Tables

Table 1 Ajax/Magnolia Surface Water Analytical Results

			TAL Metals, µg/L																			
		Sample No.	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	CALCIUM	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SODIUM	THALLIUM	VANADIUM	ZINC
Adits	MAGN	AD-SFW-13	33.5B	<4.7U	**61.6**	**21.1B**	**132000**	<1.4U	11.1B	<2.4U	**955**	<1.3U	68700	**1690**	<0.1U	**64.7**	4800B	<1.7U	5780	**4.3B**	<2U	26.1
		AD-SFW-55	57.2B	<4.7U	<4.8U	**42.8B**	21500	<1.4U	<2U	4.6B	<16.8U	<1.3U	10600	36.1	<0.1U	<2.1U	1480B	<1.7U	6360	<2.8U	<2U	4.6B
	AJAX	AD-SFW-07	**907**	4.5B	**41.9**	**29.5B**	109000	<0.6U	13.3B	10.3B	**10500**	**4.4**	59500	**1590**	**0.48**	**41.6**	3860B	**1.8B**	5200	<2.8U	2.2B	83
Stream Samples	MAGN	ST-SFW-01	30.2B	4.1B	<2.4U	**55.2B**	28200	<0.6U	<1.8U	<1.4U	38.8B	<1.5U	12800	3.3B	**0.1B**	<2U	2420B	**2.4B**	6480	<2.8U	<2.2U	<5.7U
		ST-SFW-02	29.1B	5.6B	**29.7**	**62.3B**	40500	<0.6U	<1.8U	<1.4U	102	<1.5U	18500	21.2	<0.1U	<2U	2780B	<1.7U	6230	<2.8U	<2.2U	<5.7U
		ST-SFW-03	33.4B	<4.7U	**28.2**	**71.7B**	41900	<1.4U	<2U	<2.4U	112	<1.3U	19300	4.7B	<0.1U	<2.1U	2400B	<1.7U	6100	**3.1B**	<2U	3.3B
	AJAX	ST-SFW-04	28.2B	4.2B	**22.9**	**70.2B**	41000	<0.6U	<1.8U	2.1B	90.2B	**2B**	18800	8.6B	**0.11B**	<2U	2530B	<1.7U	6700	<2.8U	2.5B	<5.7U
		ST-SFW-52	83.1B	<3.8U	**63.6**	**26.7B**	111000	<0.6U	<1.8U	<1.4U	**1230**	<1.3U	58800	**136**	**0.16B**	<2U	4440B	<1.7U	5420	<2.8U	<2.2U	7.5B
	GRAN	ST-SFW-53	79.3B	<4.7U	**13.1**	**55B**	15300	<1.4U	<2U	<2.4U	<16.8U	<1.3U	3540B	10.3B	**0.2B**	<2.1U	1870B	<1.7U	3380B	<2.8U	<2U	3.1B
		ST-SFW-54	26.4B	<3.8U	**9.6B**	**51B**	15900	0.74B	<1.8U	<1.4U	32.3B	<1.3U	4040B	6.7B	**0.1B**	<2U	2490B	<1.7U	3650B	<2.8U	<2.2U	<5.7U
Ponds	MAGN	PD-SFW-11	29.4B	<4.7U	**7.7B**	**15.8B**	**134000**	<1.4U	5.2B	<2.4U	**484**	<1.3U	69800	**880**	**0.16B**	**43**	4750B	<1.7U	5870	<2.8U	<2U	11.9B
	AJAX	PD-SFW-06	30.6B	<3.8U	<2.4U	**9.8B**	106000	<0.6U	<1.8U	<1.4U	<16.8U	2.3B	58400	**95.9**	**0.12B**	5B	3480B	<1.7U	5240	<2.8U	<2.2U	<5.7U
Comparison	Criteria	EPA-Ecological	87	30	150	4	NA	71.8 314.7	23	13.2 61.5	1000	0.8 5.2	NA	120	0.77	56.7 260.9	NA	5	NA	12	20	113.6 523.8
		EPA-Human Health	NA	5.6	0.018	1000	NA	NA	NA	1300	300	NA	NA	50	NA	610	NA	170	NA	1.7	NA	7400
		Oak Ridge PRG	87	30	NA	4	NA	11	23	12	1000	3.2	NA	120	1.3	160	NA	0.39	NA	9	20	110
		OR-Ecological	87	1600	NA	4	116000	83.5 365.9	23	13.2 61.5	1000	1.0 10.1	82000	120	0.012	56.9 261.7	53000	5	680000	40	20	115.2 531.2
		OR-Human Health	NA	146	0.022	1000	NA	50	NA	NA	300	50	NA	50	0.144	13.4	NA	10	NA	13	NA	NA

Table 1 Ajax/Magnolia Surface Water Analytical Results, continued

			Laboratory General Chemistry										Field Parameters								
		Sample No.	ALKALINITY, BICARBONATE MG/L	CONDUCTANCE UMHOS/CM	HARDNESS MG/L	PH PH UNITS	REDOX POTENTIAL MV	SULFATE MG/L	SUSPENDED SOLIDS, TOTAL MG/L	SUSPENDED SOLIDS, VOLATILE MG/L	TOTAL ALKALINITY MG/L	TOTAL DISSOLVED SOLIDS MG/L	CHROMIUM, HEXAVALENT MG/L	CURRENT VELOCITY FT/SEC	DEPTH FT	DISSOLVED OXYGEN MG/L	PH PH UNITS	REDOX POTENTIAL MV	SPECIFIC CONDUCTANCE µS/CM³	TEMPERATURE DEG C	TURBIDITY NTU
Adits	MAGN	AD-SFW-13	230	906	680	7	193	637	28.7	<5U	230	**841**	0	0.08	2	**5.8**	7.33	-6.3	1019	7.77	92
		AD-SFW-55	111	180	112	7.3	186	16.8	90.5	7.1	111	128	0.01	0	0.42	8.14	7.98	-6.1	205	11.6	24.1
	AJAX	AD-SFW-07	166	758	512	7.9	169.5	380	69	<5U	166	**692**	0	0.35	0.04	11.62	7.94	34.5	873	8.93	584
Stream Samples	MAGN	ST-SFW-01	142	215	260	8	164	5.2	0.9	<5U	142	169	0.02	0	0.5	9.81	8.17	28.9	245	14.7	0.14
		ST-SFW-02	139	318	156	8.1	167.5	69.3	5.2	<5U	139	**252**	0.01	0	0.17	9.66	8.42	21.2	359	14.74	0.87
		ST-SFW-03	137	315	188	8	161	57.3	0.9	<5U	137	**256**	0.01	0.03	0.33	9.82	8.7	7.1	353	14.4	0.75
	AJAX	ST-SFW-04	137	307	224	8.1	152	58.6	3.1	<5U	137	**260**	0.01	0.03	0.29	9.39	8.65	28.5	355	16.01	0.87
		ST-SFW-52	176	761	524	7.5	184	320	36	9.7	176	**733**	0	NA	0.08	**3.86**	7.84	58.6	861	15.35	39.1
	GRAN	ST-SFW-53	46.9	108	80	7.6	184	14.8	7.2	<5U	46.9	100	0	0.03	0.58	10.2	7.81	78.4	122	14.96	0.58
		ST-SFW-54	51.2	112	104	7.7	181	15.3	5	<5U	51.2	116	0	0.08	0.83	10.58	8.49	-7.5	133	14.04	5
Ponds	MAGN	PD-SFW-11	226	899	680	8	167	391	0.8	<5U	226	**772**	0.01	NA	2	9.71	8.3	38.1	1019	18	1.17
	AJAX	PD-SFW-06	170	760	524	8.1	164.5	350	4.1	<5U	170	**700**	0.01	NA	0.42	11.13	8.57	83.6	880	18.91	2.72
Comparison	Criteria	EPA-Ecological			>20	6.5-9			NA			NA				8	6.5-9				
		EPA-Human Health			NA	5-9			NA			250				NA	5-9				
		Oak Ridge PRG			NA	NA			NA			NA				NA	NA				
		OR-Ecological			NA	6.5-9			NA			500				6-11	6.5-9				
		OR-Human Health			NA	NA			NA			NA				NA	NA				

Table 1 Ajax/Magnolia Surface Water Analytical Results, continued

Notes

- **Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.**
- Cyanide (total) was anaylzed for but not detected in any sample.
- All alkalinity was contributed by bicarbonate: carbonate and hydroxide were not detected in any samples.
- The following dissolved metals were analyzed for but not detected in any sample: beryllium, cadmium and silver.
- There were no comparison criteria for total chromium (Cr); therefore, the most conservative criteria, for Cr 6, were used.
- Hardness-based criteria for cadmium, chromium III, copper, lead, nickel, silver, and zinc were calculated for each sample. The range of calculated criteria is indicated, the top number indicating the lowest and the bottom number the highest.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).
NA = Not available.

Empty cells in the table indicate no data.

Units:

DEG C	=	Degrees celcius	MV	=	Millivolts
FT	=	Feet	NTU	=	Nephelometric turbidity units
FT/SEC	=	Feet per second	UG/L	=	Micrograms per liter
MG/L	=	Milligrams per liter	UMHOS/CM	=	Micro MHOS per centimeter'
µS/CM³	=	Microsiemens per cubic centimeter			

Comparison Criteria

Oregon Ecological - Criteria are the lowest of:
- ODEQ Water Quality Criteria, Protection of Aquatic Life, Fresh Chronic Criteria (OAR 340-041-001), or
- ODEQ (1998b) Guidance for Ecological Risk Assessment, Level II Screening Values for surface water.

EPA Ecological - Criteria are the lowest of:
- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, chronic; hardness dependent values were calculated for each sample, or
- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, Tier II secondary chronic values calculated by Oak RidgeNational Laboratory (Suter & Tsao 1996).

Oak Ridge PRGs - Oak Ridge National Laboratory Preliminary Remediation Goals (Efroymson et al 1997c).
Oregon Human Health - ODEQ Water Quality Criteria, Protection of Human Health, Water and Fish Ingestion (OAR-340-041-001).
EPA Human Health - USEPA (2002) recommended ambient water quality criteria for protection of human consumption of fish; hardness dependent values were calculated for each sample, the range of values is indicated.

Table 2 Ajax/Magnolia Pore Water Analytical Results

			TAL Metals, µg/L													Field Parameters						
		Sample No.	ALUMINUM	ARSENIC	BARIUM	CALCIUM	CHROMIUM, TOTAL	IRON	MAGNESIUM	MANGANESE	MERCURY	POTASSIUM	SODIUM	THALLIUM	ZINC	CHROMIUM, HEXAVALENT MG/L	DISSOLVED OXYGEN MG/L	PH PH UNITS	REDOX POTENTIAL MV	SPECIFIC CONDUCTANCE µS/CM³	TEMPERATURE DEG C	TURBIDITY NTU
Stream Samples	MAGN	ST-PWP-01	60.7B	<2.4U	**74.4B**	29200	2.1B	40.4B	12500	4B	**0.11B**	2150B	6550	<2.8U	<5.7U	0.01	8.75	8.1	34.2	255	16.6	579
		ST-PWP-02	<23.6U	26.2	**76B**	41800	<1.4U	65.2B	19300	8.6B	**0.19B**	2380B	6400	<2.8U	9.7B	0	8.6	8.4	16.2	359	16.15	47.2
		ST-PWP-03	<23.6U	27.3	**74.2B**	41700	<1.4U	86.9B	19200	3.7B	**0.14B**	2470B	6320	<2.8U	8.5B	0	8.21	8.58	5.6	355	16.1	21
	AJAX	ST-PWP-04	28B	11.5	**84.1B**	44200	<1.4U	34.9B	20000	15.2	<0.1U	2480B	7420	<5.7U	5B	0.01	**5.81**	8.11	59.4	370	17.83	601
	GRAN	ST-PWP-53	60.5B	16.7	**47.6B**	15500	<1.4U	23.3B	3580B	4B	<0.1U	2000B	3420B	4.1B	5.9B	0.00	9.35	8.2	83.9	124	15.9	61.8
		ST-PWP-54	45.7B	13.2	**45.9B**	16700	<1.4U	<16.8U	4440B	4.4B	**0.12B**	1830B	3540B	<2.8U	5.4B	0	10.79	8.45	10.2	138	12.08	176
Comparison	Criteria	EPA-Ecological	87	150	4	NA	71.8 314.7	1000	NA	120	0.77	NA	NA	12	113.6 523.8		8	6.5-9				
		Oak Ridge PRG	87	NA	4	NA	11	1000	NA	120	1.3	NA	NA	12	110		NA	NA				
		OR-Ecological	87	NA	4	116000	83.5 365.9	1000	82000	120	0.012	53000	680000	40	115.2 531.2		6-11	6.5-9				

Table 2 Ajax/Magnolia Pore Water Analytical Results, continued

Notes

- **Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.**
- Cyanide (total) was anaylzed for but not detected in any sample.
- All alkalinity was contributed by bicarbonate; carbonate and hydroxide were not detected in any samples.
- The following dissolved metals were analyzed for but not detected in any sample: antimony, beryllium, cadmium, cobalt, copper, lead, nickel, selenium, silver, and vanadium.
- There were no comparison criteria for total chromium (Cr); therefore, the most conservative criteria, for Cr 6, were used.
- Hardness-based criteria for cadmium, chromium III, copper, lead, nickel, silver, and zinc were calculated for each sample. The range of calculated criteria is indicated, the top number indicating the lowest and the bottom number the highest.

U = Analyte was analyzed for but not detected.
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EPA Ecological - Criteria are the lowest of:
- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, chronic; hardness dependent
- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, Tier II secondary chronic

Oak Ridge PRGs - Oak Ridge National Laboratory Preliminary Remediation Goals (Efroymson et al 1997c).

Oregon Human Health - ODEQ Water Quality Criteria, Protection of Human Health, Water and Fish Ingestion (OAR-340-041-001).
EPA Human Health - USEPA (2002) recommended ambient water quality criteria for protection of human consumption of fish; hardness dependent values were calculated for each sample, the range of values is indicated.

Table 3 Ajax/Magnolia Sediment Analytical Results

			TAL Metals and Cyanide, mg/kg																							
		Sample No.	CYANIDE	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	VANADIUM	ZINC
Stream Samples	MAGN	ST-PSD-01	<0.64U	14900	<0.46U	1.3	502	0.44B	<0.059U	5500	14.9	9.6	14.3	20700	3.8	3910	424	0.02B	**24.3**	394B	0.48B	<0.21U	764	<0.56U	34.2	21.8
		ST-PSD-02	<0.7U	1550	2.6B	**121**	40.2	0.65	0.16B	923	**51.7**	3.1B	**36.1**	23200	4.6	1010	319	**1.4**	6.6	848	0.45B	**3.6**	74.8B	0.99B	62.2	50.3
		ST-PSD-03	<0.55U	4750	**5.1B**	**742**	188	0.42B	**0.74**	2000	11.6	59.5	**32.8**	42100	**54.1**	1060	**1920**	**1.1**	**131**	1300	1.6	**1.2**	65.3B	0.84B	29.4	**140**
	AJAX	ST-PSD-04	<0.48U	10300	**3.4B**	**326**	233	0.71	**1.2**	7350	19.5	18.1	**80.4**	36500	**69.4**	5360	**2570**	**0.51**	**43.8**	2560	1.3	**2.2**	287B	<0.65U	39.4	**180**
		ST-RSD-04	<0.59U	9950	1.5B	**631**	263	0.76	0.58	13800	18.5	18	**36.9**	44500	26.3	8630	**2600**	**0.42**	**29.6**	2830	0.85	**1.3**	132B	<0.62U	50	120
		ST-SSD-52	<4U	16800	**12.2B**	**2800**	268	0.96B	**5.3**	16500	21	28.3B	**105**	134000	**42.5**	5490	**3480**	**1**	**161**	3250B	6.9	**2.6B**	599B	<4U	57.3	**705**
	GRAN	ST-PSD-53	<0.57U	10200	2B	**130**	139	0.24B	**0.96**	2180	10.4	6.9	18.1	21600	**38.2**	4790	364	0.11	6.2	2840	0.44B	**1.8**	<45.2U	0.69B	52.1	**150**
		ST-PSD-54	<0.59U	8910	**5.1B**	**303**	144	0.26B	**2.8**	2740	10.9	6.5	**28**	18900	**148**	3460	611	**0.32**	7.6	2400	0.8	**7.9**	70.2B	<0.67U	43	**186**
		ST-RSD-53	<0.6U	9670	2.3B	**126**	127	0.25B	**1.2**	2230	9.9	6.2	18.6	19000	**44.3**	4030	360	0.12	6.5	2550	0.42B	**4.9**	<45.9U	0.73B	45.9	**148**
		ST-RSD-54	<0.57U	7770	**5.1B**	**246**	126	0.21B	**1.8**	1750	8.3	6.4	**30**	18300	**121**	3380	560	0.12	7.3	2340	0.63	**6.3**	79.5B	0.76B	38.3	**151**
Ponds	MAGN	PD-SSD-11	<3.3U	46500	**6.5B**	**2190**	200	3.8	**3.6**	11000	**54.9**	54.9	**461**	136000	23.2	7110	**2750**	**1.2**	**159**	5430	2.6B	**2.3B**	<263U	5.5B	90.2	**515**
	AJAX	PD-SSD-06	2.9	5190	**5.2B**	**1020**	309	1.5	**9.3**	33300	4.4	254	**316**	319000	27.9	3530	**40600**	**0.76**	**860**	892B	11.6	<0.6U	<129U	<15.6U	17.8	**1660**
Comparison	Criteria	ER-L		NA	NA	8.2	NA	NA	1.2	NA	81	NA	34	NA	47	NA	NA	0.15	21	NA	NA	1	NA	NA	NA	150
		ER-M		NA	NA	70	NA	NA	9.6	NA	370	NA	270	NA	218	NA	NA	0.71	51.6	NA	NA	3.7	NA	NA	NA	410
		OR		NA	3	NA	NA	NA	0.6	NA	37	NA	36	NA	35	NA	1100	0.2	18	NA	NA	4.5	NA	NA	NA	123
		PEL		NA	NA	41.6	NA	NA	4.21	NA	160	NA	108	NA	112	NA	NA	0.696	42.8	NA	NA	1.77	NA	NA	NA	271
		TEL		NA	NA	7.24	NA	NA	0.676	NA	52.3	NA	18.7	NA	30.2	NA	NA	0.13	15.9	NA	NA	0.733	NA	NA	NA	124

Table 3 Ajax/Magnolia Sediment Analytical Results, continued

			Lab	Grain Size, percent						Clay Minerals. percent								
		Sample No.	TOC LLOYD KHAN MG/KG	GRAVEL %	SAND, COARSE %	SAND, FINE %	SAND, MEDIUM %	SILT %	CLAY %	<4µ WEIGHT% %	AMPHIBOLE %	CHLORITE %	GOETHITE %	ILLITE & MICA %	KAOLINITE %	PLAGIOCLASE %	QUARTZ %	SMECTITE %
Stream Samples	MAGN	ST-PSD-01	5130	36.6	27	6.8	23.9	3.4	2.3	2.92	9.59	0	0	4.53	0	29.73	0	56.16
		ST-PSD-02	12400	37.8	22.2	7	27.1	2.9	3	2.93	3.9	0.5	0	21.65	24.37	4.37	9.06	36.17
		ST-PSD-03	6040	54.8	24.3	3.8	12.4	2	2.6	1.96	8.84	0.63	0	23.98	16.21	2.89	8.25	39.2
	AJAX	ST-PSD-04	3840	33.1	21.4	11.3	22.4	9.4	2.4	2.37	5.86	0	0	15.43	15.04	11.14	35.82	16.71
		ST-RSD-04	15500	24.4	24.7	7.3	28.6	13.4	1.6									
		ST-SSD-52	119900	19.3	12.8	12.8	7.6	29.8	17.6	3.22	5.88	0	0	35.46	14.36	8.12	32.38	3.8
	GRAN	ST-PSD-53	2670	8.8	12.2	28.3	42.1	5.1	3.5									
		ST-PSD-54	27700	1.1	6.9	45.7	37.5	4.3	4.6									
		ST-RSD-53	6750	14.7	8.7	36.2	34.2	3.8	2.2									
		ST-RSD-54	<121U	7.4	11.8	28.1	48.3	2	2.4									
Ponds	MAGN	PD-SSD-11	11200	0	0	3.9	3.1	50.8	42.1	13.21	4.54	0.53	0	35.58	29.78	2.7	5.81	21.06
	AJAX	PD-SSD-06	17200	0	0.1	11.8	2.4	42.4	43.3	28.33	0	13.06	20.01	51.29	0	0	0	15.64

Table 3 Ajax/Magnolia Sediment Analytical Results, continued

Notes

Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).
NA = Not available.
Empty cells in the table indicate no data.

Units:
MG/KG = Milligrams per kilogram

Comparison Criteria

- Threshold Effects Level (TEL) and Probable Effects Level (PEL) from USEPA National Sediment Quality Survey, Screening Values for Chemicals Evaluated, http://www.epa.gov/waterscience/cs/vol1/appdx_d.pdf.
- Effects Range-Low (ER-L) and Effects Range-Medium (ER-M), National Oceanic and Atmospheric Administration (NOAA), from USEPA (1997) National Sediment Quality Survey, Screening Values for Chemicals Evaluated.
- ODEQ (1998) Guidance for Ecological Risk Assessment, Level II Screening Values for freshwater sediment (there was no criterion for total arsenic; therefore, the most conservative criterion, for arsenic 3, was used).

Oak Ridge National Laboratory values are not included; they are compiled from TEL and ER-L values, and USEPA Assessment and Remediation of Contaminated Sediment (ARCS) program values which exceed TELs.

Sediment samples analyzed for clay minerology were collected in pool habitat only.

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results

			TAL Metals, mg/kg																								
		Sample No.	CYANIDE	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM, HEXAVALENT	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	VANADIUM	ZINC
Background	GRAN	BG-SSS-34(0.5)	<0.63U	**26400**	<0.38U	**3.4**	**187**	**0.72**	0.35B	1130		**5.7**	5.5	8.9	10800	3.8	880	**429**	**0.032B**	5.2	848	**0.61**	0.28B	1220	<0.28U	**24.9**	**50.2**
		BG-SSS-35(0.5)	<0.68U	**31200**	<0.4U	**5.5**	**268**	**1**	0.54	2110		**6.2**	6.7	15.4	12400	5.9	1560	**156**	**0.035B**	5.6	1140	**0.42B**	0.62B	1450	<0.29U	**26.5**	**43.2**
		BG-SSS-36(0.5)	<0.55U	**19400**	<0.33U	**11.4**	**319**	**0.55**	<0.026U	2080		**27.4**	10.2	11	17700	6.3	4930	**610**	**0.027B**	23.4	3920	**0.24B**	0.48B	1180	<0.24U	**47.2**	**61.3**
	LUCA	BG-SSS-19(0.5)	<0.54U	**24400**	0.84B	**4.5**	**288**	**1.2**	0.43B	1830	<2.2U	**31.3**	11.3	30.7	24600	8.4	2630	**837**	**0.14**	23.4	1570	**0.76**	0.26B	806	0.97	**47.8**	**105**
On Site	MAGN	PD-SSS-12(0.3)	4.9	**14000**	**17.1**	**3730**	**273**	**3.4**	**16.9**	19200	<5.7U	**22**	**301**	**310**	**139000**	**151**	4540	**34300**	**9**	**888**	3180	**11.6**	**12.1**	<54.2U	**36.3**	**34.2**	**1620**
		TA-SSS-15(0.5)	<0.53U	**3300**	**17.6**	**828**	72.5	**0.18B**	0.56	821	<2.2U	**5**	3.6B	35.4	24700	**524**	1060	**130**	**9.4**	6.7	2280	**3.7**	**37.2**	152B	**1.9**	**30.5**	**73**
		TA-SUS-18(1.5)	<0.49U	**23200**	0.97B	**32.6**	**328**	**1.1**	<0.025U	1040	0.49B	**24.4**	14.1	40.2	26800	9.8	4570	**614**	**0.12**	18.8	5260	**0.67**	0.48B	869	0.96	**72.8**	**91.4**
		WP-SSS-16(0.5)	<0.53U	**6740**	**5.7**	**317**	70	**0.42B**	<0.028U	2330	<2.2U	**11.2**	5.8	**50.2**	30500	**17**	1140	**193**	**0.88**	13	2610	**1.6**	**2.2**	173B	**1.2**	**43.3**	**56.2**
		WP-SUS-14(3.0)	<0.55U	**7290**	**10.6**	**1220**	**131**	**1.2**	<0.027U	11900	<2.2U	**10.8**	18	**61.2**	75700	**31.7**	3400	**2350**	**1.8**	17.1	2750	**2.4**	**4**	168B	**4.9**	**36.1**	**181**
		WP-SUS-17(2.0)	<0.52U	**1940**	**5.7**	**286**	74	**0.49**	0.57	7580	<2.0U	**14.3**	12	**90.5**	30100	**18.9**	3380	**631**	**3.2**	**32.9**	1340	**3.1**	1.8	<20.4U	**2.3**	**27.6**	**138**
	AJAX	WP-SUS-08(1.2)	<0.42U	**3870**	**6.2**	**411**	25.5	**0.59**	<0.03U	5800	<2.2U	**14.3**	14.6	**58.7**	37500	8.4	3600	**1700**	**1.2**	27.4	1430	**1.6**	0.77B	39.6B	**2.6**	**19.4**	**71**
		WP-SUS-09(1.0)	<0.5U	**2660**	3.3B	**154**	38.7	**0.46**	<0.025U	25100	<2.1U	**8**	7.8	**67.9**	23400	5	9600	**2130**	**1.9**	22.7	1990	**0.96**	0.32B	145B	**2.4**	**15.1**	**47.3**
		WP-SUS-10(2.0)	<0.52U	**18800**	1.6B	**95.7**	**186**	**0.89**	<0.025U	985	0.52B	**39.5**	16.8	**84.7**	35500	9.7	4260	**762**	**0.43**	26.8	3730	**1.1**	1.4	714	**1.5**	**65.8**	**87.4**
Comparison	Criteria	EPA Industrial PRG	35	100000	410	1.6	67000	1900	450	NA	64	450	1900	41000	100000	750	NA	19000	310	20000	NA	5100	5100	NA	67	7200	100000
		EPA-Ecological	NA	NA	21	37	NA	NA	29	NA	330	5	32	61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	120
		EPA-Human Health	1600	NA	31	0.4	5500	0.1	78	NA	270	270	NA	NA	NA	400	NA	NA	NA	1600	NA	390	390	NA	NA	550	23000
		Oak Ridge	NA	NA	5	9.9	283	10	4	NA	NA	0.4	20	60	NA	40.5	NA	NA	0.00051	30	NA	0.21	2	NA	1	2	8.5
		OR-Ecological	NA	50	5	8	85	10	4	NA	410	NA	20	50	NA	16	NA	100	0.1	30	NA	1	2	NA	1	2	50

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results, continued

			TAL Metals by SPLP, µg/L																						
		Sample No.	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	VANADIUM	ZINC
Background	GRAN	BG-SSS-34(0.5)	1010	4.1B	<2.4U	11.5B	<0.2U	<0.3U	777B	0.99B	<1.8U	4.7B	405	3B	<293U	19.9	20	<2U	651B	3B	<0.9U	17400	<2.8U	<2.2U	13.2B
		BG-SSS-35(0.5)	1380	<3.8U	<2.4U	13.3B	<0.2U	<0.3U	1200B	1.1B	<1.8U	5B	362	<1.5U	<293U	6.8B	14.4B	<2U	475B	2.3B	<0.9U	15500	<2.8U	<2.2U	7.8B
		BG-SSS-36(0.5)	10100	3.9B	6.5B	165B	<0.2U	<0.3U	2040B	4.9B	2.4B	8.5B	5070	3.3	930B	211	21	5B	1770B	3.7B	<0.9U	18900	<2.8U	10.2B	25.2
	LUCA	BG-SSS-19(0.5)	534	<3.8U	<2.4U	9.9B	<0.2U	0.33B	1440B	1.1B	<1.8U	3.9B	266	1.7B	347B	31.4	<10U	<2U	711B	2B	<0.9U	5140	<2.8U	<2.2U	<5.7U
On Site	MAGN	TA-SSS-15(0.5)	54.5B	7.5B	18.1	10B	<0.2U	<0.3U	1950B	<0.6U	<1.8U	6.9B	392	17.9	802B	4B	<10U	<2U	743B	2.7B	<0.9U	6950	<2.8U	<2.2U	12B
		WP-SSS-16(0.5)	1840	<3.8U	6.1B	54.2B	0.36B	1.4B	60900	5.2B	19.5B	97.7	3880	72.6	1940B	1050	<10U	17.1B	1120B	<1.7U	<0.9U	3630B	<2.8U	<2.2U	122
		WP-SUS-14(3.0)	<18.3U	5.3B	<2.4U	29.9B	<0.2U	2.5B	359000	<0.6U	3B	3.2B	<66.7U	<1.5U	31200	5740	<10U	29.8B	3030B	4.7B	<0.9U	6330	4.7B	<2.2U	<5.7U
		WP-SUS-17(2.0)	<18.3U	<3.8U	<2.4U	11B	<0.2U	<0.3U	13800	0.89B	<1.8U	2.9B	<66.7U	<1.5U	2710B	1.3B	12.4B	<2U	933B	2.6B	<0.9U	5280	<2.8U	<2.2U	<5.7U
	AJAX	WP-SUS-08(1.2)	46.4B	4.3B	5.9B	11.5B	<0.2U	0.38B	12100	1.1B	<1.8U	3B	<66.7U	2.1B	3800B	<0.7U	<10U	<2U	1420B	2.2B	<0.9U	1220B	<2.8U	<2.2U	6.8B
		WP-SUS-09(1.0)	<18.3U	4B	<2.4U	7.9B	<0.2U	<0.3U	10900	0.99B	<1.8U	3B	<66.7U	<1.5U	2960B	<0.7U	<10U	<2U	706B	<1.7U	<0.9U	12000	<2.8U	<2.2U	<5.7U
		WP-SUS-10(2.0)	284	<3.8U	<2.4U	107B	0.23B	0.94B	1980B	<0.6U	<1.8U	25.3	<66.7U	<1.5U	924B	495	<10U	11.2B	3190B	<1.7U	<0.9U	5600	<2.8U	<2.2U	45.2

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results, continued

			Lab	Acid/Base Accounting							
		Sample No.	PH PH UNITS	FIZZ RATING NO UNITS	MAXIMUM POTENTIAL ACIDITY KG CACO3/TON	NEUTRALIZATION POTENTIAL KG CACO3/TON	PASTE PH PH UNITS	SULFATE SULFUR WT.%	SULFIDE SULFUR WT.%	TOTAL SULFUR WT.%	NET NEUTRALIZATION POTENTIAL KG CACO3/TON
Background	GRAN	BG-SSS-34(0.5)	6.4	none	<0.6	-5.0	6.0	<0.01	< .02	< .02	-5.0
		BG-SSS-35(0.5)	6.7	none	<0.6	-5.0	6.4	<0.01	< .02	< .02	-5.0
		BG-SSS-36(0.5)	6.6	none	<0.6	0.5	6.3	<0.01	< .02	< .02	0.5
	LUCA	BG-SSS-19(0.5)	5.9	none	<0.6	-6.0	5.7	<0.01	< .02	< .02	-6.0
On Site	MAGN	PD-SSS-12(0.3)	7.7								
		TA-SSS-15(0.5)	4.5	none	10.3	-2.3	4.8	0.20	0.33	0.53	-12.6
		TA-SUS-18(1.5)	7.2								
		WP-SSS-16(0.5)	2.7	none	1.6	-5.3	3.1	0.27	0.05	0.32	-6.9
		WP-SUS-14(3.0)	5.7	slight	30.3	12.5	5.7	0.61	0.97	1.58	-17.8
		WP-SUS-17(2.0)	7.7	slight	23.4	31.0	7.7	0.02	0.75	0.77	7.6
	AJAX	WP-SUS-08(1.2)	7.8	slight	22.8	72.5	7.8	0.01	0.73	0.74	49.7
		WP-SUS-09(1.0)	8.2	slight	17.8	83.8	8.2	<0.01	0.57	0.57	66.0
		WP-SUS-10(2.0)	3.9	none	0.9	-1.3	4.1	0.06	0.03	0.09	-2.2

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results, continued

Notes

Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.

Cyanide (total) was anaylzed for but not detected in any sample.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).
NA = Not available.

Units:

MG/KG = Milligrams per kilogram
UG/KG = Micrograms per kilogram
UG/L = Micrograms per liter

Comparison Criteria

- OR Ecological - ODEQ (1998) Guidance for Ecological Risk Assessment, Level II Screening Values - lowest criteria for bird, plant, invertebrate, and mammal.
- EPA Ecological - EPA (2000b) Ecological Soil Screening Levels - Lowest Criteria Indicators for bird, plant, invertebrate, and mammal.
- Oak Ridge National Laboratory, US DOE (Efroymson et al 1997), Preliminary Remediation Goals (PRGs) for protection of plants, wildlife, or soil invertebrates.
- EPA Human Health Criteria - Generic Soil Screening Levels (SSLs) for Protection of Human Health EPA (2000a).
- EPA Region 9 PRGS for industrial soil (http://www.epa.gov/region09/waste/sfund/prg/index.htm).

Table 5 Ajax/Magnolia Plant Tissue Analytical Results

			TAL Metals, mg/kg																		
		Sample No.	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	POTASSIUM	SELENIUM	SODIUM	VANADIUM	ZINC
Background	GRAN	BG-PLT-34	143	<1.2U	<1.2U	341	0.071B	0.37B	13300	<0.51U	4.3B	181	1.1	4280	262	<0.045U	16800	<0.86U	311B	<0.51U	18.1
		BG-PLT-35	312	<1.3U	<1.3U	368	0.12B	<0.16U	10400	<0.53U	4.6B	315	0.91	4290	202	<0.052U	19600	1.2B	340B	0.94B	14.2
		BG-PLT-36	213	<1U	<1.1U	505	0.054B	<0.13U	17300	<0.44U	4.8B	247	0.38B	4570	324	<0.045U	16200	0.95B	285B	0.6B	13.4
	LUCA	BG-PLT-19	72.7	<1.2U	<1.3U	252	0.12B	<0.16U	12400	<0.52U	5.7B	132	1.1	4330	238	<0.051U	16500	1.4	330B	<0.52U	21.4
On Site	MAGN	PD-PLT-11	290	<1.4U	8.1	86.7	0.12B	<0.18U	14000	<0.62U	5.8B	679	1.7	5200	95.3	0.064B	16200	<1U	342B	1.3B	27
		WP-PLT-14	157	<1.3U	3	123	0.12B	<0.17U	15200	<0.55U	6.8B	338	0.91	6130	113	<0.047U	14600	1.6	292B	0.65B	22.3
		WP-PLT-17	409	1.3B	2.9	277	0.13B	0.3B	15000	<0.56U	6.1B	692	1.1	6250	212	<0.047U	14000	1.4	317B	1.6B	20.9
	AJAX	PD-PLT-06	161	<1.4U	4.1	34.2B	0.088B	<0.18U	14800	0.61B	5.6B	718	1.7	6560	208	0.058B	16200	<1U	595B	1.1B	20.6
		WP-PLT-08	218	<1.4U	20.4	37.5B	0.098B	<0.17U	16000	<0.58U	6.5B	1080	1.2	7170	154	<0.048U	17300	1.6	422B	1.2B	19.5

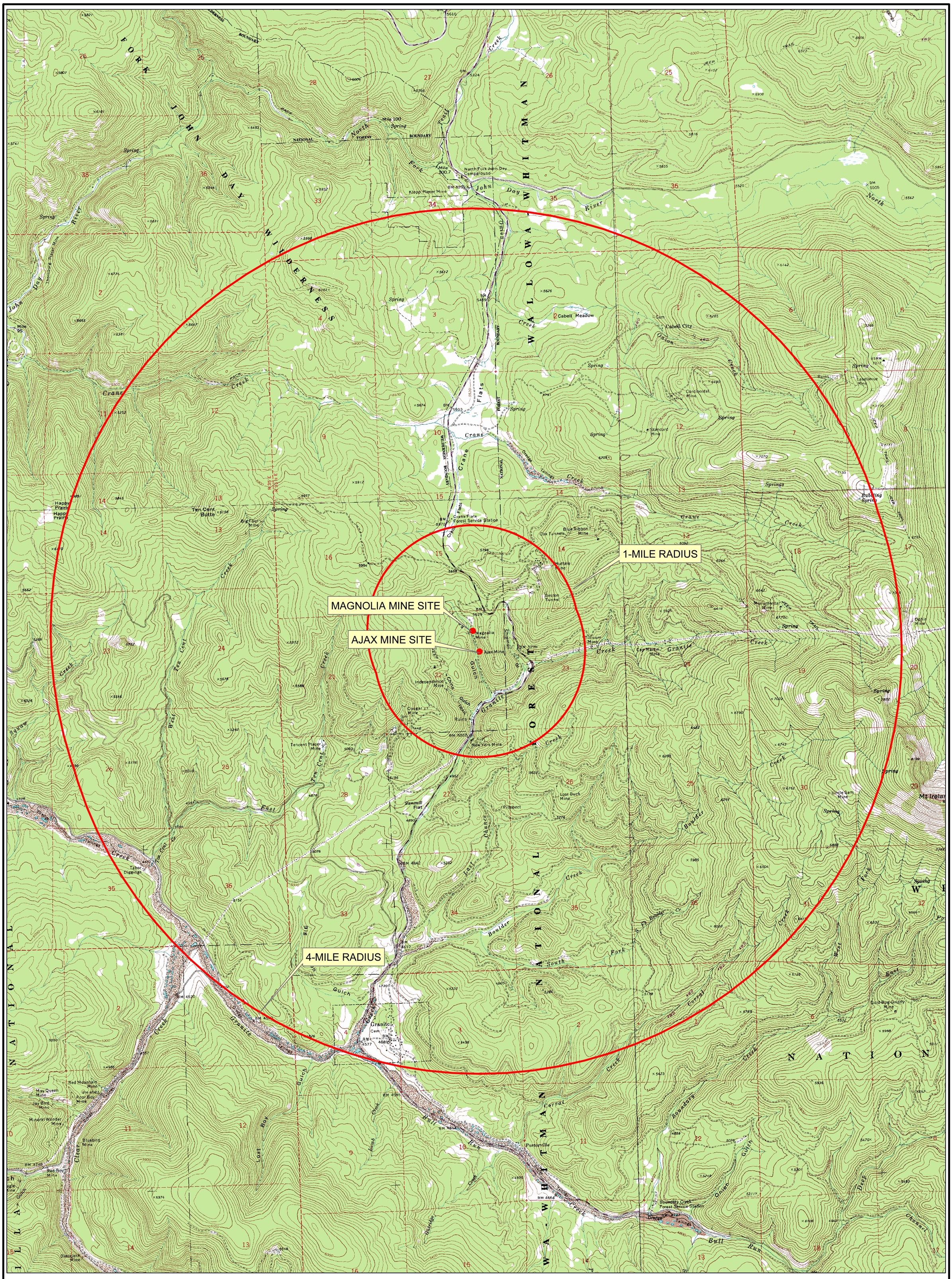
Notes

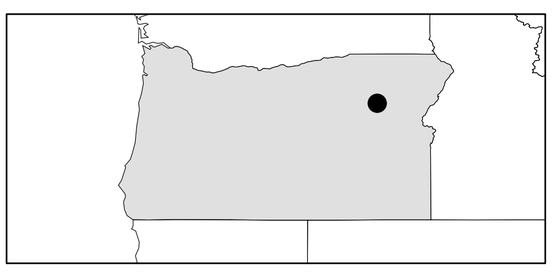
Cyanide (total) was anaylzed for but not detected in any sample.
The following metals were analyzed for but not detected in any sample: chromium, nickel, silver, and thallium.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).

Units:
MG/KG = Milligrams per kilogram

Plates





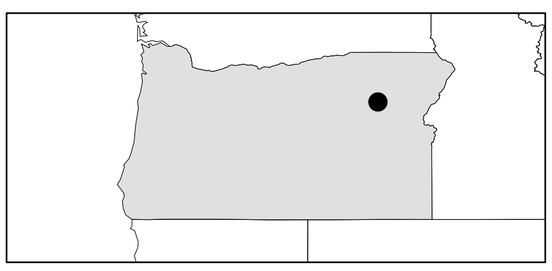
0 1/2 1 2 3 4 MILES

N

Source: Oregon Geospatial Data Clearinghouse - USGS Topo maps

EA®	AJAX/MAGNOLIA MINE SITE INSPECTION UMATILLA NATIONAL FOREST, OREGON	PLATE 1 SITE LOCATION WITH 1 AND 4-MILE RADII.

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
GH	DC	DC	JK	AS SHOWN	10 NOV 2003	1389016	I:\NFS\SITELOCATION-AJAX_MAG.MXD



0 1/2 1 2 3 4 MILES

Source: Oregon Geospatial Data Clearinghouse - USGS Topo maps

EA®	AJAX/MAGNOLIA MINE SITE INSPECTION UMATILLA NATIONAL FOREST, OREGON	PLATE 2 SITE LOCATION AND 15-MILE DOWNSTREAM REACH.

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
GH	DC	DC	JK	AS SHOWN	10 NOV 2003	1389016	I:\NFS\AJAX_MAG 15-MILE.MXD

Appendix A

Deviations from the Project Plans

DEVIATIONS FROM THE PROJECT PLANS, AJAX AND MAGNOLIA MINE SITES SI

Ajax Mine				
Surface Water - Stream	2 pool	ref, site	1	Downstream station deemed redundant with the added GRAN-54 station. As such AJAX-05 was eliminated.
Surface Water - Settling po	1	from pond	1	As per Work Plan
Surface Water - Adit portal	1	if water is discharging	1	As per Work Plan
Surface Water - drainage from settling pond	0		1	Water was observed draining from base of settling pond into Lucas Gulch. Referred to as AJAX-52.
Pore Water	4 (2 riffle/2 pool)	ref, site	1	Downstream station deemed redundant with the added GRAN-54 station. As such AJAX-05 was eliminated. Due to the time required to collect the sample volume, the scope was reduced to collecting pore water in pool habitat only.
Pore Water- Settling pond	1	from pond	0	Not sampled due to pond being uninhabitated by fish.
Soil- Adit discharge (or sedi	1	sediment if water is present	0	Collected sediment from pond immediately below the adit discharge, therefore, sample would be redundant.
Sediment - Stream	4 (2 riffle/2 pool)	ref, site	2	Downstream station deemed redundant with the added GRAN-54 station. As such, AJAX-05 was eliminated.
Sediment/Soil - Settling Por	1	from pond	1	Sample was sediment since water was present (Station AJAX-06)
Benthic	4	2 samples per location	1	Downstream station deemed redundant with added GRAN-54 station. As such AJAX-05 was eliminated. Sampled only riffles since adequate pool habitat was lacking.
Waste pile No. 1	2	surface, subsurface	2	Native soil interface beneath waste pile was not accessible using hand auger; however two subsurface samples were collected to determine heterogeneity within WP material; one subsurface sample collected in run-off channel - probable route of overland runoff into stream
Waste pile No. 2	2	surface, subsurface	1	Native soil interface beneath waste pile was not accessible using hand auger; only subsurface sample collected; the similarity of surface and subsurface WP material, and the WP's remoteness from surface water bodies did not warrant the collection of an additional sample
Downhill from WP	1	subsurface	0	No sample collected; stream was immediately adjacent to WP
Plant Tissue	2	Co-located with settling pond and WP	2	As per Work Plan

Magnolia Mine				
Surface Water - Stream	3 pool	ref, site, between Mag. and Ajax mine	3	As per Work Plan
Surface Water - Upper settl	1	from pond	1	As per Work Plan (Station MAGN-11)
Surface Water - Lower settl	1	from pond	0	Not sampled due to pond being dry.
Surface Water - Main adit p	1	if water is discharging	1	As per Work Plan (Station MAGN-13)
Surface Water - Secondary	0	W. bank of Lucas Gulch	1	Water observed draining from adit and flowing into Lucas Gulch. (Station MAGN-55).
Pore Water	6 (3 riffle/3 pool)	ref, site, between Mag. and Ajax mine	3	Due to the time required to collect the sample volume, the scope was reduced to collecting pore water in pool habitat at the three stations.
Pore Water- Upper settling	1	from pond	0	Not sampled due to pond being uninhabited by fish.
Pore Water- Lower settling	1	from pond	0	Not sampled due to pond being dry.
Sediment - Stream	6 (3 riffle/3 pool)	ref, site, between Mag. and Ajax mine	3	
Sediment/Soil - Upper Settl	1	from pond	1	Sample was sediment since water was present (Station MAGN-11)
Sediment/Soil - Lower Settl	1	from pond	1	Sample was soil since pond was dry (Station MAGN-12)
Soil- Adit discharge (or sedi	1	surface soil (sediment if water is present)	0	Sample was not collected, since a sample was collected from the pond which the adit discharges into.
Benthic	6	2 samples at each (ref, site, between Mag and Ajax)	3	Sampled only riffles since adequate pool habitat was not identified.
Top of upper waste pile	1	surface	1	Subsurface sample was collected
Toe of upper waste pile	2	surface, subsurface	0	Downhill sample was collected immediately below upper waste pile; toe of upper waste pile samples would not have contributed that much more data
Top/sidewall of lower waste	2	surface, subsurface	2	Native soil interface beneath waste pile was not accessible using hand auger; however two subsurface samples were collected to determine heterogeneity within WP material; one subsurface sample collected in run-off channel - probable route of overland runoff into stream
Toe of lower waste pile	2	surface, subsurface	0	No sample collected; stream was immediately adjacent to WP
Downhill from WP	1	subsurface	1	Collected downhill of upper WP
Old crusher	0	surface	1	Possible old crusher discovered by lower adit WP; Soils adjacent to crusher potential "hot spot"; sampled soil to determine if "hot spot" or not
Plant Tissue	4	Co-located with the upper and lower settling ponds and upper and lower WPs	3	No plants were located at the lower pond.