



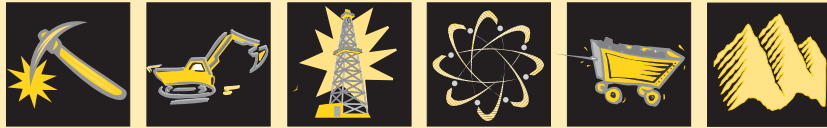
United States  
Environmental Protection  
Agency

Office of Radiation &  
Indoor Air (6602J)  
Washington, DC 20460

EPA 402-R-99-002  
October 1999

# Technologically Enhanced Naturally Occurring Radioactive Materials in the Southwestern Copper Belt of Arizona

TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIALS



T E N O R M















































Levels of radioactivity in excess of federal MCLs or Arizona guidelines are shown in bold

**Table 2**  
**Surface Water Statistical Data (pCi/L)**

<b>Radiochemical</b>	<b>Mine Sites</b>	<b>Number</b>	<b>Min.</b>	<b>Max.</b>	<b>Avg.</b>	<b>Std. Dev.</b>
Gross Alpha	MP,MM,CB,TR,AL,DF,HS,NC	54	0	1240	83.5	188.4
Gross Beta	CB,MP,MM,TR,NC	32	0	128	27.1	34
U-238	CB,TR,AL,HS,NC	19	0.1	678	<b>83.8</b>	168.2
U-234	CB,TR,AL,HS,NC	19	0.2	577	<b>80</b>	141.8
U-235	CB,TR,NC	9	0.04	2.9	1.1	0.9
Ra-226	CB,MP,NC	29	0	71.8	<b>6.4</b>	13.8
Ra-228	MP,CB,TR,AL,DF,HS,NC	18	0	55.5	<b>5.6</b>	13.1
Total-U	MP,CB,TR,NC	12	0.01	32.9	6.6	10.9
Rn-222	MP	3	39	120	68.3	44.9
Total	8 MINES	195				

Levels of radioactivity in excess of federal MCLs or Arizona guidelines are shown in bold

**Table 3**  
**Sediment and Soil Statistical Data (pCi/g)**

<b>Radiochemical</b>	<b>Mine Sites</b>	<b>Number</b>	<b>Min.</b>	<b>Max.</b>	<b>Avg.</b>	<b>Std. Dev.</b>
Gross Alpha	AL,DF,HS,MM	25	0.5	395	<b>63.1</b>	90.0
Gross Beta	AL,DF,HS,MM	25	22	248	<b>69.4</b>	52.3
U-238	AL,DF,HS	20	0.7	63.3	<b>7.9</b>	14.2
U-234	AL,DF,HS	20	0.9	60.8	<b>10.0</b>	16.6
Ra-226	AL,DF,HS	20	0.7	82.6	<b>10.4</b>	19.7
Totals	4 Mines	110				

Levels of radioactivity in excess of federal MCLs or Arizona guidelines are shown in bold

**Table 4**  
**Process Solutions Statistical Data (pCi/L)**

<b>Radiochemical</b>	<b>Mine Sites</b>	<b>Number</b>	<b>Min.</b>	<b>Max.</b>	<b>Avg.</b>	<b>Std. Dev.</b>
Gross Alpha	MP,MM,MF,SC	43	1.3	8649	<b>1841</b>	1850
Gross Beta	MP,MM,MF	41	3.0	3683	<b>975.6</b>	881.7
U-238	MF	2	248	1611	<b>929.5</b>	963.8
U-234	MF	2	254	1745	<b>999.5</b>	1054.3
U-235	MF	2	11.6	598	<b>304.8</b>	414.7
Ra-226	MF,SC	4	19.5	193	<b>86.3</b>	79.1
Ra-228	MF,SC	4	2.0	19	<b>7.8</b>	8.0
Total-U	MF,CS,TB	6	0.8	4362	<b>1895.9</b>	1532.9
Rn-222	MF,SC	4	243	3760	<b>1805.7</b>	1593.5















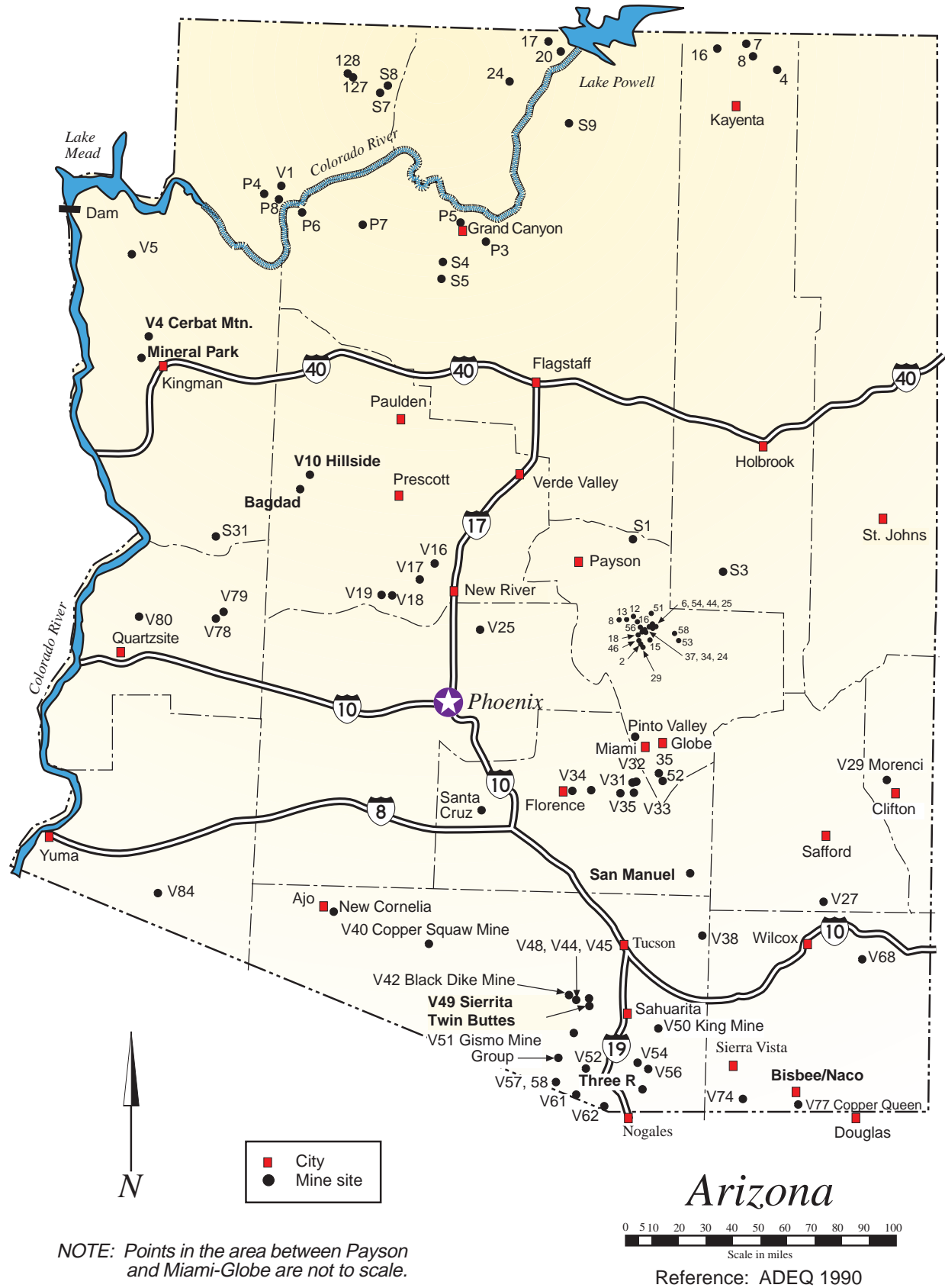








Figure A: Location Map of TENORM Sites







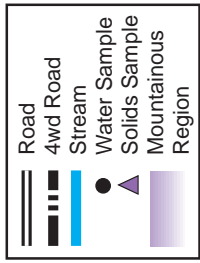
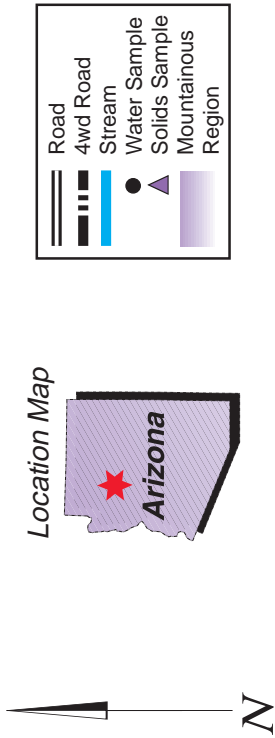
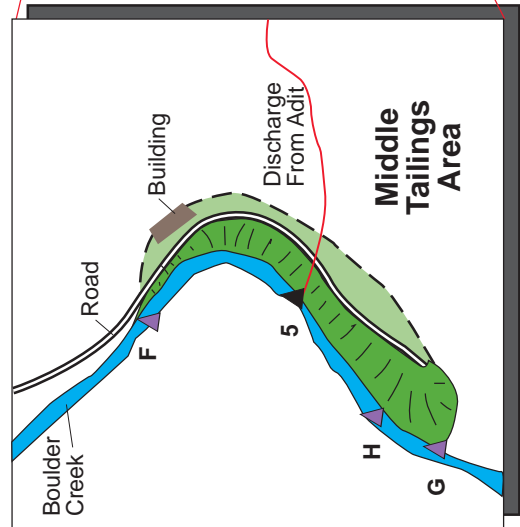
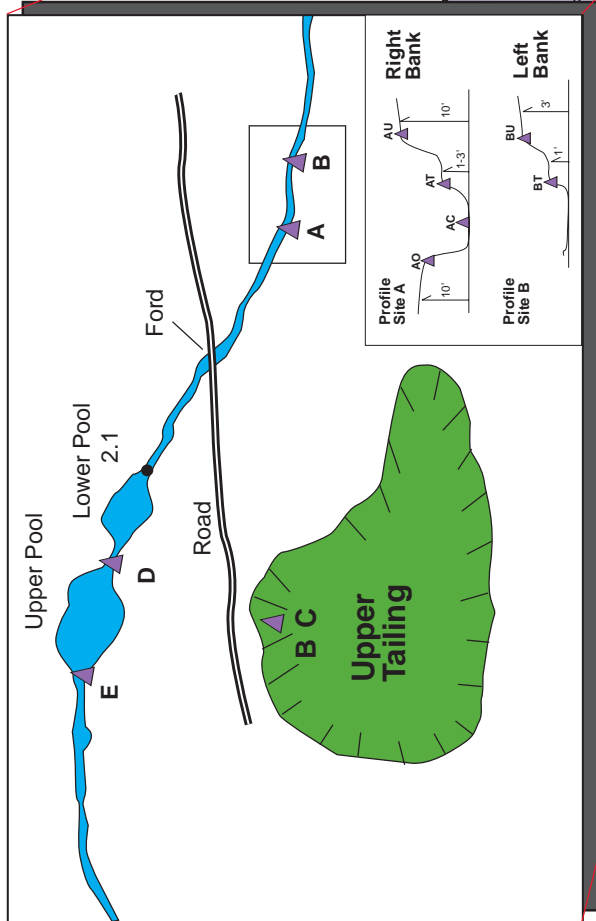
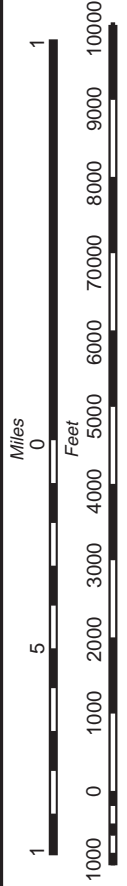
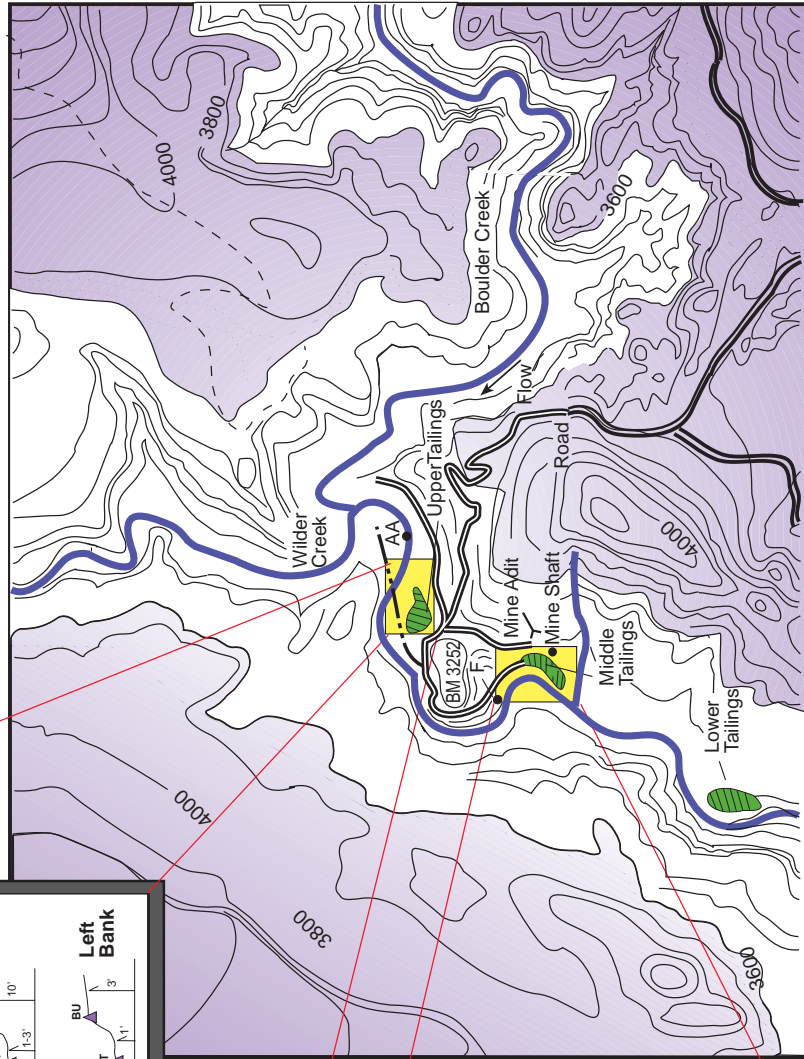


Figure B: Hillside Mine/Boulder Creek, Sample Location Map



Reference: ADEQ 4/1993













**Figure E:  
Three R Mine,  
Sample Location Map**

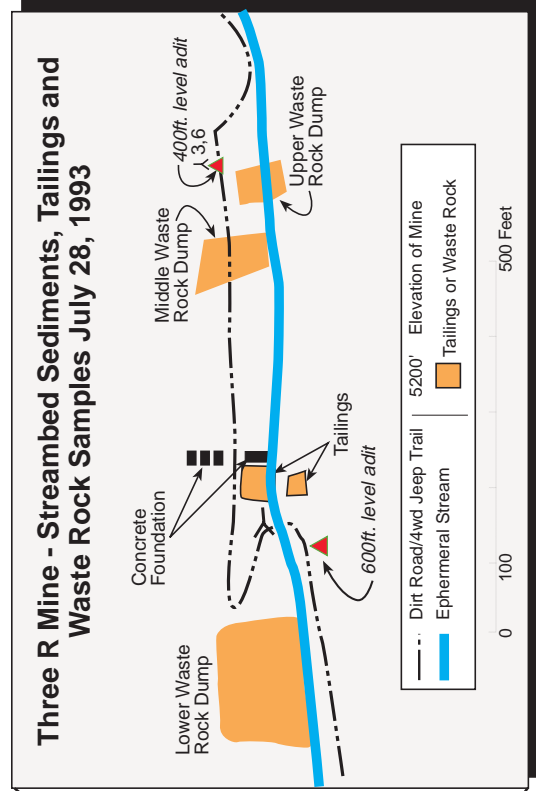
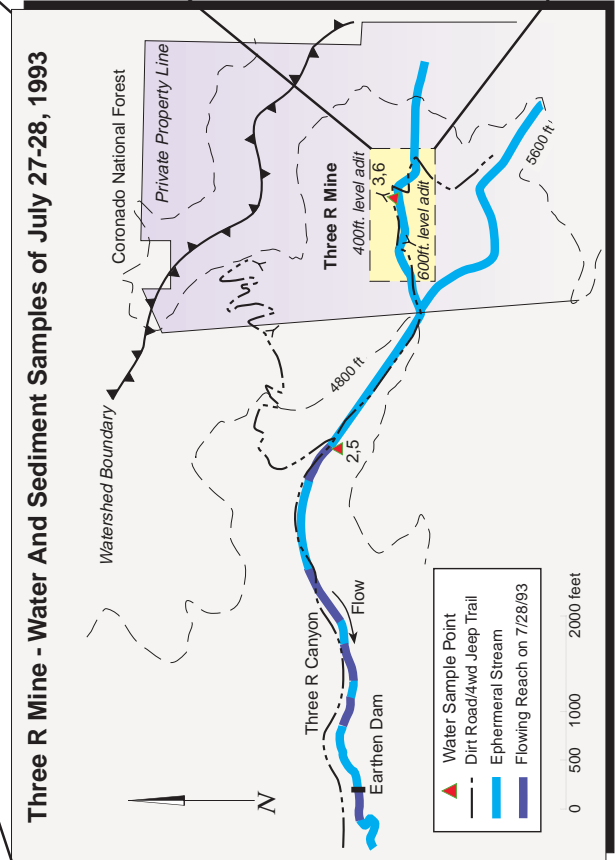
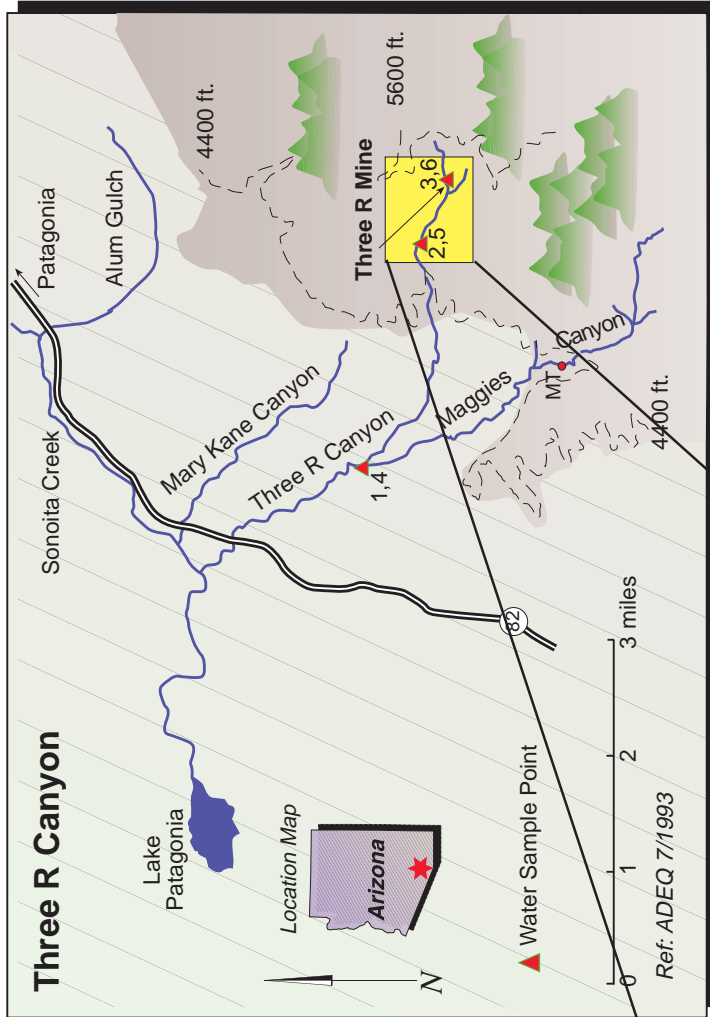


















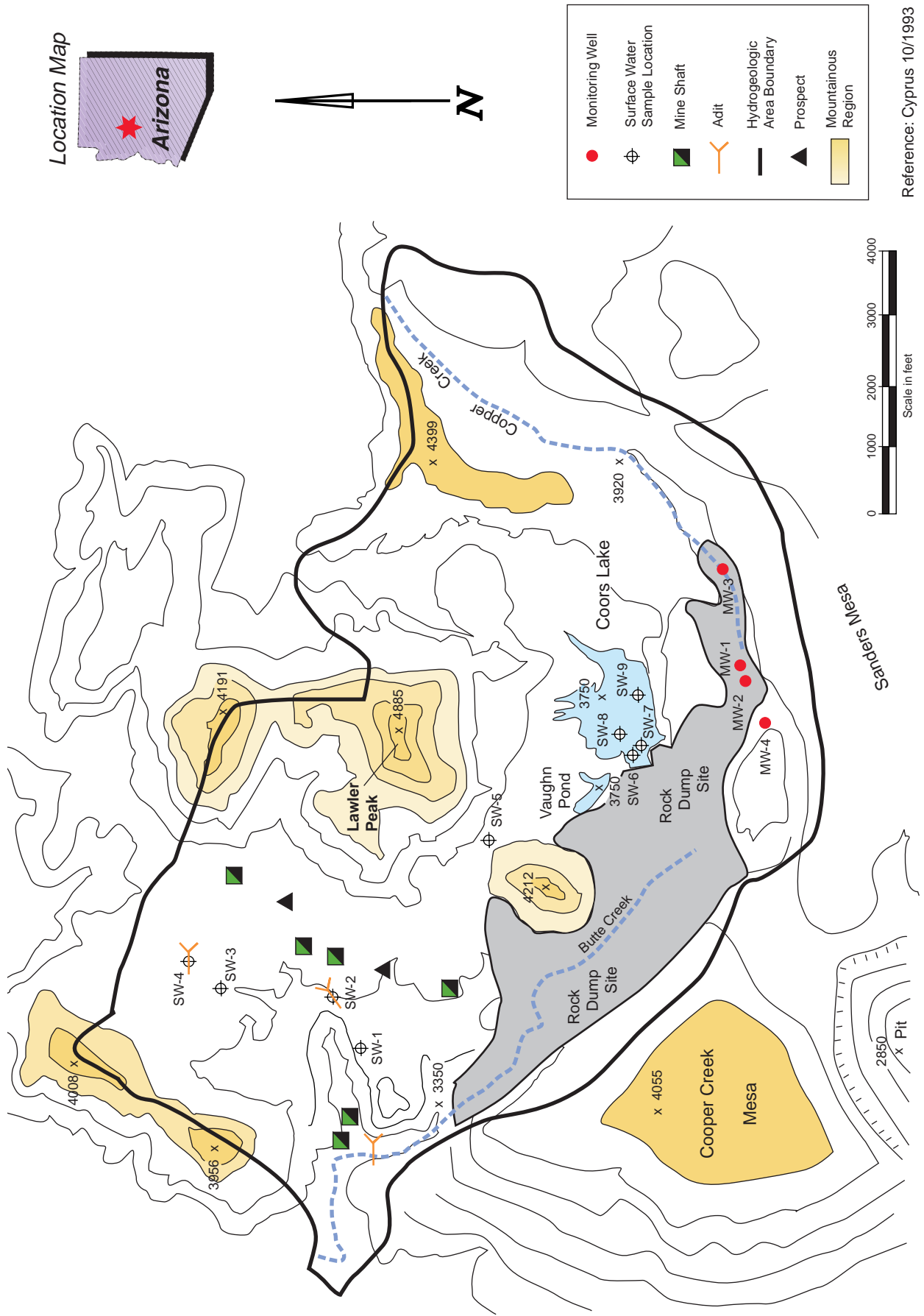








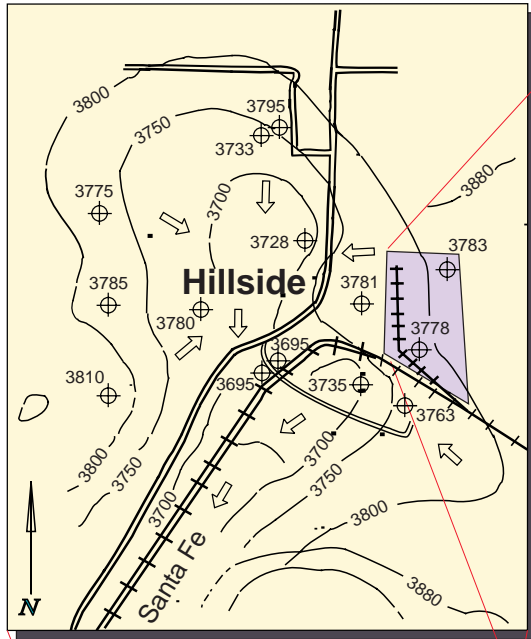
Figure H: Lawler Peak, Sample Location Map



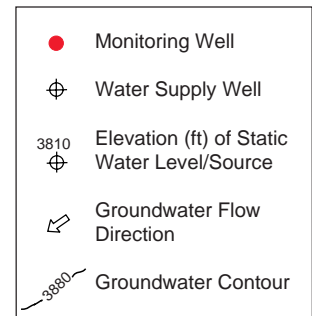
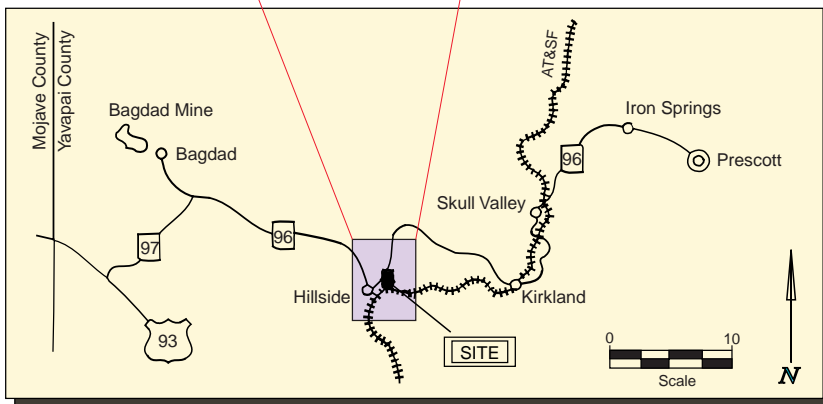
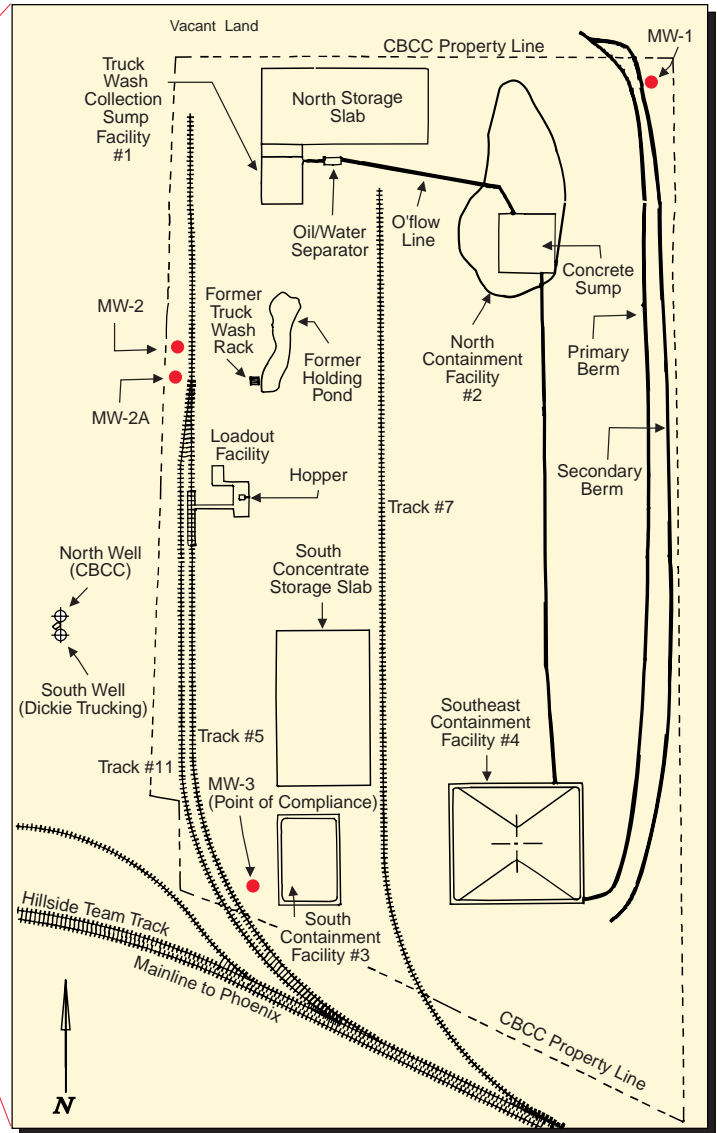
Reference: Cyprus 10/1993



Figure I: Hillside Loadout Facility, Sample Location Map



Location Map



Reference: Cyprus 12/1993



**Figure J: Hillside Loadout Facility,  
Geologic Map**

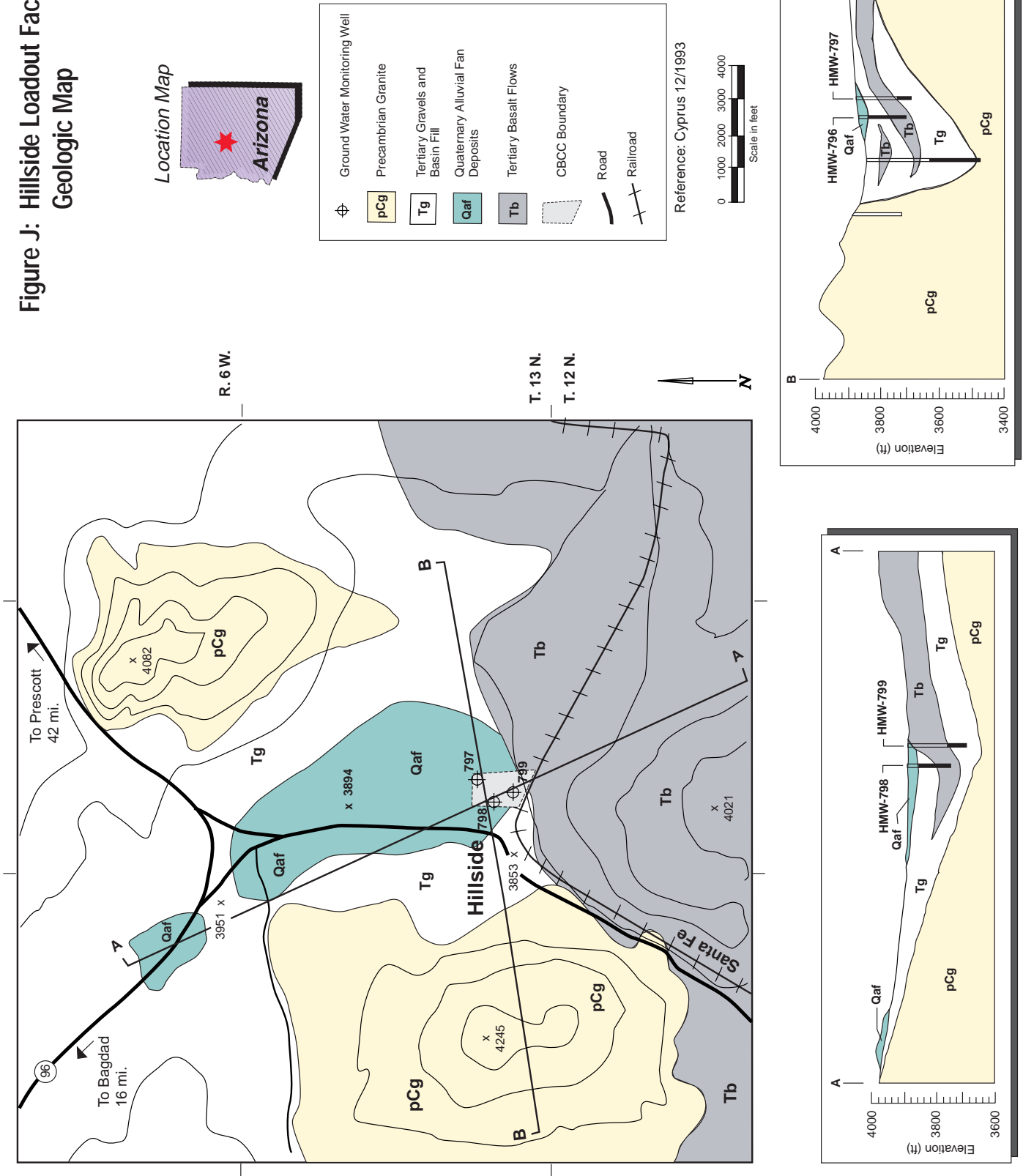






Figure K: Cyprus Sierrita, Sample Location Map

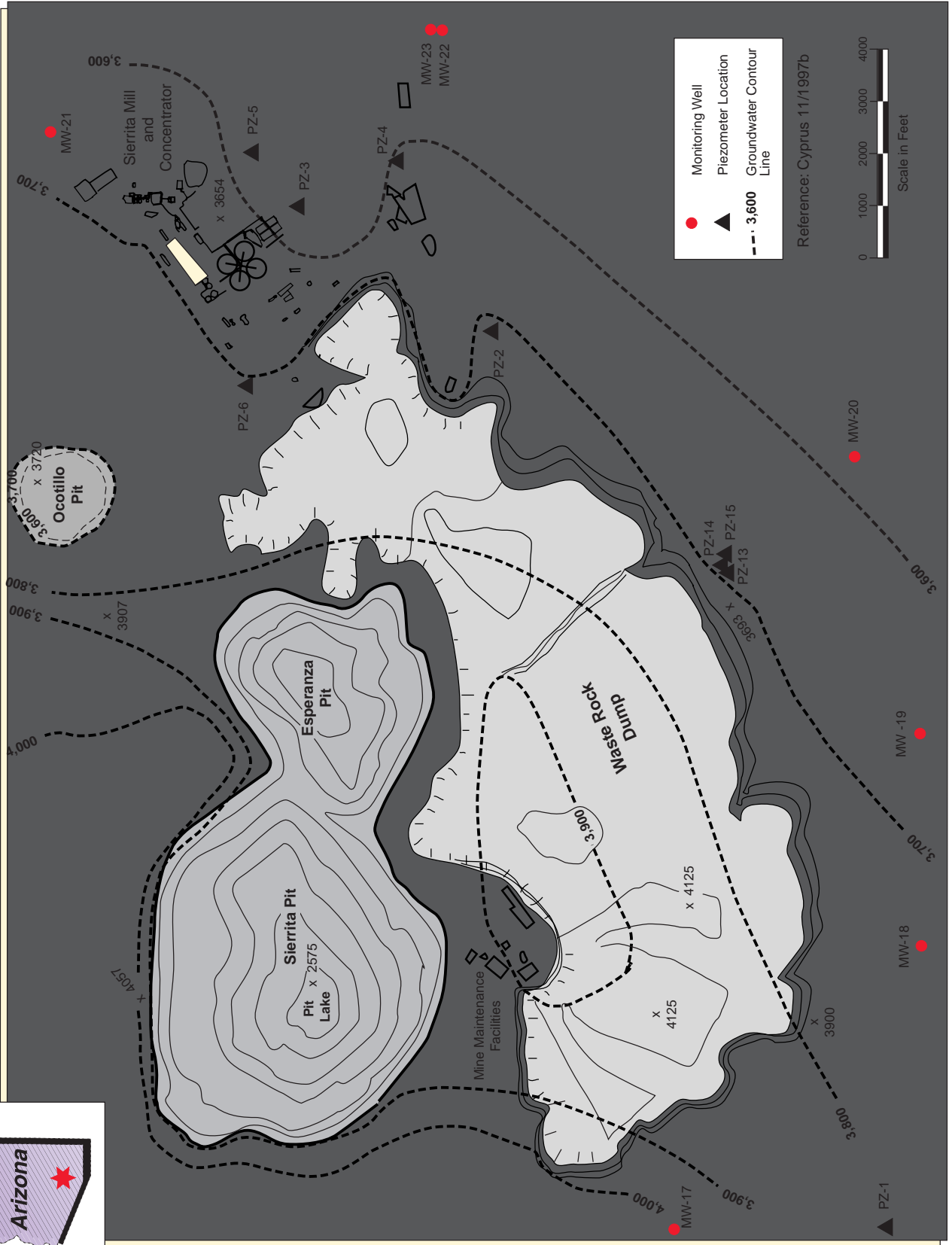




Figure L: Phelps Dodge, New Cornelia Mine, Sample Location Map

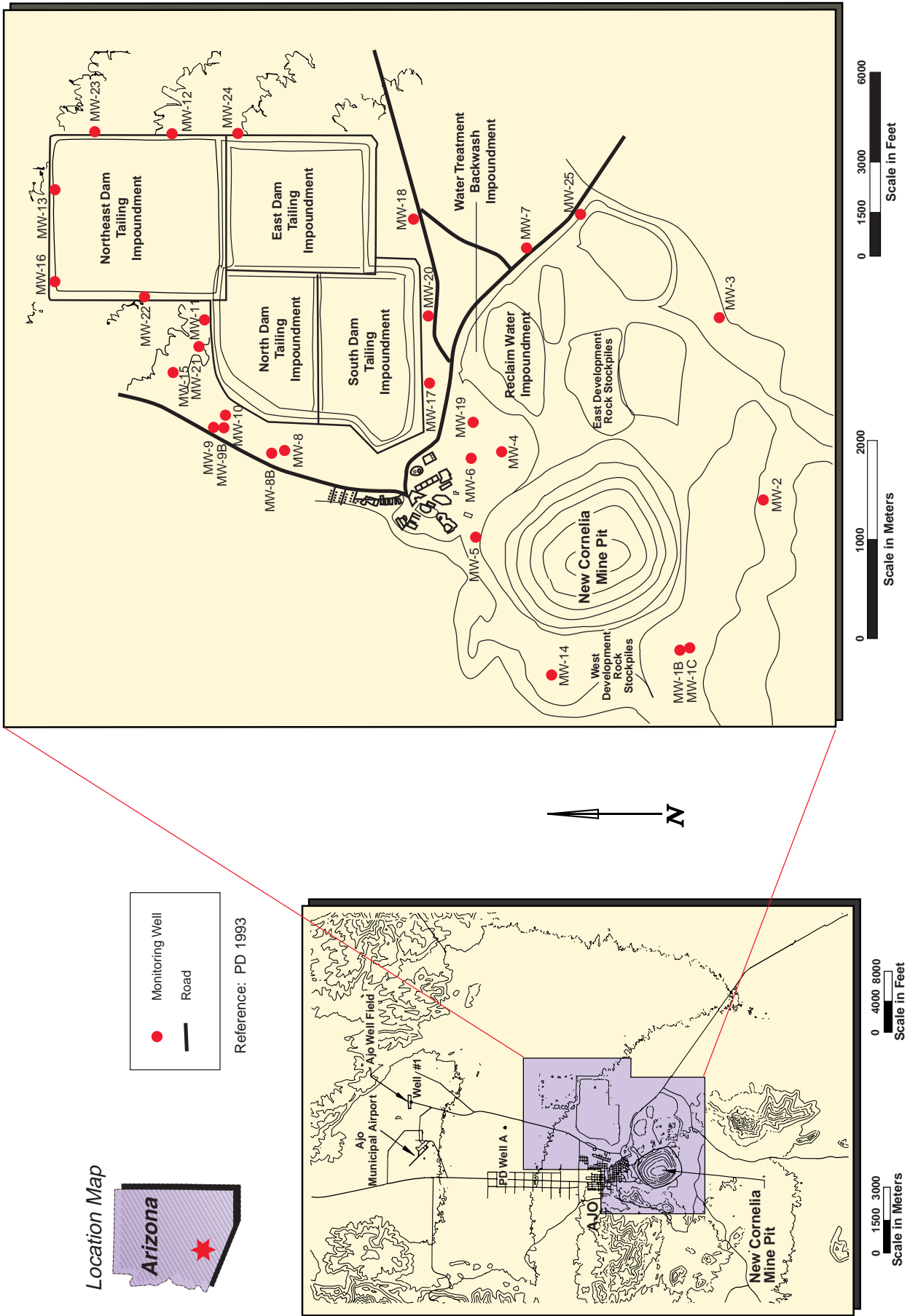












Figure M: Isoconcentration Map of Sulfate in the Shallow Zone, Phelps Dodge Copper Queen Mine

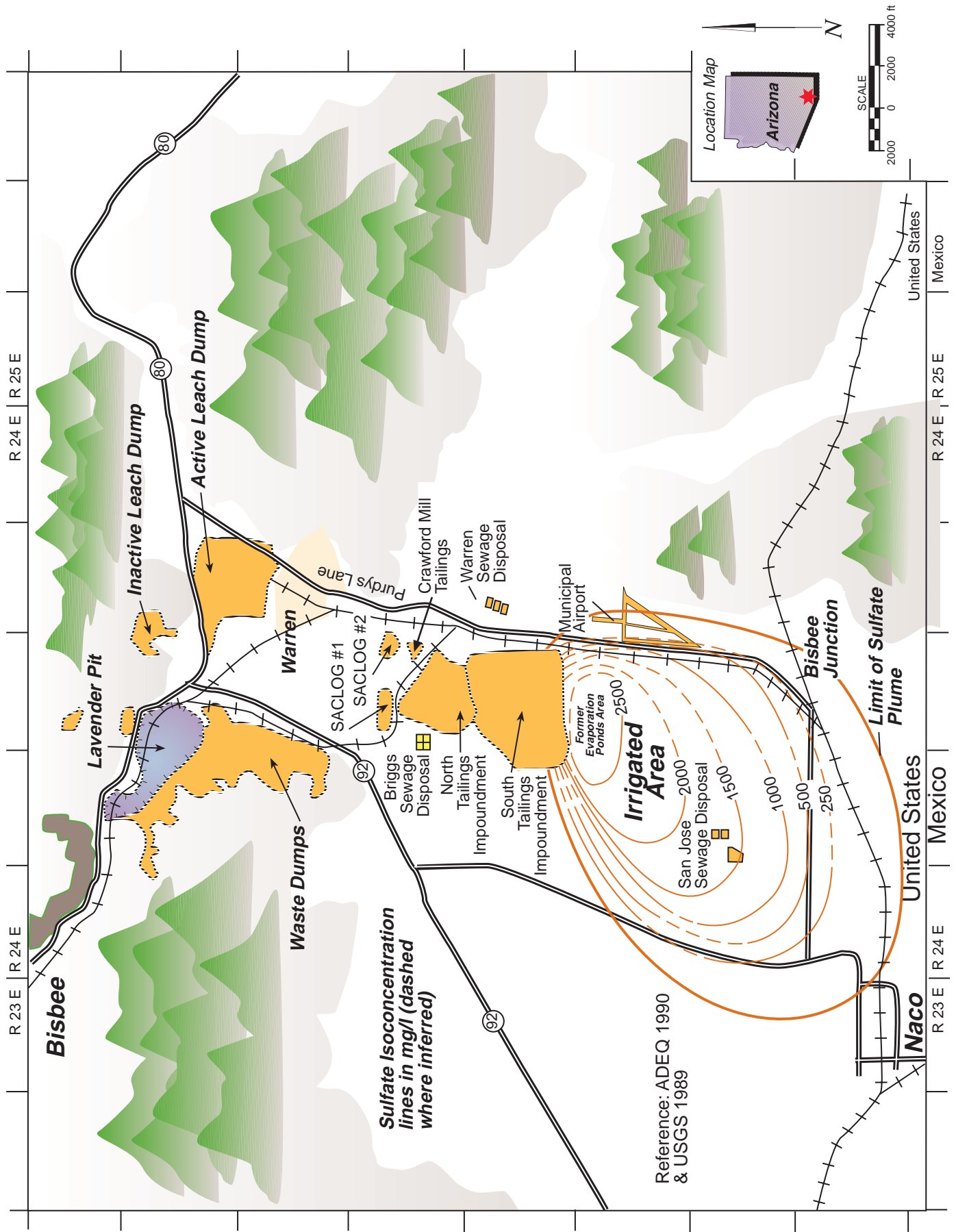






Figure N: Monitoring Well Location Map, Phelps Dodge Copper Queen Mine

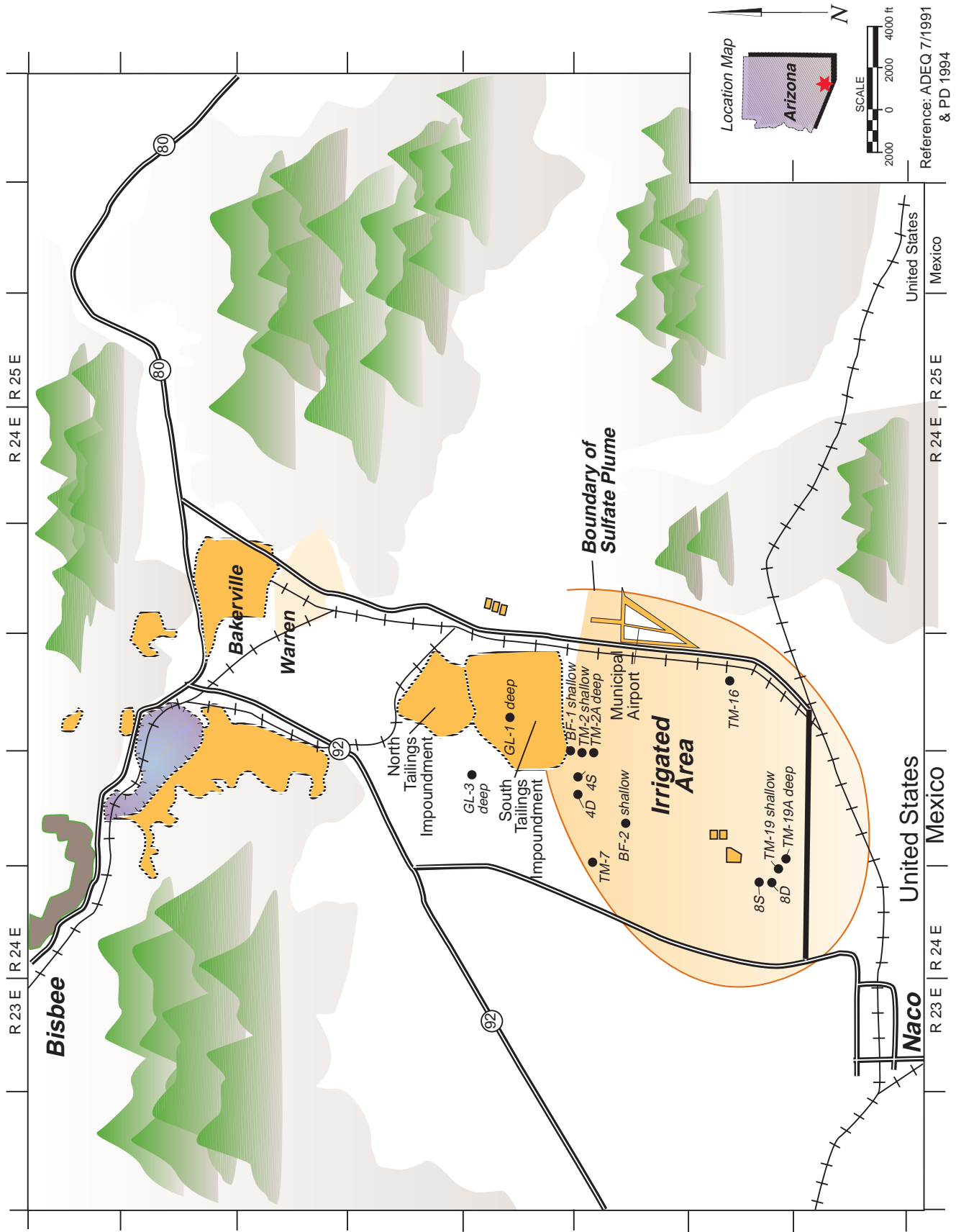




Figure 0: Hydrogeologic Map, Phelps Dodge Copper Queen, Concentration Storage Area

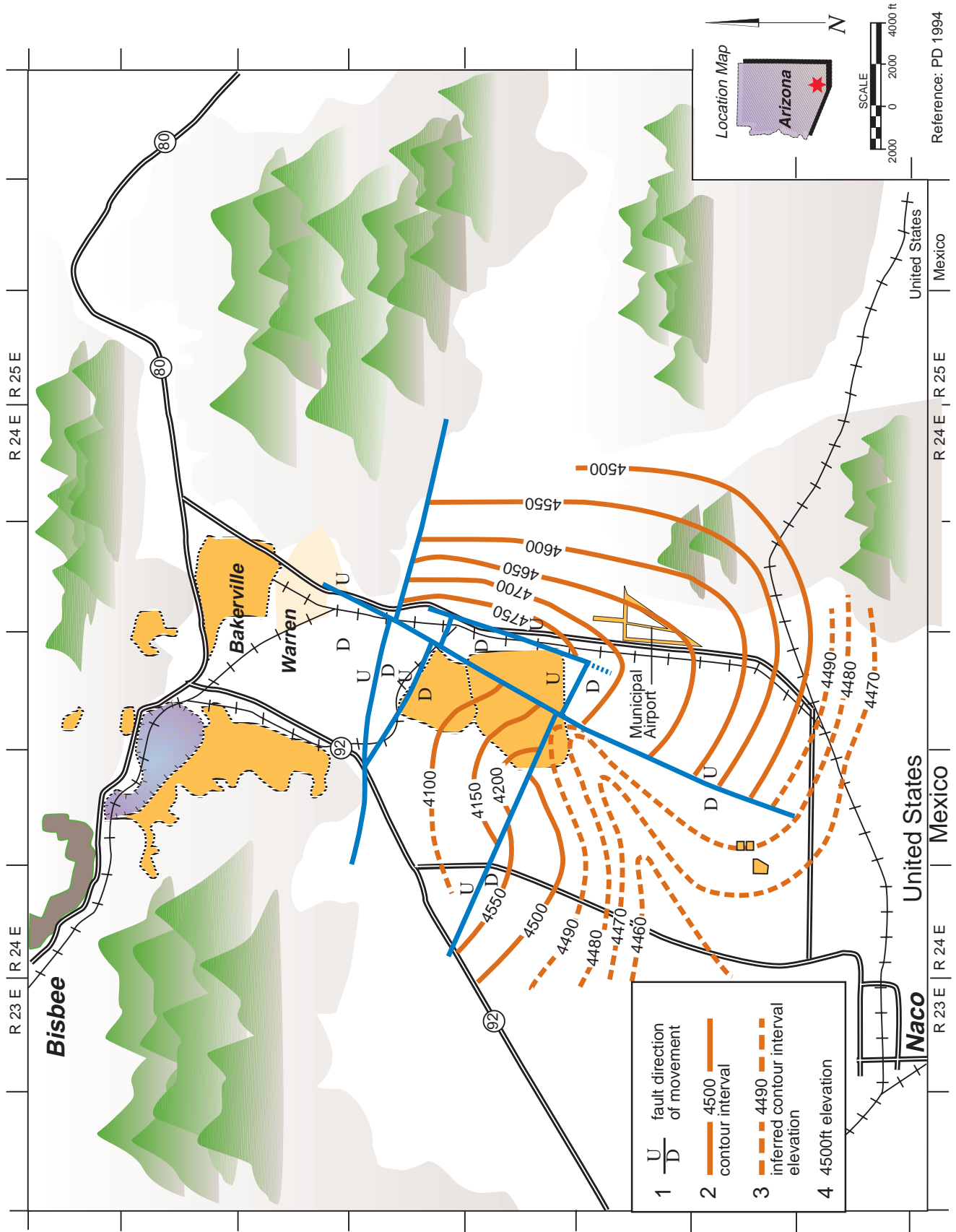






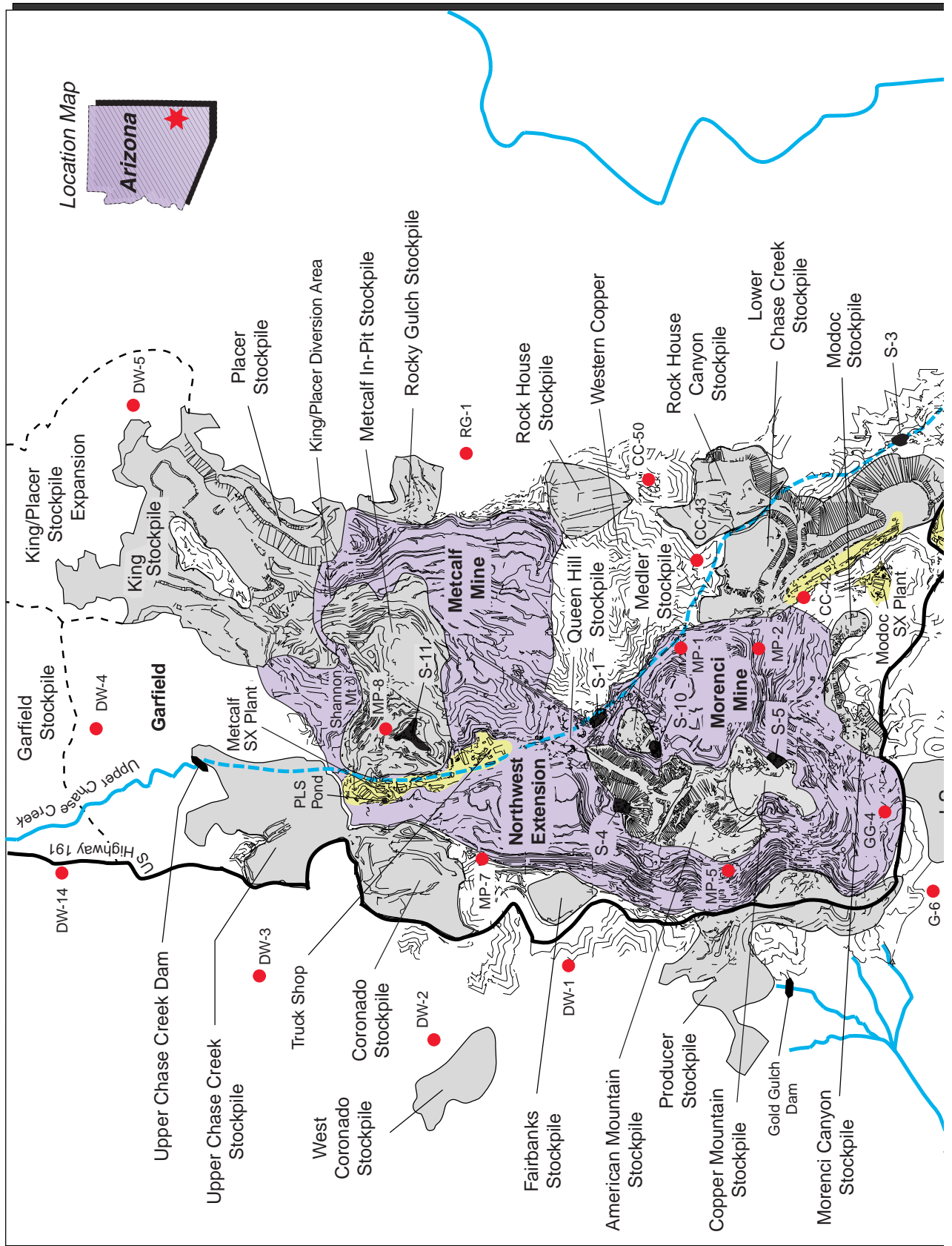


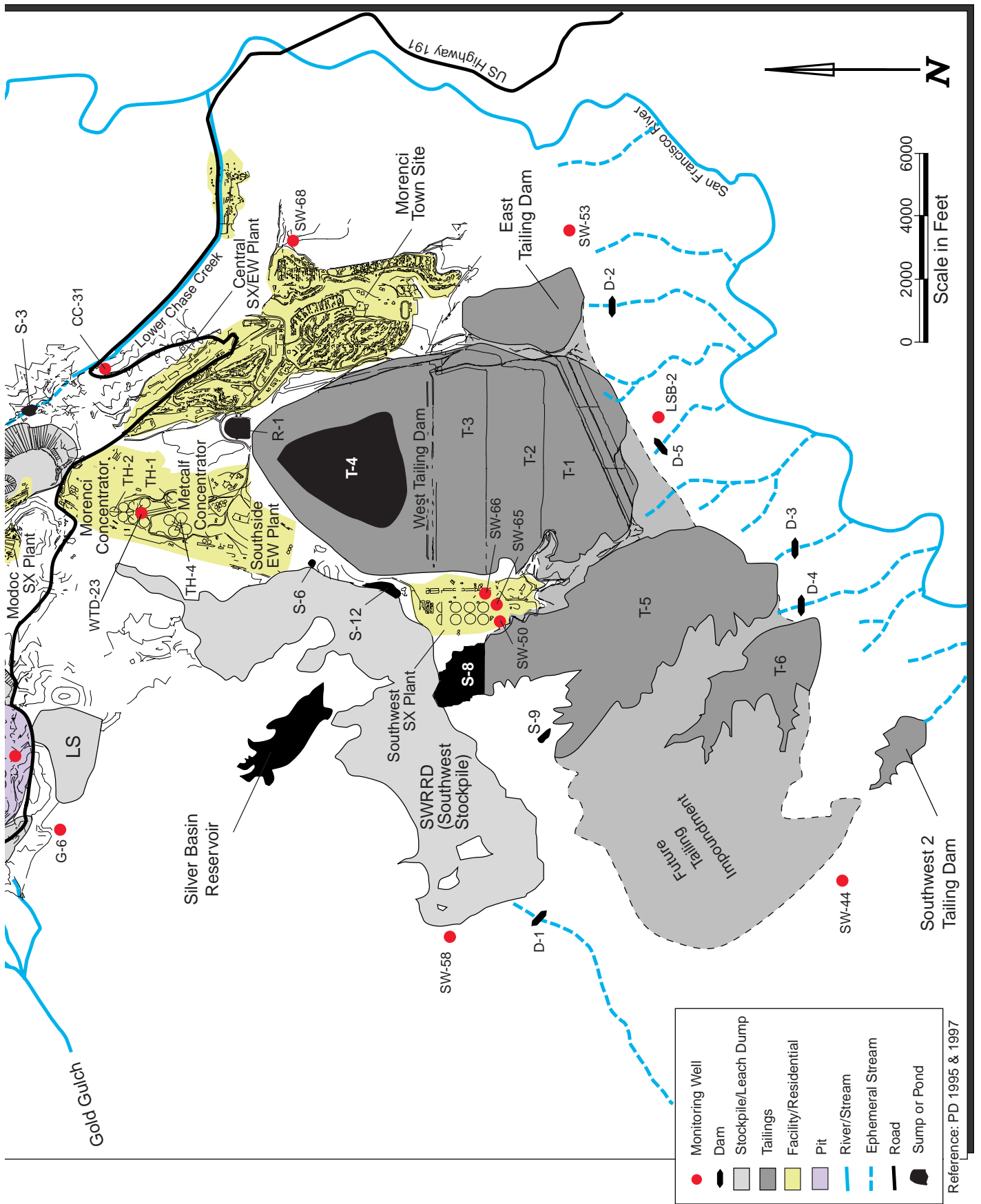






Figure Q: Morenci Mine, Sample Location Map



























































Results of Radiochemical Analyses

All Groundwater Data (pCi/L)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Cyprus Bagdad Copper Creek	GW	MW-1	58.00						10.80	31.00			
Cyprus Bagdad Copper Creek	GW	MW-2	8.00						12.90	2.00			
<b>CB-CC</b>	<b>S</b>	<b>Total = 2</b>	<b>33.00</b>						<b>11.85</b>	<b>16.50</b>			
		<b>STD</b>	<b>35.36</b>						<b>1.05</b>	<b>14.50</b>			
Cyprus Bagdad Lawler Peak	GW	MW 1	18.30	72.70	6.00	6.80	0.40		1.40	2.00	12.60		
Cyprus Bagdad Lawler Peak	GW	MW 2	13.20		6.80	8.00	0.30		0.70	0.70	14.00		
Cyprus Bagdad Lawler Peak	GW	MW 3	52.80	19.90	15.30	14.40	1.20		4.20	1.90	26.60		
Cyprus Bagdad Lawler Peak	GW	MW 4	33.00	4.00	15.10	16.60	0.70		1.20	1.50	30.70		
<b>CB-LP</b>	<b>S</b>	<b>Total = 4</b>	<b>29.33</b>	<b>32.20</b>	<b>10.80</b>	<b>11.45</b>	<b>0.65</b>		<b>1.88</b>	<b>1.38</b>	<b>20.83</b>		
		<b>STD</b>	<b>17.76</b>	<b>35.96</b>	<b>5.09</b>	<b>4.79</b>	<b>0.40</b>		<b>1.58</b>	<b>0.88</b>	<b>8.82</b>		
Cyprus Bagdad Hillside Loadout	GW	MW-1	5.50	3.60	2.30	8.20	0.10		1.60	6.20	3.50	3540.00	
Cyprus Bagdad Hillside Loadout	GW	MW-2	100.00	136.00	0.40	1.80	0.10		1.40	0.70	0.70	3680.00	
Cyprus Bagdad Hillside Loadout	GW	MW-2A	0.80	215.00	0.50	1.30			0.50	0.50	0.70	2690.00	
Cyprus Bagdad Hillside Loadout	GW	MW-3	3.10	7.50	0.60	2.50	0.10		0.50		0.70	2910.00	
Cyprus Bagdad Hillside Loadout	GW	MW-3 Dup	2.50	8.00	0.40	1.90	0.10		0.80	2.20	0.70	3180.00	
<b>CB-HL</b>	<b>S</b>	<b>Total = 5</b>	<b>22.38</b>	<b>74.02</b>	<b>0.84</b>	<b>3.14</b>	<b>0.10</b>		<b>0.96</b>	<b>2.97</b>	<b>1.26</b>	<b>3200.00</b>	
		<b>STD</b>	<b>43.42</b>	<b>96.77</b>	<b>0.82</b>	<b>2.86</b>	<b>0.00</b>		<b>0.51</b>	<b>2.93</b>	<b>1.25</b>	<b>415.51</b>	
Phelps Dodge New Cornelia	GW	MW 2-1	9.00	8.00	2.60	5.30	0.10		0.70	1.30	4.90		
Phelps Dodge New Cornelia	GW	MW 2-2	6.00	6.00	2.80	5.50	0.30		0.80	1.00	5.60		
Phelps Dodge New Cornelia	GW	MW 3-1	28.00	22.00	5.60	11.00	0.40		0.70	2.00	9.80		
Phelps Dodge New Cornelia	GW	MW 3-2	10.00	5.00	5.00	12.00	0.70		0.60	0.60	9.80		
Phelps Dodge New Cornelia	GW	MW 3-3	14.00	9.00	7.00	11.00	0.60		0.80	1.90	11.90		
Phelps Dodge New Cornelia	GW	MW 4-2	8.00	5.00	1.70	5.30	0.10		0.60	0.90	3.50		
Phelps Dodge New Cornelia	GW	MW 4-3	6.00	5.00	1.40	6.10	0.10		0.40	0.90	3.50		
Phelps Dodge New Cornelia	GW	MW 5-2	17.00	14.00	2.10	4.20	0.20		3.00	7.30	4.20		
Phelps Dodge New Cornelia	GW	MW 5-3	13.00	31.00	2.00	4.00	0.00		3.50	6.70	4.20		
Phelps Dodge New Cornelia	GW	MW 6-5	5.00	13.00	1.30	5.30	0.40		0.20	0.50	3.50		
Phelps Dodge New Cornelia	GW	MW 7-2	6.00	6.00	2.10	5.80	0.30		0.20	0.70	4.20		
Phelps Dodge New Cornelia	GW	MW 7-3	9.00	5.00	2.50	6.50	0.00		0.10	0.10	4.20		
Phelps Dodge New Cornelia	GW	MW 8-B5	6.00	8.00	2.40	9.00	0.80		0.00	0.20	5.60		
Phelps Dodge New Cornelia	GW	MW 8-B Dup	8.00	11.00	3.40	8.00	0.10		0.20	0.40	5.60		
Phelps Dodge New Cornelia	GW	MW 9B5	12.00	10.00	8.50	10.00	0.80		0.20	0.00	15.40		
Phelps Dodge New Cornelia	GW	MW 10-5	3.00	5.00	2.30	2.40	0.10		0.00	0.00	4.20		
Phelps Dodge New Cornelia	GW	MW 12-2	4.00	4.00	3.00	5.90	0.10		0.10	0.20	4.90		
Phelps Dodge New Cornelia	GW	MW 12-3	5.00	3.00	2.50	5.10	0.20		0.20	0.00	4.90		

STD = Standard Deviation  
 AVG = Average

Maximum and minimum values are shown in italics  
 Bold text (STD and AVG) also appear in summary tables (1-5)



Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelps Dodge New Cornelia	GW	MW 13-1	33.00	66.00	2.00	3.10	0.00		1.20	2.30	3.50		
Phelps Dodge New Cornelia	GW	MW 13-2	15.00	27.00	1.60	3.60	0.00		0.60	1.80	3.50		
Phelps Dodge New Cornelia	GW	MW 13-3	0.00	11.00	1.70	3.10	0.20		0.60	1.00	3.50		
Phelps Dodge New Cornelia	GW	MW 14-1	33.00	25.00	10.00	9.20	0.10		3.10	6.80	15.40		
Phelps Dodge New Cornelia	GW	MW 14-2	37.00	17.00	21.00	24.00	1.10		0.20	4.60	37.10		
Phelps Dodge New Cornelia	GW	MW 14-3	43.00	15.00	21.00	24.00	1.10		0.40	0.30	38.60		
Phelps Dodge New Cornelia	GW	MW 15-1	3.00	38.00	2.00	1.80	0.10		0.20	0.20	4.20		
Phelps Dodge New Cornelia	GW	MW 15-2	6.00	8.00	2.50	2.20	0.30		0.10	0.80	4.20		
Phelps Dodge New Cornelia	GW	MW 15-3	2.00	2.00	2.10	2.20	0.10		0.00	0.00	4.20		
Phelps Dodge New Cornelia	GW	MW 16-1	7.00	31.00	2.30	4.20	0.30		0.80	1.80	4.20		
Phelps Dodge New Cornelia	GW	MW 16-2	35.00	50.00	2.90	4.60	0.30		1.80	1.00	5.60		
Phelps Dodge New Cornelia	GW	MW 16-3	0.00	4.00	1.60	3.00	0.10		1.20	2.90	3.50		
Phelps Dodge New Cornelia	GW	MW 17-1	10.00	12.00	6.00	14.00	0.30		0.30	0.70	9.10		
Phelps Dodge New Cornelia	GW	MW 17-2	18.00	25.00	4.70	10.00	0.30		0.70	6.00	8.40		
Phelps Dodge New Cornelia	GW	MW 17-3	6.00	5.00	5.70	13.00	0.20		0.30	0.10	9.10		
Phelps Dodge New Cornelia	GW	MW 18-1	5.00	18.00	3.10	5.50	0.40		0.40	0.60	6.30		
Phelps Dodge New Cornelia	GW	MW 18-2	31.00	35.00	7.70	13.00	0.50		2.50	0.00	12.60		
Phelps Dodge New Cornelia	GW	MW 18-3	7.00	17.00	7.80	13.00	0.40		0.50	0.70	11.20		
<b>PD-NC</b>		<b>Average</b>	<b>12.78</b>	<b>16.00</b>	<b>4.54</b>	<b>7.66</b>	<b>0.31</b>		<b>0.76</b>	<b>1.56</b>	<b>8.17</b>		
		<b>STD</b>	<b>11.65</b>	<b>14.35</b>	<b>4.65</b>	<b>5.36</b>	<b>0.29</b>		<b>0.91</b>	<b>2.08</b>	<b>8.06</b>		
Cyprus Sierrita Twin Buttes	GW	MW-15 7/10/97	30.00	42.00					0.00	1.20	0.27		
Cyprus Sierrita Twin Buttes	GW	MW-15 8/26/97	42.00	28.00					0.00	0.00	0.30		
Cyprus Sierrita Twin Buttes	GW	MW-16 7/11/97	62.00	29.00					0.10	0.50	0.56		
Cyprus Sierrita Twin Buttes	GW	MW-16 8/21/97	53.00	35.00					0.30	1.70	0.65		
Cyprus Sierrita Twin Buttes	GW	MW-17 7/31/97	268.00	234.00					0.00	1.30	3.64		
Cyprus Sierrita Twin Buttes	GW	MW-17 8/25/97	144.00	123.00					0.30	0.10	3.43		
Cyprus Sierrita Twin Buttes	GW	MW-18 7/24/97	163.00	131.00					4.60	0.00	1.51		
Cyprus Sierrita Twin Buttes	GW	MW-18 8/25/97	157.00	113.00					0.00	0.80	3.30		
<b>CS-TB</b>		<b>Average of Samples</b>	<b>114.88</b>	<b>91.88</b>					<b>0.66</b>	<b>0.70</b>	<b>1.71</b>		
		<b>STD</b>	<b>82.40</b>	<b>72.61</b>					<b>1.60</b>	<b>0.65</b>	<b>1.50</b>		
Cyprus Sierrita	GW	MW-17 6/26/97	85.00	56.00					9.30	15.00	0.82		
Cyprus Sierrita	GW	MW-17 8/15/97	85.00	57.00					130.00	19.00	0.07		
Cyprus Sierrita	GW	MW-18 6/19/97	14.00	13.00					0.90	0.00	0.13		
Cyprus Sierrita	GW	MW-18 8/14/97	12.00	4.70					0.00	0.90	0.12		
Cyprus Sierrita	GW	MW-19 7/31/97	23.00	0.20					0.10	0.60	0.14		

STD = Standard Deviation  
AVG = Average

Maximum and minimum values are shown in italics  
Bold text (STD and AVG) also appear in summary tables (1-5)

Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Cyprus Sierrita	GW	MW-19 8/25/97	23.00	21.00					1.50	1.20	0.16		
Cyprus Sierrita	GW	MW-21 7/16/97	557.00	334.00					7.30	9.10	7.55		
Cyprus Sierrita	GW	MW-21 8/15/97	406.00	299.00					15.00	6.20	5.01		
Cyprus Sierrita	GW	MW-22 6/24/97	262.00	122.00					0.00	1.70	3.43		
Cyprus Sierrita	GW	MW-22 8/19/97	117.00	132.00					0.40	1.10	2.61		
Cyprus Sierrita	GW	MW-23 7/02/97	70.00	71.00					0.40	5.60	0.37		
Cyprus Sierrita	GW	MW-23 8/21/97	17.00	8.00					0.50	1.00	0.51		
Cyprus Sierrita	GW	PZ-1 6/18/97	7.50	8.20					0.00	0.10	0.03		
Cyprus Sierrita	GW	PZ-1 8/21/97	9.70	9.50					0.00	0.00	0.02		
Cyprus Sierrita	GW	PZ-2 6/27/97	48.00	40.00					1.20	10.00	0.12		
Cyprus Sierrita	GW	PZ-2 8/13/97	14.00	59.00					2.20	10.00	0.14		
Cyprus Sierrita	GW	PZ-3 6/26/97	61.00	49.00					2.00	1.70	0.51		
Cyprus Sierrita	GW	PZ-3 8/13/97	32.00	50.00					4.50	13.00	0.49		
Cyprus Sierrita	GW	PZ-4 6/23/97	63.00	49.00					0.60	0.80	0.82		
Cyprus Sierrita	GW	PZ-4 8/20/97	56.00	70.00					0.50	1.60	0.82		
Cyprus Sierrita	GW	PZ-5 6/26/97	232.00	150.00					1.40	5.80	3.84		
Cyprus Sierrita	GW	PZ-5 8/19/97	245.00	129.00					3.10	7.10	2.40		
Cyprus Sierrita	GW	PZ-6 7/02/97	26.00	27.00					2.70	30.00	0.12		
Cyprus Sierrita	GW	PZ-6 8/20/97	19.00	44.00					3.20	8.30	0.14		
Cyprus Sierrita	GW	PZ-9 7/11/97	137.00	50.00					0.00	1.50	1.44		
Cyprus Sierrita	GW	PZ-9 8/26/97	186.00	37.00					0.20	0.00	1.17		
Cyprus Sierrita	GW	PZ-13 8/06/97	15.00	47.00					0.00	2.10	0.21		
Cyprus Sierrita	GW	PZ-13 8/25/97	29.00	1.00					0.00	0.90	0.23		
Cyprus Sierrita	GW	PZ-14 8/01/97	53.00	14.00					0.10	0.00	0.14		
Cyprus Sierrita	GW	PZ-14 8/22/97	14.00	4.00					0.10	1.10	0.16		
<b>CS Average</b>		<b>Average</b>	<b>97.27</b>	<b>65.19</b>					<b>6.24</b>	<b>5.18</b>	<b>1.12</b>		
		<b>STD</b>	<b>128.84</b>	<b>79.53</b>					<b>23.61</b>	<b>6.89</b>	<b>1.76</b>		
Phelp Dodge Copper Queen	GW	TM 2 6/20/96			13.00	51.00	2.00				66.00		
Phelp Dodge Copper Queen	GW	TM 19 6/20/96			3.90	19.00	0.30				23.20		
Phelp Dodge Copper Queen	GW	BF 2 8/8/96									17.50		
Phelp Dodge Copper Queen	GW	TM 2 8/8/96									18.40		
Phelp Dodge Copper Queen	GW	TM 19 8/8/96									6.60		
Phelp Dodge Copper Queen	GW	TM 16 8/8/96									2.50		
Phelp Dodge Copper Queen	GW	TM 7 8/8/96									4.30		
Phelp Dodge Copper Queen	GW	(D-24-24)05acc 8/8/96									5.70		

STD = Standard Deviation  
AVG = Average

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Bold text (STD and AVG) also appear in summary tables (1-5)

Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Copper Queen	GW	(D-24-24)17bbb 8/8/96									4.10		
Phelp Dodge Copper Queen	GW	(D-23-24) 29bcb 8/8/96									1.20		
Phelp Dodge Copper Queen	GW	BF 1 10/93	13.15		10.19	32.84	0.45		0.30	0.83	46.56	60.00	
Phelp Dodge Copper Queen	GW	BF 1 11/93	14.48		9.98	33.76	0.67		0.27	0.92	49.73		
Phelp Dodge Copper Queen	GW	BF 2 10/93	44.27		1.88	39.80	0.50		0.37	0.65	46.83	240.00	
Phelp Dodge Copper Queen	GW	BF 2 11/93	54.04		11.86	38.65	0.47		0.27	0.80	60.99		
Phelp Dodge Copper Queen	GW	TM 2 11/93	59.48		24.56	60.37	2.54		0.38	0.72	72.78		
Phelp Dodge Copper Queen	GW	TM 19 11/93	4.97		0.78	4.72	0.01		0.34	0.76	4.21		
Phelp Dodge Copper Queen	GW	TM-2A 11/93	22.18		3.58	15.40	0.01		0.35	0.98	19.99		
Phelp Dodge Copper Queen	GW	19 A 11/93	2.45		1.10	2.80	0.01		0.28	0.74	6.16		
Phelp Dodge Copper Queen	GW	GL 1 11/93	17.48		3.44	17.55	0.01		0.27	0.70	23.77		
Phelp Dodge Copper Queen	GW	GL 3 11/93	3.35		0.47	1.98			0.29	1.50	2.36		
Phelp Dodge Copper Queen	GW	8S 7/91	5.10	7.50	0.06	16.00			0.14			521.00	
Phelp Dodge Copper Queen	GW	8D 7/91	72.00	5.00	0.40	4.30			0.27			332.00	
Phelp Dodge Copper Queen	GW	4S 7/91	34.00	35.00	35.00	58.00			0.13			542.00	
Phelp Dodge Copper Queen	GW	4Dup 7/91	3.90	33.00	35.00	60.00			0.10			586.00	
Phelp Dodge Copper Queen	GW	4D 7/91	3.00	4.90	0.52	1.90			0.16			1330.00	
<b>CQ Average</b>	<b>S Total = 25</b>	<b>Average</b>	<b>23.59</b>	<b>17.08</b>	<b>9.16</b>	<b>26.95</b>	<b>0.63</b>		<b>0.26</b>	<b>0.86</b>	<b>24.14</b>	<b>515.86</b>	
		<b>STD</b>	<b>23.43</b>	<b>15.50</b>	<b>11.69</b>	<b>21.48</b>	<b>0.85</b>					<b>405.41</b>	
BHP Copper Inc Pinto Valley	GW	W14B	11.60	5.60				1.20	0.70	0.50	12.20	530.00	
BHP Copper Inc Pinto Valley	GW	W12	179.00	68.00				1.60	1.20	1.60	209.00	150.00	
BHP Copper Inc Pinto Valley	GW	W11	67.40	22.00				2.20	0.60	2.20	84.00	300.00	
BHP Copper Inc Pinto Valley	GW	W17	48.00	33.00				5.23	2.80	5.20	0.00	2680.00	
BHP Copper Inc Pinto Valley	GW	W15B	19.00	11.80				0.80	0.30	0.80	22.00	190.00	
BHP Copper Inc Pinto Valley	GW	W19	7.00	5.80				1.10	0.60	1.10	6.00	120.00	
BHP Copper Inc Pinto Valley	GW	NW24	25.30	164.00				122.00	61.00	122.00	2.20	2000.00	
BHP Copper Inc Pinto Valley	GW	NE26	35.00	39.00				29.70	14.90	29.70	5.10	3980.00	
BHP Copper Inc Pinto Valley	GW	APP-1A	17.00	14.00				1.30	0.30	1.00	1.30	300.00	
BHP Copper Inc Pinto Valley	GW	APP-2	15.00	12.00				1.10	0.30	0.80	1.10	427.00	
BHP Copper Inc Pinto Valley	GW	APP-3A	85.00	14.00				0.90	0.20	0.70	80.00	520.00	
BHP Copper Inc Pinto Valley	GW	APP-3B	38.00	7.60				1.60	0.40	1.20	50.00	140.00	
BHP Copper Inc Pinto Valley	GW	APP-4	24.00	17.00				1.10	0.30	0.80	0.84	940.00	
BHP Copper Inc Pinto Valley	GW	APP-5A	14.00	12.00				1.20	0.30	0.90	7.20	150.00	
BHP Copper Inc Pinto Valley	GW	APP-5B	8.00	7.00				0.90	0.20	0.70	4.60	16.00	

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 AVG = Average

Maximum and minimum values are shown in italics  
 Bold text (STD and AVG) also appear in summary tables (1-5)

Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
BHP Copper Inc Pinto Valley	GW	APP-6	10.40	6.30				0.90	0.20	0.70	25.00	2000.00	
<b>PV Average</b>	<b>STotal = 16</b>	<b>Average</b>	<b>37.73</b>	<b>27.44</b>				<b>10.80</b>	<b>5.27</b>	<b>10.62</b>	<b>31.91</b>	<b>902.69</b>	
		<b>STD</b>	<b>43.70</b>	<b>39.90</b>				<b>30.49</b>	<b>15.30</b>	<b>30.56</b>	<b>54.62</b>	<b>1151.75</b>	
Cyprus Mineral Park	GW	MW-2A 8/20/95	0.00	0.00									
Cyprus Mineral Park	GW	MW-6 8/1/95	220.00	170.00									
Cyprus Mineral Park	GW	MW-7 8/1/95	140.00	0.00									
Cyprus Mineral Park	GW	MW-8 8/2/95	50.00	40.00									
Cyprus Mineral Park	GW	MW-9 8/2/95	1500.00	500.00									
Cyprus Mineral Park	GW	MW-10 8/2/95	19.00	42.00									
Cyprus Mineral Park	GW	MW-12 8/4/95	0.00	60.00									
Cyprus Mineral Park	GW	MW-14 8/1/95	0.00	0.00									
Cyprus Mineral Park	GW	MW-15 8/1/95	0.00	0.00									
Cyprus Mineral Park	GW	MW-16 8/1/95	80.00	0.00									
Cyprus Mineral Park	GW	MW-17 8/19/95	80.00	29.00									
Cyprus Mineral Park	GW	MW-18 8/19/95	73.00	0.00									
<b>MP Average</b>	<b>STotal =12</b>	<b>Average</b>	<b>180.17</b>	<b>70.08</b>									
		<b>STD</b>	<b>420.98</b>	<b>143.90</b>									
<b>All GW</b>	<b>Total = 138</b>	<b>PureAvg</b>	<b>60.25</b>	<b>44.34</b>	<b>5.91</b>	<b>12.83</b>	<b>0.38</b>	<b>10.80</b>	<b>2.96</b>	<b>4.07</b>	<b>11.97</b>	<b>1216.21</b>	
		<b>PureSTD</b>	<b>150.82</b>	<b>72.63</b>	<b>7.57</b>	<b>14.77</b>	<b>0.47</b>	<b>30.49</b>	<b>13.40</b>	<b>12.72</b>	<b>24.93</b>	<b>1308.91</b>	
<i>Morenci &gt; Fed &amp; AZ Standards</i>													
Phelp Dodge Morenci	GW	Chase Creek -42 11/1/95	4.50	74.30									
Phelp Dodge Morenci	GW	Chase Creek -43 11/1/95	30.00	47.80									
Phelp Dodge Morenci	GW	Chase Creek -31 6/26/95	1.50	347.00									
Phelp Dodge Morenci	GW	Gold Gulch -04 3/7/96	9.00	57.00									
Phelp Dodge Morenci	GW	Morenci Pit -07 2/14/96	5.60	56.10									
Phelp Dodge Morenci	GW	Morenci Pit -8 11/14/95	81.00	40.00									
Phelp Dodge Morenci	GW	Rock Gulch -01 9/26/95	117.00	149.00									
Phelp Dodge Morenci	GW	WestTailingDam-23 2/15/96	16.00	5.40									
Phelp Dodge Morenci	GW	South West -44 2/21/96	136.00	254.00									
Phelp Dodge Morenci	GW	South West -58 8/9/95	1.40	237.00									
Phelp Dodge Morenci	GW	South West -50 7/31/95	15.30	8.60									
Phelp Dodge Morenci	GW	South West -65 10/30/95	17.00	7.00									
Phelp Dodge Morenci	GW	South West -66 10/30/95	15.20	5.00									
Phelp Dodge Morenci	GW	South West -68 1/25/95	15.00	2.00									

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Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	GW	DW-3 11/2/96 Upgradient	10.00	59.00	0.10	4.70	1.70	2.60	0.90	1.70	6.90		
Phelp Dodge Morenci	GW	DW-3 12/16/96 "	17.00	50.00	0.50	23.00	8.70	2.90	1.30	1.60	33.50		
Phelp Dodge Morenci	GW	DW-14 11/30/96 "	9.00	5.00	0.40	10.00	3.70	14.20	13.00	1.20	12.60		
Phelp Dodge Morenci	GW	DW -01 11/22/96 "	28.00	66.00	1.20	2.80	0.00	11.60	4.90	6.70	5.00		
Phelp Dodge Morenci	GW	DW-19 12/12/96 "	12.00	5.00	1.80	11.00	0.30	0.00	0.00	0.00	13.10		
Phelp Dodge Morenci	GW	Gold Gulch -4 10/31/96	27.00	56.00	4.00	6.30	0.30	9.70	2.60	7.10	10.60		
Phelp Dodge Morenci	GW	Gold Gulch -4 12/11/9	13.00	47.00	7.00	18.00	2.60	8.30	3.70	4.60	27.60		
Phelp Dodge Morenci	GW	Lower Chase Creek-10 12/14/96	12.00	10.00	1.00	8.20	0.00	0.50	0.00	0.50	9.20		
Phelp Dodge Morenci	GW	Chase Creek -42 11/2/96	7.00	60.00	2.50	2.40	0.00	4.90	1.00	3.90	4.90		
Phelp Dodge Morenci	GW	Chase Creek -43 11/2/96	21.00	61.00	0.00	0.10	0.00	34.00	13.00	21.00	0.10		
Phelp Dodge Morenci	GW	Chase Creek -43 11/30/96	28.00	52.00	0.20	0.20	0.00	19.30	0.30	19.00	0.40		
Phelp Dodge Morenci	GW	Chase Creek -50 12/19/96	23.00	39.00	1.40	6.70	0.00	3.80	17.00	14.00	8.10		
Phelp Dodge Morenci	GW	Morenci Pit-1 11/5/96	150.00	140.00	110.00	130.00	10.00	42.00	28.00	14.00	250.00		
Phelp Dodge Morenci	GW	Morenci Pit-1 11/21/96	240.00	160.00	100.00	150.00	-0.10	37.60	28.00	9.60	249.90		
Phelp Dodge Morenci	GW	Morenci Pit-2 11/21/96	7.00	30.00	0.30	1.00	0.10	6.60	3.20	3.40	1.40		
Phelp Dodge Morenci	GW	Morenci Pit-5 11/5/96	79.00	100.00	61.00	61.00	1.10	2.00	0.70	1.30	123.10		
Phelp Dodge Morenci	GW	Morenci Pit-5 11/22/96	96.00	68.00	62.00	67.00	0.50	1.40	0.60	0.80	129.50		
Phelp Dodge Morenci	GW	Morenci Pit-7 11/6/96	4.00	27.00	0.10	1.50	0.10	7.80	1.60	6.20	1.70		
Phelp Dodge Morenci	GW	Metcaif Pit DC Sump -7 11/22/9	3.00	31.00	0.00	0.00	0.10	6.70	1.50	5.20	0.10		
Phelp Dodge Morenci	GW	Metcaif Pit DC Sump -8 11/6/96	51.00	51.00	12.00	21.00	0.40	18.00	8.50	9.50	42.00		
Phelp Dodge Morenci	GW	Metcaif Pit DC Sump -8 11/22/96	40.00	38.00	10.00	18.00	1.60	16.30	8.50	7.80	29.60		
Phelp Dodge Morenci	GW	South West SX Plant -50 10/15/96	19.00	6.00	2.90	18.00	1.00	1.50	0.00	1.50	21.90		
Phelp Dodge Morenci	GW	South West SX Plant -50 11/19/96	18.00	7.00	2.30	19.00	0.60	0.20	0.20	-0.10	21.90		
Phelp Dodge Morenci	GW	South West Stockpile -58 10/9/96	2.00	170.00	0.00	0.00	0.00	1.60	0.80	0.80	0.00		
Phelp Dodge Morenci	GW	South West Stockpile -58 11/13/96	2.00	110.00	0.00	0.00	0.00	0.30	0.20	0.10	0.00		
Phelp Dodge Morenci	GW	South West-61 10/10/96	8.00	6.00	0.80	8.50	0.10	2.50	1.80	0.70	10.00		
Phelp Dodge Morenci	GW	South West-61 11/20/96	10.00	7.00	1.10	8.80	0.50	1.60	1.00	0.60	0.40		
Phelp Dodge Morenci	GW	South West SX Plant -65 10/1/96	35.00	0.00	10.00	54.00	2.20	0.30	0.00	0.30	66.20		
Phelp Dodge Morenci	GW	South West SX Plant -65 11/13/96	66.00	11.00	14.00	77.00	2.40	0.50	0.20	0.30	93.40		
Phelp Dodge Morenci	GW	South West SX Plant -66 10/11/96	20.00	8.00	3.70	17.00	0.20	0.30	0.20	0.10	20.90		
Phelp Dodge Morenci	GW	South West SX Plant -66 11/13/96	19.00	4.00	3.00	20.00	0.20	0.50	0.30	0.20	23.20		
Phelp Dodge Morenci	GW	Rocky Gulch Dam -1 12/4/96	190.00	190.00	38.00	64.00	0.00	117.70	7.70	110.00	102.00		
Phelp Dodge Morenci	GW	LSB-2 10/11/96 Lower silver Basin	17.00	41.00	0.50	1.40	0.00	2.30	0.80	1.50	1.90		
Phelp Dodge Morenci	GW	South West -44 11/15/96	27.00	53.00	1.00	2.30	0.00	4.40	0.70	3.70	3.30		
Phelp Dodge Morenci	GW	SW-48 10/16/96	6.00	10.00	1.90	5.60	0.10	1.20	0.10	1.10	7.60		

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Bold text (STD and AVG) also appear in summary tables (1-5)

Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	GW	SW-48 11/14/96	8.00	8.00	1.70	6.70	0.30	0.60	0.10	0.50	8.70		
Phelp Dodge Morenci	GW	South West -53 10/8/96	18.00	25.00	2.00	3.20	0.00	1.70	0.90	0.80	5.20		
<b>PD MM Average</b>		<b>Average</b>	<b>35.42</b>	<b>60.81</b>	<b>12.39</b>	<b>22.93</b>	<b>1.05</b>	<b>10.47</b>	<b>4.14</b>	<b>7.06</b>	<b>36.38</b>		
		<b>STD</b>	<b>50.17</b>	<b>73.11</b>	<b>26.93</b>	<b>35.25</b>	<b>2.21</b>	<b>20.98</b>	<b>7.14</b>	<b>18.21</b>	<b>62.11</b>		
<b>All GW + MM&gt;</b>		<b>Pure avg</b>	<b>53.18</b>	<b>49.40</b>	<b>8.33</b>	<b>16.60</b>	<b>0.65</b>	<b>10.57</b>	<b>3.25</b>	<b>4.82</b>	<b>17.76</b>	<b>1216.21</b>	
		<b>PureSTD</b>	<b>130.62</b>	<b>72.95</b>	<b>17.66</b>	<b>24.83</b>	<b>1.47</b>	<b>23.94</b>	<b>12.17</b>	<b>14.30</b>	<b>38.44</b>	<b>1308.91</b>	
Morenci <Fed & AZ Standards — These wells are not located on map (Figure Q) or Table 33													
Phelp Dodge Morenci	GW	Chase Creek -04 7/6/95	0.90	10.20									
Phelp Dodge Morenci	GW	Chase Creek -05 7/10/95	2.80	6.70									
Phelp Dodge Morenci	GW	Chase Creek -07 6/21/95	8.60	13.30									
Phelp Dodge Morenci	GW	Chase Creek -08 6/21/95	1.90	18.70									
Phelp Dodge Morenci	GW	Chase Creek -10 8/7/95	7.40	2.00									
Phelp Dodge Morenci	GW	Chase Creek -14 6/21/95	5.10	23.00									
Phelp Dodge Morenci	GW	Chase Creek -28 12/6/95	9.40	9.90									
Phelp Dodge Morenci	GW	Chase Creek -29 6/28/95	2.70	9.30									
Phelp Dodge Morenci	GW	Chase Creek -33 6/29/95	2.70	14.40									
Phelp Dodge Morenci	GW	Chase Creek -40 12/6/95	1.70	8.10									
Phelp Dodge Morenci	GW	Chase Creek -44 6/26/95	2.40	10.10									
Phelp Dodge Morenci	GW	Chase Creek -45 12/7/95	1.90	13.20									
Phelp Dodge Morenci	GW	Chase Creek -46 12/13/95	1.50	8.70									
Phelp Dodge Morenci	GW	Chase Creek -50 2/26/95	1.10	5.20									
Phelp Dodge Morenci	GW	DW -01 2/25/95 Upgradient	5.60	25.20									
Phelp Dodge Morenci	GW	DW -02 9/19/95	6.30	17.50									
Phelp Dodge Morenci	GW	DW -03 2/21/95	13.40	42.30									
Phelp Dodge Morenci	GW	DW -04 2/22/95	7.00	8.40									
Phelp Dodge Morenci	GW	DW -14 10/17/95	0.40	3.90									
Phelp Dodge Morenci	GW	DW -14 2/12/95	5.60	4.00									
Phelp Dodge Morenci	GW	GG -02 9/18/95 Gold Gulch	2.90	7.90									
Phelp Dodge Morenci	GW	GG -07 8/31/95	0.90	10.00									
Phelp Dodge Morenci	GW	GG -08 8/30/95	2.30	5.20									
Phelp Dodge Morenci	GW	GG -09 2/13/95	4.10	9.00									
Phelp Dodge Morenci	GW	GG -10 2/12/95	8.00	38.00									
Phelp Dodge Morenci	GW	GG -11 9/11/95	0.75	3.85									
Phelp Dodge Morenci	GW	GG -14 2/8/95	3.00	7.00									
Phelp Dodge Morenci	GW	GG -18 2/26/95	7.10	12.90									

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Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	GW	LSB-02 1/23/95 Lower Silver Basin	6.90	22.50									
Phelp Dodge Morenci	GW	LSB-03 8/17/95	0.70	6.40									
Phelp Dodge Morenci	GW	LSB-05 1/29/95	2.50	4.40									
Phelp Dodge Morenci	GW	MP-01 12/12 Morenci Pit	6.00	44.00									
Phelp Dodge Morenci	GW	MP-02 11/9/95	5.40	34.80									
Phelp Dodge Morenci	GW	MP-03 8/22/95	0.90	20.60									
Phelp Dodge Morenci	GW	MP-05 2/20/95	16.00	33.00									
Phelp Dodge Morenci	GW	MP-06 11/8/95	6.20	29.00									
Phelp Dodge Morenci	GW	MP-09 2/7/95	2.80	20.10									
Phelp Dodge Morenci	GW	RG-02 10/4/95 Rocky Gulch	0.00	9.20									
Phelp Dodge Morenci	GW	RG-03 10/3/95	2.30	24.80									
Phelp Dodge Morenci	GW	RG-05 10/31/95	0.29	2.70									
Phelp Dodge Morenci	GW	SW -26A 7/26/95 South West	1.10	7.10									
Phelp Dodge Morenci	GW	SW -27A 7/26/95	3.80	4.00									
Phelp Dodge Morenci	GW	SW -28B 1/23/96	3.30	9.10									
Phelp Dodge Morenci	GW	SW -30B 1/24/96	0.00	7.50									
Phelp Dodge Morenci	GW	SW -33 7/13/95	0.13	3.20									
Phelp Dodge Morenci	GW	SW -34 7/18/95	0.70	6.20									
Phelp Dodge Morenci	GW	SW -35 1/9/96	0.00	6.90									
Phelp Dodge Morenci	GW	SW -36 1/15/96	1.20	6.60									
Phelp Dodge Morenci	GW	SW -37 7/27/95	0.70	16.00									
Phelp Dodge Morenci	GW	SW -38 7/27/95	1.60	8.90									
Phelp Dodge Morenci	GW	SW -39 1/10/96	0.30	5.80									
Phelp Dodge Morenci	GW	SW -40 8/16/95	3.00	7.00									
Phelp Dodge Morenci	GW	SW -41 7/13/95	3.30	10.10									
Phelp Dodge Morenci	GW	SW -42 1/11/96	0.20	8.30									
Phelp Dodge Morenci	GW	SW -43 1/11/96	11.70	14.80									
Phelp Dodge Morenci	GW	SW -45 2/12/96	1.60	6.50									
Phelp Dodge Morenci	GW	SW -46 7/20/95	9.30	23.00									
Phelp Dodge Morenci	GW	SW -47 8/3/95	7.10	9.70									
Phelp Dodge Morenci	GW	SW -48 2/14/96	11.50	16.80									
Phelp Dodge Morenci	GW	SW -49 8/2/95	8.50	9.00									
Phelp Dodge Morenci	GW	SW -52 7/12/95	6.70	12.80									
Phelp Dodge Morenci	GW	SW -53 7/12/95	3.40	7.60									
Phelp Dodge Morenci	GW	SW -54 2/14/95	14.00	32.00									

STD = Standard Deviation

AVG = Average

Maximum and minimum values are shown in italics

Bold text (STD and AVG) also appear in summary tables (1-5)

Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	GW	SW -55 8/1/95	1.20	4.00									
Phelp Dodge Morenci	GW	SW -56 7/31/95	1.50	4.30									
Phelp Dodge Morenci	GW	SW -57 8/8/95	0.30	7.10									
Phelp Dodge Morenci	GW	SW -59 8/14/95	0.40	3.90									
Phelp Dodge Morenci	GW	SW -60A 12/14/95	3.70	3.10									
Phelp Dodge Morenci	GW	SW -61 8/15/95	10.50	3.80									
Phelp Dodge Morenci	GW	SW -64 1/24/96	9.10	9.00									
Phelp Dodge Morenci	GW	SW -67 11/29/95	2.50	7.30									
Phelp Dodge Morenci	GW	DW-04 12/03/96 Upgradient	4.00	8.00	1.00	1.40	0.00	1.80	0.40	1.40	2.40		
Phelp Dodge Morenci	GW	DW-04 12/12/96	5.00	9.00	1.00	3.30	0.10	0.70	0.40	0.30	4.40		
Phelp Dodge Morenci	GW	DW-05 12/3/96	4.00	7.00	0.40	2.00	0.00	1.20	0.20	1.00	2.40		
Phelp Dodge Morenci	GW	DW-05 12/12/96	4.00	7.00	0.50	3.00	0.00	0.50	0.10	0.40	3.50		
Phelp Dodge Morenci	GW	DW-14 10/26/96	9.00	5.00	1.80	6.50	0.00	1.30	0.40	0.90	8.30		
Phelp Dodge Morenci	GW	GG-2 12/6/96 Gold Gulch	2.00	6.00	0.00	0.00	0.00	1.00	0.60	0.40	0.00		
Phelp Dodge Morenci	GW	GG-8 4/24/96	1.60	2.70				0.70	0.25	1.10			
Phelp Dodge Morenci	GW	GG-8 10/18/96	3.00	7.00	0.00	0.80	0.00	0.00	0.00	0.10	0.60		
Phelp Dodge Morenci	GW	GG-8 12/6/96	2.00	9.00	0.30	1.20	0.00	0.30	0.30	0.00	1.50		
Phelp Dodge Morenci	GW	GG-9 12/6/96	2.00	8.00	0.10	0.40	0.00	0.20	0.20	0.20	0.50		
Phelp Dodge Morenci	GW	GG-10 4/24/96	2.30	5.40									
Phelp Dodge Morenci	GW	GG-10 10/18/96	6.00	14.00	1.50	2.70	0.00	0.60	0.40	0.20	4.20		
Phelp Dodge Morenci	GW	GG-10 12/7 96	9.00	17.00	1.80	3.30	0.00	1.40	0.80	0.60	5.10		
Phelp Dodge Morenci	GW	GG-13 12/12/96	2.00	3.00	0.30	1.10	0.00	0.40	0.20	0.20	1.40		
Phelp Dodge Morenci	GW	GG-13 12/11/96	0.00	3.00	0.20	1.00	0.00	0.30	0.20	0.10	1.20		
Phelp Dodge Morenci	GW	GG-14 12/7/96	14.00	17.00	1.70	4.90	0.00	0.90	0.30	0.60	6.60		
Phelp Dodge Morenci	GW	GG-18 12/6/96	6.00	23.00	1.70	2.60	0.00	2.30	0.00	1.70	4.30		
Phelp Dodge Morenci	GW	CC-4 4/24/96 Lower Chase Creek	1.60	3.90				0.60	0.00	0.90			
Phelp Dodge Morenci	GW	CC-4 10/30/96	10.00	4.00	0.80	6.00	0.00	0.30	0.00	0.30	6.80		
Phelp Dodge Morenci	GW	CC-4 10/17/96	11.00	25.00	0.40	2.20	0.20	0.10	0.00	0.10	2.80		
Phelp Dodge Morenci	GW	CC-4 12/14/96	7.00	18.00	0.50	2.50	0.00	0.00	0.00	0.00	3.00		
Phelp Dodge Morenci	GW	CC-5 10/19/96	3.00	10.00	0.90	3.60	0.10	0.50	0.00	0.50	4.60		
Phelp Dodge Morenci	GW	CC-5 12/16/96	2.00	8.00	0.40	3.10	0.00	0.00	0.00	0.00	3.60		
Phelp Dodge Morenci	GW	CC-7 9/18/96	2.00	8.00	0.80	1.90	0.00	0.00	0.00	0.00	2.70		
Phelp Dodge Morenci	GW	CC-7 11/13/96	5.00	12.00	0.70	1.20	0.00	0.10	0.10	0.00	1.90		
Phelp Dodge Morenci	GW	CC-8 9/18/96	1.00	33.00	0.20	2.10	0.00	0.50	0.10	0.40	2.30		
Phelp Dodge Morenci	GW	CC-8 11/13/96	4.00	16.00	0.10	1.50	0.00	0.10	0.10	0.00	1.60		

STD = Standard Deviation  
AVG = Average

Maximum and minimum values are shown in italics  
Bold text (STD and AVG) also appear in summary tables (1-5)



Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	GW	CC-14 9/18/96	1.00	7.00	0.40	1.30	0.00	0.00	0.00	0.00	1.70		
Phelp Dodge Morenci	GW	CC-14 11/13/96	3.00	11.00	0.40	1.60	0.10	0.50	0.00	0.50	2.10		
Phelp Dodge Morenci	GW	CC-31 9/19/96	3.00	16.00	0.80	1.30	0.00	0.70	0.10	0.60	2.10		
Phelp Dodge Morenci	GW	CC-31 11/13/96	6.00	15.00	0.70	0.80	0.00	0.00	0.00	0.00	1.50		
Phelp Dodge Morenci	GW	CC-44 9/19/96	2.00	10.00	0.20	0.40	0.00	0.50	0.10	0.40	0.60		
Phelp Dodge Morenci	GW	CC-44 11/15/96	2.00	6.00	0.10	0.30	0.00	0.20	0.00	0.20	0.40		
Phelp Dodge Morenci	GW	CC-44 11/30/96	1.00	8.00	0.30	0.60	0.10	0.20	0.00	0.20	1.00		
Phelp Dodge Morenci	GW	CC-45 10/22/96	2.00	12.00	0.60	2.00	0.10	0.60	0.00	0.60	2.70		
Phelp Dodge Morenci	GW	CC-45 11/29/96	2.00	10.00	0.50	1.70	0.00	0.30	0.20	0.10	2.20		
Phelp Dodge Morenci	GW	CC-46 10/22/96	0.00	8.00	0.50	2.00	0.10	0.10	0.00	0.10	2.60		
Phelp Dodge Morenci	GW	CC-46 11/29/96	3.00	11.00	0.60	2.00	0.10	0.50	0.10	0.40	2.70		
Phelp Dodge Morenci	GW	CC-51 10/19/96	7.00	8.00	0.30	1.30	0.00	0.20	0.00	0.30	1.60		
Phelp Dodge Morenci	GW	CC-51 11/29/96	4.00	10.00	1.10	3.30	0.10	0.50	0.10	0.40	4.50		
Phelp Dodge Morenci	GW	CC-42 11/29/96 Mining Area	6.00	46.00	1.30	2.90	0.00	3.60	1.20	2.40	4.20		
Phelp Dodge Morenci	GW	DW-2 10/31/96	5.00	13.00	1.40	1.30	0.00	1.20	0.60	0.80	2.70		
Phelp Dodge Morenci	GW	DW-2 11/30/96	4.00	22.00	1.10	0.20	0.00	0.40	0.20	0.20	1.20		
Phelp Dodge Morenci	GW	MP-2 12/11/96	7.00	23.00	0.30	1.10	0.00	3.80	1.60	2.20	1.40		
Phelp Dodge Morenci	GW	MP-9 11/04/96	4.00	15.00	0.20	0.30	0.00	4.50	2.70	1.80	0.50		
Phelp Dodge Morenci	GW	MP-9 11/22/96	8.00	28.00	0.70	1.10	0.00	3.60	2.30	1.30	1.80		
Phelp Dodge Morenci	GW	SW-45 10/12/96	3.00	5.00	0.40	1.70	0.00	0.30	0.10	0.20	2.10		
Phelp Dodge Morenci	GW	SW-45 11/19/96	1.00	6.00	0.50	2.20	0.00	0.00	0.00	0.00	2.70		
Phelp Dodge Morenci	GW	SW-47 10/15/96	4.00	8.00	0.40	1.70	0.10	0.60	0.10	0.50	2.20		
Phelp Dodge Morenci	GW	SW-47 11/15/96	3.00	7.00	0.50	1.20	0.00	0.10	0.00	0.10	1.70		
Phelp Dodge Morenci	GW	SW-55 10/7/96	1.00	4.00	0.20	0.50	0.00	0.80	0.10	7.00	0.70		
Phelp Dodge Morenci	GW	SW-55 11/14/96	2.00	4.00	0.10	1.30	0.00	0.20	0.10	0.10	1.40		
Phelp Dodge Morenci	GW	SW-56 11/11/96	3.00	4.00	0.30	1.30	0.00	0.50	0.00	0.50	1.60		
Phelp Dodge Morenci	GW	SW-56 12/12/96	3.00	4.00	0.20	1.10	0.00	0.10	0.10	0.20	1.30		
Phelp Dodge Morenci	GW	SW-59 10/10/96	1.00	3.00	0.00	0.80	0.00	0.70	0.00	0.70	1.00		
Phelp Dodge Morenci	GW	SW-59 11/13/96	4.00	6.00	0.00	1.00	0.00	0.10	0.10	0.00	1.00		
Phelp Dodge Morenci	GW	SW-60A 10/10/96	4.00	3.00	0.40	4.40	0.00	1.50	0.70	0.80	4.80		
Phelp Dodge Morenci	GW	SW-60A 11/14/96	3.00	2.00	0.30	3.80	0.00	0.70	0.30	0.40	4.10		
Phelp Dodge Morenci	GW	SW-67 10/12/96	8.00	8.00	1.10	3.70	0.00	0.20	0.10	0.10	4.80		
Phelp Dodge Morenci	GW	SW-67 11/19/96	7.00	10.00	0.80	3.60	0.10	0.10	0.10	0.00	4.50		
Phelp Dodge Morenci	GW	RG-2 12/4/96	1.00	11.00	0.20	0.40	0.00	0.90	0.20	0.70	0.60		
Phelp Dodge Morenci	GW	RG-2 12/12/96	2.00	11.00	0.20	0.80	0.00	0.50	0.10	0.40	1.00		

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Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	GW	RG-3 12/4/96	2.00	13.00	0.40	0.80	0.00	1.00	0.30	0.70	1.20		
Phelp Dodge Morenci	GW	RG-5 11/2/96	1.00	3.00	0.00	0.00	0.00	0.10	0.10	0.00	0.00		
Phelp Dodge Morenci	GW	RG-5 12/5/96	1.00	2.00	0.00	0.40	0.00	0.30	0.00	0.30	0.40		
Phelp Dodge Morenci	GW	LSB-2 11/13/96 Downgrdrt of Tail. Dams	9.00	22.00	0.70	1.50	0.00	0.80	0.20	0.50	2.20		
Phelp Dodge Morenci	GW	SW-26A 10/2/96	2.00	9.00	0.30	0.90	0.00	2.60	2.30	0.30	1.20		
Phelp Dodge Morenci	GW	SW-26A 11/19/96	2.00	10.00	0.40	1.30	0.00	0.50	0.00	0.50	1.70		
Phelp Dodge Morenci	GW	SW-30B 9/2/96	1.00	12.00	0.30	0.70	0.00	0.00	0.00	0.00	1.00		
Phelp Dodge Morenci	GW	SW-30B 12/14/96	4.00	13.00	0.40	0.90	0.00	0.00	0.00	0.00	1.30		
Phelp Dodge Morenci	GW	SW-33 10/7/96	0.00	3.00	0.10	0.20	0.00	0.60	0.00	0.67	0.30		
Phelp Dodge Morenci	GW	SW-33 11/16/96	1.00	3.00	0.10	0.20	0.00	0.00	0.00	0.00	0.30		
Phelp Dodge Morenci	GW	SW-34 10/7/96	3.00	6.00	0.10	0.80	0.10	1.10	0.00	1.10	1.00		
Phelp Dodge Morenci	GW	SW-34 11/23/96	2.00	6.00	0.40	0.90	0.10	0.20	0.00	0.20	1.40		
Phelp Dodge Morenci	GW	SW-35 10/3/96	2.00	10.00	0.10	1.10	0.00	0.60	0.00	0.60	1.20		
Phelp Dodge Morenci	GW	SW-35 11/23/96	2.00	7.00	0.40	0.90	0.10	0.50	0.00	0.40	1.40		
Phelp Dodge Morenci	GW	SW-36 10/2/96	1.00	7.00	0.40	0.80	0.00	0.60	0.00	0.60	1.20		
Phelp Dodge Morenci	GW	SW-36 11/26/96	1.00	8.00	0.10	0.30	0.00	0.20	0.10	0.10	0.40		
Phelp Dodge Morenci	GW	SW-37 10/3/96	1.00	10.00	0.30	1.00	0.00	1.20	0.00	1.20	1.30		
Phelp Dodge Morenci	GW	SW-37 11/19/96	1.00	45.00	0.20	1.00	0.00	0.20	0.20	0.00	1.20		
Phelp Dodge Morenci	GW	SW-38 9/20/96	1.00	8.00	0.40	1.00	0.00	0.00	0.00	0.00	1.40		
Phelp Dodge Morenci	GW	SW-38 11/21/96	2.00	28.00	0.00	0.60	0.10	0.10	0.10	0.00	0.70		
Phelp Dodge Morenci	GW	SW-39 9/20/96	1.00	10.00	0.40	0.90	0.00	0.00	0.00	0.00	1.30		
Phelp Dodge Morenci	GW	SW-39 11/21/96	2.00	10.00	0.20	1.50	0.00	0.00	0.00	0.00	1.70		
Phelp Dodge Morenci	GW	SW-40 11/8/96	7.00	23.00	0.60	2.70	0.00	0.20	0.10	0.10	3.30		
Phelp Dodge Morenci	GW	SW-40 11/20/96	1.00	24.00	0.50	1.80	0.00	0.20	0.00	0.20	2.30		
Phelp Dodge Morenci	GW	SW-41 10/11/96	3.00	9.00	0.30	1.30	0.00	0.10	0.00	0.10	1.60		
Phelp Dodge Morenci	GW	SW-41 11/16/96	2.00	9.00	0.20	1.00	0.00	0.10	0.00	0.10	1.20		
Phelp Dodge Morenci	GW	SW-42 4/26/96	1.60	3.40				1.30	0.24	1.20			
Phelp Dodge Morenci	GW	SW-42 11/16/96	3.00	10.00	0.30	1.30	0.10	0.20	0.00	0.20	1.70		
Phelp Dodge Morenci	GW	SW-42 10/17/96	0.00	8.00	0.20	0.80	0.00	0.10	0.10	0.00	1.00		
Phelp Dodge Morenci	GW	SW-43 10/14/96	3.00	10.00	0.20	1.50	0.00	1.30	0.10	1.20	1.70		
Phelp Dodge Morenci	GW	SW-44 11/15/96	5.00	13.00	0.40	1.80	0.00	1.60	0.70	0.90	2.20		
Phelp Dodge Morenci	GW	SW-46 10/15/96	2.00	7.00	0.10	0.90	0.00	1.30	0.00	1.40	1.00		
Phelp Dodge Morenci	GW	SW-46 11/17/96	2.00	8.00	0.20	1.20	0.00	0.10	0.10	0.00	1.40		
Phelp Dodge Morenci	GW	SW-52 10/8/96	2.00	8.00	0.20	1.10	0.00	0.80	0.20	0.60	1.30		
Phelp Dodge Morenci	GW	SW-52 11/14/96	2.00	8.00	0.10	0.90	0.10	0.10	0.10	0.00	1.10		

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Results of Radiochemical Analyses

All Groundwater Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	GW	SW-53 11/19/96	6.00	11.00	0.60	2.60	0.00	0.60	0.30	0.30	3.30		
Phelp Dodge Morenci	GW	SW-54 10/10/96	10.00	16.00	0.10	0.50	0.00	0.60	0.10	0.50	1.60		
Phelp Dodge Morenci	GW	SW-54 11/13/96	4.00	11.00	0.10	0.90	0.00	0.20	0.10	0.10	1.00		
Phelp Dodge Morenci	GW	SW-57 10/11/96	3.00	6.00	0.10	1.60	0.00	0.90	0.40	0.50	1.70		
Phelp Dodge Morenci	GW	SW-57 11/13/96	1.00	7.00	0.50	1.40	0.00	0.60	0.20	0.40	2.00		
Phelp Dodge Morenci	GW	SW-64 10/9/96	2.00	8.00	0.90	3.30	0.10	0.30	0.00	0.30	4.20		
Phelp Dodge Morenci	GW	SW-64 11/19/96	4.00	7.00	0.90	2.90	0.00	0.10	0.10	0.00	3.80		
Phelp Dodge Morenci	GW	SW-68 10/8/96	6.00	9.00	0.90	2.20	0.10	0.60	0.20	0.40	3.20		
Phelp Dodge Morenci	GW	SW-68 11/19/96	2.00	2.00	0.40	1.70	0.10	0.60	0.10	0.50	2.20		
Phelp Dodge Morenci	GW	SW-70B 10/30/96	2.00	13.00	0.40	1.40	0.00	0.20	0.00	0.20	1.80		
Phelp Dodge Morenci	GW	SW-70B 11/19/96	3.00	4.00	0.30	1.90	0.10	0.00	0.00	0.40	23.00		
<b>PD MM &lt; Average</b>	<b>STotal=179</b>	<b>Average</b>	<b>3.64</b>	<b>11.28</b>	<b>0.47</b>	<b>1.61</b>	<b>0.02</b>	<b>0.63</b>	<b>0.21</b>	<b>0.49</b>	<b>2.31</b>		
		<b>STD</b>	<b>3.16</b>	<b>8.71</b>	<b>0.41</b>	<b>1.20</b>	<b>0.04</b>	<b>0.81</b>	<b>0.45</b>	<b>0.80</b>	<b>2.54</b>		
<b>All MM only Average</b>	<b>STotal =230</b>	<b>Average</b>	<b>10.68</b>	<b>22.26</b>	<b>3.59</b>	<b>7.21</b>	<b>0.29</b>	<b>3.16</b>	<b>1.22</b>	<b>2.18</b>	<b>11.25</b>		
		<b>STD</b>	<b>27.06</b>	<b>40.64</b>	<b>14.64</b>	<b>20.23</b>	<b>1.21</b>	<b>11.40</b>	<b>3.99</b>	<b>9.60</b>	<b>34.97</b>		
<b>All GW Average</b>	<b>Total=368</b>	<b>Pure Average</b>	<b>28.41</b>	<b>29.62</b>	<b>4.30</b>	<b>8.92</b>	<b>0.32</b>	<b>3.92</b>	<b>2.00</b>	<b>2.99</b>	<b>11.58</b>	<b>1216.21</b>	
		<b>PureSTD</b>	<b>95.54</b>	<b>54.37</b>	<b>12.92</b>	<b>18.88</b>	<b>1.05</b>	<b>14.49</b>	<b>9.45</b>	<b>11.07</b>	<b>30.73</b>	<b>1308.91</b>	

STD = Standard Deviation  
AVG = Average

Maximum and minimum values are shown in italics  
Bold text (STD and AVG) also appear in summary tables (1-5)

Results of Radiochemical Analyses

All Soil - Sediments Data (pCi/g)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Cerbat Mt. American Legion	SS	S6	62.30	93.40	4.20	22.80			7.40				
Cerbat Mt. American Legion	SS	S7	15.10	23.40	6.80	7.00			0.94				
<b>AL Average</b>	<b>STotal = 2</b>	<b>Average</b>	<b>38.70</b>	<b>58.40</b>	<b>5.50</b>	<b>14.90</b>			<b>4.17</b>				
		<b>STD</b>	<b>33.38</b>	<b>49.50</b>	<b>1.84</b>	<b>11.17</b>			<b>4.57</b>				
Cerbat Mt. De la Fontaine	SS	S1	44.30	52.50	4.90	4.80			5.30				
Cerbat Mt. De la Fontaine	SS	S2	95.80	134.00	9.90	10.80			12.80				
Cerbat Mt. De la Fontaine	SS	S3	8.20	30.80	0.99	0.87			0.71				
Cerbat Mt. De la Fontaine	SS	S4	73.00	94.20	6.90	7.80			18.40				
CONFLUENCE AL/DF	SS	S5	171.00	57.20	6.60	6.70			7.20				
<b>DF Average</b>	<b>STotal = 5</b>	<b>Average</b>	<b>78.46</b>	<b>73.74</b>	<b>5.86</b>	<b>6.19</b>			<b>8.88</b>				
		<b>STD</b>	<b>61.23</b>	<b>40.68</b>	<b>3.26</b>	<b>3.69</b>			<b>6.86</b>				
<b>Cerbat MT Avg</b>	<b>Total = 7</b>	<b>PureAverage</b>	<b>67.10</b>	<b>69.36</b>	<b>5.76</b>	<b>8.68</b>			<b>7.54</b>				
		<b>STD</b>	<b>55.33</b>	<b>39.59</b>	<b>2.77</b>	<b>6.92</b>			<b>6.34</b>				
Hillside Boulder Creek	SS	AA No. 1	57.40	54.30	5.90	2.90			5.50				
Hillside Boulder Creek	SS	A O.p. Bank	9.60	33.20	0.70	0.88			0.69				
Hillside Boulder Creek	SS	A Terrace	20.10	31.50	2.50	2.70			1.90				
Hillside Boulder Creek	SS	A Channel	21.10	53.00	0.97	1.08			0.94				
Hillside Boulder Creek	SS	A Upland	19.40	34.50	1.23	1.23			2.00				
Hillside Boulder Creek	SS	B Terrace	60.10	68.40	5.90	6.10			9.40				
Hillside Boulder Creek	SS	B Upland	35.90	46.90	3.90	4.10			4.30				
Hillside Boulder Creek	SS	BC 100 Upper Tails	17.30	22.00	1.79	1.82			0.89				
Hillside Boulder Creek	SS	D Lower Tails	20.90	45.40	1.49	1.90			1.74				
Hillside Boulder Creek	SS	E Middle Tails	26.70	48.10	2.30	2.20			1.40				
Hillside Boulder Creek	SS	F Middle Tails	16.00	45.30	1.70	2.46			0.77				
Hillside Boulder Creek	SS	G Middle Tails	261.00	185.00	25.60	51.30			44.00				
Hillside Boulder Creek	SS	H Middle Tails	395.00	248.00	63.30	60.80			82.60				
<b>HS Average</b>	<b>STotal = 13</b>	<b>Average</b>	<b>73.88</b>	<b>70.43</b>	<b>9.02</b>	<b>10.73</b>			<b>12.01</b>				
		<b>STD</b>	<b>117.05</b>	<b>67.13</b>	<b>17.59</b>	<b>20.25</b>			<b>24.21</b>				
Phelp Dodge Morenci	SS	PD Mine Leval 2016-X 9/2/95	0.50	82.00									
Phelp Dodge Morenci	SS	Lone Star Stockpile 9/23/95	86.00	100.00									
Phelp Dodge Morenci	SS	GRA- SV-X Soil 2/15/96	18.70	49.50									
Phelp Dodge Morenci	SS	GARFIELD Oxide-X Soil 2/15/96	24.40	57.30									
Phelp Dodge Morenci	SS	GARFIELD DV-X Soil 2/15/96	16.80	45.40									
<b>MM Average</b>	<b>STotal = 5</b>	<b>Average</b>	<b>29.28</b>	<b>66.84</b>									
		<b>STD</b>	<b>32.93</b>	<b>23.35</b>									
<b>All SS Average</b>	<b>Total = 25</b>	<b>Pure Average</b>	<b>63.06</b>	<b>69.41</b>	<b>7.88</b>	<b>10.01</b>			<b>10.44</b>				
		<b>STD</b>	<b>90.01</b>	<b>52.32</b>	<b>14.15</b>	<b>16.59</b>			<b>19.69</b>				

STD = Standard Deviation  
AVG = Average

Maximum and minimum values are shown in italics  
Bold text (STD and AVG) also appear in summary tables (1-5)

Results of Radiochemical Analyses

Surface Water (pCi/L)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Cyprus Mineral Park	SW	Golden Eagle Spring 8/04/95	16.00	18.00									
Cyprus Mineral Park	SW	Jamison Wash Adit 8/04/95	68.00	35.00									
Cyprus Mineral Park	SW	Bismark Wash Adit 8/04/95	11.00	20.00									
Cyprus Mineral Park	SW	Keystone Wash Adit 8/03/95	20.00	10.00									
Cyprus Mineral Park	SW	Keystone Wash Adit 8/04/95	43.00	22.00									
Cyprus Mineral Park	SW	Keystone Wash Adit 8/04/95	0.00	6.00									
Cyprus Mineral Park	SW	Long Wash Adit 8/04/95	36.00	26.00									
Cyprus Mineral Park	SW	Long Wash 4/5/95	62.00	0.00					0.80	1.40	0.10	120.00	
Cyprus Mineral Park	SW	Jamison Wash 4/5/95	47.00	0.00					0.50	1.80	0.05	46.00	
Cyprus Mineral Park	SW	Jamison Wash 8/04/95	37.00	24.00									
Cyprus Mineral Park	SW	Mineral Park Wash 8/03/95	140.00	0.00									
Cyprus Mineral Park	SW	No Name Wash 8/04/95	150.00	90.00									
Cyprus Mineral Park	SW	Turquoise Wash 8/04/95	37.00	43.00									
Cyprus Mineral Park	SW	Turquoise Wash 8/05/95	27.00	0.00					0.40	1.60	0.01	39.00	
<b>MP Average</b>		<b>Average</b>	<b>49.57</b>	<b>21.00</b>					<b>0.57</b>	<b>1.60</b>	<b>0.05</b>	<b>68.33</b>	
		<b>STD</b>	<b>44.52</b>	<b>24.17</b>									
Phelp Dodge Morenci	SW	Gold Gulch Spring 8/28/95	36.00	17.00									
Phelp Dodge Morenci	SW	Central Chase Creek Wash	1.70	5.70									
Phelp Dodge Morenci	SW	Producer Creek Seep	1.60	8.80									
<b>MM Average</b>		<b>Average</b>	<b>13.10</b>	<b>10.50</b>									
		<b>STD</b>	<b>19.83</b>	<b>5.84</b>									
Cyprus Bagdad Copper Creek	SW	BC-2 Up gradient	19.00						0.00	0.00			
Cyprus Bagdad Copper Creek	SW	BC-1 Down gradient	84.00						0.00	2.00			
Cyprus Bagdad Copper Creek	SW	BC-0 Down gradient	20.00						0.00	0.00			
Cyprus Bagdad Copper Creek	SW	S-4	18.00						0.00	0.00			
Cyprus Bagdad Copper Creek	SW	S-3	2.00						8.00	0.00			
Cyprus Bagdad Copper Creek	SW	S-2	27.00						0.00	7.00			
Cyprus Bagdad Copper Creek	SW	S-1	10.00						0.60	2.00			
<b>CB-CC Average</b>		<b>Average</b>	<b>25.71</b>						<b>1.23</b>	<b>1.57</b>			
		<b>STD</b>	<b>26.91</b>						<b>2.99</b>	<b>2.57</b>			
Cyprus Bagdad Lawler Peak	SW	SW-1 Spring	23.50	6.70	12.00	33.90	0.80		0.40	1.90	18.90		
Cyprus Bagdad Lawler Peak	SW	SW-2 Adit	13.70	3.10	9.10	16.20	1.20		0.20	0.20	19.60		
Cyprus Bagdad Lawler Peak	SW	SW-3 Spring	57.10	59.80	18.70	21.90	2.90		19.30	17.80	32.90		
Cyprus Bagdad Lawler Peak	SW	SW-4 Adit	1.10	6.60	0.80	1.10			0.30	4.40	0.70		
Cyprus Bagdad Lawler Peak	SW	SW-5 Spring	3.30		1.30	2.10	0.10		0.20	3.10	2.10		

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Results of Radiochemical Analyses

Surface Water (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Cyprus Bagdad Lawler Peak	SW	SW-6 Lake	3.00	11.40							0.70		
Cyprus Bagdad Lawler Peak	SW	SW-7 Lake	1.50	8.70							1.40		
Cyprus Bagdad Lawler Peak	SW	SW-8 Lake	0.60	7.70							1.40		
Cyprus Bagdad Lawler Peak	SW	SW-9 Lake	2.80	5.70							0.70		
<b>CB-LP</b>	<b>STotal = 9</b>	<b>Average</b>	<b>11.84</b>	<b>13.71</b>	<b>8.38</b>	<b>15.04</b>	<b>1.25</b>		<b>4.08</b>	<b>5.48</b>	<b>8.71</b>		
	<b>STD</b>		<b>18.61</b>	<b>18.77</b>	<b>7.54</b>	<b>13.84</b>	<b>1.19</b>		<b>8.51</b>	<b>7.06</b>	<b>11.99</b>		
Three R	SW	2 6/92	139.00	128.00									
Three R	SW	3 6/92	35.00	37.00									
Three R	SW	4 7/93	53.70	54.33	30.98	52.13	1.36		0.67	1.70			
Three R	SW	5 7/93	131.60	126.74	23.02	34.10	1.42		10.38	0.00			
Three R	SW	6 7/93	0.00	10.24	22.60	32.74	0.98		0.00	55.45			
Three R	SW	MT 7/93	5.61	49.91	0.12	0.19	0.04		0.10				
<b>TR Average</b>	<b>STotal = 6</b>	<b>Average</b>	<b>60.82</b>	<b>67.70</b>	<b>19.18</b>	<b>29.79</b>	<b>0.95</b>		<b>3.68</b>	<b>19.05</b>			
	<b>STD</b>		<b>60.97</b>	<b>48.71</b>	<b>13.28</b>	<b>21.62</b>	<b>0.64</b>		<b>5.07</b>	<b>31.53</b>			
Cerbat Mt American Legion	SW	2A	53.30		23.50	26.60			1.10				
Cerbat Mt American Legion	SW	2B	54.80		25.30	27.10			0.80				
Cerbat Mt American Legion	SW	3A	55.90		22.30	23.80			20.30				
Cerbat Mt American Legion	SW	3B	67.40						16.70				
Cerbat Mt American Legion	SW	4A	154.00		112.00	110.00			16.80				
Cerbat Mt American Legion	SW	4B	297.00		115.00	117.00			12.80				
Cerbat Mt American Legion	SW	5A	158.00						0.50				
Cerbat Mt American Legion	SW	5B	159.00		73.70	77.10			0.60				
Cerbat Mt American Legion	SW	6A	66.80										
Cerbat Mt American Legion	SW	6B	68.30		30.00	33.60			0.50				
<b>AL Average</b>	<b>STotal = 10</b>	<b>Average</b>	<b>113.45</b>		<b>57.40</b>	<b>59.31</b>			<b>7.79</b>				
	<b>STD</b>		<b>78.95</b>		<b>42.28</b>	<b>41.32</b>			<b>8.62</b>				
Cerbat Mt De la Fontaine	SW	1A	55.70						3.40				
Cerbat Mt De la Fontaine	SW	1B	43.60										
<b>DF Average</b>	<b>STotal = 2</b>	<b>Average</b>	<b>49.65</b>						<b>3.40</b>				
	<b>STD</b>		<b>8.56</b>										
Hillside Boulder Creek	SW	2.1 Up gradient	6.90		11.60	3.80			0.10				
Hillside Boulder Creek	SW	5	1240.00		678.00	577.00			71.80				
Hillside Boulder Creek	SW	6	644.00		383.00	330.00			18.50				
<b>HS Average</b>	<b>STotal = 3</b>	<b>Average</b>	<b>630.30</b>		<b>357.53</b>	<b>303.60</b>			<b>30.13</b>				
	<b>STD</b>		<b>616.66</b>		<b>333.93</b>	<b>287.51</b>			<b>37.24</b>				
<b>All SW Average</b>	<b>Total = 54</b>	<b>Pure Average</b>	<b>83.51</b>	<b>27.14</b>	<b>83.84</b>	<b>80.02</b>	<b>1.10</b>		<b>6.43</b>	<b>5.58</b>	<b>6.55</b>	<b>68.33</b>	
	<b>STD</b>		<b>188.38</b>	<b>33.99</b>	<b>168.21</b>	<b>141.80</b>	<b>0.90</b>		<b>13.76</b>	<b>13.13</b>	<b>10.95</b>	<b>44.88</b>	

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Results of Radiochemical Analyses

All Process Solution Data (pCi/L)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
Phelp Dodge Morenci	PS	King Placer Diversion Reservoir	3450.00	2390.00									
Phelp Dodge Morenci	PS	Dam BC5 8/8/95	1530.00	840.00									
Phelp Dodge Morenci	PS	Treat/Stor. Res. Dam 2B 8/21/95	160.00	140.00									
Phelp Dodge Morenci	PS	Treat/Stor. Res. Dam 6 8/22/95	46.00	10.00									
Phelp Dodge Morenci	PS	Treat/Stor. Res. Dam 7B 8/22/95	313.00	169.00									
Phelp Dodge Morenci	PS	Treat/Stor. Res. Dam 4B 8/21/95	1210.00	610.00									
Phelp Dodge Morenci	PS/PW?	Treatment Storage Res. DAM 11	1.30	4.90									
Phelp Dodge Morenci	PS/PW?	Treatment Storage Res. DAM5B	5.00	3.00									
<b>MM TSR Average</b>	<b>S Total = 8</b>	<b>Average</b>	<b>839.41</b>	<b>520.86</b>									
		<b>STD</b>	<b>1206.90</b>	<b>816.59</b>									
Cyprus Mineral Park	PS	Bismark Sump 7/31/95	1200.00	600.00									
Cyprus Mineral Park	PS	Central Sump 8/2/95	730.00	590.00									
Cyprus Mineral Park	PS	Gross Sump 1 8/2/95	780.00	480.00									
Cyprus Mineral Park	PS	Gross Sump 3 8/2/95	1700.00	880.00									
Cyprus Mineral Park	PS	Hardy Sump 7/31/95	1100.00	370.00									
Cyprus Mineral Park	PS	Ithaca Sump 1 7/31/95	260.00	190.00									
Cyprus Mineral Park	PS	Ithaca Sump 2 7/31/95	410.00	290.00									
Cyprus Mineral Park	PS	Ithaca Sump 3 7/31/95	820.00	430.00									
Cyprus Mineral Park	PS	Sump 27 8/4/95	28.00	56.00									
<b>MP Sumps Average</b>	<b>S Total = 9</b>	<b>Average</b>	<b>780.89</b>	<b>431.78</b>									
		<b>STD</b>	<b>512.60</b>	<b>244.99</b>									
Phelp Dodge Morenci	PS	4250 Sump 8/8/95	3970.00	1930.00									
Phelp Dodge Morenci	PS	4500 Sump 8/9/95	1030.00	600.00									
Phelp Dodge Morenci	PS	HORSESHOE Sump 8/9/95	3800.00	3060.00									
Phelp Dodge Morenci	PS	Queen Hill Sump 8/17/95	202.00	162.00									
Phelp Dodge Morenci	PS	Copper Mountain Sump 8/17/95	2080.00	1290.00									
Phelp Dodge Morenci	PS	Stargo Sump 8/24/95	1760.00	1040.00									
Phelp Dodge Morenci	PS	Morenci Pit Sump 8/21/95	21.00	76.00									
Phelp Dodge Morenci	PS	23/25 Morenci Mine Sump 8/23/95	1590.00	1100.00									
Phelp Dodge Morenci	PS	27 Morenci Mine Sump 8/23/95	720.00	280.00									
Phelp Dodge Morenci	PS	Medler Sump 8/17/85	1050.00	710.00									
Phelp Dodge Morenci	PS	Metcalf Sump 8/17/95	3060.00	1630.00									
Phelp Dodge Morenci	PS	5X Sump 8/25/95	1930.00	930.00									
Phelp Dodge Morenci	PS	Pond-29 8/6/95	1060.00	1150.00									
<b>MM Sumps Average</b>	<b>S Total = 13</b>	<b>Average</b>	<b>1713.31</b>	<b>1073.69</b>									

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Results of Radiochemical Analyses

All Process Solution Data (pCi/L) (continued)

Site Name	Type	Monitoring Well-Sample ID	Alpha	Beta	U-238	U-234	U-235	Total Ra	Ra-226	Ra-228	Total U	Rn-222	Th-230
<b>All PS Sumps = 22</b>		STD	1255.91	810.17									
		Pure Average	1331.86	811.09									
		STD	1105.26	708.72									
<i>PLS</i>													
Phelp Dodge Morenci	PS	Modoc SX PLS 8/16/95	2990.00	1910.00									
Phelp Dodge Morenci	PS	Metcalf Cent. Fac. SX PLS 8/16/95	3600.00	2140.00									
Phelp Dodge Morenci	PS	Central SX PLS 8/95	3700.00	2390.00									
Phelp Dodge Morenci	PS	South West SX PLS Tank 4 8/9/95	1250.00	1110.00									
<b>MM PLS Average</b>	<b>STotal = 4</b>	<b>Average</b>	<b>2885.00</b>	<b>1887.50</b>									
		STD	1134.27	554.16									
Magma Florance ISL	PS	ISL leach test Quartz Monzonite	8649.00	3683.00	1611.00	1745.00	598.00	33.60	2.00	2.00	4362.00	810.00	
Magma Florance ISL	PS	ISL Leach test Granodiorite	897.00	612.00	248.00	254.00	11.60	19.50	2.00	2.00	0.84	243.00	
ASARCO Santa Cruz ISL	PS	ISL PLS	4410.00					99.00	8.30	8.30	1823.00	3760.00	
Cyprus Sierrita Twin Butts	PS	Oxide Tailing liquid									1020.00		1500.00
Cyprus Sierrita Twin Butts	PS	Oxide Tailing liquid									1300.00		2500.00
<b>All PLS Average</b>	<b>STotal = 9</b>	<b>Average</b>	<b>3642.29</b>	<b>1974.17</b>	<b>929.50</b>	<b>999.50</b>	<b>304.80</b>	<b>50.70</b>	<b>4.10</b>	<b>4.10</b>	<b>1701.17</b>	<b>1604.33</b>	<b>2000.00</b>
		STD	2560.82	1070.23	963.79	1054.30	414.65	42.42	3.64	3.64	1628.72	1888.27	707.11
<i>Raffinate</i>													
Phelp Dodge Morenci	PS	Modoc SX Raffinate 8/16/95	3550.00	2010.00									
Phelp Dodge Morenci	PS	Metcalf Cent. Fac. SX Raff. 8/14/95	3480.00	1810.00									
Phelp Dodge Morenci	PS	South West SX Raff. Tank 8/9/95	670.00	660.00									
Phelp Dodge Morenci	PS	Central SX Raffinate 8/16/95	2060.00	910.00									
<b>MM Raff Average</b>	<b>STotal = 4</b>	<b>Average</b>	<b>2440.00</b>	<b>1347.50</b>									
		STD	1365.16	662.54									
Cyprus Mineral Park	PS	Raffinate Pond 8/2/95	1100.00	750.00									
ASARCO Santa Cruz ISL	PS	ISL Raffinate	6600.00					193.00	19.00	19.00	2870.00	2410.00	
<b>MM Average</b>	<b>Total = 27</b>	<b>Pure Average</b>	<b>1862.30</b>	<b>1150.26</b>									
		STD	1366.37	848.87									
<b>All Raff Average</b>	<b>STotal = 6</b>	<b>Average</b>	<b>2943.33</b>	<b>1228.00</b>				<b>193.00</b>	<b>19.00</b>	<b>19.00</b>	<b>2870.00</b>	<b>2410.00</b>	
		STD	2230.52	632.95									
<b>All PS</b>	<b>Total = 45</b>	<b>Pure Average</b>	<b>1841.22</b>	<b>975.51</b>	<b>929.50</b>	<b>999.50</b>	<b>304.80</b>	<b>86.28</b>	<b>7.83</b>	<b>7.83</b>	<b>1895.97</b>	<b>1805.75</b>	<b>2000.00</b>
		STD	1850.38	881.70	963.79	1054.30	414.65	79.13	8.02	8.02	1532.93	1593.52	707.11

STD = Standard Deviation  
AVG = Average

Maximum and minimum values are shown in italics  
Bold text (STD and AVG) also appear in summary tables (1-5)









