Table 3-1 **DRAFT**

Nonresidential Soil Exposure Areas and Associated Receptors

Baseline Human Health Risk Assessment

ASARCO LLC Hayden Plant Site, Hayden, Arizona

Area	Exposure Area	Receptor
Hayden	Community Park/Library	Child: Park Recreation
	Northwest Hayden Golf Club/Adjacent to Tailings Impoundment	Adult: Park Recreation (Golf Course; 50dy/yr, 4hr/day)
	Remainder of Hayden Golf Club Property	Adult: Park Recreation (Golf Course; 50dy/yr, 4hr/day)
	San Pedro Wash	Adult, Child: Trespasser (In Town)
	Kennecott Avenue Wash	Adult, Child: Trespasser (In Town)
	Power House Wash	Adult, Child: Trespasser (In Town)
Winkelman	Winkelman School Complex	Adult: Park Recreation; Child: School Recreation
	Parcel WSCLA	Residential
	Parcel WSCLB	Residential
	Parcel WSCLC	Residential
ASARCO Properties	Kennecott Smelter - North End	Adult, Child: Trespasser (Remote)
	Kennecott Smelter Basin	Adult, Child: Trespasser (Remote)
	Kennecott Smelter Plant	Adult, Child: Trespasser (Remote)
	Kennecott Smelter - Lime Plant	Adult, Child: Trespasser (Remote)
	Kennecott Smelter - South of Lime Plant	Adult, Child: Trespasser (Remote)
	West of Administration Building	Adult, Child: Trespasser (In Town)
	Thickener Tank Area	Adult, Child: Trespasser (In Town)
	South of Concentrator	Adult, Child: Trespasser (In Town)
	South of Mill Building	Adult, Child: Trespasser (In Town)
	East of Hillcrest Avenue	Adult, Child: Trespasser (In Town)
	North of Mill Building	Adult, Child: Trespasser (In Town)
	5th Street Right of Way	Adult, Child: Trespasser (In Town)
	Crusher Facility	Adult, Child: Trespasser (In Town)
	Conveyer Drainage Tailings	Adult, Child: Trespasser (In Town)
Outlying Areas	Tertiary Sediments (Ts) - South of Smelter	Adult, Child: Trespasser (Remote)
	Slag Dump	Adult, Child: Trespasser (Remote)
	State Route 77	Adult, Child: Trespasser (Remote)
	Tailing Impoundment AB/BC	Adult, Child: Trespasser (Remote)
	Tailings Impoundment D	Adult, Child: Trespasser (Remote)
	Older Quaternary Deposits (Qo) - North of Hayden	Adult, Child: Trespasser (Remote)
	Cretaceous/Tertiary Intrusives and Volcanics (KTi)	Adult, Child: Trespasser (Remote)
	Tertiary Sediments (Ts) - South of Winkelman	Adult, Child: Trespasser (Remote)
	Quaternary Alluvium (Qa)	Adult, Child: Trespasser (Remote)
	Older Quaternary Deposits (Qo) - North of Tailings Impoundment D	Adult, Child: Trespasser (Remote)
	Tertiary Sediments (Ts) - West of Concentrator	Adult, Child: Trespasser (Remote)

Table 3-2 **DRAFT**

Groundwater Sampling Locations and Exposure Groups

Baseline Human Health Risk Assessment

ASARCO LLC Hayden Plant Site, Hayden, Arizona

Grouping Name	Location ID
Drinking Water Aquifer	H-1, H-2A, H-3, H-4, H-5, H-6, H-10, H-11, ARU-1, ARU-8, GW-03, S-4A
Hayden Municipal Supply Well and Manifold Samples	Hayden Manifold Sample, HWF-15, HWF-21, HWF-26
Winkelman Municipal Supply Well and Manifold Samples	Winkelman Manifold Sample, WM-3, WM-4
Non-drinking Water Aquifer Monitoring Wells	H-7, H-8, H-9, LC-1, MW-2, MW-4, GM-01R, GW-06, MW-2, MW-4, SM-2, GW-02
Tap Water - Hayden Library	Hayden Library
Tap Water - Winkelman School	Winkelman Elementary

TABLE 3-3
Dust Sampling Laboratory Values for Metals
Baseline Human Health Risk Assessment
ASARCO LLC Hayden, Arizona Plant Site

	Location:	Arizona	HDA-101-07-029		HDI-101-07-029		HDI-101-07-040		HDA-101-07-046		HDI-101-07-046		HDI-101-07-047		HDI-101-07-052		HDA-101-07-061		HDI-101-07-061		HDI-101-07-089T	
	Date:	Residential Soil	05/18/06		05/18/06		05/18/06		02/23/06		02/23/06		05/17/06		05/18/06		05/18/06		05/18/06		05/17/06	
Parameter	Units	Remediation Level[1]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	mg/kg	76,000	8,840		10,400		8,520		8,270		3,370		5,970		14,000		10,700		11,200		10,000	
Antimony	mg/kg	31	6.1		3.6	J	5.2	J	3.8	J	2.8	J	3.5	J	3.6	J	10.2	J	6.7	J	7.3	J
Arsenic	mg/kg	10	**127**		**45.8**		**44.6**		**92.8**		8.5		**43.7**		**31.3**		**259**		**94.0**		**49.7**	
Barium	mg/kg	15,000	136		690		196		216		2,250		298		127	J	964		347		909	
Beryllium	mg/kg	150	0.3	J	0.36	J	0.2	J	0.27	UJ	0.12	UJ	0.16	J	0.13	J	0.27	U	0.19	U	0.17	J
Boron	mg/kg	16,000	5.7		19.6		1,980		20		18.5		32.4	J	41.1	J	10.1	J	59.7	J	29.2	J
Cadmium	mg/kg	39	21		**85.7**		9.2		20.9		15.5		8.2	J	7.3	J	**51.4**		19.4	J	8.7	J
Calcium	mg/kg	--	40,100		38,800		49,300		33,500		24,400		76,300	J	39,100	J	36,900	J	35,500	J	27,800	J
Chromium	mg/kg	--	21.3		18.8		20.2		4.6		38.1		41.4		24.2		23.9		33.6		18.4	
Cobalt	mg/kg	900	40.2		17.9		18.4		24.3		13.3		31.1		13.1		36.8		18.6		18.2	
Copper	mg/kg	3,100	**29,700**		**10,200**		**16,700**		**18,100**		2,200		**6,670**		**10,400**		**34,600**		**14,000**		**15,300**	
Cyanide	mg/kg	1,200	NA		NA		NA		1.6	J	4.6		NA		NA		NA		NA		NA	
Iron	mg/kg	--	54,000		24,300		25,100		28,100		6,910		17,500		19,200		41,700		22,800		39,000	
Lead	mg/kg	400	**598**		295		192		**1,640**	J	**88,600**	J	**816**	J	193	J	**1,100**	J	**475**	J	186	J
Magnesium	mg/kg	--	7,250		7,630		9,410		6,990		2,770		6,040	J	6,010	J	8,320	J	8,410	J	6,200	J
Manganese	mg/kg	3,300	302		321		266		245		122		211	J	238	J	334	J	294	J	286	J
Mercury	mg/kg	23	0.43		0.3		0.26		0.94		0.88		1.1		0.38		1.0		1.5		0.20	
Molybdenum	mg/kg	390	235		93.1		135		106		14.6		53.5		66.2		287		116		133	
Nickel	mg/kg	1,600	48.5		31.7		42.8		32.2		8.1		20.2		32.7		45.5		35.0		42.0	
Potassium	mg/kg	--	2,780		4,550		7,060		3,080	J	1,820	J	3,190		3,120		3,630		3,880		3,040	
Selenium	mg/kg	390	17		13.9		13.8		13.3		3	J	11.4	J	7.4	J	30.1	J	18.6	J	13.6	J
Silver	mg/kg	390	15		8.5		10.1		8.3		2.6		6.7		7.0		13.1		9.0		8.3	
Sodium	mg/kg	--	1,450		3,310		4,040		3,010		8,310		8,930		3,910		2,700		5,040		3,670	
Thallium	mg/kg	5.2	0.7	U	0.7	U	0.7	U	0.68	UJ	2	UJ	0.70	UJ	0.70	UJ	0.70	UJ	0.70	UJ	0.70	UJ
Vanadium	mg/kg	78	37.2		38.9		31.3		31		10.6		20.7		28.9		41.3		35.2		28.1	
Zinc	mg/kg	23,000	1,280		1,340		1,150		3,440		6,400		2,980	J	1,000	J	3,780	J	3,330	J	7,760	J

TABLE 3-3
Dust Sampling Laboratory Values for Metals
Baseline Human Health Risk Assessment
ASARCO LLC Hayden, Arizona Plant Site

	Location:	Arizona	HDI-101-07-099		HDA-101-07-111		HDI-101-07-111		HDI-101-07-117		HDI-101-07-149		HDI-101-07-177		HDA-101-09-070		HDI-101-09-070		HDA-101-09-077		HDI-101-09-077	
	Date:	Residential Soil	05/17/06		05/17/06		05/17/06		05/18/06		05/17/06		05/18/06		05/17/06		05/17/06		05/17/06		05/17/06	
Parameter	Units	Remediation Level[1]					Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	mg/kg	76,000	13,800		7,640		**173,000**		19,100		9,030		8,370		7,870		8,320		9,280		12,300	
Antimony	mg/kg	31	8.2	J	12.7	J	**36.7**	J	3.8	J	1.3	J	1.8	J	2.3	J	3.0	J	3.1	J	4.3	J
Arsenic	mg/kg	10	**119**		**126**		**209**		**39.6**		8.3		**10**		**45.0**		**19.1**		**71.1**		**75.5**	
Barium	mg/kg	15,000	210		138	J	654	J	173		137	J	74.8		223		3,340		227		928	
Beryllium	mg/kg	150	0.19	J	0.26	J	0.76	J	0.20	J	0.21	J	0.2	J	0.27	U	0.22	J	0.31	J	0.39	J
Boron	mg/kg	16,000	33.1	J	43.2	J	880	J	30.0	J	27.2	J	14.9		19.5	J	90.5	J	8.1	J	16.2	J
Cadmium	mg/kg	39	28.6	J	23.8	J	**465**		12.0	J	2.2	J	2.4		5.6	J	23.0		8.8	J	14.8	J
Calcium	mg/kg	--	51,100	J	39,700	J	154,000	J	31,000	J	95,100	J	38,500		23,800	J	45,400	J	28,600	J	21,400	J
Chromium	mg/kg	--	24.9		23.2		117		22.0		17.5		15.5		25.0		29.9		21.2		24.0	
Cobalt	mg/kg	900	31.8		32.3		42.9	J	14.9		8.6	J	8.1		11.6		15.9		14.6		22.2	
Copper	mg/kg	3,100	**29,100**		**32,200**		**28,800**		**8,840**		1,420		1,540		**7,980**		**4,300**		**10,100**		**15,000**	
Cyanide	mg/kg	1,200	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Iron	mg/kg	--	78,300		39,100		53,200		60,300		19,000		21,100		16,800		15,600		19,800		29,100	
Lead	mg/kg	400	329	J	**499**	J	**827**	J	164	J	107	J	41.7		**521**	J	**54,400**	J	**620**	J	**6,050**	J
Magnesium	mg/kg	--	7,220	J	5,890	J	19,800	J	6,890	J	8,830	J	5,740		5,290	J	5,070	J	6,700	J	9,070	J
Manganese	mg/kg	3,300	448	J	254	J	927	J	364	J	305	J	246		204	J	209	J	275	J	378	J
Mercury	mg/kg	23	0.45		2.9		NA		0.18		1.4		0.3		1.4		1.4		1.8		3.2	
Molybdenum	mg/kg	390	233		248		314		83.6		13.5		22.4		86.4		58.4		119		169	
Nickel	mg/kg	1,600	41.9		43.8		136		44.9		24.3		18.9		26.1		22.1		24.3		34.0	
Potassium	mg/kg	--	3,000		2,630		20,500		3,740		2,530		3,390		2,530		3,550		3,170		5,880	
Selenium	mg/kg	390	23.2	J	31.8	J	98.6	J	10.0	J	1.3	J	3	J	6.0	J	6.6	J	8.5	J	16.7	J
Silver	mg/kg	390	10.3		10.9		22.1		5.7		0.97		1.3		4.2		1.0	U	5.2		10.9	
Sodium	mg/kg	--	5,310		3,930		39,700		7,180		7,640		4,110		1,680		7,360		1,390		2,840	
Thallium	mg/kg	5.2	0.70	UJ	0.70	UJ	4.7	U	0.70	UJ	0.70	UJ	0.7	U	0.70	UJ	1.4	U	0.70	UJ	0.70	UJ
Vanadium	mg/kg	78	31.9		34.9		**84.2**		36.0		29.2		23.5		30.2		23.9		38.4		51.7	
Zinc	mg/kg	23,000	9,530	J	7,450	J	8,670	J	9,710	J	497	J	2,560		634	J	8,930	J	1,220	J	1,580	J

TABLE 3-3
Dust Sampling Laboratory Values for Metals
Baseline Human Health Risk Assessment
ASARCO LLC Hayden, Arizona Plant Site

	Location:	Arizona	HDA-101-09-104		HDA-101-09-104		HDI-101-09-104		HDA-101-09-106		HDI-101-09-106		HDI-101-09-111B		HDI-101-09-111B		HDA-101-09-137		HDI-101-09-137		WDI-101-12-093	
	Date:	Residential Soil	05/17/06		05/17/06		05/17/06		02/23/06		02/23/06		05/17/06		05/17/06		05/18/06		05/18/06		05/17/06	
Parameter	Units	Remediation Level[1]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	mg/kg	76,000	10,100		9,710		8,580		12,100		10,100		11,000		13,900		12,500		14,500		30,800	
Antimony	mg/kg	31	2.9	J	2.7	J	4.2	J	5.8	J	2.9	J	13.4	J	11.6	J	8.6		3.1	J	**110**	J
Arsenic	mg/kg	10	**78.1**		**75.1**		**43.0**		**147**		**30.6**		**130**		**170**		**207**		**60.4**		**10.2**	
Barium	mg/kg	15,000	192		190		253		251		190		171		217		177		259		459	
Beryllium	mg/kg	150	0.30	J	0.30	J	0.25	J	0.46	UJ	0.22	UJ	0.20	J	0.27	J	0.44	J	0.46	J	0.17	J
Boron	mg/kg	16,000	7.4	J	7.6	J	23.5	J	9.8		31.1		26.9	J	17.6	J	58		58.8		71.2	J
Cadmium	mg/kg	39	8.8	J	8.4	J	9.8	J	18		6.4		31.8	J	**40.0**	J	29.5		8.6		5.0	J
Calcium	mg/kg	--	18,500	J	18,900	J	18,900	J	26,400		32,100		23,900	J	24,900	J	18,900		23,600		22,300	J
Chromium	mg/kg	--	15.7		15.1		21.2		8.3		4.8		24.7		23.1		21.5		22		20.1	
Cobalt	mg/kg	900	16.2		16.1		14.0		24.5		20.5		40.9		35.0		26.7		24.7		5.5	
Copper	mg/kg	3,100	**10,600**		**10,100**		**7,970**		**21,200**		**12,400**		**25,800**		**37,000**		**27,000**		**18,300**		915	
Cyanide	mg/kg	1,200	NA		NA		NA		0.8	J	0.57	J	NA		NA		NA		NA		NA	
Iron	mg/kg	--	20,300		19,600		18,500		29,400		28,700		171,000		88,900		35,600		34,400		16,300	
Lead	mg/kg	400	**546**	J	**480**	J	216	J	**705**		**1,700**		**400**	J	**505**	J	**762**		187		227	J
Magnesium	mg/kg	--	6,800	J	6,690	J	6,970	J	7,920		7,880		6,710	J	8,510	J	8,830		11,700		5,400	J
Manganese	mg/kg	3,300	300	J	337	J	274	J	396		428		702	J	511	J	364		517		235	J
Mercury	mg/kg	23	0.80		0.81		0.23		1.9		0.38		0.91		0.98		1		0.76		0.069	
Molybdenum	mg/kg	390	150		134		127		331		135		225		316		324		257		13.2	
Nickel	mg/kg	1,600	24.5		24.0		25.6		31.2		71.6		82.4		57.3		41.5		37.3		32.6	
Potassium	mg/kg	--	3,520		3,310		5,250		3,670		4,750		3,760		4,720		5,390		6,490		3,040	
Selenium	mg/kg	390	9.2	J	8.5	J	17.3	J	18.1	J	10.6	J	24.3	J	36.2	J	20.2		16.4		2.5	J
Silver	mg/kg	390	6.3		5.7		6.2		15.9		6.6		20.3		30.2		23.4		12.1		0.96	
Sodium	mg/kg	--	1,690		1,840		3,870		1,420		5,730		12,200		9,650		1,470		1,940		6,700	
Thallium	mg/kg	5.2	0.70	UJ	0.70	UJ	0.70	UJ	0.71	U	0.71	U	0.70	UJ	0.70	UJ	0.7	U	0.7	U	0.70	UJ
Vanadium	mg/kg	78	40.4		38.5		35.0		42		44.5		39.6		52.7		55.1		68.2		21.8	
Zinc	mg/kg	23,000	675	J	661	J	1,520	J	1,350		3,080		**28,400**	J	15,000	J	1,530		1,260		7,220	J

TABLE 3-3
Dust Sampling Laboratory Values for Metals
Baseline Human Health Risk Assessment
ASARCO LLC Hayden, Arizona Plant Site

	Location:	Arizona	WDI-101-12-136		WDI-101-12-136		WDA-101-12-147A		WDI-101-12-147A		WDA-101-12-241		WDI-101-12-241		Reference Blank	
	Date:	Residential Soil	05/18/06		05/18/06		05/18/06		05/18/06		05/18/06		05/18/06		09/21/06	
Parameter	**Units**	**Remediation Level[1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Aluminum	mg/kg	76,000	4,000		3,870		11,700		7,230		10,300		9,260		560	
Antimony	mg/kg	31	1.1	J	1.4	J	1.4	J	1.8	J	**112**		1.3	J	20	U
Arsenic	mg/kg	10	3.9		3.8		**16.4**		4.9		**54**		5		1.6	J
Barium	mg/kg	15,000	365		137		154		105		134		136		12	
Beryllium	mg/kg	150	0.13	J	0.13	J	0.41	J	0.24	J	0.35	J	0.25	J	0.25	
Boron	mg/kg	16,000	30.8		31.7		9		19.1		10.7		28.2		NA	
Cadmium	mg/kg	39	1.9		2.5		2.6		2.1		13.9		3		1	U
Calcium	mg/kg	--	14,100		13,900		19,100		19,200		26,200		24,400		100	J
Chromium	mg/kg	--	8.6		8.7		15.8		23		13.9		21.6		2	U
Cobalt	mg/kg	900	3	J	3	J	12		6.1		10.3		10.3		4	U
Copper	mg/kg	3,100	476		449		1,910		803		1,620		643		8	U
Cyanide	mg/kg	1,200	NA		NA		NA		NA		NA		NA		NA	
Iron	mg/kg	--	7,290		7,360		19,400		11,600		15,800		23,700		4,100	
Lead	mg/kg	400	43.6		51		95.2		66.9		161		64.5		2.8	J
Magnesium	mg/kg	--	2,890		2,790		7,390		4,700		7,260		7,750		60	J
Manganese	mg/kg	3,300	114		109		353		222		289		292		63	
Mercury	mg/kg	23	0.35		0.19		0.063		0.12		0.36		0.15		0.025	U
Molybdenum	mg/kg	390	5.4		5.6		22.4		9.4		16.1		11.3		10	U
Nickel	mg/kg	1,600	43.5		26.5		21		15.2		17.5		32.5		10	U
Potassium	mg/kg	--	3,260		3,460		4,080		3,790		3,430		3,490		1,000	U
Selenium	mg/kg	390	0.79	J	0.74	J	2.3	J	0.95	J	3.3	J	0.76	J	2	U
Silver	mg/kg	390	2.1		1.5		2.2		0.81	J	0.85	J	0.64	J	2	U
Sodium	mg/kg	--	171,999		170,000		1,220		17,600		1,210		15,100		100	U
Thallium	mg/kg	5.2	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	***10***	U
Vanadium	mg/kg	78	9.7		9.7		38.7		22.3		33.7		29.8		3.7	J
Zinc	mg/kg	23,000	1,220		1,080		633		317		818		2,690		6.8	J

Table Notes:

[1] Arizona Department of Environmental Quality Residential Soil Remediation Levels, Title 18 Chapter 7, January 2008
[2] Bold values with bold outline exceed one or more of the comparison criteria.
[3] -- = Not established
[4] HDA = Hayden Dust - Attic
[5] HDI = Hayden Dust - Indoor
[6] J = Estimated value
[7] mg/kg = milligrams per kilogram
[8] NA = Not analyzed
[9] U = Not detected; reporting limit is shown in place of a result.
[10] UJ = Not detected; reporting limit is approximate and is shown in place of a result.
[11] WDA = Winkelman Dust - Attic
[12] WDI = Winkelman Dust - Indoor

Table 4-1
Residential Exposure Assumptions for Soil
Baseline Human Health Risk Assessment
ASARCO, LLC Hayden Plant Site, Hayden, Arizona

Exposure Parameter	Units	Adult Value	Reference	Child Value	Reference
Exposure Frequency	day/yr	350	USEPA 1991	350	USEPA 1991
Exposure Duration	yr	24	USEPA 1991	6	USEPA 1991
Soil Ingestion Rate	mg/day	100	USEPA 1991	200	USEPA 1991
Inhalation Rate (Soil Particulate Inhalation)	m^3/day	20	USEPA 1991	10	USEPA 1991
Particulate Emission Factor	m^3/kg	1.32E+09	USEPA 2002	1.32E+09	USEPA 2002
Skin Surface Area (Soil Contact; 1 event per day)	cm^2/day [soil]	5.70E+03	USEPA 2004	2.80E+03	USEPA 2004
Body Weight	kg	70	USEPA 1989	15	USEPA 1991
Averaging Time for carcinogens	yr	70	USEPA 1989	70	USEPA 1989
Averaging Time for noncarcinogens	yr	24	USEPA 1989	6	USEPA 1989
Conversion Factor (yr to day)	yrs/day	2.74E-03		2.74E-03	
Conversion Factor (mg to kg)	kg/mg	1.00E-06		1.00E-06	
Bioavailability Factor for Arsenic	unitless	0.8	site-specific	0.8	site-specific
Dermal Absorption Arsenic	unitless	0.03	USEPA 2004	0.03	USEPA 2004
Dermal Absorption Copper	unitless	0.01	USEPA 2004	0.01	USEPA 2004
Adherence Factor	mg/cm^2	0.07	USEPA 2004	0.2	USEPA 2004

References

USEPA 1989: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part A).
USEPA 1991: Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors."
USEPA 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.
USEPA 2004: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E: Supplemental Guidance for Dermal Risk Assessment).

Table 4-2

Nonresidential Exposure Assumptions

Baseline Human Health Risk Assessment

ASARCO, LLC Hayden Plant Site

DRAFT

Exposure Parameter		Units	Reasonable Maximum Exposure (RME) Scenario																	
			Adult Trespasser Soil (in town)	Source	Child Trespasser Soil (in town)	Source	Adult Trespasser Soil (Remote)	Source	Child Trespasser Soil (Remote)	Source	Child School / Recreation Soil at School/ Playground	Source	Adult Golf Course Soil at Park	Source	Child Park Recreation Soil at Park	Source	Adult Recreation Sediment and Surface Water	Source	Child Recreation Sediment and Surface Water	Source
Exposure Duration	ED	yr	24	site-specific	6	site-specific	24	site-specific	6	site-specific	8	site-specific	24	site-specific	8	site-specific	24	site-specific	6	site-specific
Body Weight	BW	kg	70	EPA, 1991	28	EPA, 2006[g]	70	EPA, 1991	28	EPA, 2006[g]	28	EPA, 2006[g]	70	EPA, 1991	28	EPA, 2006[g]	70	EPA, 1997	28	EPA, 2006[g]
Averaging Time for carcinogens	ATc	yr	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989
Averaging Time for noncarcinogens	ATnc	yr	ED	EPA, 1989	ED	EPA, 1989	ED	EPA, 1989	ED	EPA, 1989	ED	EPA, 1989	ED	EPA, 1989	ED	EPA, 1989	ED	EPA, 1989	ED	EPA, 1989
Conversion Factor (L to cm^3)	CF1	L/cm^3	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000
Conversion Factor (mg to µg)	CF2	mg/µg	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000	0.001	=1/1000
Conversion Factor (yr to day)	CF3	yrs/day	2.7E-03	=1/365	2.7E-03	=1/365	2.7E-03	=1/365	2.7E-03	=1/365	2.7E-03	=1/365	2.7E-03	=1/365	2.7E-03	=1/365	2.7E-03	=1/365	2.7E-03	=1/365
Conversion Factor (mg to kg)	CF4	kg/mg	1.0E-06	=1/1000000	1.0E-06	=1/1000000	1.0E-06	=1/1000000	1.0E-06	=1/1000000	1.0E-06	=1/1000000	1.0E-06	=1/1000000	1.0E-06	=1/1000000	1.0E-06	=1/1000000	1.0E-06	=1/1000000
Soil and Sediment																				
Exposure Frequency	EF	day/yr	250	site-specific[a]	250	site-specific[a]	12	site-specific[b]	150	site-specific[b]	350	site-specific[c]	50	site-specific	350	site-specific	100	site-specific[d]	100	site-specific[e]
Exposure Time	ET	hours/day	0.5	site-specific	1	site-specific	2	site-specific	2	site-specific	6	site-specific	4	site-specific	2	site-specific	2	site-specific	2	site-specific
Soil Ingestion Rate	IRs	mg/day	100	EPA, 1991	200	EPA, 1991	100	EPA, 1991	200	EPA, 1991	200	EPA, 1991	100	EPA, 1991	200	EPA, 1991	100	EPA, 1991	200	EPA, 1991
Skin Surface Area (per event; 1 event per day)	SAs	cm^2/day	5700	EPA, 2004	3000	EPA, 2006[f]	5700	EPA, 2004	3000	EPA, 2006[f]	3000	EPA, 2006[f]	5700	EPA, 2004	3000	EPA, 2006[f]	5700	EPA, 2004	3000	EPA, 2006[f]
Particulate Emission Factor	PEF	m^3/kg	1.3E+09	EPA, 1996	1.3E+09	EPA, 1996	1.3E+09	EPA, 1996	1.3E+09	EPA, 1996	1.3E+09	EPA, 1996	1.3E+09	EPA, 1996	1.3E+09	EPA, 1996	NA		NA	
Chemical Specific skin absorption defaults	ABS																			
Arsenic	ABSas	unitless	0.03	EPA, 2004	0.03	EPA, 2004	0.03	EPA, 2004	0.03	EPA, 2004	0.03	EPA, 2004	0.03	EPA, 2004	0.03	EPA, 2004	0.03	EPA, 2004	0.03	EPA, 2004
Other inorganics	ABSin	unitless	0.01	EPA, 2004	0.01	EPA, 2004	0.01	EPA, 2004	0.01	EPA, 2004	0.01	EPA, 2004	0.01	EPA, 2004	0.01	EPA, 2004	0.01	EPA, 2004	0.01	EPA, 2004
Adherence Factor	AF	mg/cm^2	0.07	EPA, 2004	0.2	EPA, 2004	0.07	EPA, 2004	0.2	EPA, 2004	0.2	EPA, 2004	0.07	EPA, 2004	0.2	EPA, 2004	0.07	EPA, 2004	0.2	EPA, 2004
Bioavailability Factor for Arsenic	BAF_As	unitless	0.8	site-specific[h]	0.8	site-specific[h]	0.8	site-specific[h]	0.8	site-specific[h]	0.8	site-specific[h]	0.8	site-specific[h]	0.8	site-specific[h]	0.8	site-specific[h]	0.8	site-specific[h]
Surface Water																				
Exposure Frequency	EF	day/yr	NA		NA		NA		NA		NA		NA		NA		33	site-specific[d]	33	site-specific[e]
Exposure Time	ET	hours/day	NA		NA		NA		NA		NA		NA		NA		2.6	EPA, 1989	2.6	EPA, 1989
Water Ingestion Rate	IRw	ml/hr	NA		NA		NA		NA		NA		NA		NA		50	EPA, 1989	50	EPA, 1989
Skin Surface Area (Water Contact)	SAw	cm^2/day	NA		NA		NA		NA		NA		NA		NA		18000	EPA, 2004	12000	EPA, 2006[f]
Chemical Specific Permeability Constant	PC	cm/hr	NA		NA		NA		NA		NA		NA		NA		chemical specific		chemical specific	
Air																				
Inhalation Rate	InR	m^3/day	20	EPA, 1991	10	EPA, 1991	20	EPA, 1991	10	EPA, 1991	10	EPA, 1991	20	EPA, 1991	10	EPA, 1991	NA		NA	

Notes:

RME : Reason Maximum Exposure

a. Assumes that the trespasser (or recreational user) is exposed to soil piles and park located in town 5 days per week.

b. Assumes that trespasser is exposed to remote soil once a month (adult) or 3 times a week (child).

c. Assumes that school child is exposed to school yard 350 days per year.

d. Assumes the adult surface water and sediment recreation user is exposed to contaminated sediment two days per weekend (and swims in surface water 33 days/yr from June to September).

e. Assumes that the child surface water and sediment recreation user is exposed to contaminated sediment two days per weekend (and swims in surface water 33 days/yr from June to September).

f. Assumes 25% of mean total skin surface area of an 8-year old child (total surface are for swimming = 12000 cm^2).

g. Assumes mean body weight of 8-year old child.

h. Bioavailablity factor for arsenic is based on the results of mineralogy speciation and Physically Based Extraction Test.

References:

EPA 1989: *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual. Part A* . EPA/540/1-89002. December 1989.

EPA 1991: *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors* . Publication 9284.6-03. Office of Emergency and Remedial Response, Washington,, DC. NTIS PB 92-921314

EPA 1996: *Soil Screening Guidance. Technical Background Document* . EPA/540/R-95/128. Office of Emergency and Remedial Response, Washington, DC. EPA/540/R-96/128. NTIS PB96-963502.

EPA 1997: *Exposure Factors Handbook* . National Center for Environmental Assessment (NCEA). Office of Research and Development.

EPA 2004: *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)* , Final. EPA/540/R/99/005. Office of Solid Waste and Emergency Response, Washington DC. PB99-963312.

EPA 2006. *Child-Specific Exposure Factors Handbook (External Review Draft).* EPA/600/R/06/096A. [BW is the mean weight, 28.1 kg, of 8 year old male and female (Table 11-5, page 11-11). SA is the average of the 95th Percentile of 8 year old male plus female total body surface area times 0.25 (Tables 8-1 and 8-2, pages 8-17 and 8-18).]

Table 4-3 **DRAFT**

Nonresidential Surface Soil Sample Groupings

Baseline Human Health Risk Assessment

ASARCO LLC Hayden Plant Site, Hayden, Arizona

Grouping Name	Location ID (Surface Soil Only)
Winkelman Nonresidential Sample Groupings	
Winkelman School Complex	WSC-01 through WSC-38
Winkelman School Complex Parcel A	WSCLA-01, -03 to -05, -07 through WSCLA-9
Winkelman School Complex Parcel B	WSCLB-01 through WSCLB-9
Winkelman School Complex Parcel C	WSCLC-01 through WSCLC-9
Hayden Nonresidential Sample Groupings	
Community Park/Library	HPUB-01, HPUB-02, HPUB-04 through HPUB-10
Northwest Hayden Golf Club/Adjacent to Tailings Impoundment	HGC-23 through HGC-33
Remainder of Hayden Golf Club Property	HGC-01 through HGC-22
San Pedro Wash	SPW-01 through SPW-17
Kennecott Avenue Wash	KAW-01 through KAW-10
Power House Wash	PHW-01 through PHW-09
ASARCO Property Sample Groupings	
Kennecott Smelter - North End	KS-08 through KS-09
Kennecott Smelter Basin	KS-01 through KS-04
Kennecott Smelter Plant	KS-11
Kennecott Smelter - Lime Plant	KS-05 through KS-07
Kennecott Smelter - S of Lime Plant	KS-10, KS-12, and KS-14
West of Administration Building	KS-13, KS-15, and PCON-06
Thickener Tank Area	PCON-01 through -04, -27, and PCON-28
South of Concentrator	PCON-05, and -08 through PCON-14
South of Mill Building	PCON-15 through PCON-17
East of Hillcrest Avenue	PCON-18 through PCON-23
North of Mill Building	PCON-24 and PCON-25
5th Street Right of Way	PCON-26
Crusher Facility	PHW-10 through PHW-15
Conveyer Drainage Tailings	CF-01 through CF-07
Hayden and Winkelman Outlying Areas Sample Groupings	
Tertiary Sediments (Ts) - South of Smelter	UP-02
Slag Dump	SD-01, SDD-01 through SDD-04, PSMT-01
State Route 77 (SR77)	SR77-01 through -03
Tailing Impoundment AB/BC	TPA-01 through TPA-08
Tailings Impoundment D	TPD-01 through TPD-04
Quaternary Deposits (Qo) - North of Hayden	UP-01
Cretaceous/Tertiary Intrusives and Volcanics (KTi)	UPA-01
Tertiary Sediments (Ts) - South of Winkelman	UPA-02
Quaternary Alluvium (Qa)	UP03, UPA-03 through UPA-06
Older Quaternary Deposits (Qo) - North of Tailings Impoundment D	UPA-07
Tertiary Sediments (Ts) - West of Concentrator	UPA-08 through UPA-09

Table 6-1
Hayden and Winkleman Background Soil (Upper Tolerance Limit Values) - Summary of Residential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Grouping Name	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Residential Cancer Risks	Residential Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
Tertiary Sediment (Ts)	12.5	1,270	3E-05	0.9	48	No	No
Older Quatenary Deposits (Qo)	9.1	882	2E-05	0.6	46	No	No

Table 6-2
IMPROVE Organ Pipe National Park Air Monitoring Data Residential Cancer Risks – Background
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Chemical	EPC Value (ug/m3)	Adult plus Child Cancer Risks
Arsenic	4.0E-04	9.0E-07
Cadmium	6.0E-04	5.6E-07
Chromium	7.2E-04	4.5E-06
Copper	2.8E-03	NA
Lead	1.6E-03	NA
Total		6.0E-06

Table 6-3
Comparison of Hayden and Winkelman Air Monitoring Data to Background Air Data
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Analyte	Units	Hayden EPC	Winkelman EPC	Background (Organ Pipe) EPC
Arsenic	ug/m^3	4.9E-02	1.0E-02	4.0E-04
Cadmium	ug/m^3	1.3E-02	2.3E-03	6.0E-04
Chromium	ug/m^3	2.4E-03	1.7E-03	7.2E-04
Copper	ug/m^3	1.3E+00	3.6E-01	2.8E-03
Lead	ug/m^3	1.8E-01	2.8E-02	1.6E-03

Notes:
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit on the mean

Table 6-4
Hayden, Residential Properties - Summary of Residential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Zone	Property	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Adult plus Child Cancer Risks	Child Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
1	101-07-185C	9	1830	2E-05	0.9	52	No	No
	101-07-193A	14	2090	3E-05	**1**	119	No	No
	101-07-216	21	2230	4E-05	**2**	**571**	Yes	Yes
2	101-07-176	132	3,410	**3E-04**	**6**	**127**	No	Yes
	101-07-202	11	1,870	2E-05	**1**	90	No	No
	101-07-242	17	4,510	4E-05	**2**	**142**	No	Yes
	101-07-244	11	2,920	2E-05	**1**	**154**	No	Yes
	101-07-247	10	2,550	2E-05	**1**	**431**	Yes	Yes
3	101-07-219	20	4,000	4E-05	**2**	**152**	No	Yes
	101-07-234	10	2,790	2E-05	**1**	**169**	No	Yes
	101-07-236	28	5,290	6E-05	**3**	**236**	Yes	Yes
4	101-07-142A	17	2,520	3E-05	**1**	**124**	No	Yes
	101-07-149	21	5,660	4E-05	**3**	**252**	Yes	Yes
	101-07-251	16	3,760	3E-05	**2**	**185**	No	Yes
	101-07-259	13	3,350	3E-05	**2**	105	No	No
5	101-07-129	26	6,500	5E-05	**3**	**281**	Yes	Yes
	101-07-301	23	9,400	5E-05	**4**	**627**	Yes	Yes
	101-07-303	14	10,500	3E-05	**4**	**152**	No	Yes
	101-07-304A	25	6,550	5E-05	**3**	**133**	No	Yes
6	101-07-111	15	6,400	3E-05	**3**	100	No	No
	101-07-117	36	11,300	8E-05	**5**	**312**	Yes	Yes
	101-07-284	18	6,480	4E-05	**3**	**170**	No	Yes
	101-07-286	20	6,930	4E-05	**3**	**225**	Yes	Yes
7	101-07-099	58	14,800	**1E-04**	**7**	**406**	Yes	Yes
	101-07-104	21	10,900	4E-05	**4**	**297**	Yes	Yes
	101-07-270	58	17,500	**1E-04**	**8**	**1,080**	Yes	Yes
8	101-07-090	48	16,100	**1E-04**	**7**	**241**	Yes	Yes
	101-07-091	45	22,300	9E-05	**9**	**250**	Yes	Yes
	101-07-092A	31	10,100	7E-05	**4**	**208**	No	Yes
	101-07-105	34	17,100	7E-05	**7**	**867**	Yes	Yes
	101-07-110	15	5,050	3E-05	**2**	56	No	No

Table 6-4
Hayden, Residential Properties - Summary of Residential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Zone	Property	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Adult plus Child Cancer Risks	Child Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
9	101-07-035AN	56	17,900	**1E-04**	**8**	116	No	No
	101-07-037	56	16,500	**1E-04**	**8**	**1,470**	Yes	Yes
	101-07-040	55	23,400	**1E-04**	**10**	**217**	Yes	Yes
	101-07-052	37	11,400	8E-05	**5**	**237**	Yes	Yes
	101-07-060	22	6,580	5E-05	**3**	**676**	Yes	Yes
	101-07-061	28	5,680	6E-05	**3**	**210**	No	Yes
	101-07-062	43	8,860	9E-05	**5**	**239**	Yes	Yes
	101-07-089K	87	10,900	**2E-04**	**7**	**662**	Yes	Yes
	101-07-089Q	38	22,100	8E-05	**9**	**156**	No	Yes
	101-07-089S	67	20,600	**1E-04**	**9**	**230**	Yes	Yes
	101-07-089T	540	19,500	**1E-03**	**27**	**265**	Yes	Yes
	101-07-089U	50	17,300	**1E-04**	**8**	**163**	No	Yes
10	101-07-008	69	14,400	**1E-04**	**7**	**470**	Yes	Yes
	101-07-010	39	11,200	8E-05	**5**	**290**	Yes	Yes
	101-07-014	38	10,200	8E-05	**5**	**549**	Yes	Yes
	101-07-018	37	7,770	8E-05	**4**	**947**	Yes	Yes
	101-07-027	29	6,970	6E-05	**3**	**192**	No	Yes
	101-07-028	45	12,400	9E-05	**6**	**644**	Yes	Yes
	101-07-029	52	12,100	**1E-04**	**6**	**483**	Yes	Yes
	101-07-030	32	12,900	7E-05	**5**	**238**	Yes	Yes
	101-07-034	85	16,200	**2E-04**	**9**	**536**	Yes	Yes
	101-07-035AE	50	12,100	**1E-04**	**6**	**214**	Yes	Yes
	101-07-035AS	28	25,100	6E-05	**9**	**204**	No	Yes
	101-07-041	18	4,070	4E-05	**2**	**219**	Yes	Yes
	101-07-042	20	4,850	4E-05	**2**	**303**	Yes	Yes
	101-07-046	20	4,330	4E-05	**2**	**734**	Yes	Yes
	101-07-047	42	10,500	9E-05	**5**	**755**	Yes	Yes
	101-07-050A	16	4,260	3E-05	**2**	**142**	No	Yes
11	101-07-065	15	2,560	3E-05	**1**	**736**	Yes	Yes
	101-07-066	12	3,310	3E-05	**2**	**3,180**	Yes	Yes
	101-07-082	25	4,680	5E-05	**2**	**272**	Yes	Yes
	101-09-014	20	5,180	4E-05	**2**	**368**	Yes	Yes

Table 6-4
Hayden, Residential Properties - Summary of Residential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Zone	Property	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Adult plus Child Cancer Risks	Child Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
12	101-09-004	37	7,320	8E-05	**4**	**8,170**	Yes	Yes
	101-09-008	48	10,800	**1E-04**	**5**	**358**	Yes	Yes
	101-09-010	30	7,030	6E-05	**3**	**799**	Yes	Yes
	101-09-025A	20	5,970	4E-05	**3**	**227**	Yes	Yes
	101-09-027	21	4,650	4E-05	**2**	**616**	Yes	Yes
	101-09-032	33	8,490	7E-05	**4**	**481**	Yes	Yes
	101-09-033	53	10,300	**1E-04**	**5**	**972**	Yes	Yes
13	101-09-059	14	5,520	3E-05	**2**	**727**	Yes	Yes
	101-09-062	24	4,590	5E-05	**2**	**712**	Yes	Yes
	101-09-064	43	11,100	9E-05	**5**	**412**	Yes	Yes
	101-09-067	37	5,970	8E-05	**3**	**909**	Yes	Yes
	101-09-068	21	4,130	4E-05	**2**	**296**	Yes	Yes
	101-09-070	26	8,510	5E-05	**4**	**3,030**	Yes	Yes
	101-09-072	29	8,430	6E-05	**4**	**518**	Yes	Yes
14	101-09-036	32	7,000	7E-05	**4**	**2,330**	Yes	Yes
	101-09-038	79	14,300	**2E-04**	**8**	**422**	Yes	Yes
	101-09-039	22	6,890	5E-05	**3**	**3,010**	Yes	Yes
	101-09-042	18	4,960	4E-05	**2**	**398**	Yes	Yes
	101-09-045	23	5,010	5E-05	**2**	**137**	No	Yes
	101-09-047	22	7,330	5E-05	**3**	**961**	Yes	Yes
	101-09-054	26	7,480	5E-05	**3**	**676**	Yes	Yes
	101-09-077	46	6,550	1E-04	**4**	**7,250**	Yes	Yes
15	101-09-083	34	5,910	7E-05	**3**	**459**	Yes	Yes
	101-09-084	37	7,900	8E-05	**4**	**1,220**	Yes	Yes
	101-09-088	19	2,690	4E-05	**2**	**92,600**	Yes	Yes
	101-09-134	19	6,010	4E-05	**3**	86	No	No

Table 6-4
Hayden, Residential Properties - Summary of Residential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Zone	Property	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Adult plus Child Cancer Risks	Child Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
16	101-09-104	43	12,700	9E-05	**6**	**471**	Yes	Yes
	101-09-106	52	12,000	**1E-04**	**6**	**1,350**	Yes	Yes
	101-09-107	36	8,700	7E-05	**4**	**574**	Yes	Yes
	101-09-108	52	15,800	**1E-04**	**7**	**1,600**	Yes	Yes
	101-09-109	38	14,400	8E-05	**6**	**590**	Yes	Yes
	101-09-111B	61	13,800	**1E-04**	**7**	**385**	Yes	Yes
	101-09-137	31	5,570	6E-05	**3**	105	No	No
	101-09-140	221	39,700	**5E-04**	**21**	**779**	Yes	Yes
17	101-09-115	34	7,430	7E-05	**4**	**273**	Yes	Yes
	101-09-120	41	7,980	9E-05	**4**	**231**	Yes	Yes

Notes:
Bolded values indicate cancer risk greater than 1 x 10-4, noncancer hazards greater than 1, and lead concentrations >122 mg/kg.
The site-specific screening levels for lead are 212 mg/kg (excluding homegrown produce pathway) and 122 mg/kg (including the homegrown produce pathway).

Table 6-5
Summary of ELCRs, HIs and Lead Concentrations for Residential Parcels in Hayden and Winkelman
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Residential Area	Hayden (99 parcels)		Winkelman (31 parcels)	
ELCR Range	Number of Parcels	Percent	Number of Parcels	Percent
Less than 10^{-6}	0	0%	0	0%
Between 10^{-6} and 10^{-5}	0	0%	23	74%
Between 10^{-5} and 10^{-4}	93	94%	7	23%
Greater than 10^{-4}	6	6%	1	3%
HI Range	Number of Parcels	Percent	Number of Parcels	Percent
Less than 1	8	8%	28	90%
1 to 3	39	39%	2	6%
3 to 6	32	32%	1	3%
Greater than 6	20	20%	0	0%
Lead Concentration (mg/kg)	Number of Parcels	Percent	Number of Parcels	Percent
Less than 122	9	9%	13	42%
122 to 212	18	18%	7	23%
212 to 400	27	27%	6	19%
Greater than 400	45	45%	5	16%

ELCR = Excess Lifetime Cancer Risk
HI = Hazard Index

Table 6-6
Winkelman, Residential Properties - Summary of Residential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Zone	Property	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Adult plus Child Cancer Risks	Child Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
18	101-12-008F	5	655	1E-05	0.4	59	No	No
	101-12-008J	20	364	4E-05	0.9	248	Yes	Yes
	101-12-008K	4	598	9E-06	0.4	35	No	No
	101-12-023A	5	383	1E-05	0.3	341	Yes	Yes
	101-12-288	5	338	1E-05	0.3	273	Yes	Yes
19	101-12-071	112	692	**2E-04**	**4**	179	No	Yes
	101-12-073	8	547	2E-05	0.5	128	No	Yes
	101-12-075	4	603	9E-06	0.4	128	No	Yes
	101-12-101A	6	404	1E-05	0.4	517	Yes	Yes
	101-12-102	6	540	1E-05	0.4	221	Yes	Yes
20	101-12-093	7	1,040	2E-05	0.6	101	No	No
	101-12-094A	8	632	2E-05	0.5	92	No	No
	101-12-108	6	553	1E-05	0.4	124	No	Yes
21	101-12-130	5	787	1E-05	0.5	104	No	No
	101-12-142	17	1,390	3E-05	1	387	Yes	Yes
	101-12-149	45	5,130	1E-04	**3**	2,330	Yes	Yes
	101-12-150	35	4,410	7E-05	**3**	804	Yes	Yes
22	101-12-136	5	396	1E-05	0.3	65	No	No
	101-12-147A	6	631	1E-05	0.4	133	No	Yes
	101-12-187	3	324	6E-06	0.2	52	No	No
	101-12-188B	4	391	9E-06	0.3	42	No	No
23	101-12-193	6	663	1E-05	0.4	1,730	Yes	Yes
	101-12-234	7	276	1E-05	0.3	265	Yes	Yes
	101-12-236	5	643	1E-05	0.4	122	No	No
24	101-10-019	4	417	9E-06	0.3	29	No	No
	101-10-023	6	536	1E-05	0.4	51	No	No
	101-12-241	5	374	1E-05	0.3	60	No	No
25	101-12-154A	5	780	1E-05	0.4	114	No	No
	101-12-155	4	743	9E-06	0.4	1,510	Yes	Yes
	101-12-204	6	712	1E-05	0.5	75	No	No
	101-12-267	7	367	1E-05	0.4	167	No	Yes

Notes:
Bolded values indicate cancer risk greater than 1 x 10^{-4} and noncancer hazards greater than 1.
The site-specific screening levels for lead are 212 mg/kg (excluding homegrown produce pathway) and 122 mg/kg (including the homegrown produce pathway).

Table 6-7
Hayden Nonresidential Soil - Summary of Nonresidential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Exposure Area - Receptor	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Nonresidential Cancer Risks	Nonresidential Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
Community Park/Library - Child, Park Recreator	41	16,200	4E-05	3.7	119	No	No
Northwest Hayden Golf Club/Adjacent to Tailings Impoundment - Adult, Golf Course Receptor	48	5,370	4E-06	0.06	129	No	**Yes**
Remainder of Hayden Golf Club Property - Adult, Golf Course Receptor	6	7,490	6E-07	0.04	26	No	No
San Pedro Wash - Adult/Child Trespasser	21	6,820	2E-05	1	73	No	No
Kennecott Avenue Wash - Adult/Child Trespasser	16	8,020	2E-05	1	83	No	No
Power House Wash - Adult/Child Trespasser	48	9,280	5E-05	2	158	No	**Yes**

Table 6-8
Winkleman Nonresidential Soil - Summary of Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Exposure Area - Receptor	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Cancer Risks	Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
Winkelman School Complex - Child, School/Recreation	5.1	478	5.3E-06	0.2	22	No	No
Winkelman School Complex Parcel A - Adult/Child Resident	9.5	2,487	2.0E-05	1.2	77	No	No
Winkelman School Complex Parcel B - Adult/Child Resident	6.6	894	1.4E-05	0.5	32	No	No
Winkelman School Complex Parcel C - Adult/Child Resident	5.4	558	1.4E-05	0.4	27	No	No

Table 6-9
ASARCO Properties Nonresidential Soil - Summary of Nonresidential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Exposure Area -Receptor	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Nonresidential Cancer Risks	Nonresidential Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
Kennecott Smelter - North End - Adult/Child Trespasser, Remote Scenario	114	133,000	4E-05	11	552	**Yes**	**Yes**
Kennecott Smelter Basin - Adult/Child Trespasser, Remote Scenario	330	68,200	1E-04	8	527	**Yes**	**Yes**
Kennecott Smelter Plant - Adult/Child Trespasser, Remote Scenario	106	66,800	4E-05	6	172	No	**Yes**
Kennecott Smelter - Lime Plant - Adult/Child Trespasser, Remote Scenario	13	192,000	5E-06	15	333	**Yes**	**Yes**
Kennecott Smelter - South of Lime Plant - Adult/Child Trespasser, Remote Scenario	91	48,600	3E-05	4	450	**Yes**	**Yes**
West of Administration Building - Adult/Child Trespasser, In Town Scenario	76	23,300	8E-05	4	277	**Yes**	**Yes**
Thickener Tank Area - Adult/Child Trespasser, In Town Scenario	50	30,800	5E-05	5	204	No	**Yes**
South of Concentrator - Adult/Child Trespasser, In Town Scenario	51	46,800	5E-05	7	155	No	**Yes**
South of Mill Building - Adult/Child Trespasser, In Town Scenario	21	11,200	2E-05	2	62	No	No
East of Hillcrest Avenue - Adult/Child Trespasser, In Town Scenario	1720	25,500	2E-03	28	295	**Yes**	**Yes**
North of Mill Building - Adult/Child Trespasser, In Town Scenario	23	59,700	2E-05	8	348	**Yes**	**Yes**
5th Street Right of Way - Adult/Child Trespasser, In Town Scenario	9	7,540	9E-06	1	46	No	No
Crusher Facility - Adult/Child Trespasser, In Town Scenario	15	5,250	2E-05	0.9	61	No	No

Table 6-9
ASARCO Properties Nonresidential Soil - Summary of Nonresidential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Exposure Area -Receptor	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Nonresidential Cancer Risks	Nonresidential Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
Conveyer Drainage Tailings - Adult/Child Trespasser, In Town Scenario	46	123,000	5E-05	16	109	No	No

Table 6-10
Outlying Areas Nonresidential Soil - Summary of Nonresidential Cancer Risks and Noncancer Hazards (including EPCs and lead screening levels)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Exposure Area - Receptor	Arsenic Exposure Point Conc. (mg/kg)	Copper Exposure Point Conc. (mg/kg)	Nonresidential Cancer Risks	Nonresidential Noncancer Hazards	Lead Exposure Point Conc. (mg/kg)	Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?	Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?
Tertiary Sediments (Ts) - South of Smelter- Adult/Child Trespasser, Remote Scenario	70	10,200	2E-05	0.1	247	**Yes**	**Yes**
Slag Dump- Adult/Child Trespasser, Remote Scenario	249	380,000	9E-05	31	754	**Yes**	**Yes**
State Route 77- Adult/Child Trespasser, Remote Scenario	39	8,130	1E-05	1	231	**Yes**	**Yes**
Tailing Impoundment AB/BC- Adult/Child Trespasser, Remote Scenario	21	2,890	7E-06	0.4	80	No	No
Tailings Impoundment D- Adult/Child Trespasser, Remote Scenario	17	5,690	6E-06	0.6	59	No	No
Older Quaternary Deposits (Qo) - North of Hayden- Adult/Child Trespasser, Remote Scenario	11	1,540	4E-06	0.2	41	No	No
Cretaceous/Tertiary Intrusives and Volcanics (KTi) - Adult/Child Trespasser - Remote Scenario	7	854	2E-06	0.1	36	No	No
Tertiary Sediments (Ts) - South of Winkelman- Adult/Child Trespasser, Remote Scenario	6	983	2E-06	0.1	47	No	No
Quaternary Alluvium (Qa) - - Adult/Child Trespasser, Remote Scenario	8	711	3E-06	0.1	30	No	No
Older Quaternary Deposits (Qo) - North of Tailings Impoundment D - - Adult/Child Trespasser, Remote Scenario	9	882	3E-06	0.1	41	No	No
Tertiary Sediments (Ts) - West of Concentrator - - Adult/Child Trespasser, Remote Scenario	27	6,310	1E-05	0.7	143	No	**Yes**

Table 6-11
Summary of Screening Level Groundwater Cancer Risks and Noncancer Hazards – Metals
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Group	Well/Station IDs	Total Cancer Risk	Noncancer Hazard Index
Drinking Water Aquifer	H-1, H-2A, H-3, H-4, H-5, H-6, H-10, H-11, ARU-1, ARU-8, GW-03, S-4A	2E-04	7
Hayden Municipal Supply Well and Manifold Samples	Hayden Manifold Sample, HWF-15, HWF-21, HWF-26	9E-05	2
Winkelman Municipal Supply Well and Manifold Samples	Winkelman Manifold Sample, WM-3, WM-4	1E-04	2
Non-drinking Water Aquifer Monitoring Wells	H-7, H-8, H-9, LC-1, MW-2, MW-4, GM-01R, GW-06, MW-2, MW-4, SM-2, GW-02	4E-03	35
Hayden Library	Hayden Library	1E-04	1
Winkelman School	Winkelman School	1E-04	1

Table 6-12
Summary of Screening Level Groundwater Cancer Risks and Noncancer Hazards – Radionuclides
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Location	Chemical of Potential Concern	Exposure Point Concentration	Units	Basis of EPC	EPA PRG (cancer) [pCi/L]	Cancer Risk	Percent Contribution (cancer)
Drinking Water Aquifer	Radium 226 Activity	0.4	pCi/L	95% KM (t) UCL	8.23E-04	4.53E-04	97%
	Total Uranium Activity	8.0	pCi/L	95% Approximate Gamma UCL	NA		
	Uranium 234 Activity	5.2	pCi/L	95% Approximate Gamma UCL	6.74E-01	7.77E-06	2%
	Uranium 235 Activity	0.128	pCi/L	95% Approximate Gamma UCL	6.84E-01	1.87E-07	0%
	Uranium 238 Activity	2.74	pCi/L	95% Approximate Gamma UCL	7.44E-01	3.68E-06	1%
	Total					4.6E-04	3%
Hayden Municipal Supply Well and Manifold Samples	Radium 226 Activity	0.5	pCi/L	Too Few Unique Detected Values *	8.23E-04	5.47E-04	98%
	Total Uranium Activity	6.7	pCi/L	95% Student's-t UCL	NA		
	Uranium 234 Activity	4.3	pCi/L	95% Student's-t UCL	6.74E-01	6.41E-06	1%
	Uranium 235 Activity	0.48	pCi/L	Maximum Result	6.84E-01	7.02E-07	0%
	Uranium 238 Activity	2.2	pCi/L	Maximum Result	7.44E-01	2.96E-06	1%
	Total					5.6E-04	2%
Winkelman Municipal Supply Well and Manifold Samples	Total Uranium Activity	3.6	pCi/L	95% Approximate Gamma UCL	NA		
	Uranium 234 Activity	2.7	pCi/L	95% Approximate Gamma UCL	6.74E-01	4.01E-06	109%
	Uranium 235 Activity	0.0	pCi/L	95% Approximate Gamma UCL	6.84E-01	6.29E-08	2%
	Uranium 238 Activity	0.9	pCi/L	95% Approximate Gamma UCL	7.44E-01	1.21E-06	33%
	Total					5.28E-06	143%
Non-drinking Water Aquifer Monitoring Wells	Radium 226 Activity	0.3	pCi/L	Too Few Unique Detected Values *	8.23E-04	3.69E-04	97%
	Total Uranium Activity	5.8	pCi/L	95% KM (t) UCL	NA		
	Uranium 234 Activity	3.9	pCi/L	95% KM (t) UCL	6.74E-01	5.73E-06	2%
	Uranium 235 Activity	0.16	pCi/L	95% KM (Chebyshev) UCL	6.84E-01	2.34E-07	0%
	Uranium 238 Activity	3.41	pCi/L	95% KM (Chebyshev) UCL	7.44E-01	4.58E-06	1%
	Total					3.80E-04	3%

Table 6-12
Summary of Screening Level Groundwater Cancer Risks and Noncancer Hazards – Radionuclides
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Location	Chemical of Potential Concern	Exposure Point Concentration	Units	Basis of EPC	EPA PRG (cancer) [pCi/L]	Cancer Risk	Percent Contribution (cancer)
Hayden Library	Total Uranium Activity	2.5	pCi/L	Maximum Result	NA		
	Uranium 234 Activity	1.6	pCi/L	Maximum Result	6.74E-01	2.37E-06	65%
	Uranium 238 Activity	0.9	pCi/L	Maximum Result	7.44E-01	1.21E-06	33%
	Uranium 235 Activity	0.04	pCi/L	Maximum Result	6.84E-01	5.85E-08	2%
	Total					3.64E-06	100%
Winkelman School	Total Uranium Activity	3.1	pCi/L	Maximum Result	NA		
	Uranium 234 Activity	2.2	pCi/L	Maximum Result	6.74E-01	3.26E-06	74%
	Uranium 238 Activity	0.8	pCi/L	Maximum Result	7.44E-01	1.08E-06	24%
	Uranium 235 Activity	0.038	pCi/L	Maximum Result	6.84E-01	5.56E-08	1%
	Total					4.39E-06	100%

Table 6-13
Summary of Surface Water Cancer Risks and Noncancer Hazards - Recreational Scenario (Swimmer)
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Exposure Media	Receptor	COPC	RME Medium EPC Value (ug/L)	Carcinogenic Risk Total	Noncarcinogenic HI Total
Surface Water	**Adult Swimmer**	Aluminum	2.22E+04		5.1E-03
		Arsenic	9.77E+00	1.1E-06	7.4E-03
		Iron	1.91E+04		1.5E-02
		Manganese	2.49E+03		2.4E-02
		Vanadium	2.89E+01		6.6E-03
		Total		1E-06	0.06
	Child Swimmer	Aluminum	2.22E+04		1.2E-02
		Arsenic	9.77E+00	6.5E-07	1.7E-02
		Iron	1.91E+04		3.3E-02
		Manganese	2.49E+03		5.4E-02
		Vanadium	2.89E+01		1.5E-02
		Total		7E-07	0.1
	Adult/Child Swimmer	Aluminum	2.22E+04		
		Arsenic	9.77E+00	1.8E-06	
		Iron	1.91E+04		
		Manganese	2.49E+03		
		Vanadium	2.89E+01		
		Total		2E-06	NA

Notes:
NA = Not applicable

Table 6-14
Summary of Sediment Cancer Risks and Noncancer Hazards and Comparison to Site Specific Lead Screening Levels - Recreational Scenario (A
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

Exposure Media	Receptor	COPC	RME Medium EPC Value (mg/kg)	Carcinogenic Risk Total	Noncarcinogenic HI Total
In Stream Sediment	**Adult Angler**	Arsenic	4.21E+00	7.8E-07	5.1E-03
		Copper	1.49E+02		1.5E-03
		Iron	1.94E+04		2.6E-02
		Manganese	9.73E+02		2.8E-02
		Vanadium	4.30E+01		1.8E-02
		Total		8E-07	0.08
	Child Angler	Arsenic	4.21E+00	9.4E-07	2.4E-02
		Copper	1.49E+02		7.5E-03
		Iron	1.94E+04		1.3E-01
		Manganese	9.73E+02		1.4E-01
		Vanadium	4.30E+01		8.6E-02
		Total		9E-07	0.4
	Adult/Child Angler	Arsenic	4.21E+00	1.7E-06	
		Copper	1.49E+02		
		Iron	1.94E+04		
		Manganese	9.73E+02		
		Vanadium	4.30E+01		
		Total		2E-06	NA
	Lead Screening		**Lead EPC Value (mg/kg)**	**Does Lead Concentration Exceed Screening Level of 212 mg/kg (excluding homegrown produce)?**	**Does Lead Concentration Exceed Screening Level of 122 mg/kg (including homegrown produce)?**
			16	No	No

Notes:
NA = Not applicable

Table 6-15
Comparison of Indoor Dust, Attic Dust, Surface Soil Statistics and Entry Way Soil Sample Arsenic Results
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

		Attic		Indoor		Surface Soil Statistics	Front Entry Way Soil Sample			Additional Front Entry Way Soil Sample			Additional Side/Back Entry Way Sample		
Parcel	Units	Result	Qual	Result	Qual	95% UCL	SubArea	Result	Qual	SubArea	Result	Qual	SubArea	Result	Qual
Hayden															
101-07-029	mg/kg	127		45.8		51.9	B	46.1	J-	NA	NA		E	40	J-
101-07-040	mg/kg	NA		44.6		54.5	H	22	J-	NA	NA		C	29.8	J-
101-07-046	mg/kg	92.8		8.5		20.3	I	10.6	J-	NA	NA		NA	NA	
101-07-047	mg/kg	NA		43.7		42.3	A	41.1	J-	NA	NA		I	42.1	
101-07-052	mg/kg	NA		31.3		36.6	C	13.8	J-	NA	NA		NA	NA	
101-07-061	mg/kg	259		94		27.6	C	14.4	J-	NA	NA		NA	NA	
101-07-089T	mg/kg	NA		49.7		540	E	32.4		NA	NA		NA	NA	
101-07-099	mg/kg	NA		119		58	G	91.9	J-	NA	NA		NA	NA	
101-07-111	mg/kg	126		209		15.3	C	7.6	J-	NA	NA		NA	NA	
101-07-117	mg/kg	NA		39.6		36	E	16.9	J-	NA	NA		B	41.2	J-
101-07-149	mg/kg	NA		8.3		20.8	D	18.2	J-	B	33.6	J-	NA	NA	
101-07-177	mg/kg	NA		10		NA	NA	NA		NA	NA		NA	NA	
101-09-070	mg/kg	45		19.1		25.9	C	19.1		NA	NA		H	20.1	J-
101-09-077	mg/kg	71.1		75.5		45.7	E	38.4	J-	NA	NA		NA	NA	
101-09-104	mg/kg	78.1		43		42.9	G	23.6	J-	NA	NA		E	53.4	J-
101-09-106	mg/kg	147		30.6		52.4	G	37.3	J-	NA	NA		NA	NA	
101-09-111B	mg/kg	NA		170		60.5	E	34	J-	NA	NA		F	79.9	J-
101-09-137	mg/kg	207		60.4		30.8	NA	NA		NA	NA		NA	NA	
Winkelman															
101-12-093	mg/kg	NA		10.2		7.43	G	7.4	J-	NA	NA		NA	NA	
101-12-136	mg/kg	NA		3.9		4.97	G	4.5	J-	NA	NA		NA	NA	
101-12-147A	mg/kg	16.4		4.9		6.08	B	3.3	J-	NA	NA		NA	NA	
101-12-241	mg/kg	54		5		4.83	C	2.9		I	6.3	J-	NA	NA	

The maximum concentration between field duplicates and primary samples was used.

Color Key

- 1 to 10 mg/kg arsenic
- 10.1 to 25.9 mg/kg arsenic
- 26 to 47.9 mg/kg arsenic
- greater than 48 mg/kg arsenic

Table 6-16
Comparison of Indoor Dust, Attic Dust, Surface Soil Statistics and Entry Way Soil Sample Copper Results
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

		Attic		Indoor		Surface Soil Statistics	Front Entry Way Soil Sample			Additional Front Entry Way Soil Sample			Additional Side/Back Entry Way Sample		
Parcel	Units	Result	Qual	Result	Qual	95% UCL	SubArea	Result	Qual	SubArea	Result	Qual	SubArea	Result	Qual
Hayden															
101-07-029	mg/kg	29,700		10,200		12,100	B	10,800	J-	NA	NA		E	9,790	J-
101-07-040	mg/kg	NA		16,700		23,400	H	7,400	J-	NA	NA		C	18,100	J-
101-07-046	mg/kg	18,100		2,200		4,330	I	2,790	J-	NA	NA		NA	NA	
101-07-047	mg/kg	NA		6,670		10,500	A	9,540	J-	NA	NA		I	9,960	
101-07-052	mg/kg	NA		10,400		11,400	C	4,220	J-	NA	NA		NA	NA	
101-07-061	mg/kg	34,600		14,000		5,680	C	3,030	J-	NA	NA		NA	NA	
101-07-089T	mg/kg	NA		15,300		19,500	E	15,600		NA	NA		NA	NA	
101-07-099	mg/kg	NA		29,100		14,800	G	16,800		NA	NA		NA	NA	
101-07-111	mg/kg	32,200		28,800		6,400	C	2,350	J-	NA	NA		NA	NA	
101-07-117	mg/kg	NA		8,840		11,300	E	2,580	J-	NA	NA		B	13,800	J-
101-07-149	mg/kg	NA		1,420		5,660	D	3,680	J-	B	10,300	J-	NA	NA	
101-07-177	mg/kg	NA		1,540		NA	NA	NA		NA	NA		NA	NA	
101-09-070	mg/kg	7,980		4,300		8,510	C	3,420		NA	NA		H	3,830	J-
101-09-077	mg/kg	10,100		15,000		6,550	E	7,380	J-	NA	NA		NA	NA	
101-09-104	mg/kg	10,600		7,970		12,700	G	5,630	J-	NA	NA		E	19,700	J-
101-09-106	mg/kg	21,200		12,400		12,000	G	11,600	J-	NA	NA		NA	NA	
101-09-111B	mg/kg	NA		37,000		13,800	E	6,310	J-	NA	NA		F	18,200	J-
101-09-137	mg/kg	27,000		18,300		5,570	NA	NA		NA	NA		NA	NA	
Winkelman															
101-12-093	mg/kg	NA		915		1,040	G	499	J-	NA	NA		NA	NA	
101-12-136	mg/kg	NA		476		396	G	262	J-	NA	NA		NA	NA	
101-12-147A	mg/kg	1,910		803		631	B	416	J-	NA	NA		NA	NA	
101-12-241	mg/kg	1,620		643		374	C	174		I	477	J-	NA	NA	

The maximum concentration between field duplicates and primary samples was used.

Color Key

- 0 to 3,100 mg/kg copper
- 3,101 to 8,699 mg/kg copper
- 8,700 to 17,100 mg/kg copper
- greater than 17,100 mg/kg copper

Table 6-17
Comparison of Indoor Dust, Attic Dust, Surface Soil Statistics and Entry Way Soil Sample Lead Results
Baseline Human Health Risk Assesment
ASARCO LLC Hayden Plant Site, Hayden, Arizona

		Attic		Indoor		Surface Soil Statistics	Front Entry Way Soil Sample			Additional Front Entry Way Soil Sample			Additional Side/Back Entry Way Sample		
Parcel	Units	Result	Qual	Result	Qual	95% UCL	SubArea	Result	Qual	SubArea	Result	Qual	SubArea	Result	Qual
Hayden															
101-07-029	mg/kg	598		295		483	B	249	J-	NA	NA		E	691	J-
101-07-040	mg/kg	NA		192		217	H	58.9	J-	NA	NA		C	83.8	J-
101-07-046	mg/kg	1,640	J	88,600	J	734	I	978	J-	NA	NA		NA	NA	
101-07-047	mg/kg	NA		816	J	755	A	351	J-	NA	NA		I	908	J
101-07-052	mg/kg	NA		193	J	237	C	78.6	J-	NA	NA		NA	NA	
101-07-061	mg/kg	1,100	J	475	J	210	C	67.1	J-	NA	NA		NA	NA	
101-07-089T	mg/kg	NA		186	J	265	E	109	J	NA	NA		NA	NA	
101-07-099	mg/kg	NA		329	J	406	G	303		NA	NA		NA	NA	
101-07-111	mg/kg	499	J	827	J	100	C	19.2	J-	NA	NA		NA	NA	
101-07-117	mg/kg	NA		164	J	312	E	53.4	J-	NA	NA		B	389	J-
101-07-149	mg/kg	NA		107	J	252	D	289	J-	B	424	J-	NA	NA	
101-07-177	mg/kg	NA		41.7		NA	NA	NA		NA	NA		NA	NA	
101-09-070	mg/kg	521	J	54,400	J	3,030	C	312		NA	NA		H	306	J-
101-09-077	mg/kg	620	J	6,050	J	7,250	E	533	J-	NA	NA		NA	NA	
101-09-104	mg/kg	546	J	216	J	471	G	143	J-	NA	NA		E	639	J-
101-09-106	mg/kg	705		1,700		1,350	G	290	J-	NA	NA		NA	NA	
101-09-111B	mg/kg	NA		505	J	385	E	198	J-	NA	NA		F	337	J-
101-09-137	mg/kg	762		187		105	NA	NA		NA	NA		NA	NA	
Winkelman															
101-12-093	mg/kg	NA		227	J	101	G	51.1	J-	NA	NA		NA	NA	
101-12-136	mg/kg	NA		51		65	G	42.7	J-	NA	NA		NA	NA	
101-12-147A	mg/kg	95.2		66.9		133	B	45.4	J-	NA	NA		NA	NA	
101-12-241	mg/kg	161		64.5		60.3	C	19.2		I	126	J-	NA	NA	

The maximum concentration between field duplicates and primary samples was used.

Color Key

- 0 to 212 mg/kg Lead
- 213 to 400 mg/kg Lead
- 401 to 1,199 mg/kg Lead
- 1,200 to 2,400 mg/kg Lead
- greater than 2,400 mg/kg Lead

Table 6-18
Hayden, Multi-Pathway Cumulative Cancer Risks
Baseline Human Health Risk Assessment
Asarco LLC Hayden Plant Site, Hayden, Arizona

Hayden Background Soil plus Background Air (Organ Pipe)

Soil or Air	Adult plus Child Cancer Risks
Hayden Background Soil (Arsenic 12.5 mg/kg)	3E-05
Background Air (Organ Pipe)	6E-06
Total	3E-05

Soil (Arsenic 26 mg/kg) plus Hayden Ambient Air

Soil or Air	Adult plus Child Cancer Risks
Soil (Arsenic 26 mg/kg)	5E-05
Ambient Air	1E-04
Total	2E-04

Soil (Arsenic 132 mg/kg) plus Hayden Ambient Air

Soil or Air	Adult plus Child Cancer Risks
Soil (Arsenic 132 mg/kg)	3E-04
Ambient Air	1E-04
Total	4E-04

Table 6-19
Winkelman, Multi-Pathway Cumulative Cancer Risks
Baseline Human Health Risk Assessment
Asarco LLC Hayden Plant Site, Hayden, Arizona

Winkelman Background Soil plus Background Air (Organ Pipe)

Soil or Air	Adult plus Child Cancer Risks
Winkelman Background Soil (Arsenic 9.1 mg/kg)	2E-05
Background Air (Organ Pipe)	6E-06
Total	3E-05

Soil (Arsenic 20 mg/kg) plus Winkelman Ambient Air

Soil or Air	Adult plus Child Cancer Risks
Soil (Arsenic 20 mg/kg)	4E-05
Ambient Air	4E-05
Total	8E-05

Soil (Arsenic 112 mg/kg) plus Winkelman Ambient Air

Soil or Air	Adult plus Child Cancer Risks
Soil (Arsenic 112 mg/kg)	2E-04
Ambient Air	4E-05
Total	2E-04