

Table 4.3-4. Calculations of Potential Flows Downstream If Bypassing Capture

Background Area	Reference Site	Cm*	Cb*	Qb*			
		Downstream Sulfate Concentration (mg/L)	Background Sulfate Concentration (mg/L)	Area (acres)	% Infiltration + Runoff	Infiltration (inches)	Infiltration (million gal.)
Swift Gulch	L-19	Undisturbed 391.5	BKSP-1 130	161	25	4.945	21.62
King Creek	L-51	Undisturbed 417	ZL-307 102	87	25	4.945	11.64
Sullivan Gulch	D-4	Below Capture 238.5	L-44 10	59	25	4.945	7.97
Mill Gulch	L-7	Below Capture 910	L-9 294	180	25	4.945	24.14
Montana Gulch	L-47	Below Capture WTP Discharge 625	L40 47 LWTP 635	289	25	4.945	38.86 235.15
Alder Spur	Z-6A	Below Capture 173	Z-65 169.9	36	40	7.912	7.83
Carter Gulch	Z-42	Below Capture Runoff from CG-01 176.7	AGSS-10 17	211 17	40	7.912 0.5	45.40 0.23
Ruby Gulch	ZL-143	Below Capture WTP Discharge 1070	Z-52 53 ZWTP 3000	942	40	7.912	202.38 94.82
Lodgepole Creek	ZL-210	Undisturbed 103	ZL-300 75	38	40	7.912	8.15
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Mine Disturbed Area	Reference Site	Ce*	Qe*				
		Source Sulfate Concentration (mg/L)	Amount of Source Water Contributing Downstream (million gal.)	Source Water Flow Contributing Downstream (gpm)	Estimated Error in Calculations		
Swift Gulch	BKSS-6	Disturbed 1630	4.56	8.68	± 4 gpm		
King Creek	L-5	Disturbed 1140	5.07	9.65	± 5 gpm		

Table 4.3-4. (Cont.) Calculations of Potential Flows Downstream If Bypassing Capture

Mine Disturbed Area	Reference Site	Ce*	Qe*		
		Source Sulfate Concentration (mg/L)	Amount of Source Water Contributing Downstream (million gal.)	Source Water Flow Contributing Downstream (gpm)	Estimated Error in Calculations
Sullivan Gulch	L-28	Above Capture 10,000	0.19	0.35	± 0.2 gpm
Mill Gulch	L-35	Above Capture 3250	6.36	12.09	± 6 gpm
Montana Gulch	L-38	Above Capture 1645	19.72	37.51	± 15 gpm
Alder Spur	Z-14	Above Capture 1800	0.01	0.03	± 0.05 gpm
Carter Gulch	Z-13	Above Capture 8000	0.93	1.77	± 0.8 gpm
Ruby Gulch	Z-37	Above Capture 4800	6.12	11.64	± 5 gpm
Lodgepole Creek	ZL-202	Disturbed 2500	0.10	0.18	± 0.05 gpm

NOTES:

Precipitation value = 19.78 inches

Sulfate concentrations used were maximum concentrations since 1997.

Water treatment plant volumes taken from 1998 data.

Percent runoff and infiltration taken from Landusky and Zortman surface and groundwater mass balance reports.

Equations used to calculate bypassing flows:

For drainages without
WTP discharge flow

$$\frac{CeQe + CbQb}{Qe + Qb} = Cm$$

$$\frac{Qb(Cm - Cb)}{(Ce - Cm)} = Qe$$

For drainages with
WTP discharge flow

$$\frac{CeQe + CbQb + CwQw}{Qe + Qb + Qw} = Cm$$

$$\frac{Qb(Cm - Cb) + Qw(Cm - Cw)}{(Ce - Cm)} = Qe$$

*Where:

Ce = concentration escaping capture system

Qe = flow escaping capture system

Cb = concentration of background

Qb = flow from background

Cm = concentration at monitoring well

Qw = flow from water treatment plant discharge

Cw = concentration from water treatment plant discharge