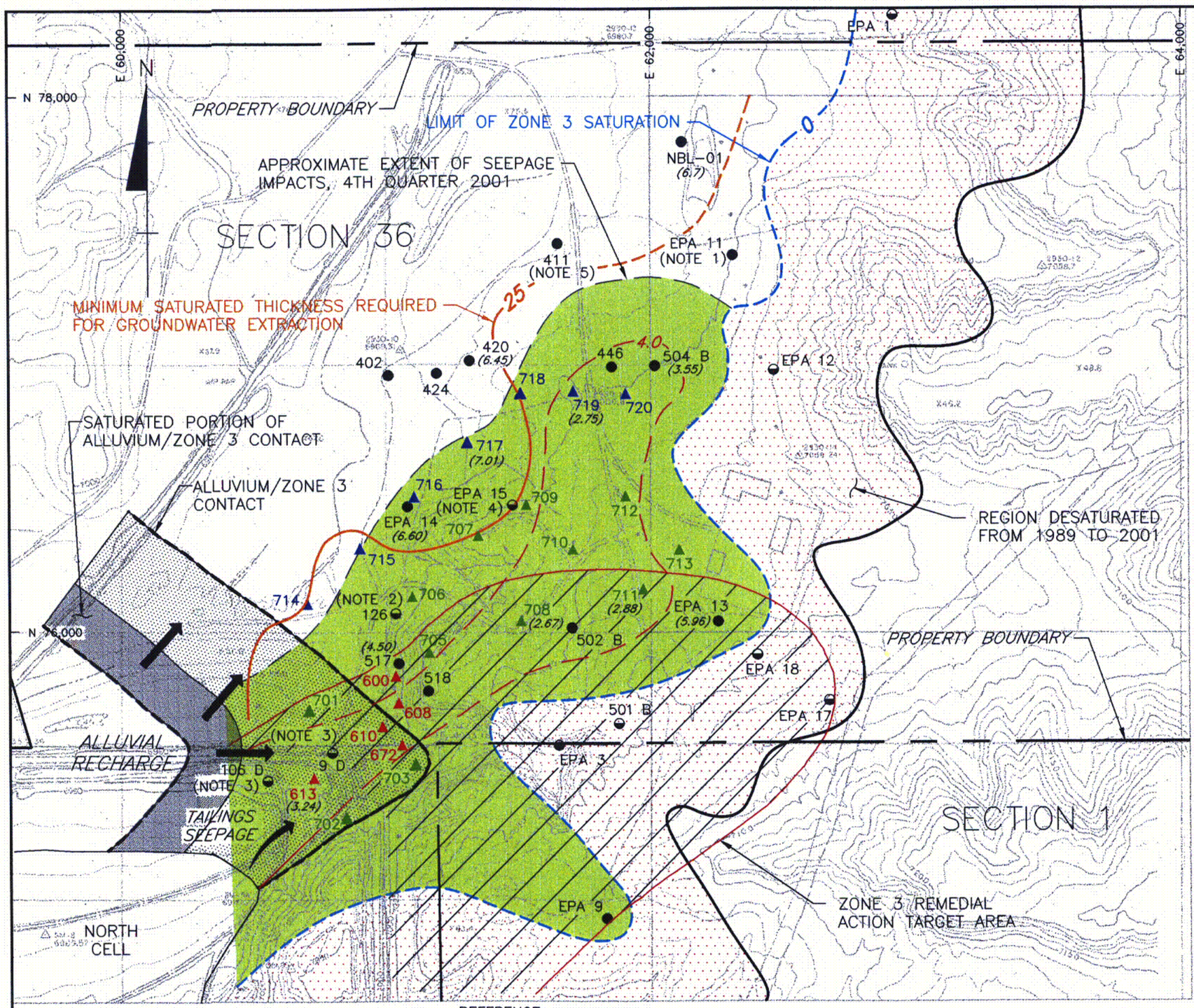
Tables and Figures\WL Graph All Chart 2\WL Graph All Chart 2



LEGEND:

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- 714▲ ZONE 3-STAGE II EXTRACTION WELL LOCATION AND DESIGNATION
- 420● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- APPROXIMATE AREA IMPACTED BY TAILINGS SEEPAGE
- (3.55) pH READING
- --4.0-- pH OF 4.0 CONTOUR

NOTES:

1. MONITORING WELL EPA-11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
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3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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SCALE
400 0 400 FEET

FIGURE 3-7

ZONE 3 APPROXIMATE EXTENT OF SEEPAGE IMPACTS, OCTOBER 2001

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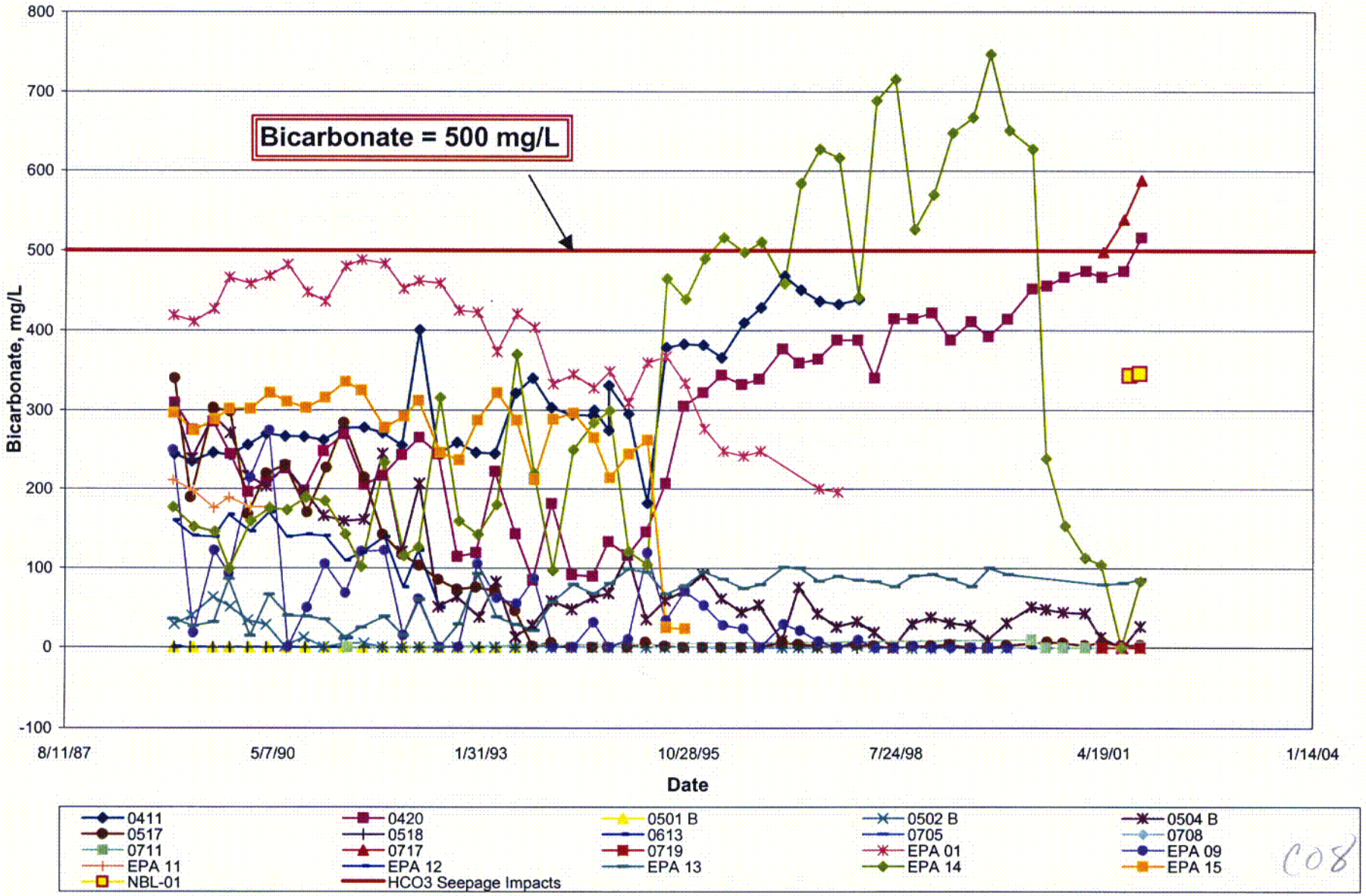
C07

EARTH TECH

1



C08

FIGURE 3-8

Zone 3 Bicarbonate Concentrations Over Time

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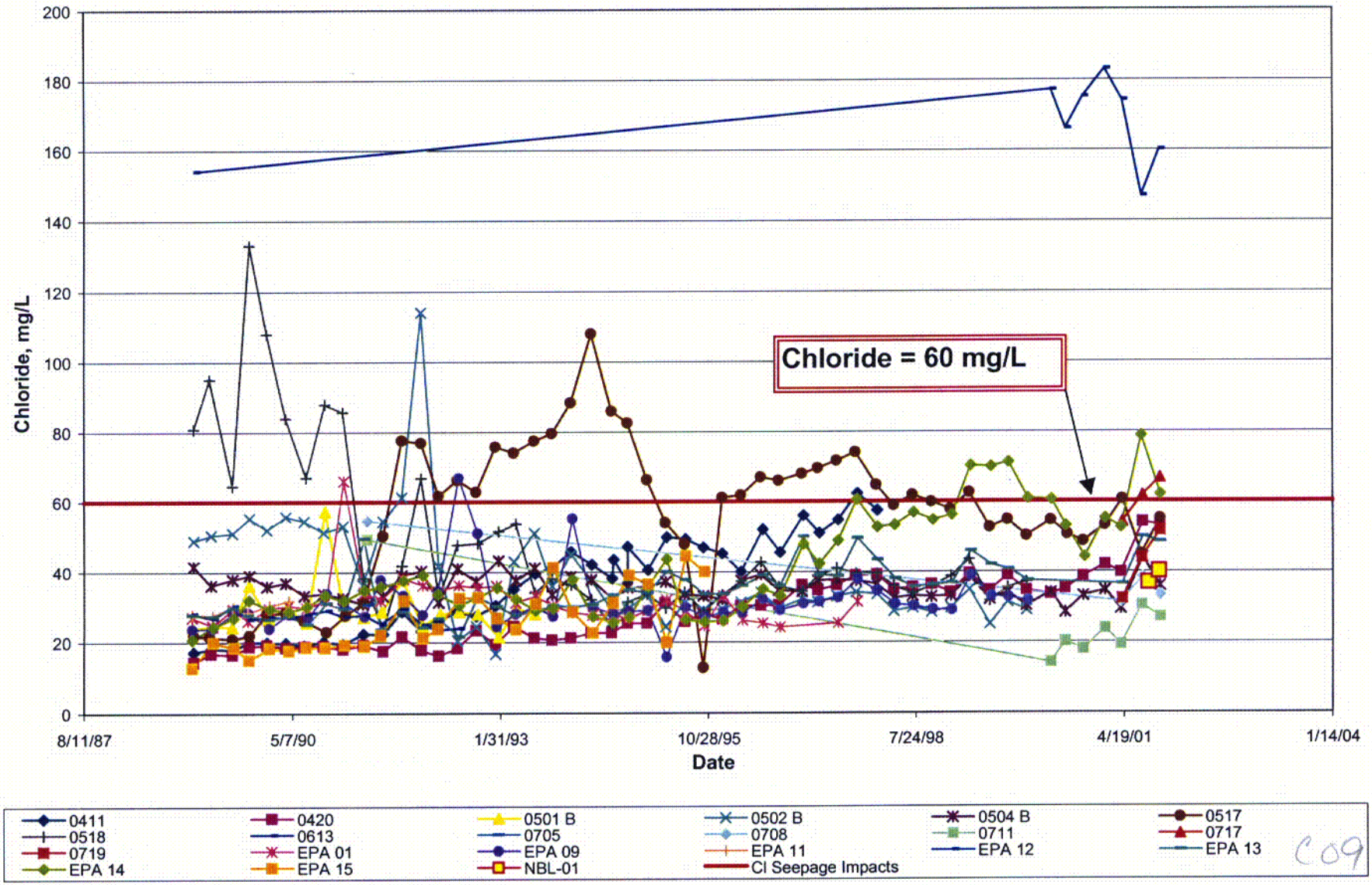

FIGURE 3-9

Zone 3 Chloride Concentrations Over Time

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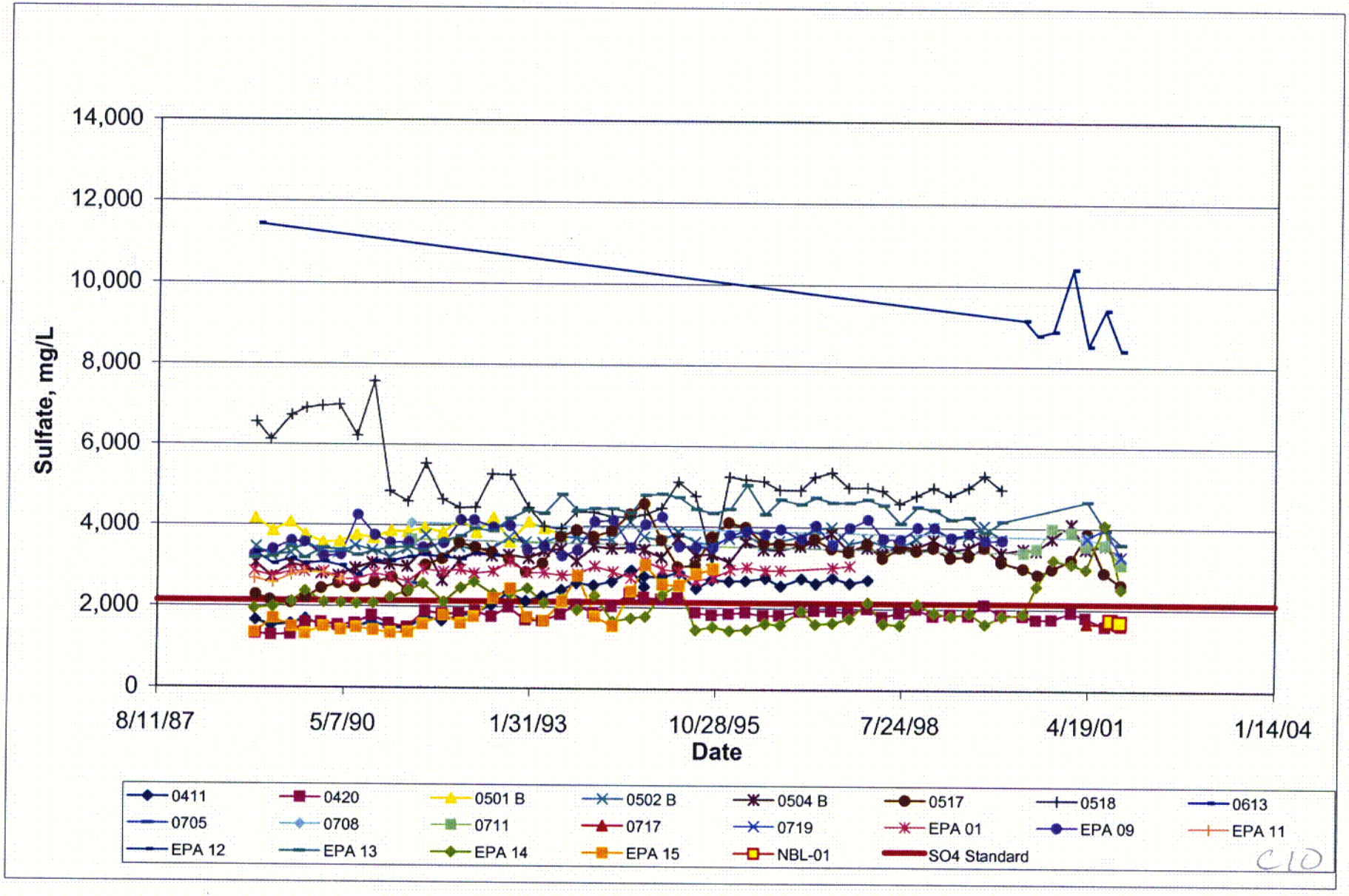

FIGURE 3-10

Zone 3 Sulfate Concentrations Over Time

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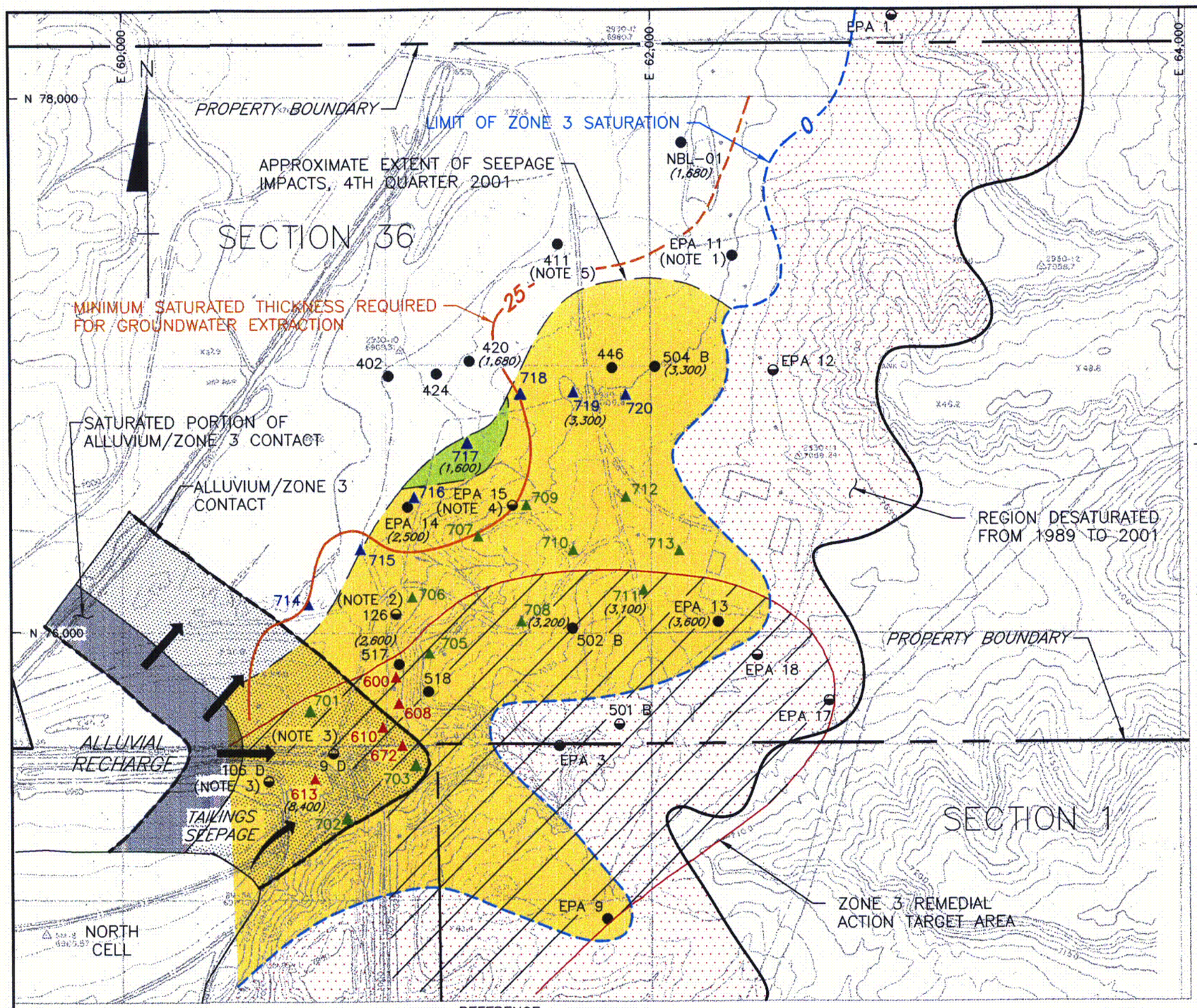
Z3 Sulfate Chart 1\Z3 Sulfate Chart 1



LEGEND:

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- 708 ▲ ZONE 3-STAGE I EXTRACTION WELL LOCATION AND DESIGNATION
- 714 ▲ ZONE 3-STAGE II EXTRACTION WELL LOCATION AND DESIGNATION
- 420 ● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17 ◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- APPROXIMATE AREA IMPACTED BY TAILINGS SEEPAGE
- APPROXIMATE EXTENT OF SULFATE EXCEEDING 2,125 mg/L
- (3,300) SULFATE CONCENTRATION, mg/L

NOTES:

1. MONITORING WELL EPA-11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
2. MONITORING WELL 126 WAS COMPLETED ABOVE THE BOTTOM OF ZONE 3. CONSEQUENTLY MEASUREMENTS OF SATURATED THICKNESS IN THIS WELL ARE LESS THAN ACTUAL CONDITIONS.
3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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SCALE
400 0 400 FEET

FIGURE 3-11

APPROXIMATE EXTENT OF SULFATE EXCEEDING 2,125 mg/L, OCTOBER 2001

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GALLUP, NEW MEXICO

EARTH TECH

1

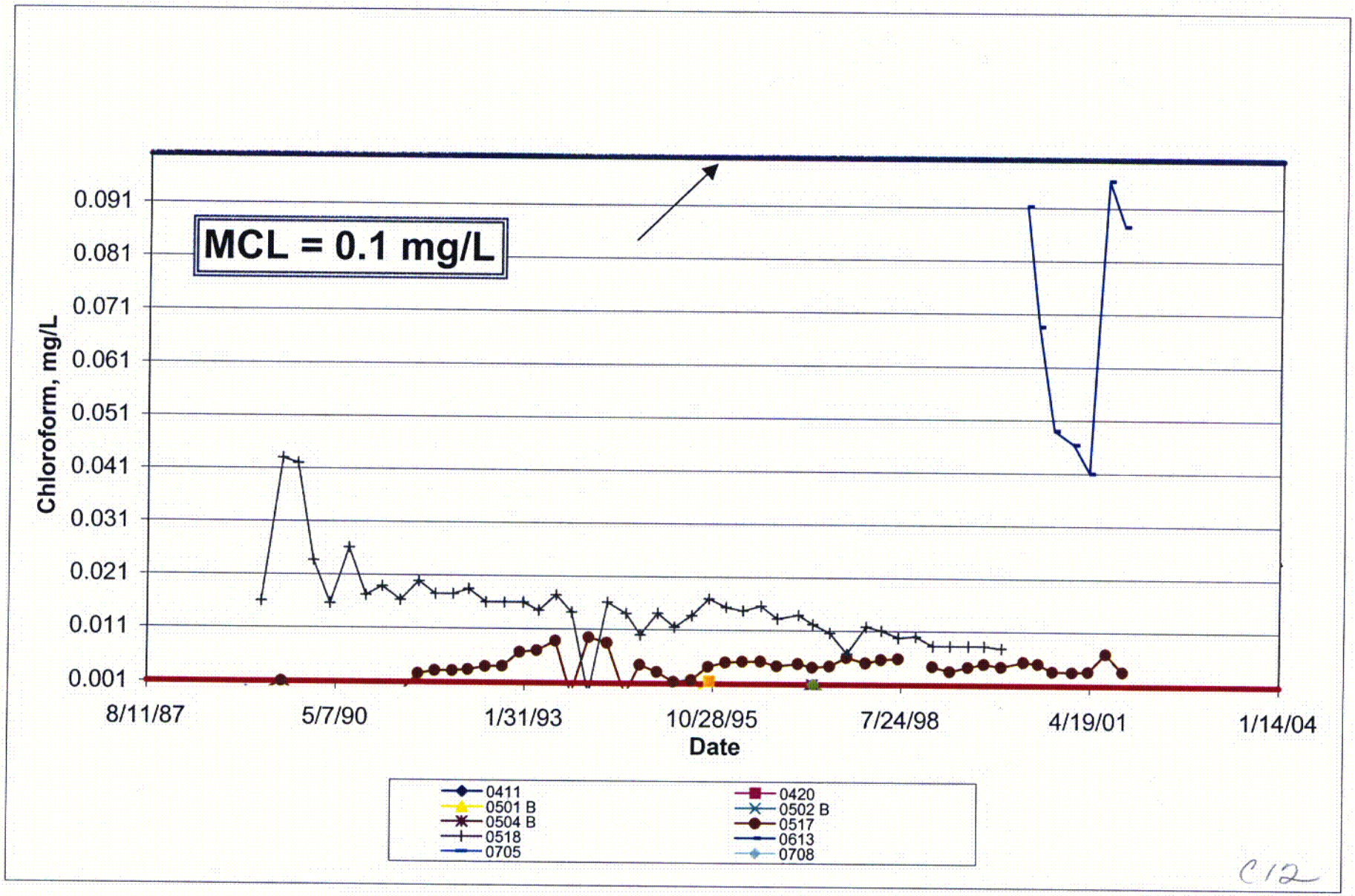

FIGURE 3-12

Zone 3 Chloroform Concentrations Over Time

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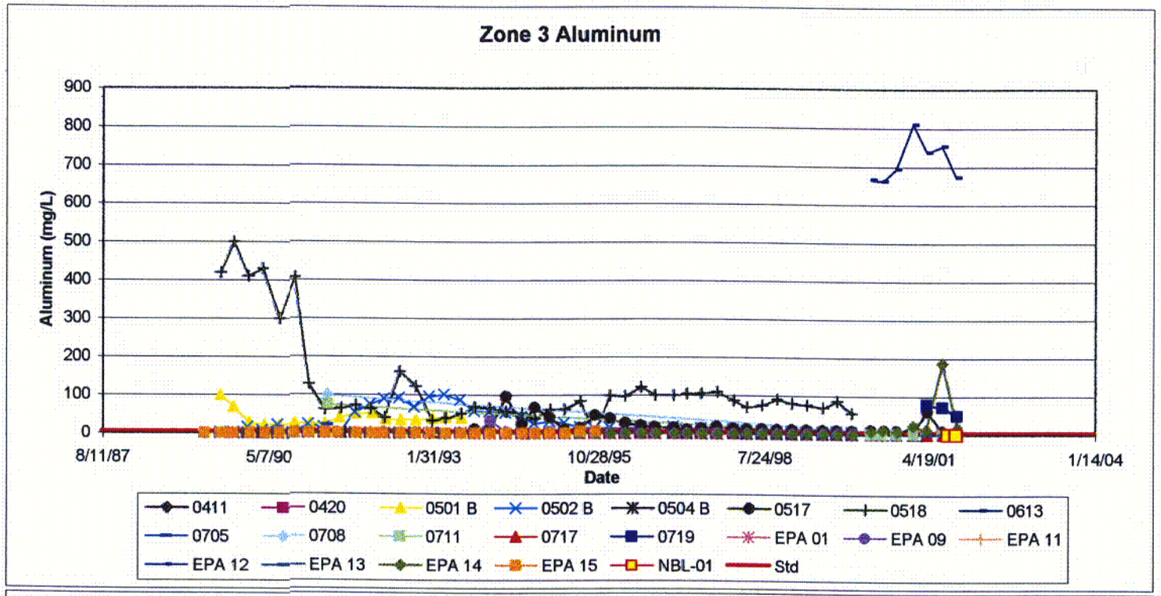
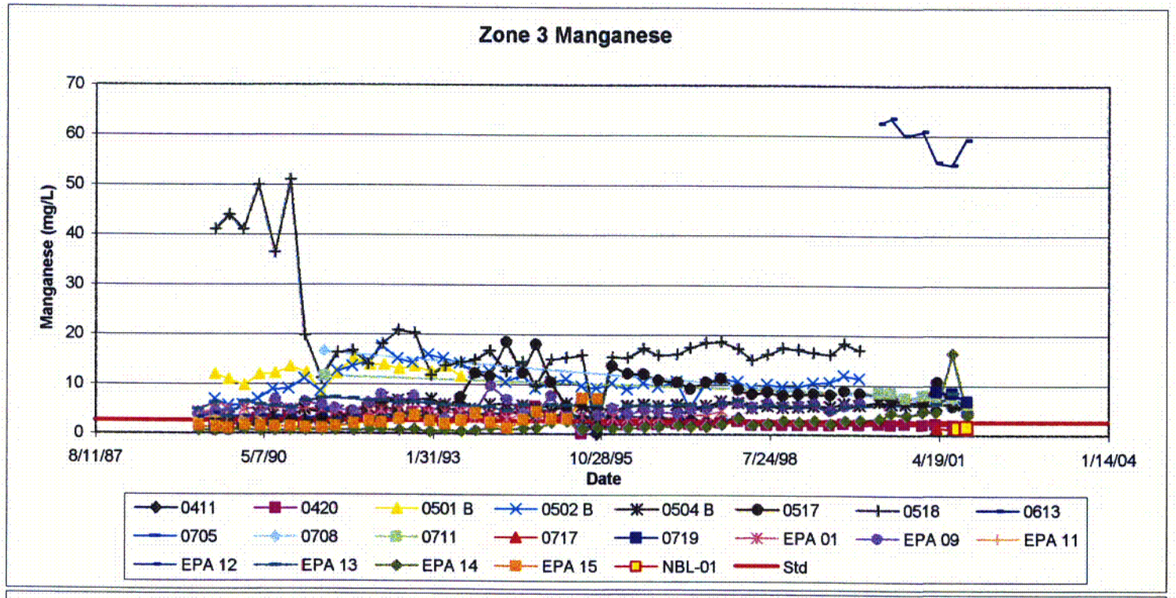
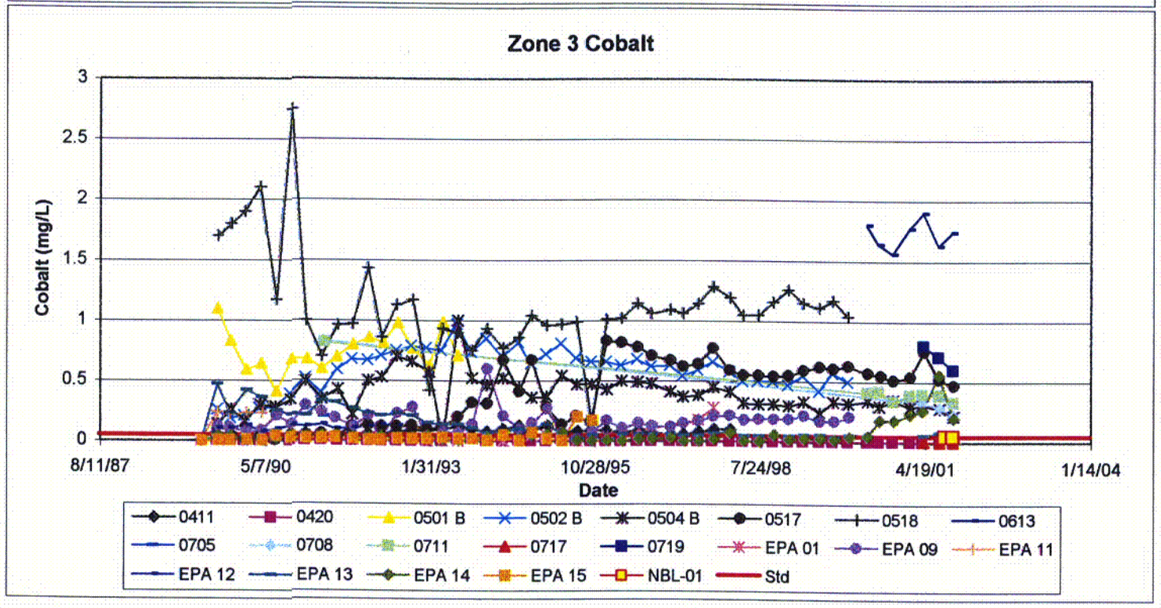
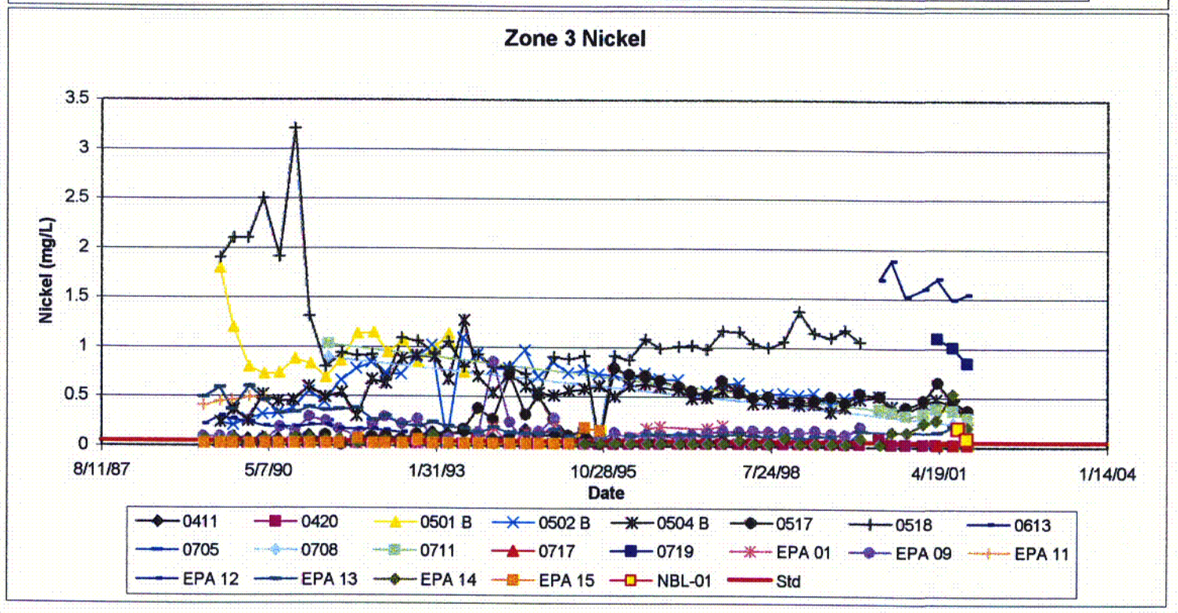
Tables and Figures\Sheet1 Chart 6\Sheet1 Chart 6



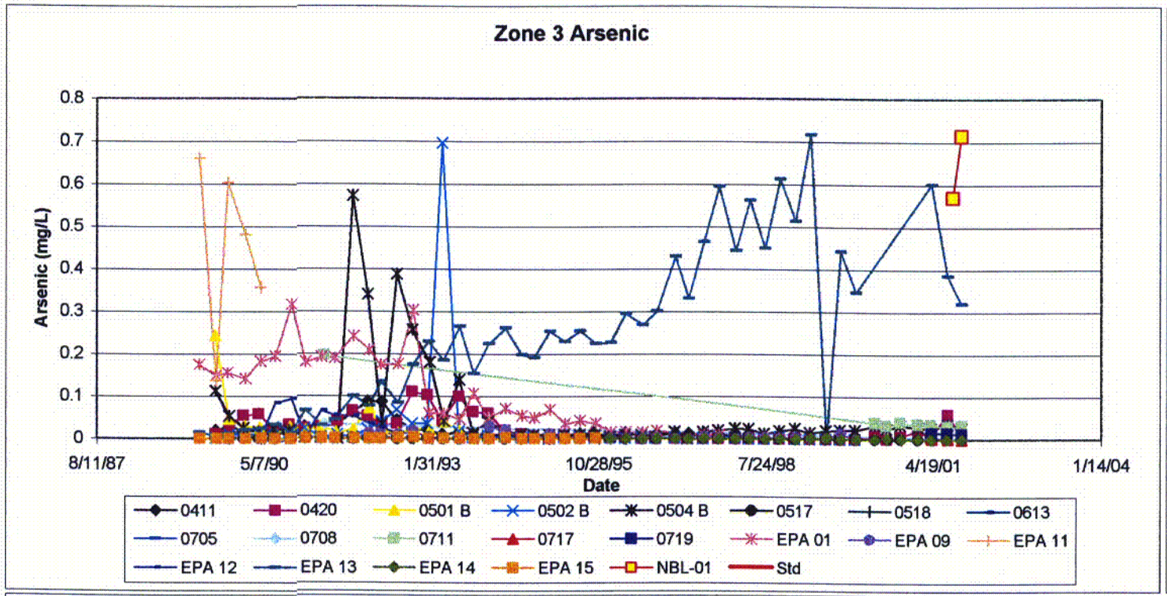


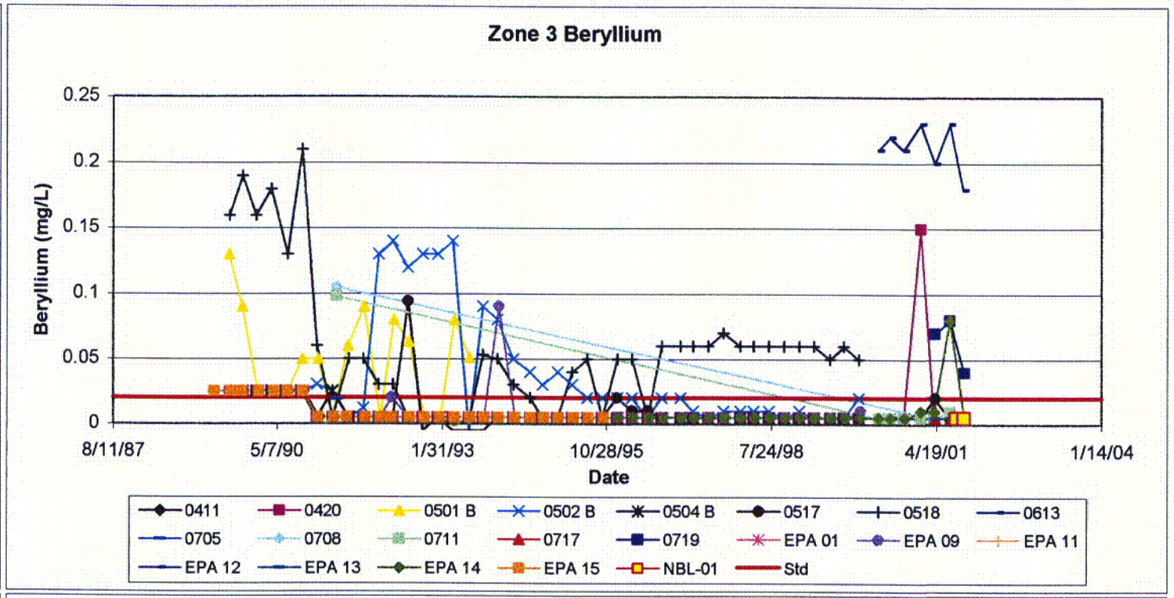


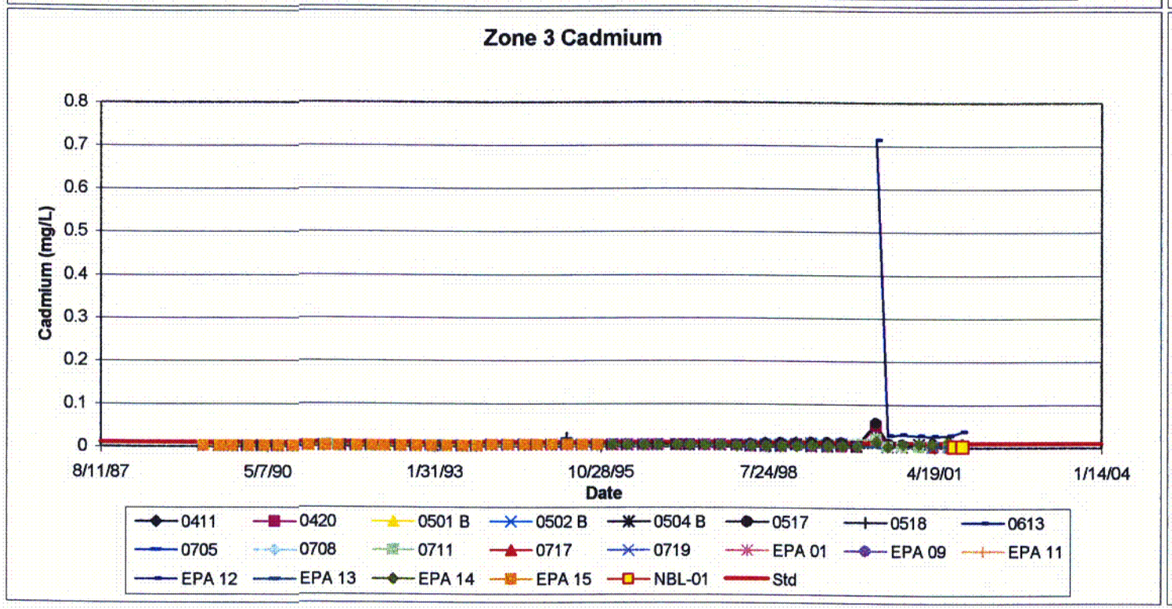


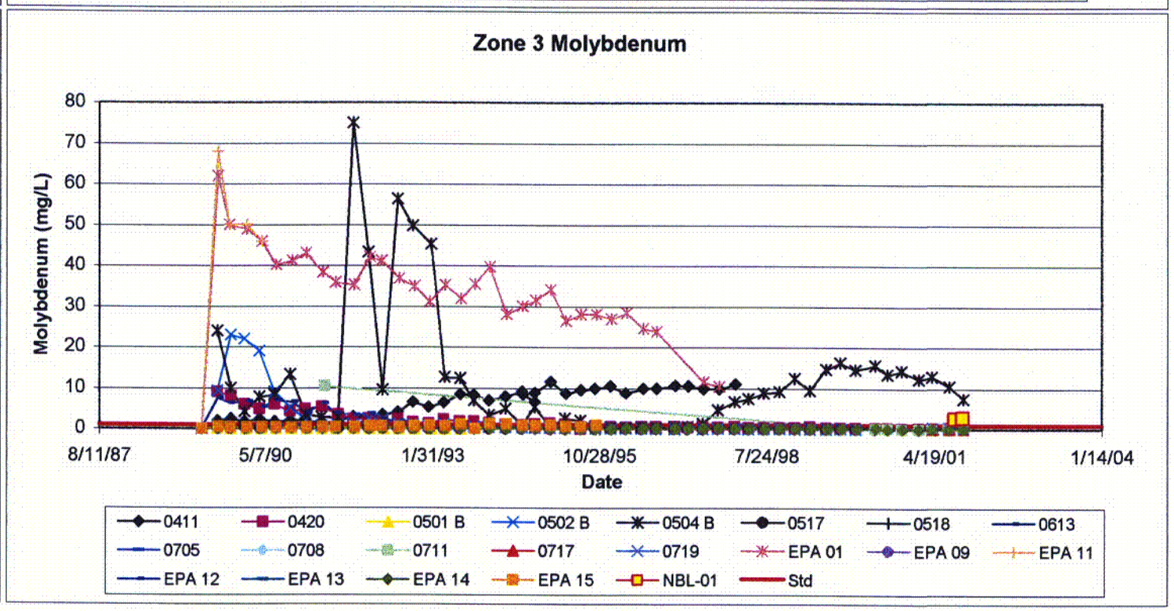
C13

FIGURE 3-13
Zone 3 Metals Concentrations Over Time



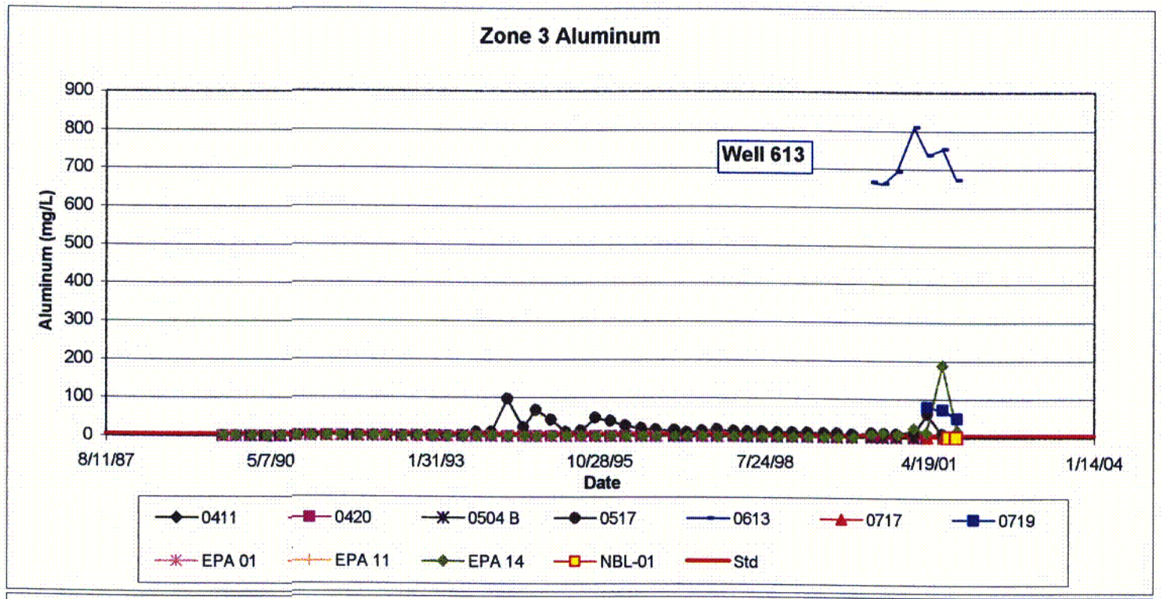


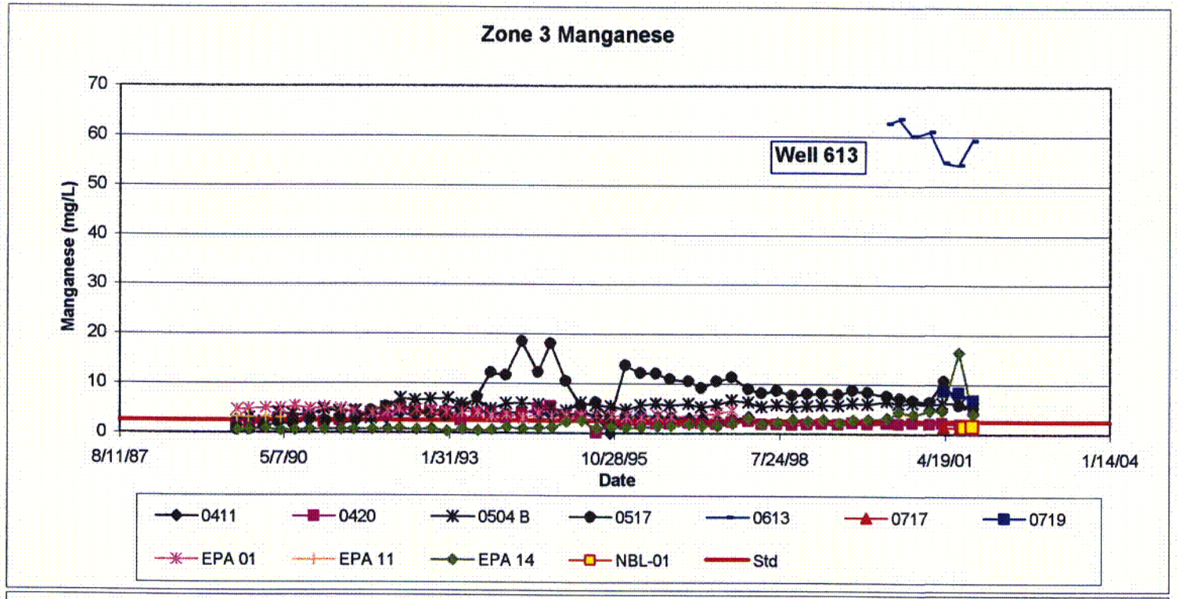


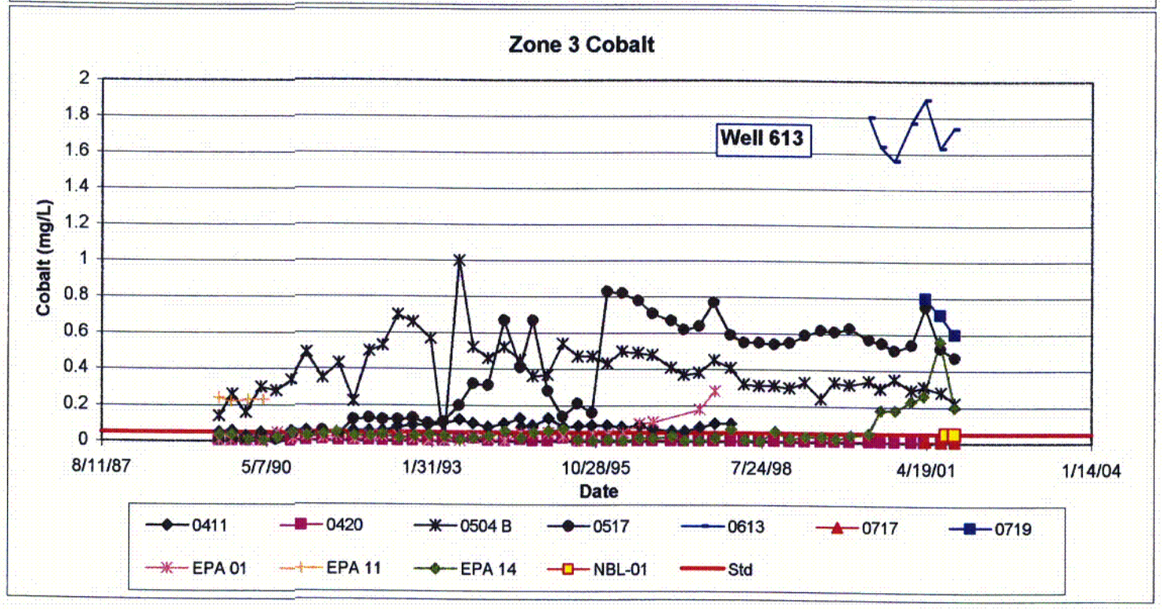


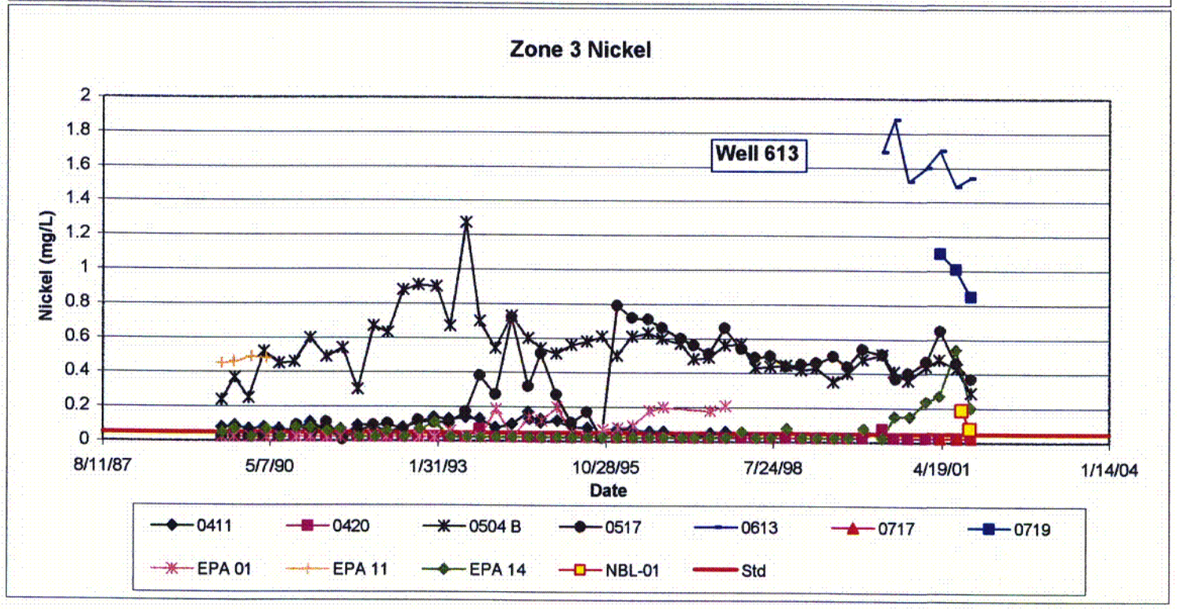
C14

FIGURE 3-13
Zone 3 Metals Concentrations Over Time



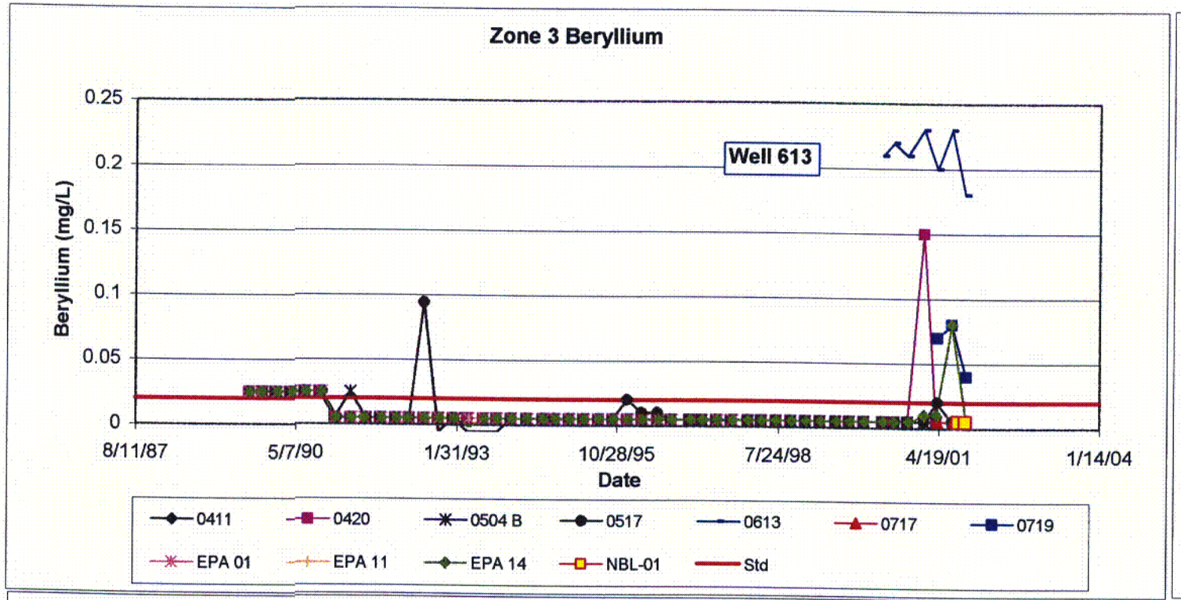


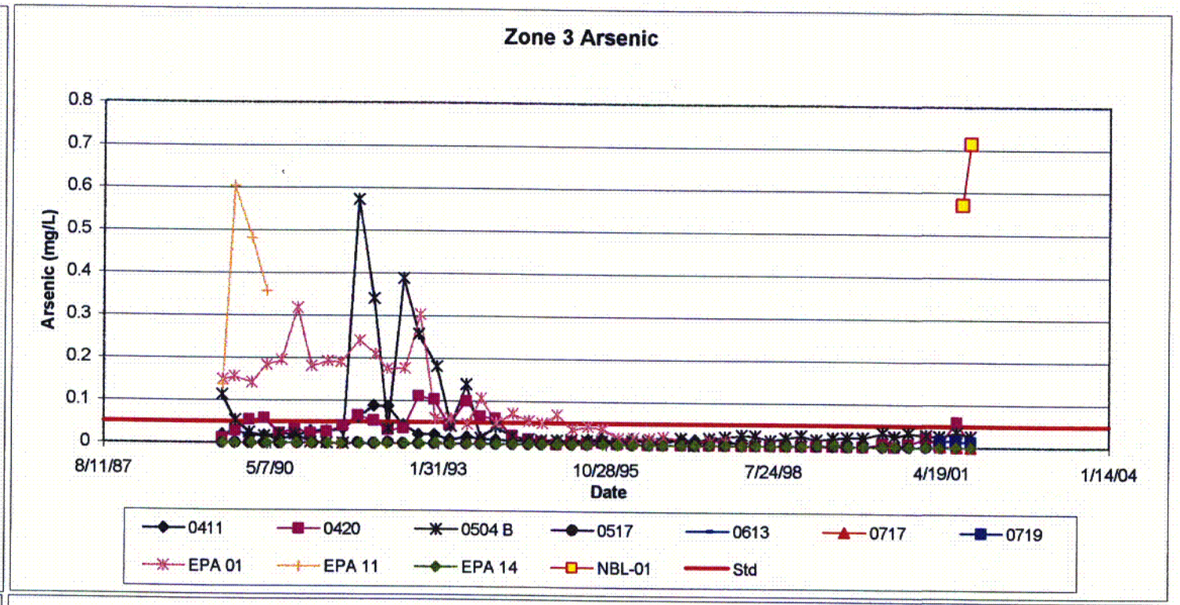


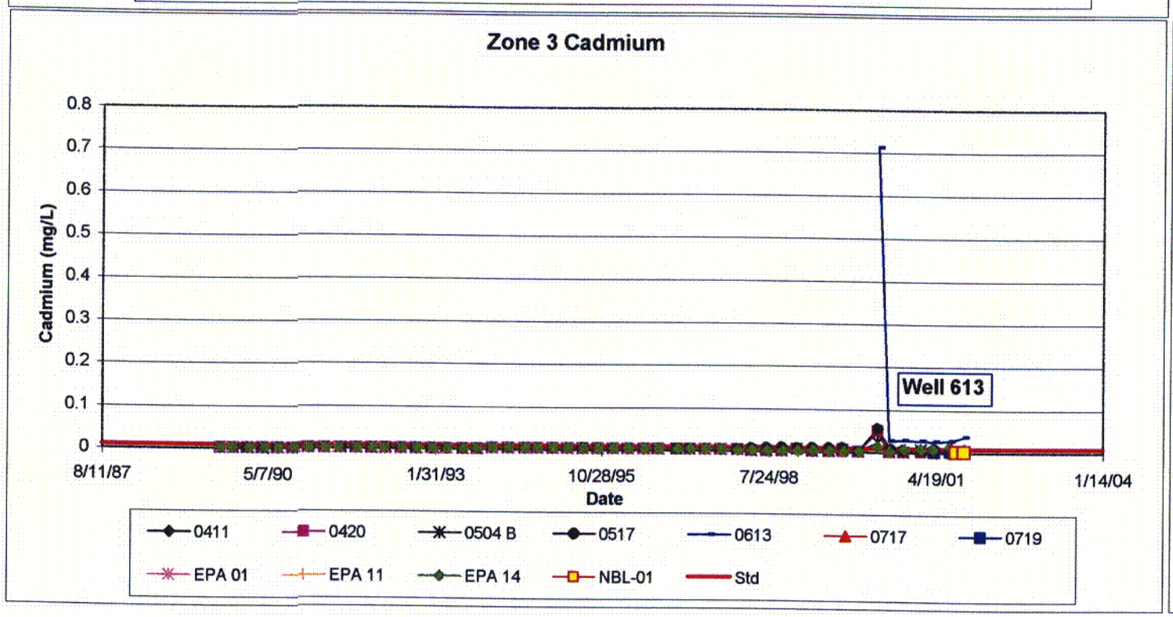


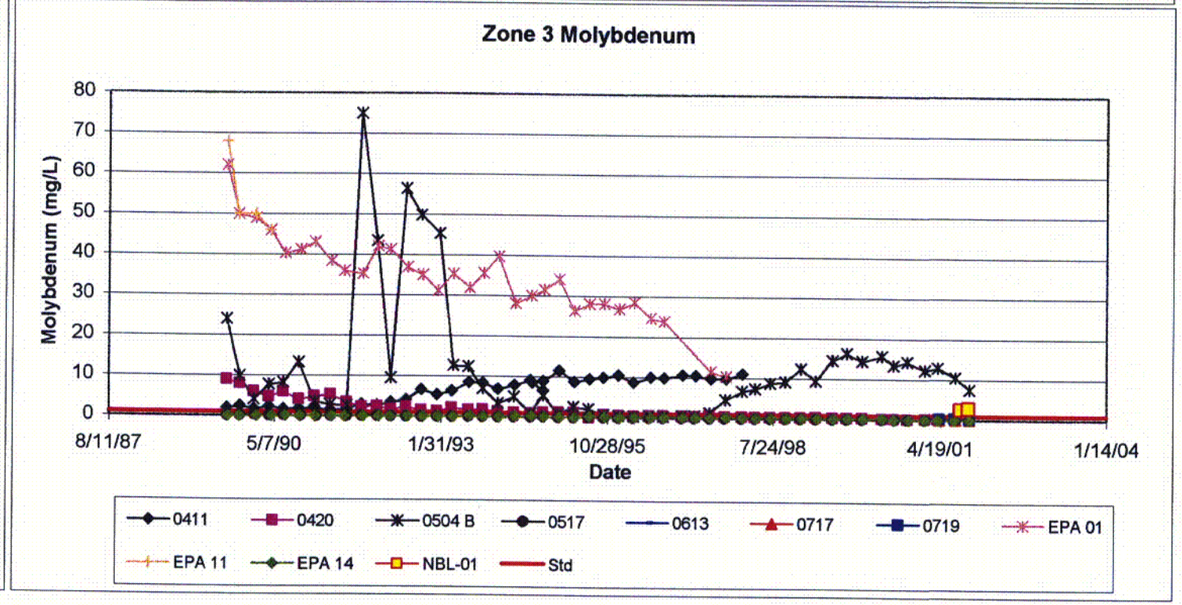
C15

FIGURE 3-14
Attenuation of Metals in Zone 3



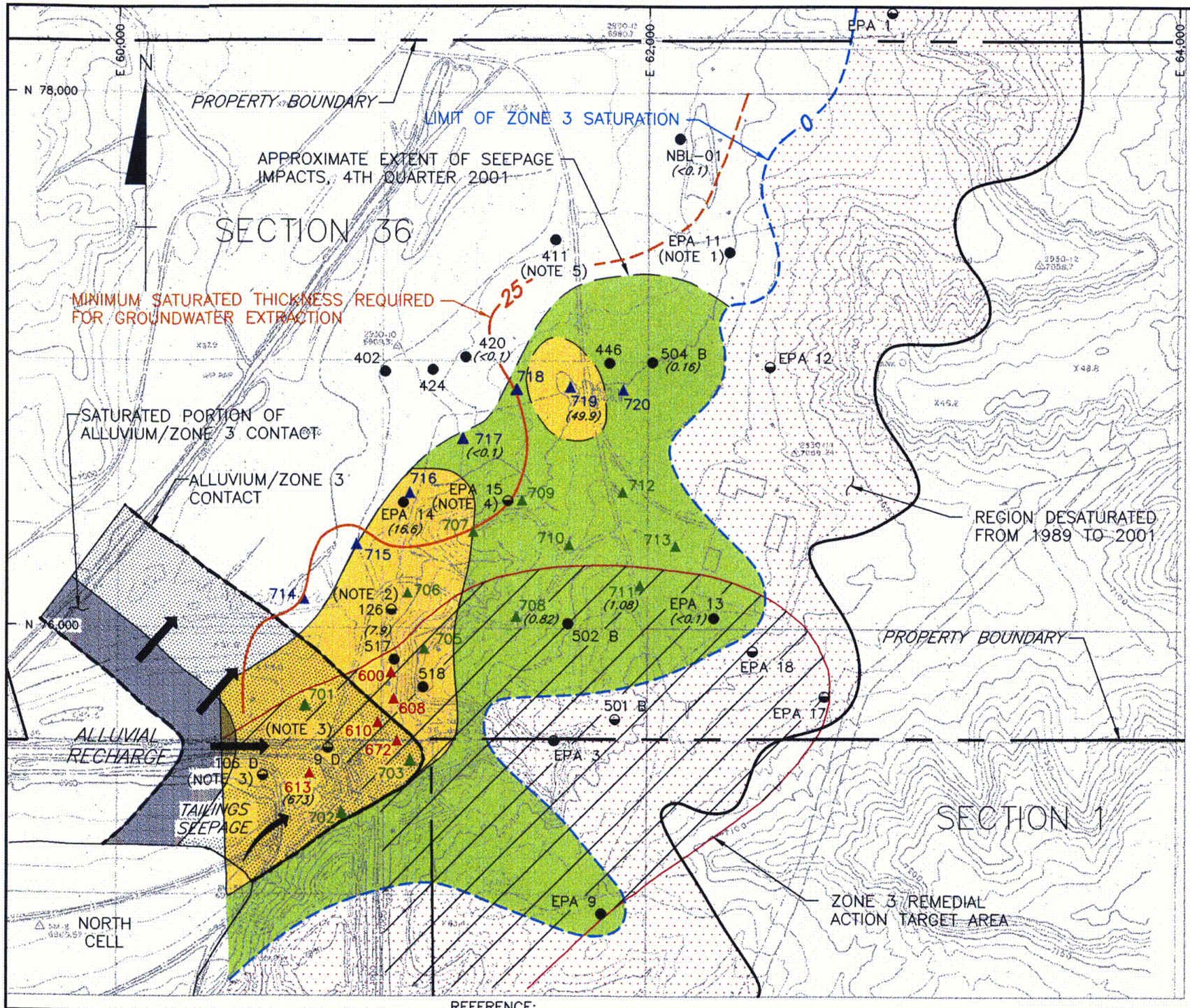






C16

FIGURE 3-14
Attenuation of Metals in Zone 3



LEGEND:

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- EPA 17 ◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- APPROXIMATE AREA IMPACTED BY TAILINGS SEEPAGE
- APPROXIMATE EXTENT OF ALUMINUM EXCEEDING 5.0 mg/L
- *(0.16)* ALUMINUM CONCENTRATION, mg/L

NOTES:

1. MONITORING WELL EPA-11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
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3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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B1253.DWG

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SCALE
400 0 400 FEET

FIGURE 3-15

APPROXIMATE EXTENT OF ALUMINUM EXCEEDING 5.0 mg/L, OCTOBER 2001

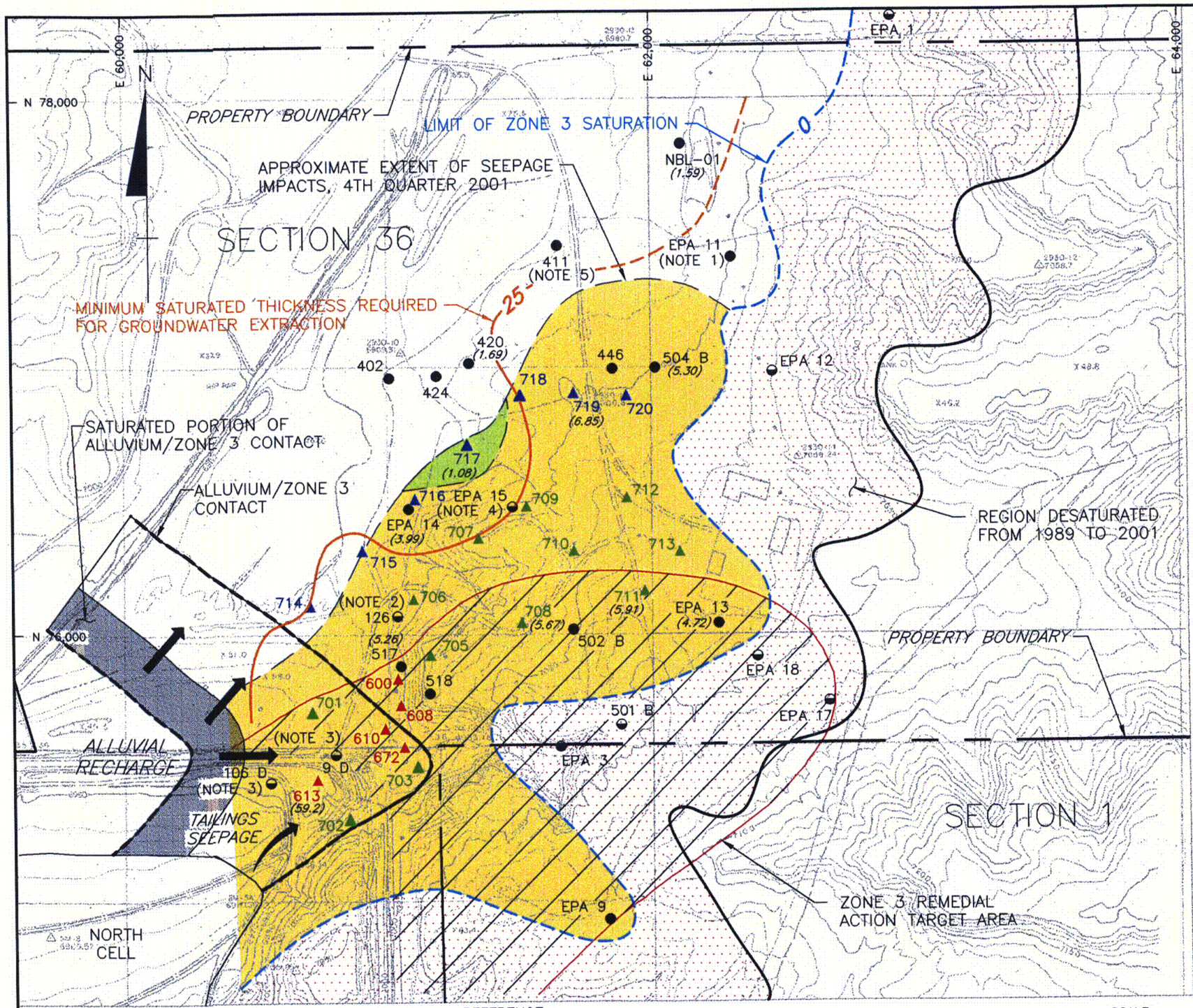
PREPARED FOR:

UNC MINING AND MILLING GALLUP, NEW MEXICO

C17

EARTH TECH

1



LEGEND:

- 608 ▲ NORTHEAST PUMP-BACK WELL LOCATION AND DESIGNATION
- 708 ▲ ZONE 3-STAGE I EXTRACTION WELL LOCATION AND DESIGNATION
- 714 ▲ ZONE 3-STAGE II EXTRACTION WELL LOCATION AND DESIGNATION
- 420 ● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17 ◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- APPROXIMATE AREA IMPACTED BY TAILINGS SEEPAGE
- APPROXIMATE EXTENT OF MANGANESE EXCEEDING 2.6 mg/L
- (5.30) MANGANESE CONCENTRATION, mg/L

NOTES:

1. MONITORING WELL EPA-11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
2. MONITORING WELL 126 WAS COMPLETED ABOVE THE BOTTOM OF ZONE 3. CONSEQUENTLY MEASUREMENTS OF SATURATED THICKNESS IN THIS WELL ARE LESS THAN ACTUAL CONDITIONS.
3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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B1254.DWG

REFERENCE:
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SCALE
400 0 400 FEET

FIGURE 3-16

APPROXIMATE EXTENT OF MANGANESE EXCEEDING 2.6 mg/L, OCTOBER 2001

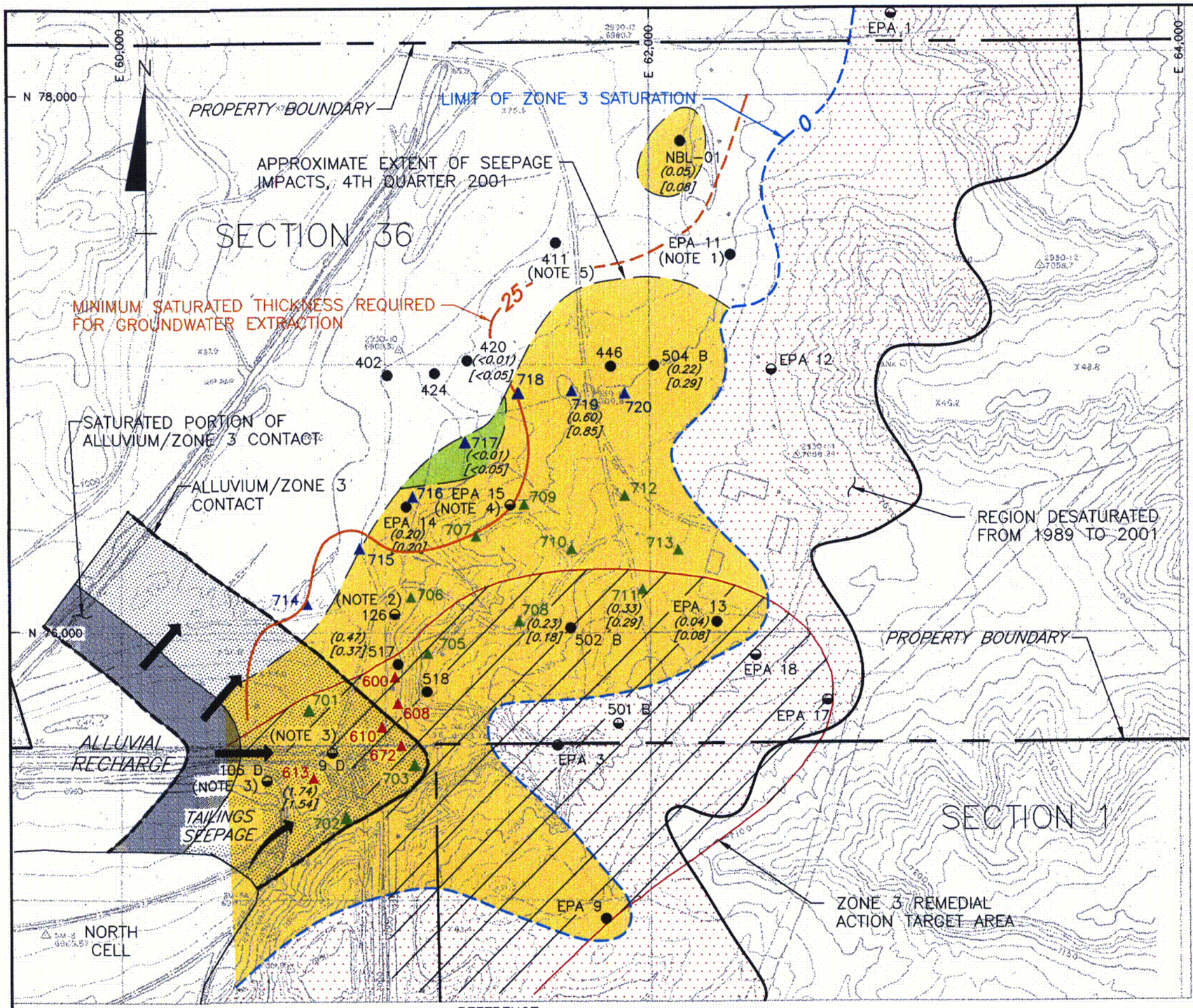
PREPARED FOR:

UNC MINING AND MILLING
GALLUP, NEW MEXICO

C18

EARTH TECH

1



LEGEND:

- 608 ▲ NORTHEAST PUMP-BACK WELL LOCATION AND DESIGNATION
- 708 ▲ ZONE 3-STAGE I EXTRACTION WELL LOCATION AND DESIGNATION
- 714 ▲ ZONE 3-STAGE II EXTRACTION WELL LOCATION AND DESIGNATION
- 420 ● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17 ◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- APPROXIMATE AREA IMPACTED BY TAILINGS SEEPAGE
- APPROXIMATE EXTENT OF COBALT AND NICKEL EXCEEDING 0.05 mg/L
- *(0.60)* COBALT CONCENTRATION, mg/L
- *[0.85]* NICKEL CONCENTRATION, mg/L

NOTES:

1. MONITORING WELL EPA-11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
2. MONITORING WELL 126 WAS COMPLETED ABOVE THE BOTTOM OF ZONE 3. CONSEQUENTLY MEASUREMENTS OF SATURATED THICKNESS IN THIS WELL ARE LESS THAN ACTUAL CONDITIONS.
3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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B1252.DWG

REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, N.M. DATED: 8-1-96. SCALE: 1" = 400'.

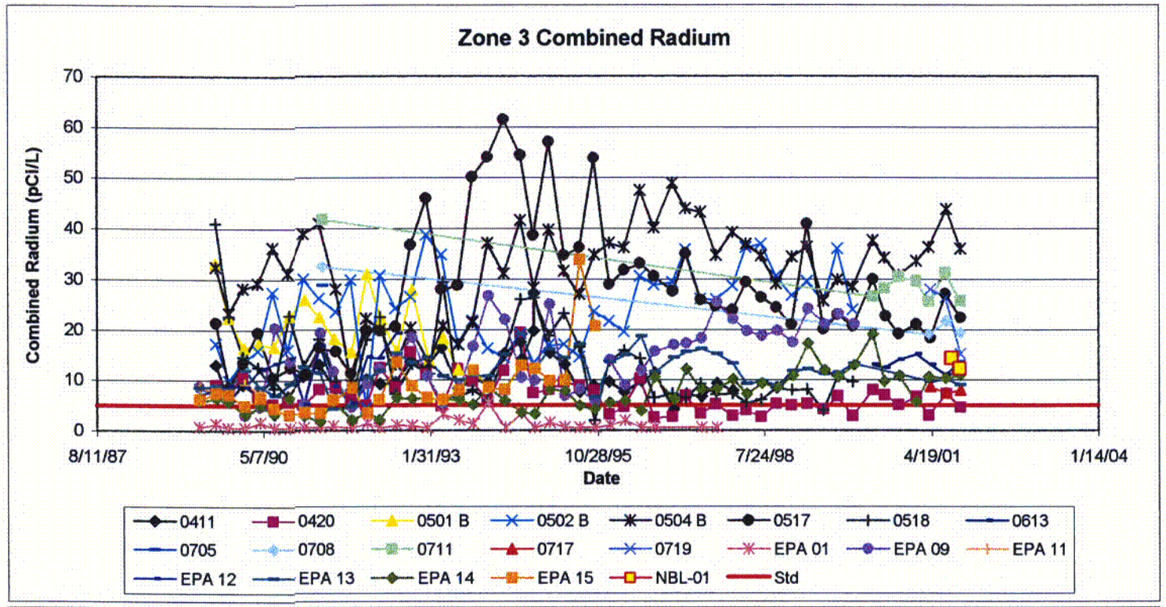
SCALE
400 0 400 FEET

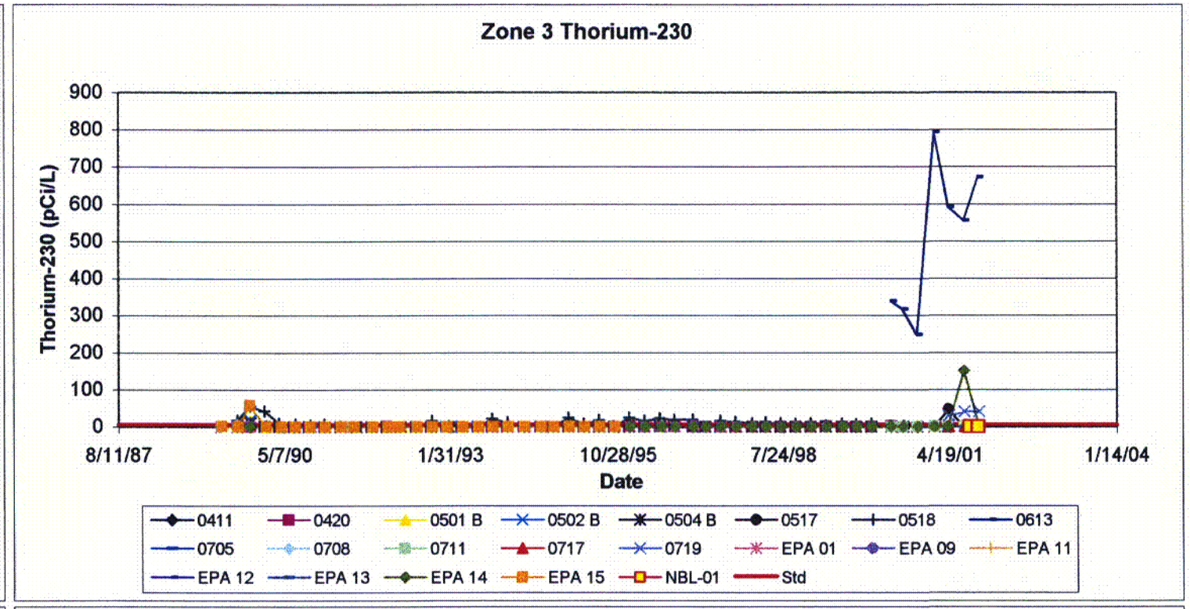
FIGURE 3-17
APPROXIMATE EXTENT OF COBALT AND NICKEL EXCEEDING 0.05 mg/L, OCTOBER 2001
PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

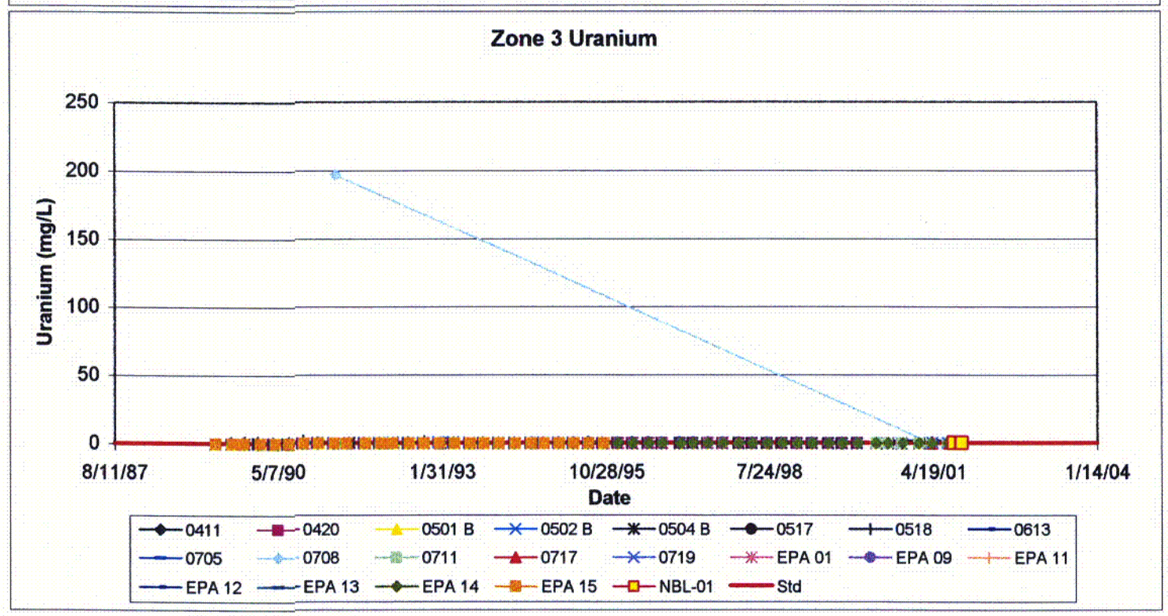
C19

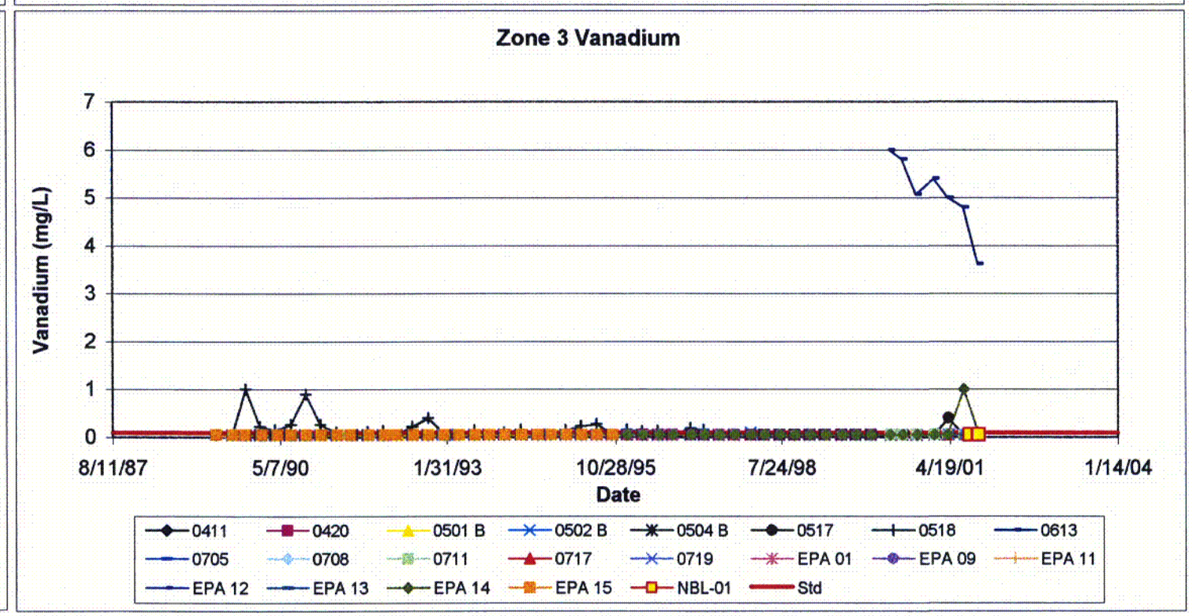
EARTH TECH

1





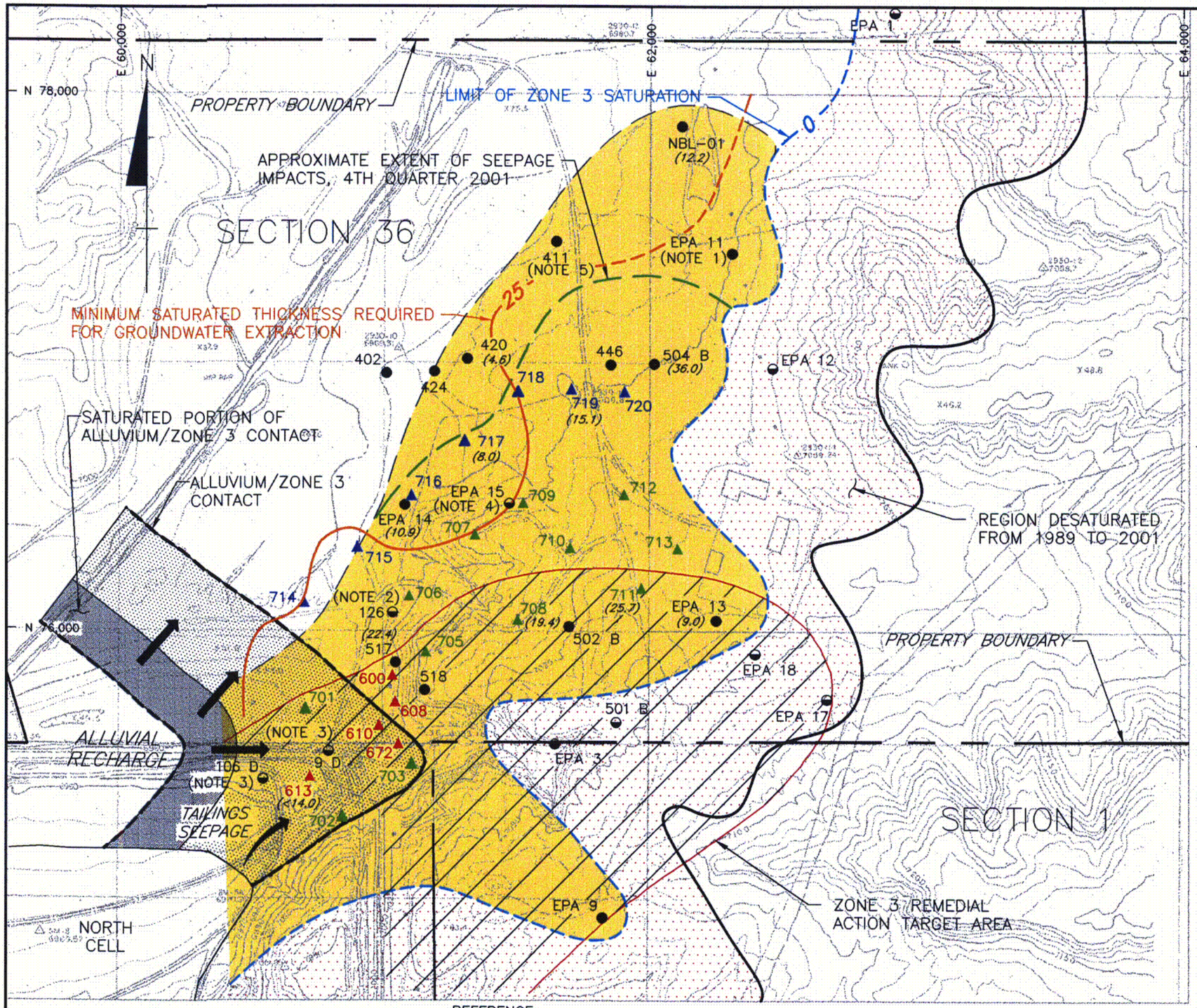




C 20

FIGURE 3-18
Zone 3 Radionuclides Over Time

L:\Work\32114\Proj\Annual-2001\Constituent Graphs-Zone 3



LEGEND:

- 608 ▲ NORTHEAST PUMP-BACK WELL LOCATION AND DESIGNATION
- 708 ▲ ZONE 3-STAGE I EXTRACTION WELL LOCATION AND DESIGNATION
- 714 ▲ ZONE 3-STAGE II EXTRACTION WELL LOCATION AND DESIGNATION
- 420 ● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17 ◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- APPROXIMATE AREA IMPACTED BY TAILINGS SEEPAGE
- APPROXIMATE EXTENT OF COMBINED RADIUM EXCEEDING 5.0 pCi/L
- (36.0) COMBINED RADIUM-226 & RADIUM-228 CONCENTRATION, pCi/L

NOTES:

1. MONITORING WELL EPA-11 WAS NOT USABLE AS OF THIRD QUARTER 1990. THE WATER LEVEL DROPPED BELOW THE PUMP INTAKE. THE PUMP COULD NOT BE LOWERED BECAUSE IT IS CEMENTED IN THE WELL. THE NRC AND EPA WERE NOTIFIED OF THIS PROBLEM IN TELEPHONE CONVERSATIONS ON JULY 18 AND SEPTEMBER 5, 1990.
2. MONITORING WELL 126 WAS COMPLETED ABOVE THE BOTTOM OF ZONE 3. CONSEQUENTLY MEASUREMENTS OF SATURATED THICKNESS IN THIS WELL ARE LESS THAN ACTUAL CONDITIONS.
3. MONITORING WELLS 9 D AND 106 D APPEAR TO BE COMPLETED ABOVE THE BOTTOM OF ZONE 3. MEASUREMENTS OF SATURATED THICKNESS IN THESE WELLS MAY BE LESS THAN ACTUAL CONDITIONS.
4. THE BOTTOM OF MONITORING WELL EPA 15 IS COMPLETED IN A SHALE LAYER WHICH CONTAINS NO WATER.
5. WELL 411 FILLED WITH OIL AS OF SECOND QUARTER 1998.

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SCALE
400 0 400 FEET

FIGURE 3-19
APPROXIMATE EXTENT OF COMBINED RADIUM-226 AND RADIUM-228 EXCEEDING 5.0 pCi/L, OCTOBER 2001
PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

C21

EARTH TECH

1

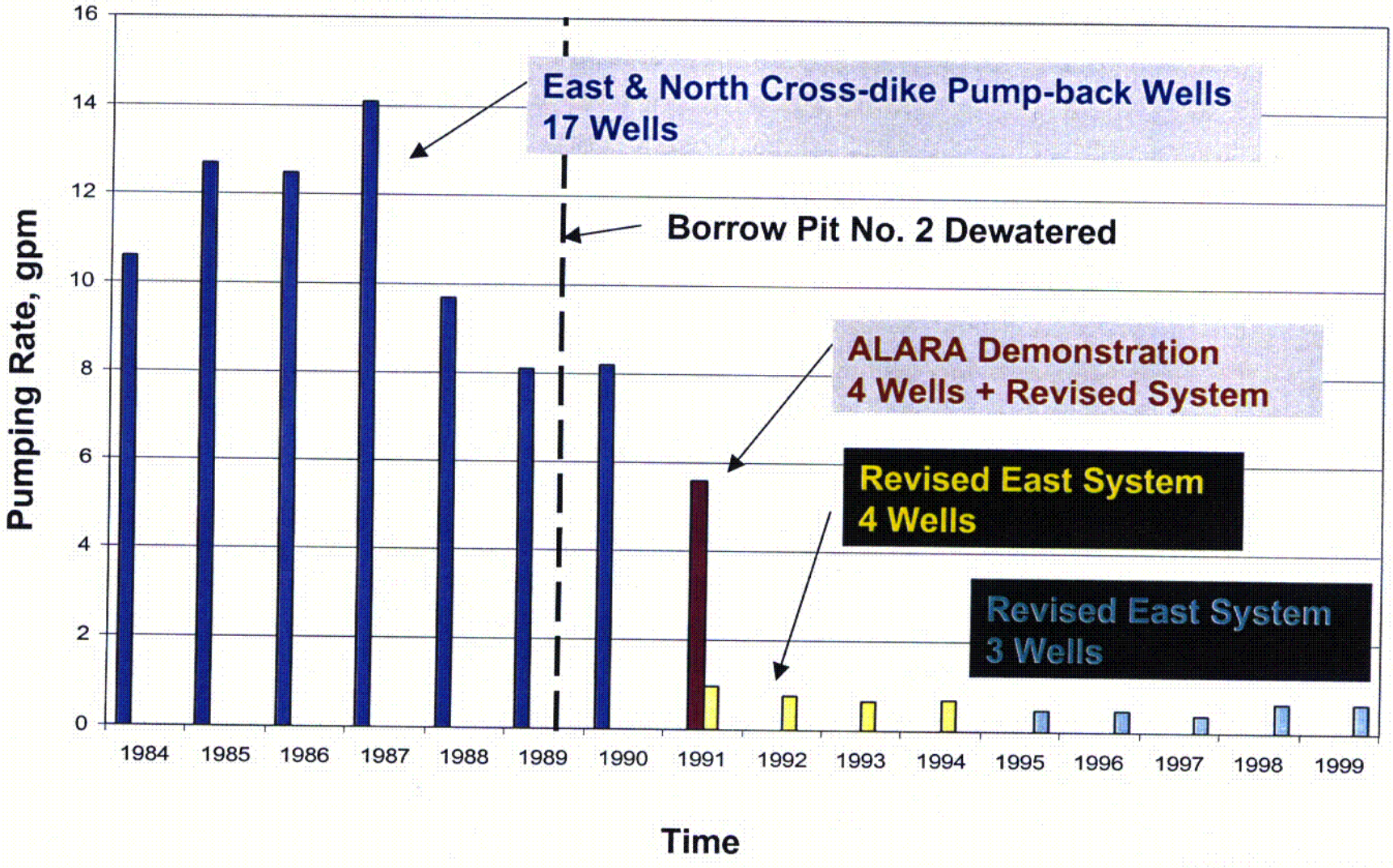
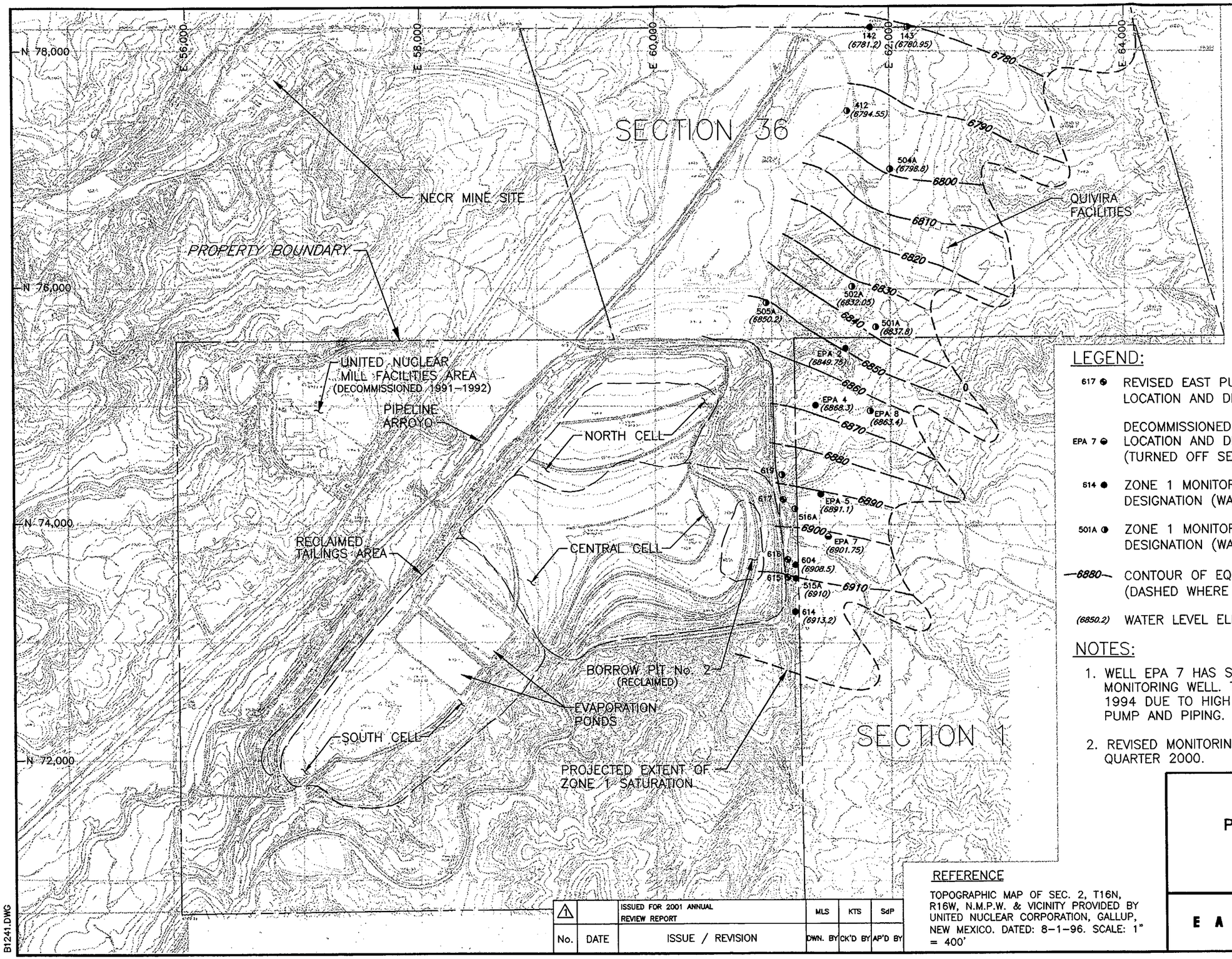


FIGURE 4-1
Zone 1 Pumping Rates

L:\Work\32114\Proj\Annual-2001\Tables and Figures\Powerpoint Figures

C22



LEGEND:

- 617 ◔ REVISED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF JULY, 1999)
- EPA 7 ◒ DECOMMISSIONED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF SEPTEMBER, 1990)
- 614 ● ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER QUALITY AND WATER LEVEL)
- 501A ◑ ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER LEVEL ONLY)
- —6880— CONTOUR OF EQUAL WATER ELEVATION (DASHED WHERE INFERRED)
- (6850.2) WATER LEVEL ELEVATION, FEET (MSL)

NOTES:

1. WELL EPA 7 HAS SERVED AS BOTH A PUMP–BACK AND MONITORING WELL. THE PUMP WAS SHUT OFF OCTOBER 1994 DUE TO HIGH LEVELS OF PRECIPITATION IN THE PUMP AND PIPING.
2. REVISED MONITORING PROGRAM IMPLEMENTED IN SECOND QUARTER 2000.

REFERENCE

TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W, N.M.P.W. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, NEW MEXICO. DATED: 8–1–96. SCALE: 1" = 400'

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FIGURE 4-2
ZONE 1 PIEZOMETRIC SURFACE MAP

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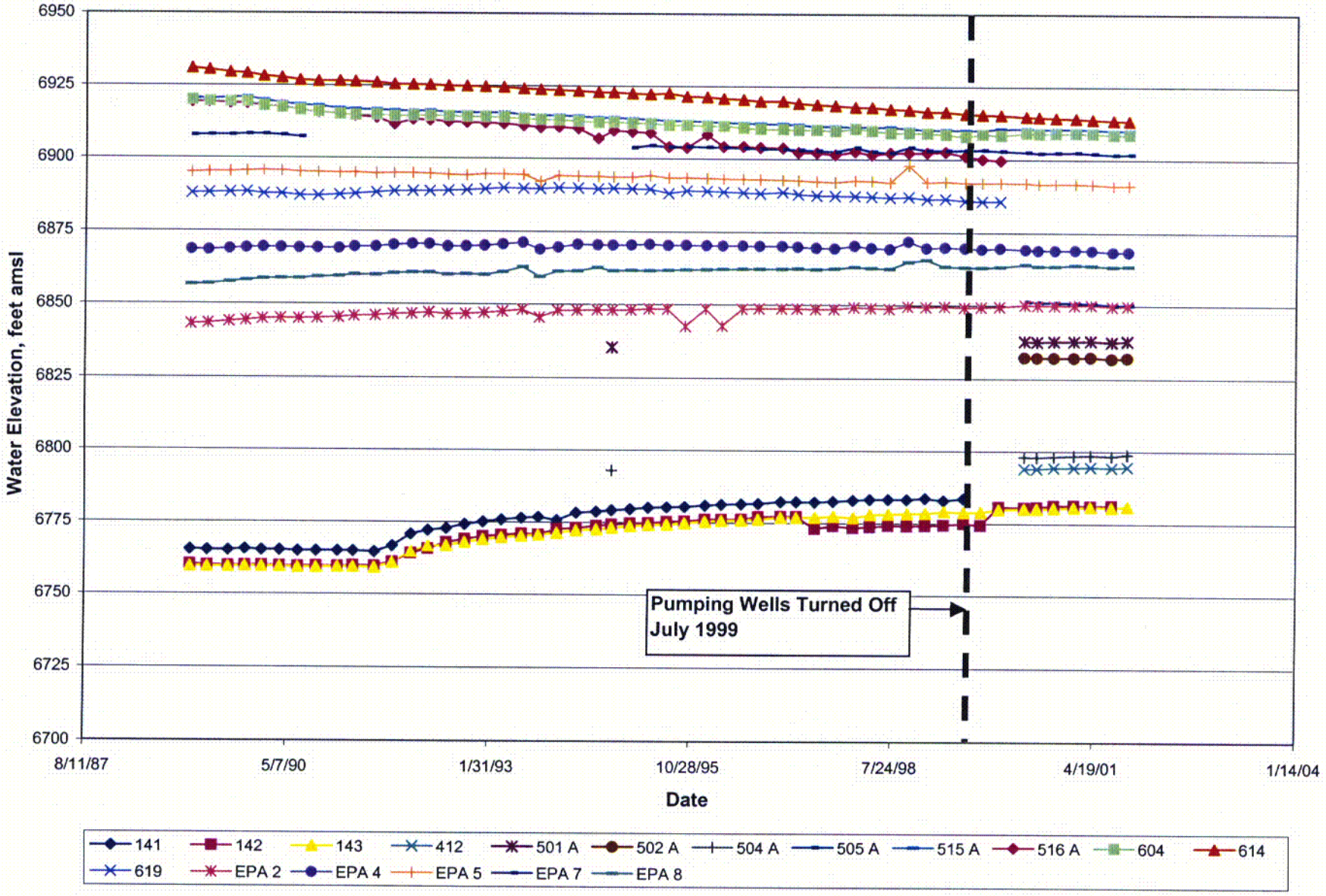
GALLUP, NEW MEXICO

EARTH TECH

B1241.DWG

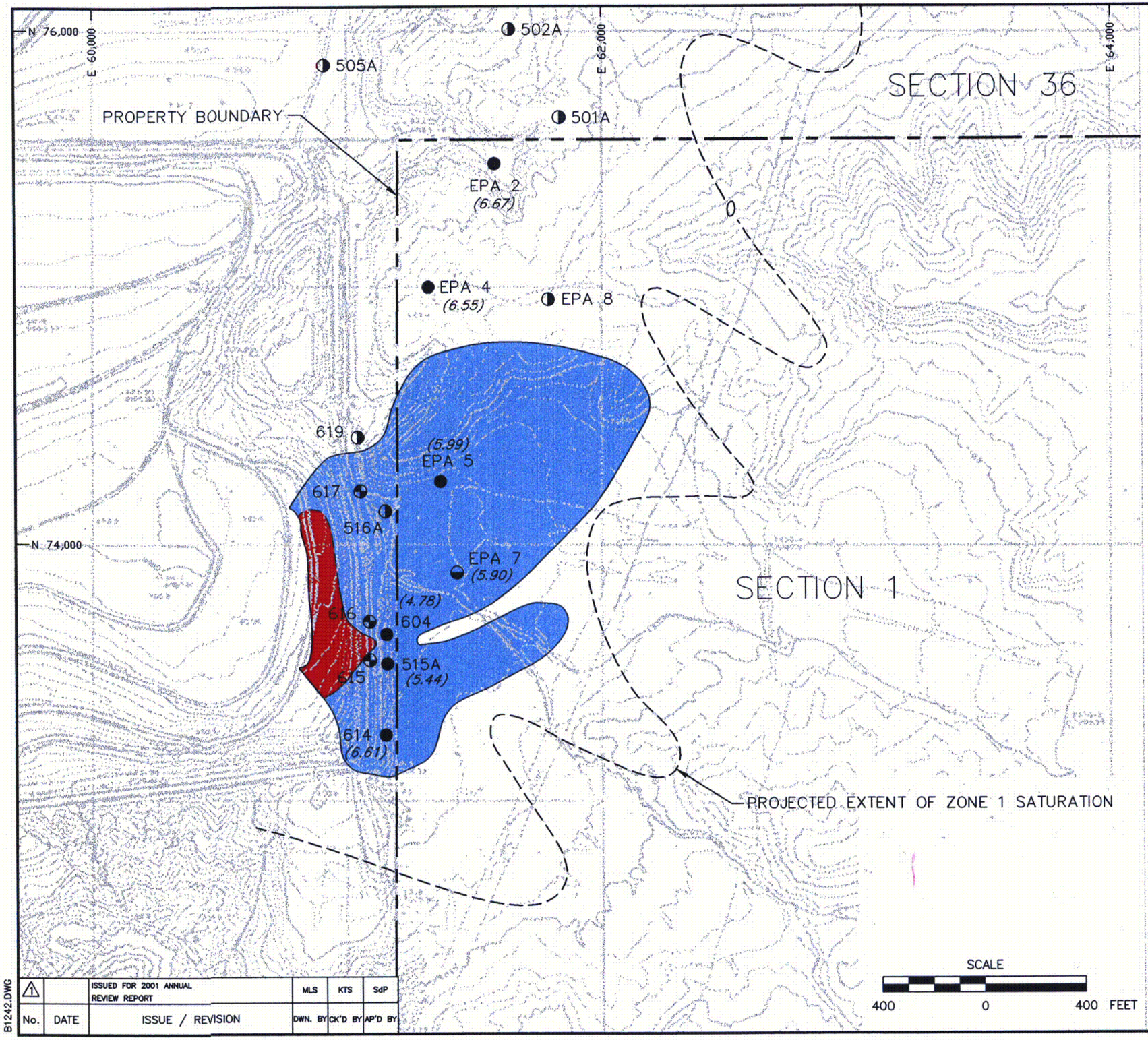
1



C23 **FIGURE 4-3**

Zone 1 Water Levels Over Time

L\Work\32114\Proj\Annual-2001\Chart Chart 1\Chart Chart 1



LEGEND:

- 617 ◓ REVISED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF JULY, 1999)
- EPA 7 ◒ DECOMMISSIONED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF SEPTEMBER, 1990)
- 614 ● ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER QUALITY AND WATER LEVEL)
- 501A ◑ ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER LEVEL ONLY)
- APPROXIMATE EXTENT OF ZONE 1 SEEPAGE IMPACTS (DELINEATED BY CHLORIDE >50 mg/L)
- APPROXIMATE EXTENT OF ZONE 1 pH LESS THAN 4.0
- *(6.67)* pH READING

NOTES:

1. WELL EPA 7 HAS SERVED AS BOTH A PUMP–BACK AND MONITORING WELL. THE PUMP WAS SHUT OFF OCTOBER 1994 DUE TO HIGH LEVELS OF PRECIPITATION IN THE PUMP AND PIPING.
2. REVISED MONITORING PROGRAM IMPLEMENTED IN SECOND QUARTER 2000.

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TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, N.M. DATED: 8–1–96. SCALE: 1" = 400'.

SCALE
400 0 400 FEET

N

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B1242.DWG

FIGURE 4-4

ZONE 1 EXTENT OF SEEPAGE IMPACTS, OCTOBER 2001

PREPARED FOR:

UNC MINING AND MILLING GALLUP, NEW MEXICO

C24

EARTH TECH

1

N 76,000

E 60,000

E 62,000

E 64,000

502A

505A

SECTION 36

PROPERTY BOUNDARY

501A

EPA 2
(<0.001)

0

EPA 4
(<0.001)

EPA 8

619

617

EPA 5
(<0.001)

516A

(<0.001)
EPA 7

N 74,000

(0.003)
616
604

615
515A
(0.165)

614
(0.183)

SECTION 1

PROJECTED EXTENT OF ZONE 1 SATURATION

SCALE

400 0 400 FEET

N

LEGEND:

617 REVISED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF JULY, 1999)

EPA 7 DECOMMISSIONED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF SEPTEMBER, 1990)

614 ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER QUALITY AND WATER LEVEL)

501A ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER LEVEL ONLY)

APPROXIMATE EXTENT OF ZONE 1 SEEPAGE IMPACTS (DELINEATED BY CHLORIDE >50 mg/L)

APPROXIMATE EXTENT OF CHLOROFORM EXCEEDING 0.001 mg/L

(<0.001) CHLOROFORM CONCENTRATION, mg/L

NOTES:

1. WELL EPA 7 HAS SERVED AS BOTH A PUMP–BACK AND MONITORING WELL. THE PUMP WAS SHUT OFF OCTOBER 1994 DUE TO HIGH LEVELS OF PRECIPITATION IN THE PUMP AND PIPING.
2. REVISED MONITORING PROGRAM IMPLEMENTED IN SECOND QUARTER 2000.

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B1248.DWG

FIGURE 4-5

APPROXIMATE EXTENT OF CHLOROFORM EXCEEDING 0.001 mg/L, OCTOBER 2001

PREPARED FOR:

UNC MINING AND MILLING
GALLUP, NEW MEXICO

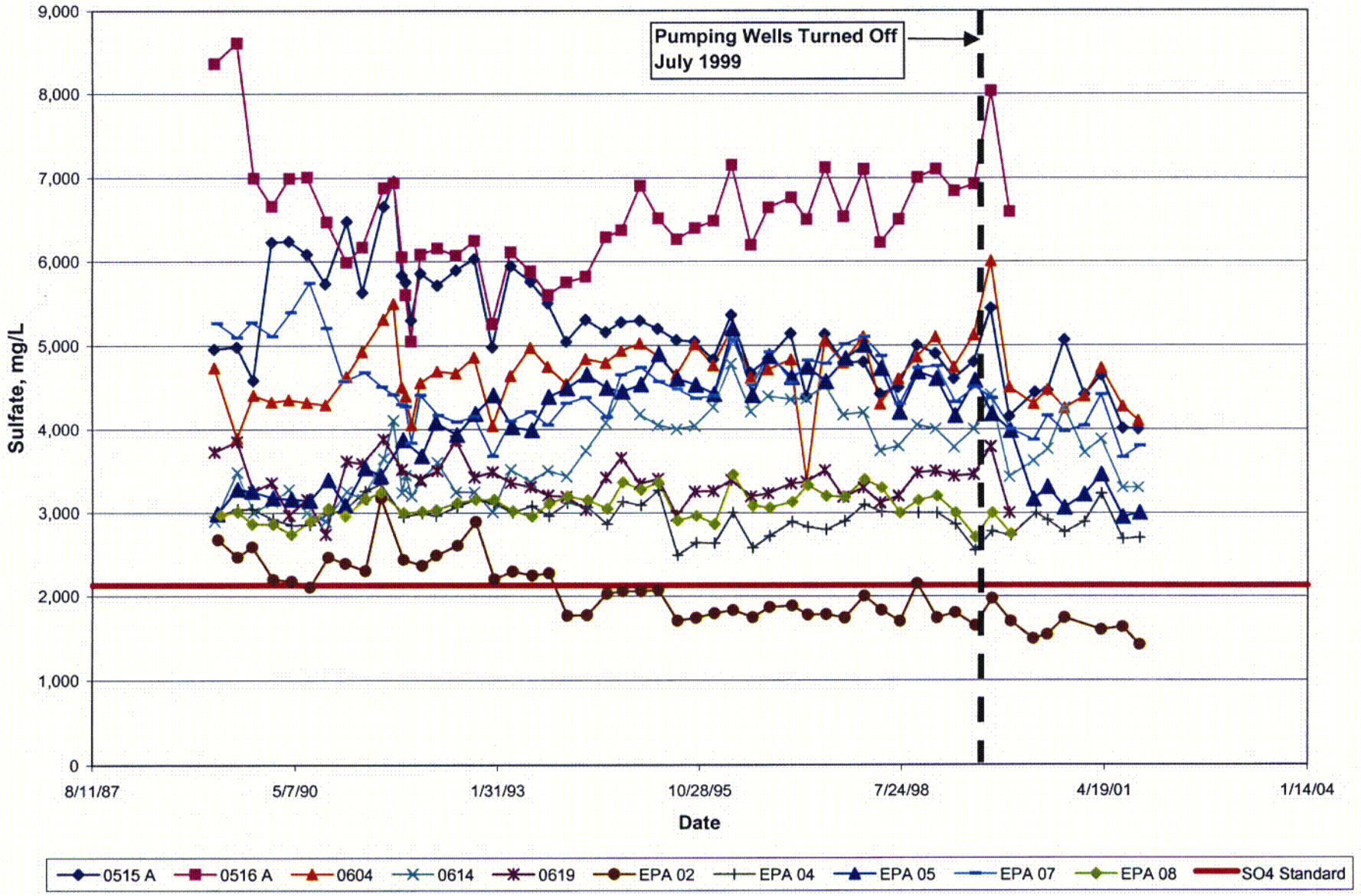
C25

EARTH TECH

1

Constituent	Will Standards Be Met?		Remarks
	Section 1	Section 36	
Manganese	Maybe	Maybe	Dependent on bicarbonate availability
Sulfate	No	No	Limited by calcium availability
TDS	No	No	Governed by sulfate concentration
Metals	Yes	Yes	Attenuated by neutralization and adsorption
Radionuclides	Yes	Yes	Attenuated by neutralization and adsorption

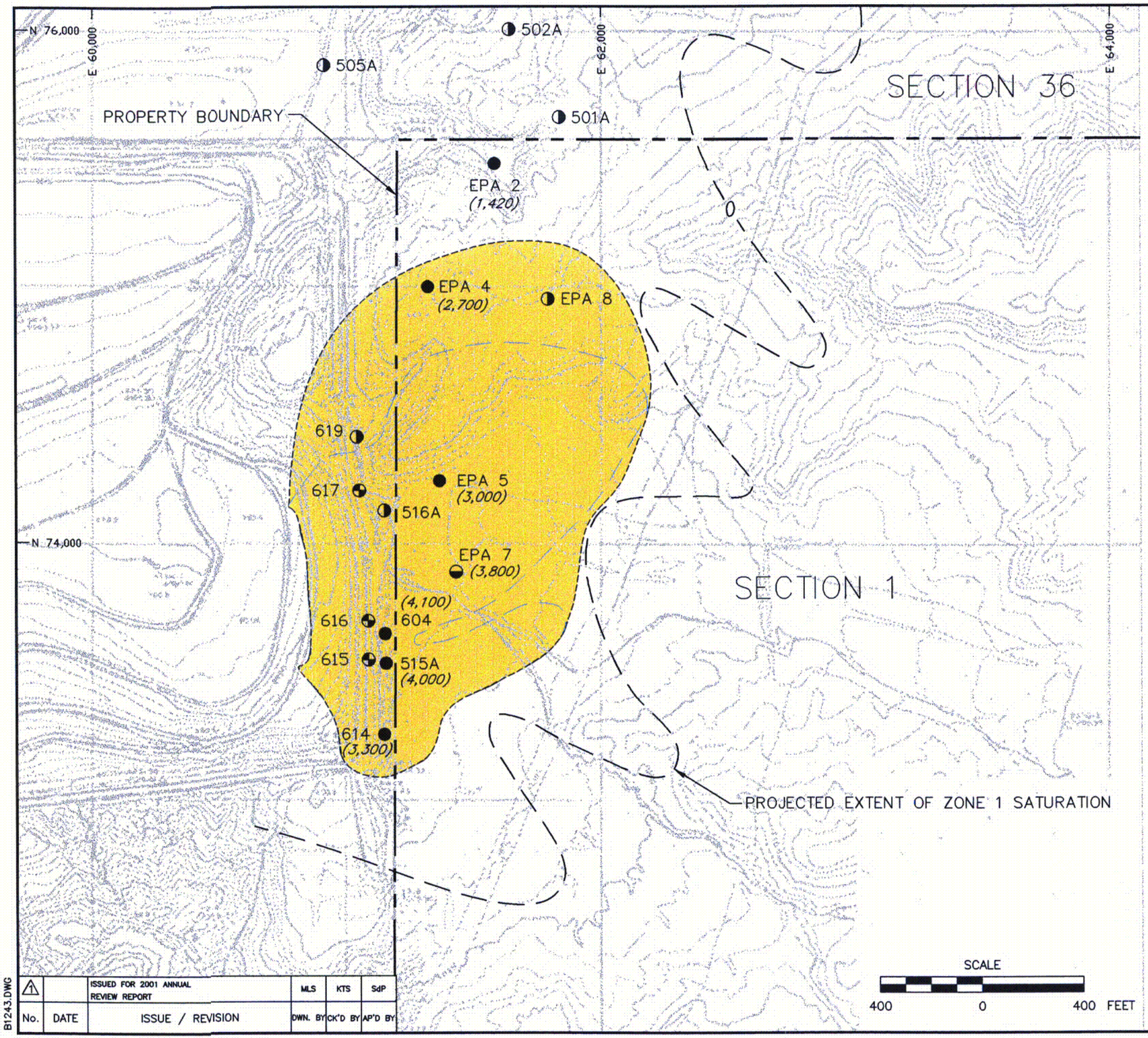
FIGURE 4-6
Predicted Performance of the Zone 1 Natural System



C26

FIGURE 4-7
Zone 1 Sulfate Concentrations Over Time

L\Work\32114\Proj\Annual-2001\Tables and Figures
\Sulfate Graph Chart 1\Sulfate Graph Chart 1



LEGEND:

- 617 ◓ REVISED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF JULY, 1999)
- EPA 7 ◒ DECOMMISSIONED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF SEPTEMBER, 1990)
- 614 ● ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER QUALITY AND WATER LEVEL)
- 501A ◑ ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER LEVEL ONLY)
- APPROXIMATE EXTENT OF ZONE 1 SEEPAGE IMPACTS (DELINEATED BY CHLORIDE >50 mg/L)
- APPROXIMATE EXTENT OF SULFATE EXCEEDING 2,125 mg/L
- *(1,420)* SULFATE CONCENTRATION, mg/L

NOTES:

1. WELL EPA 7 HAS SERVED AS BOTH A PUMP–BACK AND MONITORING WELL. THE PUMP WAS SHUT OFF OCTOBER 1994 DUE TO HIGH LEVELS OF PRECIPITATION IN THE PUMP AND PIPING.
2. REVISED MONITORING PROGRAM IMPLEMENTED IN SECOND QUARTER 2000.

N

REFERENCE:
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B1243.DWG

FIGURE 4-8

APPROXIMATE EXTENT OF SULFATE EXCEEDING 2,125 mg/L, OCTOBER 2001

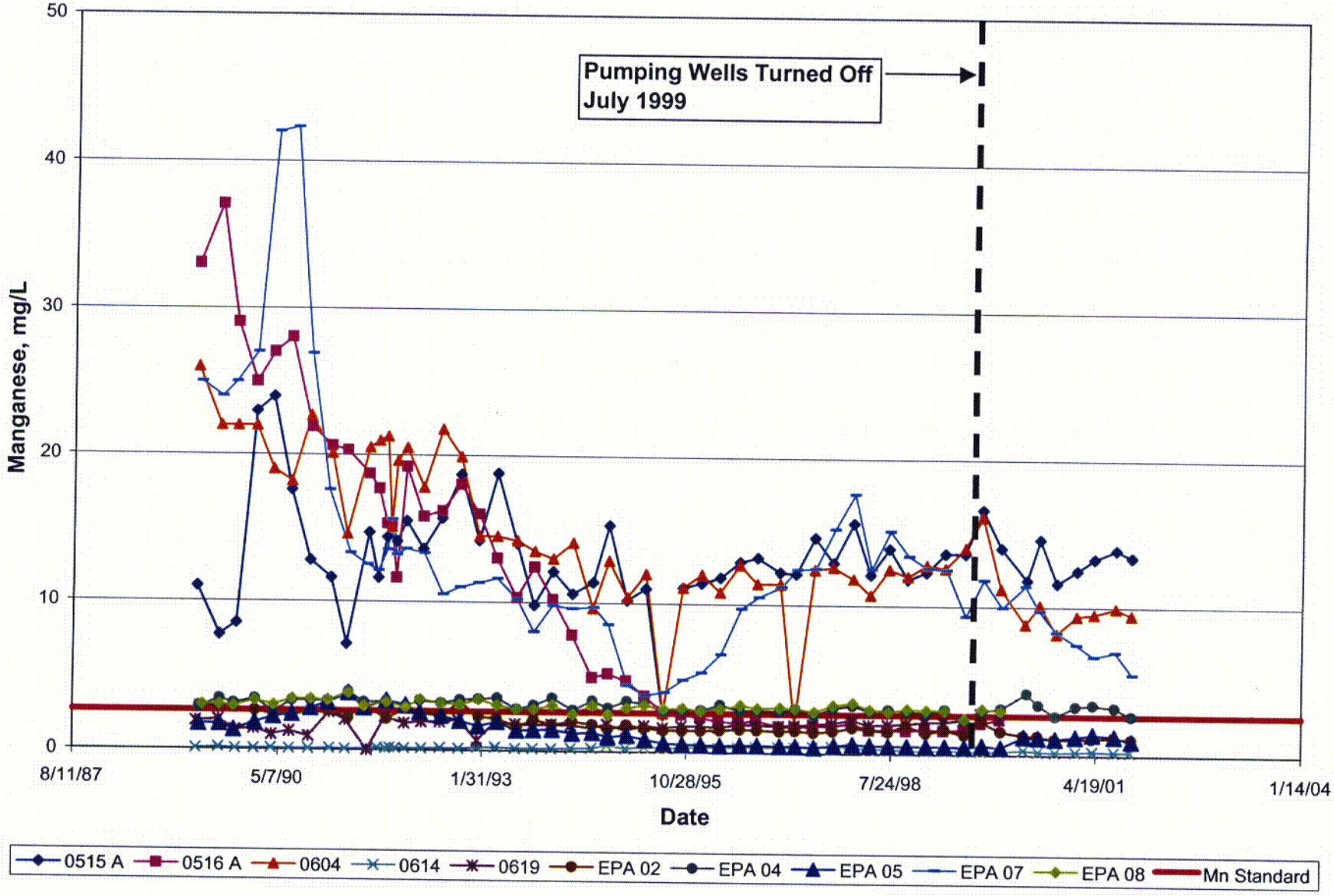
PREPARED FOR:

UNC MINING AND MILLING
GALLUP, NEW MEXICO

C27

EARTH TECH

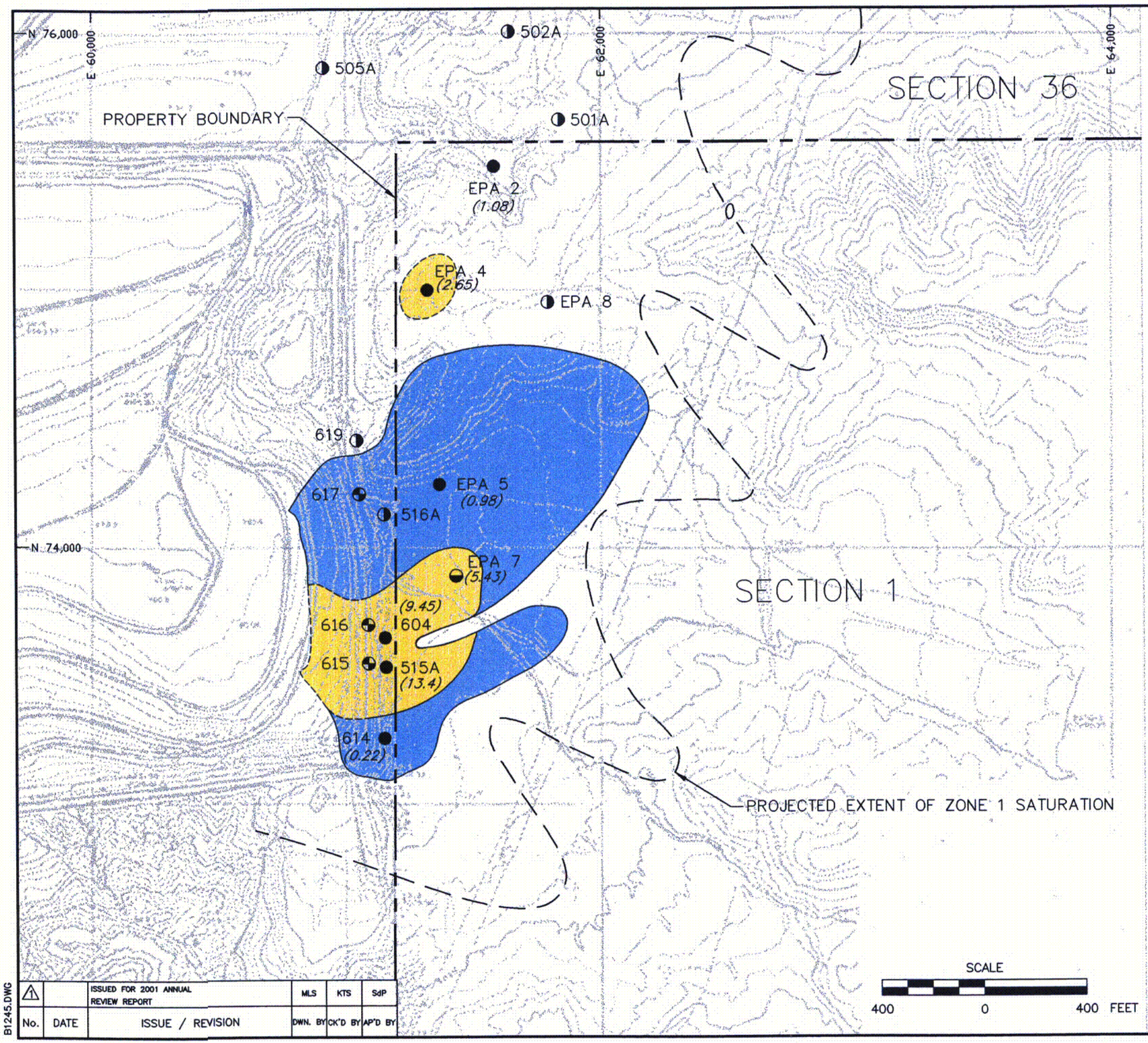
1



C28 **Figure 4-9**

Zone 1 Manganese Concentrations Over Time

L:\Work\32114\Proj\Annual-2001\Tables and Figures\MN Graph Chart 1\MN Graph Chart 1



LEGEND:

- 617 ◒ REVISED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF JULY, 1999)
- EPA 7 ◒ DECOMMISSIONED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF SEPTEMBER, 1990)
- 614 ● ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER QUALITY AND WATER LEVEL)
- 501A ◑ ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER LEVEL ONLY)
- APPROXIMATE EXTENT OF ZONE 1 SEEPAGE IMPACTS (DELINEATED BY CHLORIDE >50 mg/L)
- APPROXIMATE EXTENT OF MANGANESE EXCEEDING 2.60 mg/L
- *(1.08)* MANGANESE CONCENTRATION, mg/L

NOTES:

1. WELL EPA 7 HAS SERVED AS BOTH A PUMP–BACK AND MONITORING WELL. THE PUMP WAS SHUT OFF OCTOBER 1994 DUE TO HIGH LEVELS OF PRECIPITATION IN THE PUMP AND PIPING.
2. REVISED MONITORING PROGRAM IMPLEMENTED IN SECOND QUARTER 2000.

N

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B1245.DWG

FIGURE 4-10

APPROXIMATE EXTENT OF MANGANESE EXCEEDING 2.60 mg/L, OCTOBER 2001

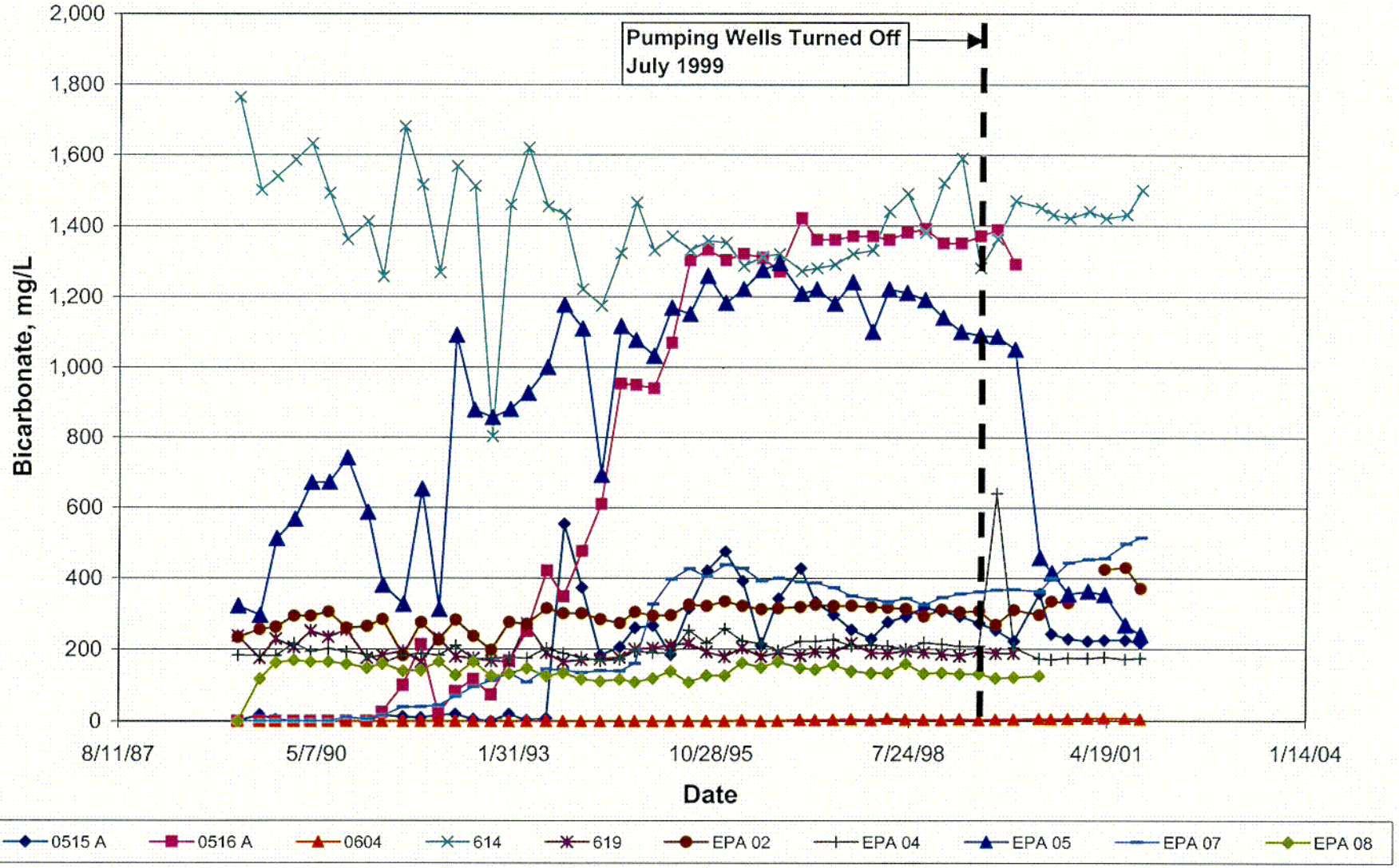
PREPARED FOR:

UNC MINING AND MILLING
GALLUP, NEW MEXICO

C29

EARTH TECH

1



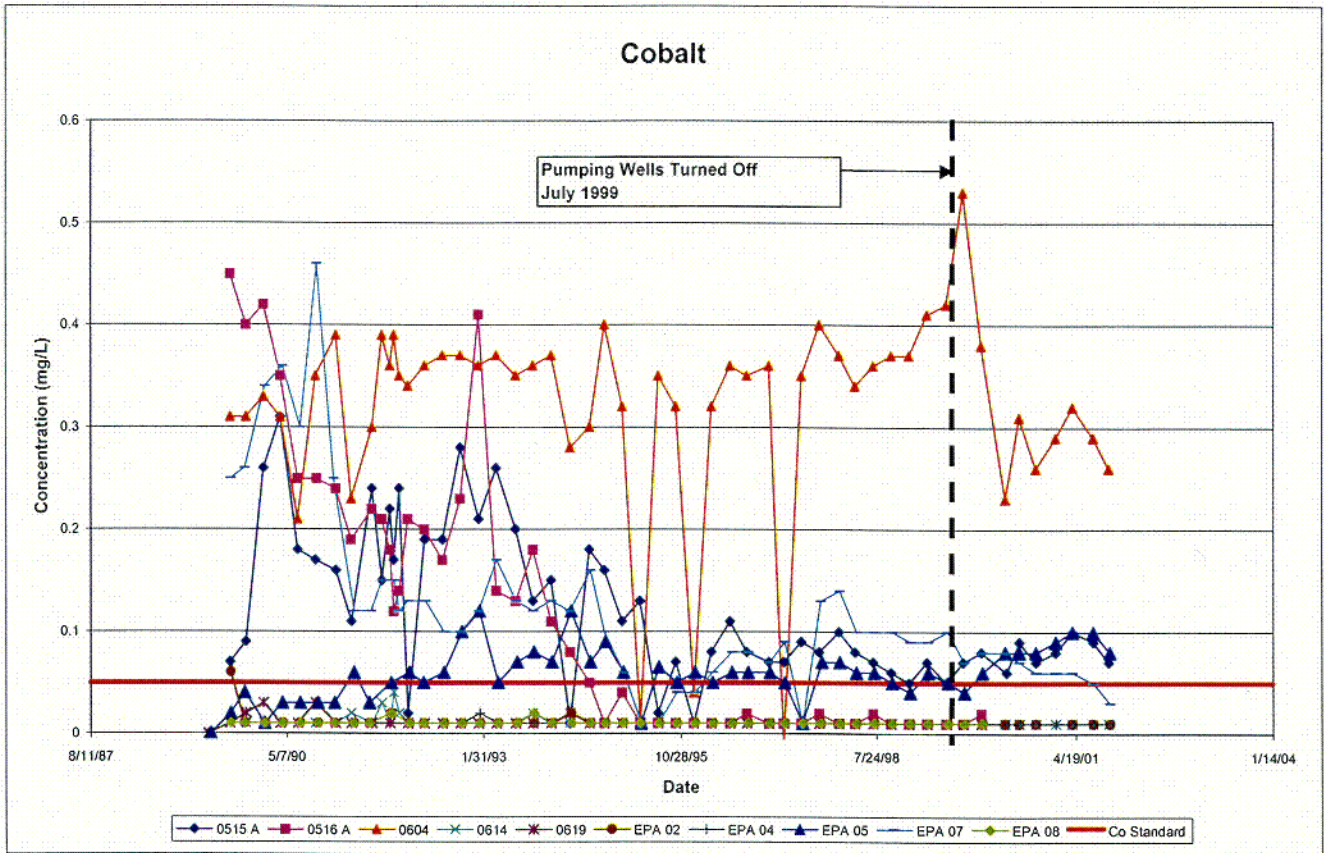
C30

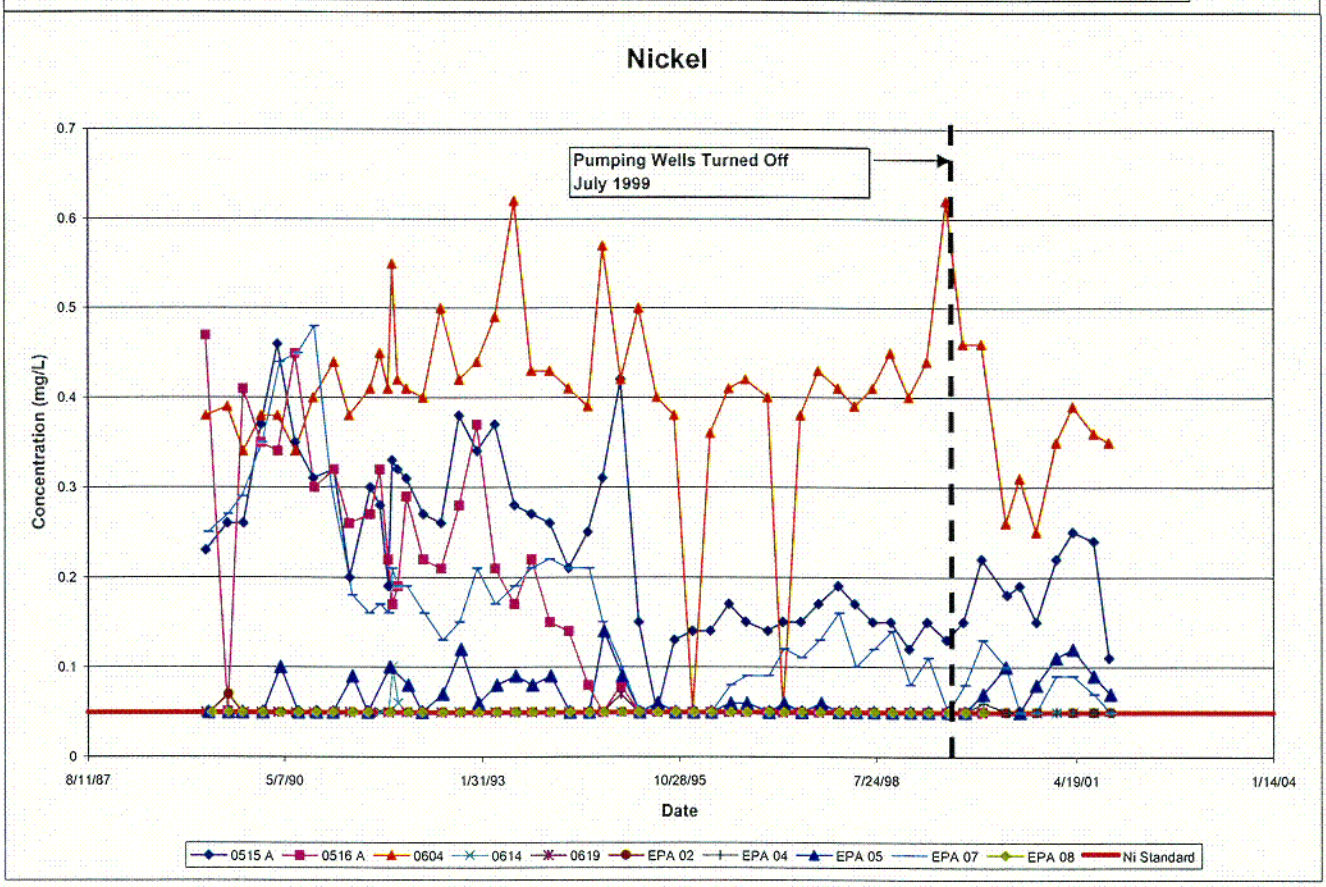
C30

FIGURE 4-11

Zone 1 Bicarbonate Concentrations Over Time

L|Work\32114\Proj\Annual-2001\Tables and Figures\Charts Chart 4\Charts Chart 4





C31

FIGURE 4-12

Zone 1 Cobalt and Nickel Concentrations Over Time

L:\Work\32114\Proj\Annual-2001\Tables and Figures\ Presentation Graphs-Zone 1\Co-Ni Combined

N 76,000

E 60,000

E 62,000

E 64,000

502A

505A

SECTION 36

PROPERTY BOUNDARY

501A

EPA 2
(<0.01)
[<0.05]

0

EPA 4
(<0.01)
[<0.05]

EPA 8

619

617

EPA 5
(0.08)
[0.07]

516A

N 74,000

EPA 7
(0.03)
[<0.05]

(0.26)
[0.35]

616

604

615

515A
(0.07)
[0.11]

614
(<0.01)
[<0.05]

SECTION 1

PROJECTED EXTENT OF ZONE 1 SATURATION

SCALE

400 0 400 FEET

N

LEGEND:

617 REVISED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF JULY, 1999)

EPA 7 DECOMMISSIONED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF SEPTEMBER, 1990)

614 ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER QUALITY AND WATER LEVEL)

501A ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER LEVEL ONLY)

APPROXIMATE EXTENT OF ZONE 1 SEEPAGE IMPACTS (DELINEATED BY CHLORIDE >50 mg/L)

APPROXIMATE EXTENT OF COBALT AND/OR NICKEL EXCEEDING 5.0 mg/L

(<0.01) COBALT CONCENTRATION, mg/L

[<0.05] NICKEL CONCENTRATION, mg/L

NOTES:

1. WELL EPA 7 HAS SERVED AS BOTH A PUMP–BACK AND MONITORING WELL. THE PUMP WAS SHUT OFF OCTOBER 1994 DUE TO HIGH LEVELS OF PRECIPITATION IN THE PUMP AND PIPING.
2. REVISED MONITORING PROGRAM IMPLEMENTED IN SECOND QUARTER 2000.

REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, N.M. DATED: 8–1–96. SCALE: 1" = 400'.

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1		ISSUED FOR 2001 ANNUAL REVIEW REPORT	MLS	KTS	SdP

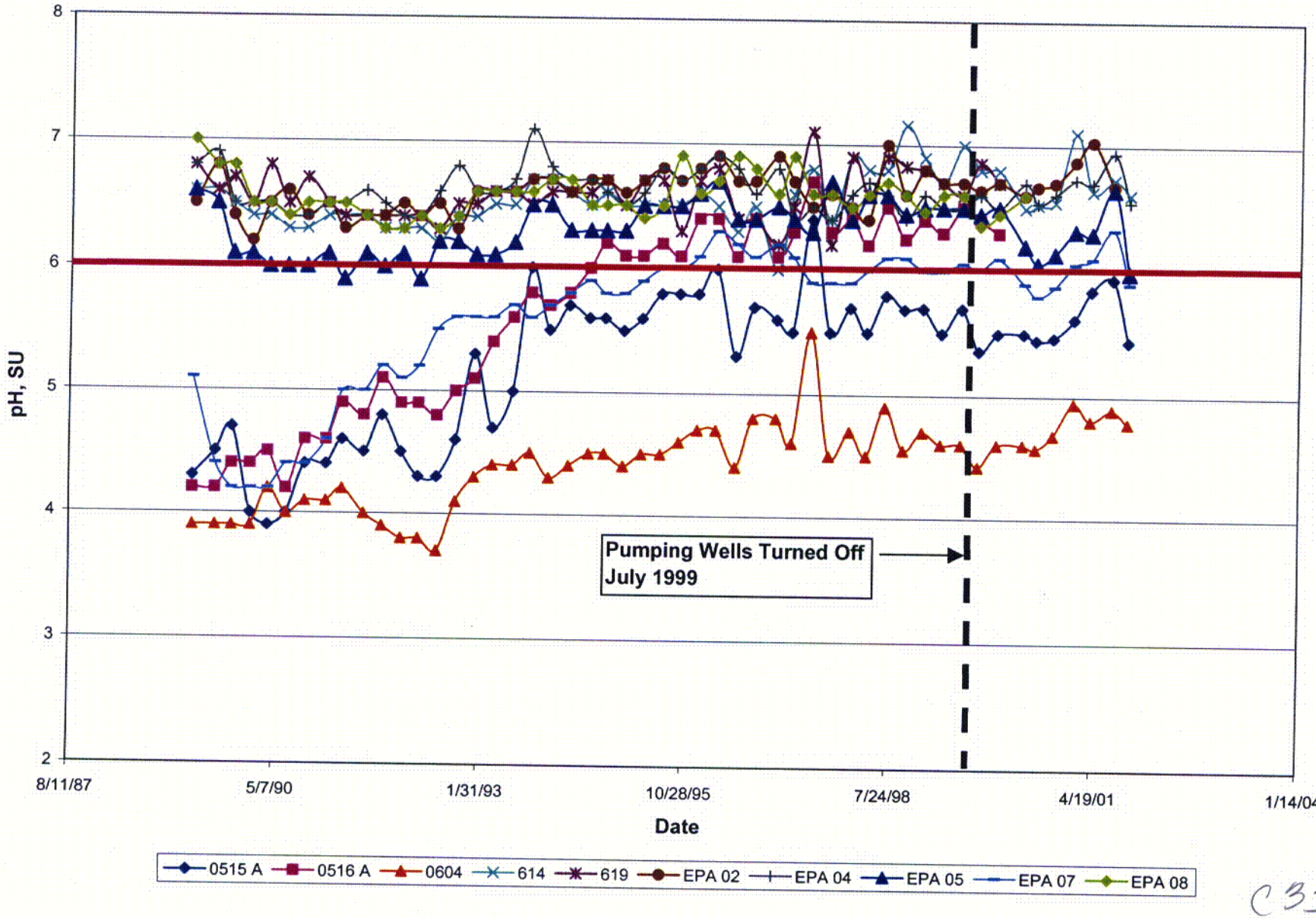
B1244.DWG

FIGURE 4-13
APPROXIMATE EXTENT OF COBALT AND NICKEL EXCEEDING 0.05 mg/L, OCTOBER 2001
PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

C32

EARTH TECH

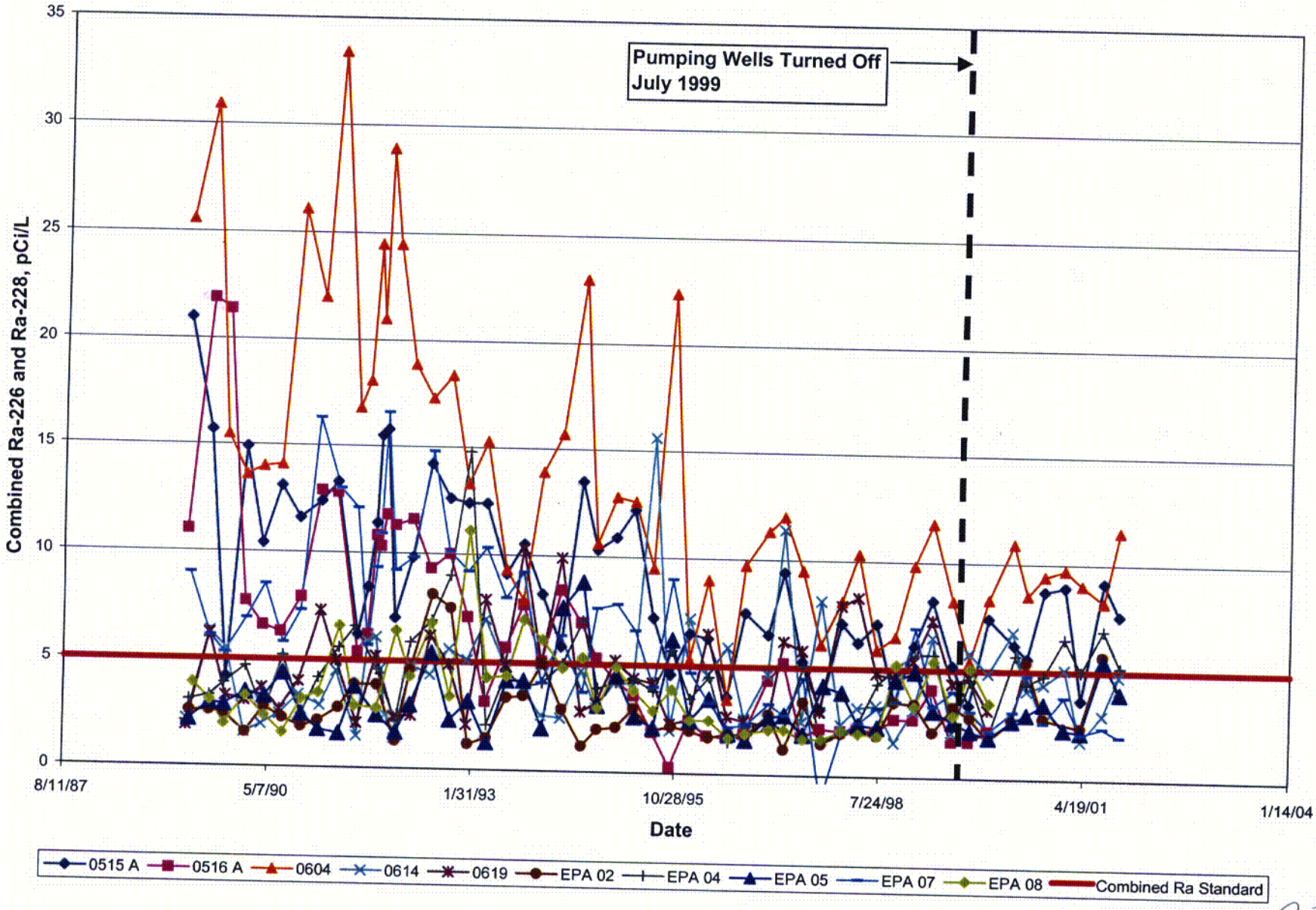
1



C33

FIGURE 4-14
Zone 1 pH over Time

L:\Work\32114\Proj\Annual-2001\Charts Chart 5\Charts Chart 5



C34

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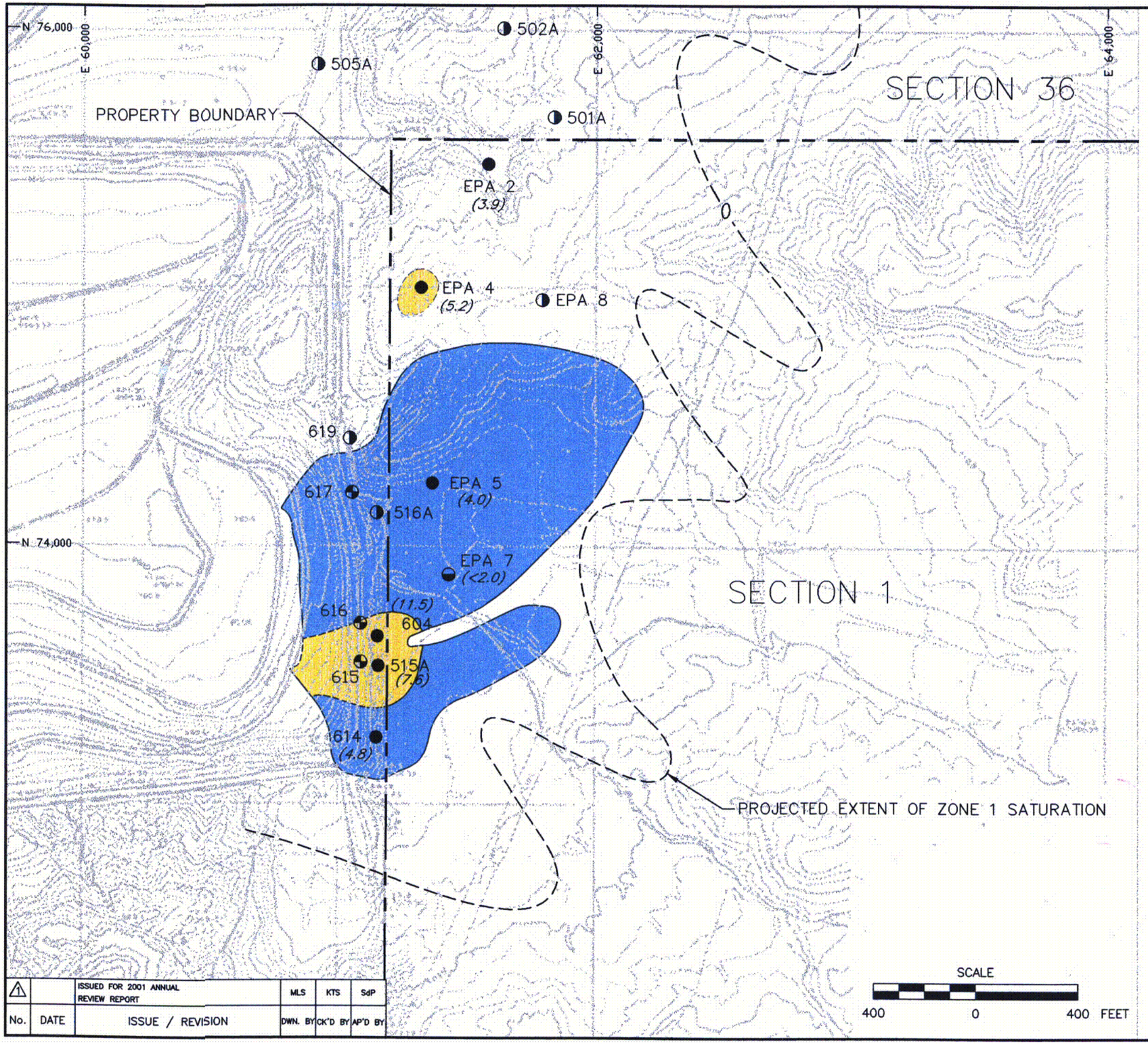
Comb Ra Graph Chart 1\Comb Ra Graph Chart 1

FIGURE 4-15

Zone 1 Combined Radium-226 and -228 Over Time



LEGEND:

617 ◓	REVISED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF JULY, 1999)
EPA 7 ◒	DECOMMISSIONED EAST PUMP – BACK SYSTEM WELL, LOCATION AND DESIGNATION (TURNED OFF SEPTEMBER, 1990)
614 ●	ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER QUALITY AND WATER LEVEL)
501A ◑	ZONE 1 MONITORING WELL, LOCATION AND DESIGNATION (WATER LEVEL ONLY)
▭	APPROXIMATE EXTENT OF ZONE 1 SEEPAGE IMPACTS (DELINEATED BY CHLORIDE >50 mg/L)
▭	APPROXIMATE EXTENT OF COMBINED RADIUM–226 AND RADIUM–228 EXCEEDING 5.0 pCi/L
(3.9)	COMBINED RADIUM CONCENTRATION, pCi/L

NOTES:

1. WELL EPA 7 HAS SERVED AS BOTH A PUMP–BACK AND MONITORING WELL. THE PUMP WAS SHUT OFF OCTOBER 1994 DUE TO HIGH LEVELS OF PRECIPITATION IN THE PUMP AND PIPING.
2. REVISED MONITORING PROGRAM IMPLEMENTED IN SECOND QUARTER 2000.

N

SCALE
400 0 400 FEET

REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, N.M. DATED: 8–1–96. SCALE: 1" = 400'.

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1		ISSUED FOR 2001 ANNUAL REVIEW REPORT	MLS	KTS	SdP

B1247.DWG

FIGURE 4-16
APPROXIMATE EXTENT OF COMBINED RADIUM-226 AND RADIUM-228 EXCEEDING 5.0 pCi/L, OCTOBER 2001

PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

C35

EARTH TECH

1

APPENDIX A

MASS EXTRACTION CALCULATIONS

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APPENDIX A

MASS EXTRACTION CALCULATIONS

1.0 INTRODUCTION

This appendix presents the methodology used to calculate the mass of hazardous constituents removed by the pump-back and corrective action systems at United Nuclear Corporation's (United Nuclear's) Church Rock Site. Calculations for the mass extracted during the 2001 operating year are presented in detail, and a summary of the mass extracted for the 12-year period from 1989 to 2001 is provided. Detailed calculations for mass extracted during previous years are presented in Appendix B of the 1991 Annual Review [Canonie Environmental Services Corp. (Canonie), 1991], and Appendix A of the 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, and 2000 Annual Reviews [Canonie, 1992b, 1993b and 1995; Smith Technology Corporation (Smith Technology), 1995 and 1996; Rust Environment and Infrastructure (Rust), 1997; and Earth Tech, Inc. (Earth Tech), 1998, 1999, and 2000e]. The mass extraction calculations were made for only the Southwest Alluvium because the pumping wells in Zone 1 and Zone 3 were shut down and/or decommissioned during the 2000 operating year. Figure A-3 shows the locations of the Southwest Alluvium Target Area and the extraction wells, which include Wells 801, 802, 803 and 808. Well 801 was decommissioned at the end of July 1999 and is not included in the calculations for this operating year.

Section 2.0 presents the general methodology used to calculate the mass extracted for the Southwest Alluvium. Section 5.0 presents specific methodologies and assumptions that were used for the Southwest Alluvium system. The term "mass extracted" as it is used in this report refers to the extraction of both mass and radioactivity.

2.0 GENERAL METHODOLOGY

The mass of hazardous constituents extracted for the Southwest Alluvium system was calculated by multiplying the volumes of water pumped (as reported by United Nuclear) by the average constituent concentrations in water from the extraction wells or nearby monitoring wells.

The calculation of mass extracted was performed only for those constituents determined to be present in the Southwest Alluvium remedial action target area in hazardous concentrations. This included all constituents consistently present in the target area in concentrations exceeding Nuclear Regulatory Commission (NRC) standards and/or U.S. Environmental Protection Agency (EPA) applicable or relevant and appropriate requirements (ARARs) during the initial four years of corrective action (i.e., the initial 16 quarterly sampling events). The term "consistently present" was defined as a constituent being present in at least:

1. Two target area monitoring wells during a minimum of 30 percent of the sampling events in concentrations exceeding agency standards, or

2. One target area monitoring well for more than 50 percent of the sampling events in concentrations of more than twice the agency standards.

The two criteria listed above for being "consistently present" were effective in focusing the extraction calculations on the constituents that are of greatest concern within the specified target area while excluding those constituents that show only sporadic or localized exceedances.

Then-current EPA ARARs for nitrate as nitrogen (NO_3-N) (30 milligrams per liter [mg/L]) and sulfate (SO_4) (2,160 mg/L) were used in previous calculations to define hazardous concentrations within the target areas. However, the *Background Water Quality Report (BWQ Report)* (Canonie, 1992a) and the *Statistical Analysis Report* (Canonie, 1993a) showed that alluvial background concentrations for these two constituents exceeded their respective ARARs. Therefore, a portion of the calculated mass extracted for nitrate and sulfate will be background mass rather than tailings seepage mass. Based on recommendations by the NRC (June, 1996) and the New Mexico Environmental Department (NMED) (January 1998), background standards have been revised for

nitrate as nitrogen (190 mg/L) and sulfate (2,125 mg/L). These revised standards were used in calculations to define hazardous concentrations within target areas.

Total dissolved solids (TDS) are present in concentrations exceeding the ARARs, but are not included in the mass calculations because TDS are composed of other constituents that are calculated. Consequently, calculation of mass removed for TDS would be redundant.

Constituent concentrations reported as being "less than" a specified laboratory measuring capability were assumed to be equal to zero for the purpose of calculating the mass extracted. Units of pounds, tons and microcuries proved to be the most convenient for expressing the mass or radioactivity extracted. The conversion factors are: 1 mg/L = 8.35×10^{-6} lbs/gal = 4.18×10^{-9} tons/gal and 1 pCi/L = 3.79×10^{-6} μCi/gal where:

mg/L = milligrams per liter
lbs/gal = pounds per gallon
tons/gal = tons per gallon
pCi/L = picocuries per liter
μCi/gal = microcuries per gallon

3.0 ZONE 3 MASS EXTRACTION

No mass extraction calculations were completed for Zone 3 because the system was shut down at the end of June 2000 for maintenance. The three Zone 3 wells were decommissioned in accordance with an email letter from Greg Lyssy to United Nuclear dated November 15, 2000 (Lyssy, 2000). Therefore, Figure A-1 and Tables A.1 through A.3 are not included in the appendix.

4.0 ZONE 1 MASS EXTRACTION

No mass extraction calculations were completed for Zone 1 because the system was decommissioned at the end of July 1999. Therefore, Figure A-2 and Tables A.4 through A.6 are not included in the appendix.

5.0 SOUTHWEST ALLUVIUM MASS EXTRACTION

Mass extraction for the Southwest Alluvium was calculated for each of the three extraction wells (802, 803 and 808) that compose this system by multiplying the volume pumped by the constituent concentrations. The total mass extracted for the system is determined by averaging the mass extracted at each individual well.

Review of Table A.7 shows that the constituents consistently present within the Southwest Alluvium target area were SO_4, chloride (Cl), NO_3-N, manganese (Mn), nickel (Ni), chloroform, and lead-210 (Pb-210). Although Pb-210 met the criteria for being consistently present in the target area, its erratic occurrence in the alluvium (both within and outside of the target area) indicates that its presence is not related to tailings seepage. The constituents SO_4, Cl and NO_3-N, as discussed in the *BWQ Report* (Canonie, 1992a), are present in elevated concentrations in the background water, which probably accounts for a significant portion of their target area concentrations also. Of the remaining three constituents (Mn, Ni and chloroform), chloroform is present in concentrations exceeding the EPA and NRC standards at all extraction wells.

The mass extracted by an individual well was calculated by multiplying the well pumping rate by the average concentration of the identified constituents at each well. The volume of water pumped by individual wells was determined by prorating the total volume of water pumped by the individual pumping rates. The total mass removed is the average constituent concentration for the system multiplied by the total volume pumped. Table A.8 presents the mass extracted for the 2001 operating period (September 29, 2000, to January 12, 2001). The operating period is less than one year because the pumping wells in the target area were turned off for the natural attenuation test. The average concentrations are based on the quarterly water quality data for Wells 802 and 803, which are presented in Table B.1 of Appendix B. Well 808, which was not monitored for water quality during the 2001 operating year, is assumed to have constituent concentrations equal to an average of Wells 802 and 803 because of its location midway between these two wells.

Table A.9 summarizes the mass extracted in the Southwest Alluvium from the start of remediation in October 1989 through January 2001. The mass extracted during these years is calculated in the same manner as for the 2000 operating year. Details of these calculations are presented in the previous

annual reviews (Canonie, 1991, 1992b, 1993b, and 1995; Smith Technology, 1995 and 1996; Rust, 1997; and Earth Tech, 1998, 1999, and 2000e).

TABLES

ZONE 3

TABLE A.1
NOT INCLUDED

ZONE 3

TABLE A.2
NOT INCLUDED

ZONE 3

TABLE A.3
NOT INCLUDED

ZONE 1

TABLE A.4
NOT INCLUDED

ZONE 1

TABLE A.5
NOT INCLUDED

ZONE 1

TABLE A.6
NOT INCLUDED

TABLE A.7

DETERMINATION OF CONSTITUENTS CONSISTENTLY PRESENT IN THE SOUTHWEST ALLUVIUM TARGET AREA

Constituent	Exceedences of Standards (Oct. 89 - Jul. 93)	Target Area Well No. 801	802	803	632	GW 1	GW 2	GW 3	EPA 28	Consistently Present
Cl	Rate	6-16	0-16	0-16	14-16	0-16	0-16	0-16	0-16	Yes
	Percentage	38	0	0	88	0	0	0	0	
NO_3 as N	Rate	4-16	16-16	12-16	16-16	16-16	14-16	16-16	16-16	Yes
	Percentage	25	100	75	100	100	88	100	100	
SO_4	Rate	16-16	16-16	16-16	16-16	13-16	16-16	0-16	16-16	Yes
	Percentage	100	100	100	100	81	100	0	100	
Al	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	
As	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	
Be	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	
Cd	Rate	0-16	1-16	0-16	0-16	0-16	2-16	0-16	0-16	No
	Percentage	0	6	0	0	0	13	0	0	
Co	Rate	14-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	88	0	0	0	0	0	0	0	
Pb	Rate	0-15	0-15	0-15	0-16	0-16	1-16	0-16	0-15	No
	Percentage	0	0	0	0	0	6	0	0	
Mn	Rate	16-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	Yes
	Percentage	100	0	0	0	0	0	0	0	
Mo	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	
Ni	Rate	13-16	0-16	0-16	1-16	0-16	0-16	1-16	0-16	Yes
	Percentage	81	0	0	6	0	0	6	0	
Se	Rate	0-16	0-16	0-16	1-16	0-16	0-16	1-16	1-16	No
	Percentage	0	0	0	6	0	0	6	6	
V	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	
U	Rate	0-16	0-16	0-16	0-16	0-16	0-16	2-16	0-16	No
	Percentage	0	0	0	0	0	0	13	0	
Pb-210	Rate	4-16	5-16	1-16	4-16	8-16	4-16	4-16	4-16	Yes
	Percentage	25	31	6	25	50	25	25	25	
Combined Ra-226, Ra-228	Rate	1-16	1-16	0-16	3-16	0-16	1-16	0-16	0-16	No
	Percentage	6	6	0	19	0	6	0	0	
Th-230	Rate	0-16	0-16	0-16	0-16	0-16	1-16	0-16	0-16	No
	Percentage	0	0	0	0	0	6	0	0	
Gross Alpha	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	
Chloroform	Rate	14-16	1-16	0-16	0-16	0-16	0-16	0-16	0-16	Yes
	Percentage	88	6	0	0	0	0	0	0	
Cyanide	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	
Naphthalene	Rate	0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16	No
	Percentage	0	0	0	0	0	0	0	0	

Notes:

1. "Rate" refers to the number of samples with exceedences of the EPA/NRC standards for the site compared to the total number of samples collected during the period from October 1989 to July 1993 (i.e., 16 sampling events).
2. "Percentage" refers to the percentage of exceedences and is calculated by dividing the number of exceedences by the total number of samples, then multiplying by 100.
3. Shading indicates an exceedence percentage of 30 percent or greater.
4. Cobalt does not meet Criterion 1 or 2 for being consistently present. Manganese, nickel and chloroform meet Criterion 2 for being consistently present at Well No. 801.

TABLE A.8

SOUTHWEST ALLUVIUM MASS EXTRACTION
2000 - 2001

Average Concentration of Extracted Water

		SO_4 (mg/l)	Cl (mg/l)	NO_3 as N (mg/l)	Mn (mg/l)	Ni (mg/l)	Chloroform (mg/l)	Pb-210 (pCi/l)
	NRC Standard	NA	NA	NA	NA	0.05	0.001	1
	EPA Standard	2,125	250	190	2.6	0.20	NA	NA
Well No.	**Gallons Extracted**							
801	0	0	0	0.0	0.00	0.00	0.0000	0.00
802	871,683	3,180	202	84.5	2.35	0.00	0.0021	0.00
803	556,806	3,250	177	46.0	1.84	0.00	0.0000	0.00
808	359,882	3,215	189	65.2	2.09	0.00	0.0011	0.00
Total	1,788,371	3,209	191	68.6	2.14	0.00	0.00123	0.00

Mass/Radioactivity Extracted

Well No.	Gallons Extracted	SO_4 (lbs)	Cl (lbs)	NO_3 as N (lbs)	Mn (lbs)	Ni (lbs)	Chloroform (lbs)	Pb-210 (µCi)
801	0	0	0	0	0.0	0.00	0.000	0.00
802	871,683	23,146	1,470	615	17.1	0.00	0.015	0.00
803	556,806	15,110	821	214	8.5	0.00	0.000	0.00
808	359,882	9,661	569	196	6.3	0.00	0.003	0.00
Total	1,788,371	47,917	2,860	1,025	31.9	0.00	0.018	0.00

Notes:
1. All averages are weighted averages (i.e., average = mass/volume).
2. Average concentration is shaded where NRC and/or EPA standard is exceeded.
3. Conversion factors are 1 mg/l = 8.35 x 10-6 lbs/gal and 1 pCi/l = 3.79 x 10-6 µCi/gal.

TABLE A.9

SOUTHWEST ALLUVIUM MASS EXTRACTION
1990 - 2001

Average Concentration

		SO4 (mg/L)	Cl (mg/L)	NO3 as N (mg/L)	Mn (mg/L)	Ni (mg/L)	Chloroform (mg/L)	Pb-210 (pCi/l)
	NRC Standard	NA	NA	NA	NA	0.05	0.001	1.0
	EPA Standard	2,125	250	190	2.6	0.20	NA	NA
Date	Gallons Extracted							
1990	7,400,000	2,695	213	105	2.26	0.01	0.0004	0.76
1991	12,400,000	2,713	217	112.6	1.20	0.01	0.0001	1.22
1992	17,200,000	2,698	211	78.5	1.00	0.001	0.00005	0.44
1993	18,100,000	2,897	212	72.3	0.88	0.0004	0.00003	0.24
1994	15,700,000	3,181	196	70.2	0.95	0.0006	0.00003	0.50
1995	12,935,534	3,204	221	67.2	1.00	0.0003	0.00002	1.04
1996	12,172,658	3,251	206	66.9	0.91	0.0000	0.00044	1.08
1997	9,191,166	3,133	239	63.7	1.17	0.0002	0.00002	0.01
1998	9,000,854	3,088	220	71.9	1.38	0.0009	0.00058	0.00
1999	7,533,665	3,189	201	70.6	1.40	0.0000	0.00087	0.00
2000	7,651,231	2,982	181	69.9	1.79	0.0500	0.00156	0.00
2001	1,788,371	3,209	191	68.6	2.14	0.0000	0.00123	0.00
TOTAL 1990-2001	131,073,479	2,821	200	72.5	1.08	0.0019	0.00019	0.51

Mass/Radioactivity Extracted

Date	Gallons Extracted	SO_4 (lbs)	Cl (lbs)	NO_3 (lbs)	Mn (lbs)	Ni (lbs)	Chloroform (lbs)	Pb-210 (µCi)
1990	7,400,000	165,524	13,161	6,488	139.1	0.62	0.0247	21.20
1991	12,400,000	280,904	22,468	11,659	124.0	1.04	0.0104	57.40
1992	17,200,000	387,487	30,304	11,274	141.7	0.14	0.0072	28.80
1993	18,100,000	437,838	32,041	10,927	133.7	0.06	0.0045	16.59
1994	15,700,000	417,013	25,743	9,203	124.6	0.08	0.0033	32.30
1995	12,900,000	346,070	23,871	7,258	107.6	0.03	0.0018	51.15
1996	12,300,000	330,457	21,924	6,798	93.5	0.00	0.0440	50.28
1997	9,191,166	240,447	18,343	4,892	90.0	0.01	0.0010	0.32
1998	9,000,854	232,098	16,554	5,400	104.0	0.07	0.0433	0.00
1999	7,533,665	200,616	12,630	4,440	88.2	0.00	0.0548	0.00
2000	7,651,231	190,510	11,565	4,464	114.4	3.19	0.0999	0.00
2001	1,788,371	47,917	2,860	1,025	31.9	0.00	0.0184	0.00
TOTAL 1990-2001	131,073,479	3,277,881	230,463	83,828	1293.6	5.25	0.3141	254.76

Notes:
1. All averages are weighted averages (i.e., average = mass/volume).
2. Average concentration is shaded where NRC and/or EPA standard is exceeded.
3. Conversion factors are 1 mg/L = 8.35 x 10-6 lbs/gal and 1 pCi/L = 3.79 x 10-6 µCi/gal.

FIGURES

ZONE 3

FIGURE A-1
NOT INCLUDED

ZONE 1

FIGURE A-2
NOT INCLUDED

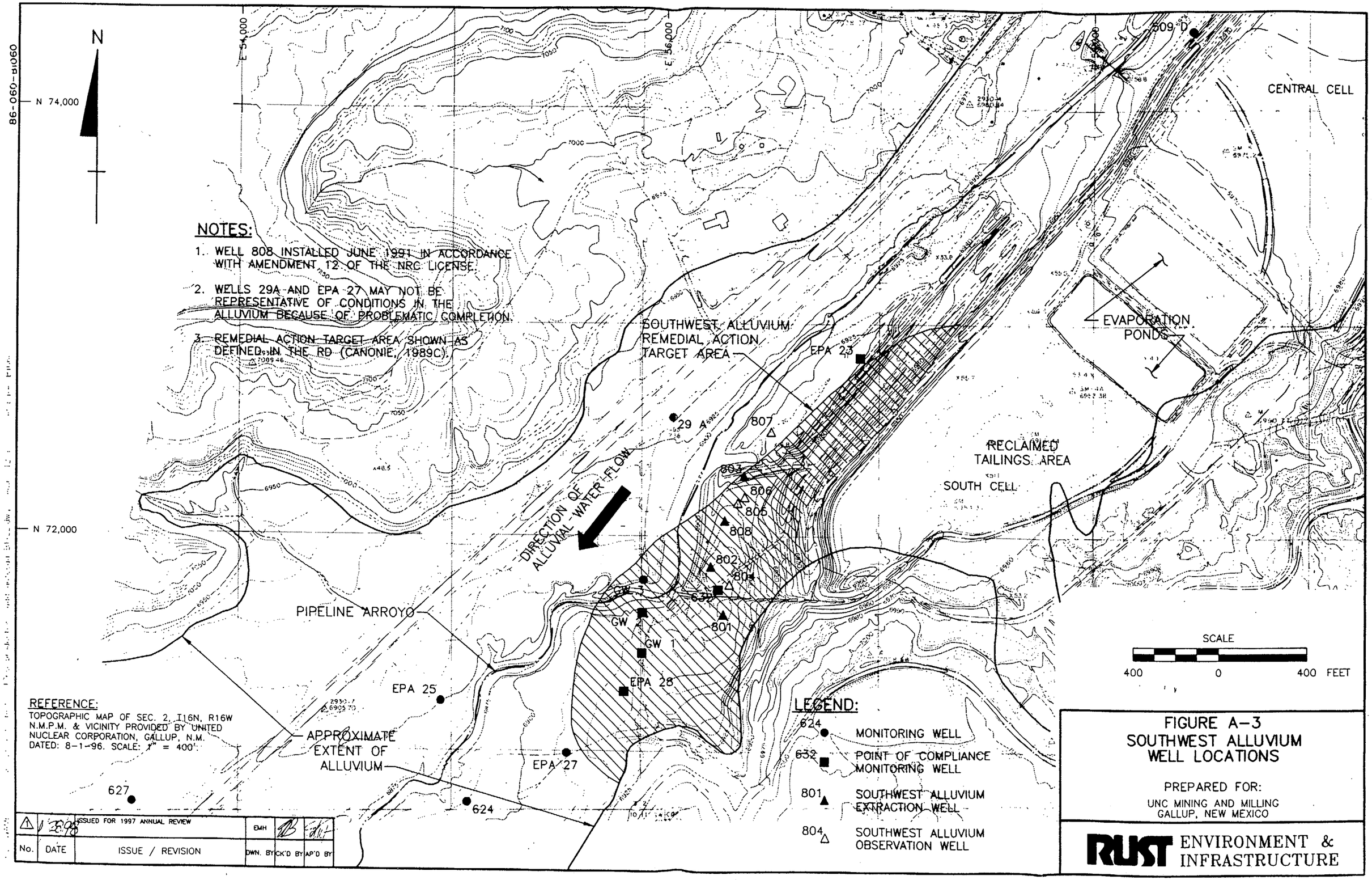

FIGURE A-3
SOUTHWEST ALLUVIUM
WELL LOCATIONS

PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

RUST ENVIRONMENT & INFRASTRUCTURE