

ATTACHMENT D1
GROUNDWATER COPCs

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D1. GROUNDWATER COPCS

Potential migration of surface and subsurface contamination may occur via leaching to groundwater and subsequent transport, or runoff of surface contamination to adjacent drainageways. Solid waste management units (SWMUs) that are adjacent to drainageways are identified, and where chemicals of potential concern (COPCs) are identified in surface soils this pathway is considered complete, but only qualitatively evaluated.

A primary migration pathway of concern for contaminants in soil is the potential for these to pose an ongoing source of contamination to Regional Gravel Aquifer (RGA) groundwater and subsequent migration to off-site areas. In Sections 5–11 of this RI, the nature and extent evaluation highlights detected contaminants exceeding the RGA groundwater protection Soil Screening Level (SSL) for one or more of the samples. The SSL for the RGA screening is derived using the project-specific dilution attenuation factor (DAF) of 57 as presented in Appendix C.

This process is conservatively identifying chemicals that should be considered further for potential impacts to the RGA and downgradient receptors. For example, the concentrations may be below background levels and/or infrequently detected/exceeded. Therefore, a process to refine this list and identify chemicals for more detailed modeling was established.

SWMU 1 was not considered for groundwater or vapor modeling under this operable unit (OU) based on its extensive modeling under other OUs. SWMUs deferred to the Soils and Slabs OU also have not been considered for groundwater or vapor modeling under this OU.

D1.1 Process for Developing Target COPCs for Modeling

The overall modeling process includes the following:

- Evaluating the overall distribution and average soil concentration using Spatial Analysis and Decision Assistance (SADA)
- Using these data to evaluate transport to the RGA using Seasonal Soil Compartment Model (SESOIL)
- Estimate chemical concentrations at the SWMU boundary and downgradient locations using AT123D

It was clear when reviewing these screening results on an OU-wide basis, that many of these chemicals were not indicative of potential threats to groundwater based on the data patterns, background and results of groundwater monitoring. Many of the SSLs are at concentrations below background for many naturally occurring chemicals, a factor that should be considered further in the modeling process. Because of these issues, the list of chemicals was refined to more accurately define those with potential concern for impacts to the RGA.

D1.2 Step 1. Average Concentration Screening

The basis for modeling considers not a maximum or single value exceedance, but rather an average over the SWMU. The arithmetic average of all soil samples (surface and subsurface) was calculated as an approximation to the result that may be obtained using SADA (the average not to exceed the maximum detected value). Chemicals were eliminated from further consideration of modeling if the average concentration was below:

- The RGA SSL, and/or
- Background (lower of surface and subsurface values)

The RGA SSLs were developed using the same methodology as the SSLs derived in the Risk Methods Document (DOE 2011). The target concentration [i.e., maximum contaminant level (MCL) or no action level (NAL)] is specified in Table D1.1.

D1.3 Step 2. Soils OU Wide Evaluation of Potential COPCs for Groundwater Impacts

When the first step in this screening process was completed for all SWMUs, 24 chemicals were identified with potential to impact the RGA at concentrations above MCLs or Child Resident NALs for groundwater. These results are shown in Table D1.1. Given the considerable uncertainty when evaluating the leaching pathway, particularly for metals, these preliminary COPCs for groundwater were evaluated against existing RGA groundwater data.

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
12	1,1-Dichloroethene	1.66E+00	1.76E+01	16	2		1.42E-01	MCL	COPC	
12	Chloroform	7.00E-03	3.63E-03	16	1		3.58E-03	NAL		Excluded
12	Molybdenum	9.49E+01	7.85E+00	172	23		6.00E+00	NAL		Excluded
12	Silver	1.70E+01	4.62E+00	176	27	2.30E+00	2.50E+00	NAL		Excluded
12	Arsenic	8.59E+01	7.29E+00	179	102	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
12	Cobalt	1.07E+02	1.16E+01	35	34	1.30E+01	8.06E-01	NAL	Average<bkg	
12	Iron	1.12E+05	1.96E+04	179	179	2.80E+04	36594	RSL	avg below SSL and bkg	
12	Manganese	4.38E+03	4.17E+02	179	179	8.20E+02	9.11E+01	NAL	Average<bkg	
12	Mercury	8.80E+00	4.16E+00	179	24	1.30E-01	5.96E+00	MCL	avg below SSL	
12	Nickel	1.84E+02	3.92E+01	179	71	2.10E+01	7.73E+01	NAL	avg below SSL	
12	Total PAH	3.40E-01	1.78E-01	22	5		2.46E-01	NAL	avg below SSL	
12	Uranium	4.33E+03	1.52E+02	173	105	4.60E+00	7.70E+02	MCL	avg below SSL	
12	Vanadium	5.83E+01	2.45E+01	35	34	3.70E+01	4.03E+00	NAL	Average<bkg	
13	Total PAH	1.25E+00	2.62E-01	39	3		2.46E-01	NAL		Excluded
13	Cobalt	8.75E+00	4.65E+00	9	9	1.30E+01	8.06E-01	NAL	Average<bkg	
13	Manganese	1.12E+03	4.70E+02	9	9	8.20E+02	9.11E+01	NAL	Average<bkg	
13	Nickel	1.40E+02	1.11E+01	39	34	2.10E+01	7.73E+01	NAL	avg below SSL and bkg	
13	Silver	2.81E+00	1.19E+00	39	1	2.30E+00	2.50E+00	NAL	avg below SSL and bkg	
13	Vanadium	3.93E+01	2.14E+01	39	39	3.70E+01	4.03E+00	NAL	Average<bkg	
14	Molybdenum	2.87E+01	7.16E+00	284	32		6.00E+00	NAL		Excluded
14	Nickel	2.67E+03	2.44E+02	284	185	2.10E+01	7.73E+01	NAL		Excluded
14	Silver	2.22E+01	5.13E+00	284	41	2.30E+00	2.50E+00	NAL		Excluded
14	Arsenic	4.48E+01	7.45E+00	284	140	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
14	Cobalt	1.93E+01	8.72E+00	25	24	1.30E+01	8.06E-01	NAL	Average<bkg	
14	Iron	9.27E+04	1.82E+04	284	284	2.80E+04	36594	RSL	avg below SSL and bkg	
14	Lead	9.44E+02	2.82E+01	284	275	2.30E+01	798	RSL MCL	avg below SSL	
14	Manganese	2.67E+03	4.71E+02	284	281	8.20E+02	9.11E+01	NAL	Average<bkg	

COPC = chemical of potential concern
MCL = maximum contaminant level
NAL = no action level
ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
14	Mercury	4.37E+01	4.87E+00	284	34	1.30E-01	5.96E+00	MCL	avg below SSL	
14	PCB, Total	1.00E+01	2.70E+00	285	34		4.4574	RSLMCL	avg below SSL	
14	Selenium	3.07E+01	9.30E+00	284	26	7.00E-01	1.48E+01	MCL	avg below SSL	
14	Uranium	4.60E+03	1.22E+02	285	220	4.60E+00	7.70E+02	MCL	avg below SSL	
14	Vanadium	8.62E+01	2.74E+01	25	24	3.70E+01	4.03E+00	NAL	Average<bkq	
15	Molybdenum	2.36E+01	7.16E+00	294	30		6.00E+00	NAL		Excluded
15	Naphthalene	1.20E-01	1.20E-01	36	1		3.30E-02	NAL		Excluded
15	Nickel	3.79E+03	1.23E+02	308	170	2.10E+01	7.73E+01	NAL		Excluded
15	Silver	1.80E+01	5.25E+00	308	61	2.30E+00	2.50E+00	NAL		Excluded
15	Antimony	2.45E+01	2.83E+00	39	25	2.10E-01	1.55E+01	MCL	avg below SSL	
15	Arsenic	1.11E+02	8.99E+00	308	164	7.90E+00	1.66E+01	MCL	avg below SSL	
15	Cobalt	3.41E+01	9.04E+00	25	25	1.30E+01	8.06E-01	NAL	Average<bkq	
15	Copper	6.12E+03	1.32E+02	308	176	1.90E+01	2.61E+03	MCL	avg below SSL	
15	Iron	1.71E+05	1.95E+04	294	294	2.80E+04	36594	RSL	avg below SSL and bkg	
15	Lead	1.80E+03	5.61E+01	308	283	2.30E+01	798	RSL MCL	avg below SSL	
15	Manganese	2.90E+03	4.24E+02	294	288	8.20E+02	9.11E+01	NAL	Average<bkq	
15	Mercury	1.53E+01	4.63E+00	308	40	1.30E-01	5.96E+00	MCL	avg below SSL	
15	PCB, Total	5.00E+01	3.20E+00	309	39		4.4574	RSL MCL	avg below SSL	
15	Selenium	2.67E+01	9.23E+00	308	30	7.00E-01	1.48E+01	MCL	avg below SSL	
15	Vanadium	3.72E+01	2.37E+01	39	39	3.70E+01	4.03E+00	NAL	Average<bkq	
15	Zinc	3.17E+03	1.48E+02	308	307	6.00E+01	1.11E+03	NAL	avg below SSL	
16	Silver	1.02E+01	3.82E+00	31	3	2.30E+00	2.50E+00	NAL		Excluded
16	Total PAH	2.93E+00	4.78E-01	9	2		2.46E-01	NAL		Excluded
16	Cobalt	1.19E+01	5.95E+00	11	10	1.30E+01	8.06E-01	NAL	Average<bkq	
16	Manganese	1.46E+03	3.36E+02	31	31	8.20E+02	9.11E+01	NAL	Average<bkq	
16	Nickel	1.13E+02	3.53E+01	31	16	2.10E+01	7.73E+01	NAL	avg below SSL	
16	Vanadium	3.64E+01	2.28E+01	11	11	3.70E+01	4.03E+00	NAL	Average<bkq	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
19	Naphthalene	1.10E+00	1.94E-01	28	1		3.30E-02	NAL		Excluded
19	Silver	7.92E+01	3.75E+00	28	1	2.30E+00	2.50E+00	NAL		Excluded
19	Total PAH	5.23E+00	5.96E-01	28	8		2.46E-01	NAL		Excluded
19	Arsenic	2.01E+01	5.65E+00	28	28	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
19	Cobalt	1.56E+01	7.67E+00	28	23	1.30E+01	8.06E-01	NAL	Average<bkg	
19	Manganese	7.23E+02	2.74E+02	28	28	8.20E+02	9.11E+01	NAL	Average<bkg	
19	Nickel	4.38E+02	4.35E+01	28	25	2.10E+01	7.73E+01	NAL	avg below SSL	
19	Vanadium	5.72E+01	1.93E+01	28	28	3.70E+01	4.03E+00	NAL	Average<bkg	
20	Cobalt	1.29E+01	6.57E+00	21	16	1.30E+01	8.06E-01	NAL	Average<bkg	
20	Manganese	4.27E+02	2.81E+02	21	21	8.20E+02	9.11E+01	NAL	Average<bkg	
20	Nickel	8.04E+02	5.81E+01	21	21	2.10E+01	7.73E+01	NAL	avg below SSL	
20	Vanadium	3.51E+01	2.08E+01	21	21	3.70E+01	4.03E+00	NAL	Average<bkg	
26	Chloroform	1.10E-02	1.10E-02	41	1		3.58E-03	NAL		Excluded
26	Molybdenum	2.01E+01	6.67E+00	61	8		6.00E+00	NAL		Excluded
26	Naphthalene	4.10E+00	3.21E-01	90	6		3.30E-02	NAL		Excluded
26	Nickel	1.76E+04	1.60E+02	134	87	2.10E+01	7.73E+01	NAL		Excluded
26	Silver	8.33E+01	4.47E+00	135	23	2.30E+00	2.50E+00	NAL		Excluded
26	Total PAH	2.15E+00	3.46E-01	90	14		2.46E-01	NAL		Excluded
26	Arsenic	1.30E+02	9.88E+00	143	75	7.90E+00	1.66E+01	MCL	avg below SSL	
26	Cobalt	9.05E+01	9.11E+00	61	60	1.30E+01	8.06E-01	NAL	Average<bkg	
26	Copper	9.52E+03	1.08E+02	130	89	1.90E+01	2.61E+03	MCL	avg below SSL	
26	Iron	8.51E+04	1.42E+04	130	130	2.80E+04	36594	RSL	avg below SSL and bkg	
26	Manganese	1.80E+03	3.70E+02	130	128	8.20E+02	9.11E+01	NAL	Average<bkg	
26	Mercury	1.40E+01	2.11E+00	140	39	1.30E-01	5.96E+00	MCL	avg below SSL	
26	PCB, Total	6.08E+00	1.02E+00	272	50		4.4574	RSLMCL	avg below SSL	
26	Thallium	1.39E+01	3.56E+00	85	10	2.10E-01	8.12E+00	MCL	avg below SSL	
26	Uranium	3.10E+03	8.62E+01	134	78	4.60E+00	7.70E+02	MCL	avg below SSL	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
26	Vanadium	1.06E+02	2.74E+01	83	83	3.70E+01	4.03E+00	NAL	Average<bkg	
27	Cobalt	1.05E+01	5.70E+00	9	9	1.30E+01	8.06E-01	NAL	Average<bkg	
27	Manganese	5.19E+02	2.11E+02	9	9	8.20E+02	9.11E+01	NAL	Average<bkg	
27	Vanadium	2.44E+01	1.66E+01	9	9	3.70E+01	4.03E+00	NAL	Average<bkg	
32	Cobalt	6.50E+00	6.00E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkg	
32	Manganese	3.44E+02	2.80E+02	2	2	8.20E+02	9.11E+01	NAL	Average<bkg	
32	Vanadium	1.85E+01	1.82E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkg	
47	Naphthalene	1.90E+00	1.28E+00	20	4		3.30E-02	NAL		Excluded
47	Total PAH	5.41E+01	5.56E+00	20	13		2.46E-01	NAL		Excluded
47	Trichloroethene	1.40E+00	1.45E-01	13	3		1.02E-01	MCL	COPC	
47	Arsenic	4.52E+01	9.67E+00	24	24	7.90E+00	1.66E+01	MCL	avg below SSL	
47	Cobalt	1.69E+01	7.16E+00	23	21	1.30E+01	8.06E-01	NAL	Average<bkg	
47	Fluoranthene	9.68E+01	1.08E+01	20	12		9.12E+01	NAL	avg below SSL	
47	Manganese	1.69E+03	3.93E+02	24	24	8.20E+02	9.11E+01	NAL	Average<bkg	
47	Nickel	8.25E+01	1.85E+01	24	23	2.10E+01	7.73E+01	NAL	avg below SSL and bkg	
47	Pyrene	1.11E+02	9.70E+00	20	11		3.61E+01	NAL	avg below SSL	
47	trans-1,2-Dichloroethene	2.50E+00	2.52E-01	10	1		1.67E+00	MCL	avg below SSL	
47	Vanadium	3.57E+01	2.53E+01	23	23	3.70E+01	4.03E+00	NAL	Average<bkg	
74	Naphthalene	5.20E-01	3.13E-01	3	1		3.30E-02	NAL		Excluded
74	Total PAH	3.16E+00	9.73E-01	3	1		2.46E-01	NAL		Excluded
75	Arsenic	1.68E+01	7.61E+00	4	3	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
75	Cobalt	2.20E+00	2.20E+00	1	1	1.30E+01	8.06E-01	NAL	Average<bkg	
75	Iron	4.42E+04	1.73E+04	4	4	2.80E+04	36594	RSL	avg below SSL and bkg	
75	Manganese	4.17E+02	2.11E+02	4	4	8.20E+02	9.11E+01	NAL	Average<bkg	
75	Nickel	8.87E+01	3.82E+01	4	1	2.10E+01	7.73E+01	NAL	avg below SSL	
75	Vanadium	8.20E+00	8.20E+00	1	1	3.70E+01	4.03E+00	NAL	Average<bkg	
76	Total PAH	1.76E+00	1.01E+00	2	2		2.46E-01	NAL		Excluded

avg = average
bkg = background (DOE 2011)
COPC = chemical of potential concern
MCL = maximum contaminant level (DOE 2011)
NAL = no action level (DOE 2011)
RSL = regional screening level
ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
76	Cobalt	6.10E+00	5.45E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkgs	
76	Manganese	4.57E+02	3.01E+02	3	3	8.20E+02	9.11E+01	NAL	Average<bkgs	
76	Mercury	7.45E+00	3.50E+00	3	3	1.30E-01	5.96E+00	MCL	avg below SSL	
76	Vanadium	3.69E+01	3.07E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkgs	
77	Technetium-99	1.94E+05	3.30E+04	6	6	2.50E+00	3.93E+04	MCL	avg below SSL	
78	Naphthalene	1.60E+01	2.93E+00	7	2		3.30E-02	NAL		Excluded
78	Total PAH	3.91E+01	7.65E+00	7	2		2.46E-01	NAL		Excluded
78	Acenaphthene	1.70E+01	3.49E+00	7	2		8.07E+00	NAL	avg below SSL	
78	Cobalt	1.61E+01	5.86E+00	7	7	1.30E+01	8.06E-01	NAL	Average<bkgs	
78	Fluorene	1.70E+01	3.42E+00	7	2		9.41E+00	NAL	avg below SSL	
78	Manganese	1.47E+03	3.95E+02	7	7	8.20E+02	9.11E+01	NAL	Average<bkgs	
78	PCB, Total	1.20E+01	1.66E+00	11	3		4.4574	RSLMCL	avg below SSL	
78	Pyrene	4.10E+01	9.83E+00	7	2		3.61E+01	NAL	avg below SSL	
78	Trichloroethene	3.37E-01	7.27E-02	8	4		1.02E-01	MCL	avg below SSL	
78	Vanadium	3.11E+01	1.79E+01	7	7	3.70E+01	4.03E+00	NAL	Average<bkgs	
79	Cobalt	5.20E+00	2.87E+00	5	3	1.30E+01	8.06E-01	NAL	Average<bkgs	
79	Manganese	1.03E+03	3.31E+02	8	8	8.20E+02	9.11E+01	NAL	Average<bkgs	
79	PCB, Total	1.20E+01	1.75E+00	13	3		4.4574	RSLMCL	avg below SSL	
79	Vanadium	2.42E+01	1.34E+01	5	5	3.70E+01	4.03E+00	NAL	Average<bkgs	
80	Uranium	5.72E+03	1.16E+03	3	2	4.60E+00	7.70E+02	MCL	COPC	
80	Cobalt	7.70E+00	7.70E+00	1	1	1.30E+01	8.06E-01	NAL	Average<bkgs	
80	Manganese	3.76E+02	3.07E+02	2	2	8.20E+02	9.11E+01	NAL	Average<bkgs	
80	PCB, Total	7.30E+01	2.67E+00	92	39		4.4574	RSLMCL	avg below SSL	
80	Vanadium	2.59E+01	2.59E+01	1	1	3.70E+01	4.03E+00	NAL	Average<bkgs	
81	Naphthalene	3.90E-01	2.21E-01	12	1		3.30E-02	NAL		Excluded
81	PCB, Total	3.70E+02	6.31E+00	79	39		4.4574	RSLMCL		Excluded
81	Silver	2.70E+00	2.70E+00	55	10	2.30E+00	2.50E+00	NAL		Excluded

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
81	Uranium	6.50E+03	9.14E+02	71	29	4.60E+00	7.70E+02	MCL	COPC	
81	Cobalt	4.83E+01	1.14E+01	10	10	1.30E+01	8.06E-01	NAL	Average<bkg	
81	Manganese	3.65E+03	5.87E+02	55	54	8.20E+02	9.11E+01	NAL	Average<bkg	
81	Mercury	8.33E+00	4.27E+00	55	9	1.30E-01	5.96E+00	MCL	avg below SSL	
81	Nickel	1.14E+02	3.31E+01	55	15	2.10E+01	7.73E+01	NAL	avg below SSL	
81	Vanadium	3.23E+01	2.63E+01	10	9	3.70E+01	4.03E+00	NAL	Average<bkg	
99	Molybdenum	1.60E+01	7.09E+00	62	7		6.00E+00	NAL		Excluded
99	Silver	1.03E+01	4.44E+00	68	7	2.30E+00	2.50E+00	NAL		Excluded
99	Cobalt	8.60E+00	5.10E+00	13	13	1.30E+01	8.06E-01	NAL	Average<bkg	
99	Manganese	1.23E+03	3.13E+02	68	67	8.20E+02	9.11E+01	NAL	Average<bkg	
99	Mercury	9.53E+00	4.20E+00	68	6	1.30E-01	5.96E+00	MCL	avg below SSL	
99	Nickel	9.05E+01	3.45E+01	68	22	2.10E+01	7.73E+01	NAL	avg below SSL	
99	Vanadium	3.49E+01	2.64E+01	13	13	3.70E+01	4.03E+00	NAL	Average<bkg	
135	PCB, Total	3.60E+02	5.14E+01	25	21		4.4574	RSLMCL		Excluded
138	Silver	1.65E+01	4.79E+00	148	21	2.30E+00	2.50E+00	NAL		Excluded
138	Cobalt	1.76E+01	7.59E+00	13	13	1.30E+01	8.06E-01	NAL	Average<bkg	
138	Iron	4.08E+04	1.35E+04	135	135	2.80E+04	36594	RSL	avg below SSL and bkg	
138	Manganese	1.23E+03	3.63E+02	135	134	8.20E+02	9.11E+01	NAL	Average<bkg	
138	Mercury	2.13E+01	4.89E+00	148	28	1.30E-01	5.96E+00	MCL	avg below SSL	
138	Nickel	1.13E+02	3.54E+01	148	41	2.10E+01	7.73E+01	NAL	avg below SSL	
138	Vanadium	4.28E+01	2.48E+01	13	13	3.70E+01	4.03E+00	NAL	Average<bkg	
153	Silver	1.32E+01	5.37E+00	13	4	2.30E+00	2.50E+00	NAL		Excluded
153	Cobalt	8.10E+00	7.70E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkg	
153	Manganese	1.02E+03	3.00E+02	13	13	8.20E+02	9.11E+01	NAL	Average<bkg	
153	Nickel	9.92E+01	4.18E+01	13	5	2.10E+01	7.73E+01	NAL	avg below SSL	
153	Vanadium	2.92E+01	2.90E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkg	
154	Naphthalene	4.30E-02	4.30E-02	1	1		3.30E-02	NAL		Excluded

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
154	Cobalt	5.70E+00	5.00E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bk-g	
154	Manganese	1.02E+03	2.71E+02	10	10	8.20E+02	9.11E+01	NAL	Average<bk-g	
154	Nickel	9.89E+01	3.83E+01	10	4	2.10E+01	7.73E+01	NAL	avg below SSL	
154	Vanadium	2.70E+01	2.07E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bk-g	
155	Silver	1.55E+01	5.59E+00	11	2	2.30E+00	2.50E+00	NAL		Excluded
155	Cobalt	2.30E+00	2.30E+00	1	1	1.30E+01	8.06E-01	NAL	Average<bk-g	
155	Manganese	2.94E+02	2.10E+02	8	8	8.20E+02	9.11E+01	NAL	Average<bk-g	
155	Nickel	9.21E+01	2.87E+01	11	4	2.10E+01	7.73E+01	NAL	avg below SSL	
155	PCB, Total	1.70E+01	3.39E+00	11	2		4.4574	RSLMCL	avg below SSL	
155	Vanadium	4.80E+00	4.80E+00	1	1	3.70E+01	4.03E+00	NAL	Average<bk-g	
156	Silver	1.19E+01	4.71E+00	24	3	2.30E+00	2.50E+00	NAL		Excluded
156	Cobalt	1.72E+01	9.23E+00	3	3	1.30E+01	8.06E-01	NAL	Average<bk-g	
156	Manganese	2.83E+03	4.17E+02	24	24	8.20E+02	9.11E+01	NAL	Average<bk-g	
156	Mercury	9.87E+00	4.70E+00	24	4	1.30E-01	5.96E+00	MCL	avg below SSL	
156	Vanadium	3.28E+01	2.35E+01	3	3	3.70E+01	4.03E+00	NAL	Average<bk-g	
158	Silver	1.47E+01	4.44E+00	62	10	2.30E+00	2.50E+00	NAL		Excluded
158	Cobalt	3.65E+01	9.61E+00	10	10	1.30E+01	8.06E-01	NAL	Average<bk-g	
158	Manganese	1.86E+03	4.02E+02	62	61	8.20E+02	9.11E+01	NAL	Average<bk-g	
158	Mercury	1.05E+01	4.46E+00	62	10	1.30E-01	5.96E+00	MCL	avg below SSL	
158	Nickel	1.32E+02	3.56E+01	62	19	2.10E+01	7.73E+01	NAL	avg below SSL	
158	Vanadium	3.53E+01	2.81E+01	10	10	3.70E+01	4.03E+00	NAL	Average<bk-g	
160	Silver	1.13E+01	4.48E+00	5	3	2.30E+00	2.50E+00	NAL		Excluded
160	Cobalt	4.90E+00	4.25E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bk-g	
160	Manganese	3.77E+02	2.90E+02	5	5	8.20E+02	9.11E+01	NAL	Average<bk-g	
160	Vanadium	2.33E+01	1.96E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bk-g	
163	Silver	1.05E+01	4.53E+00	30	4	2.30E+00	2.50E+00	NAL		Excluded
163	Cobalt	1.17E+01	6.70E+00	5	5	1.30E+01	8.06E-01	NAL	Average<bk-g	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
163	Manganese	6.62E+02	2.59E+02	30	30	8.20E+02	9.11E+01	NAL	Average<bkg	
163	Mercury	7.53E+00	4.33E+00	30	3	1.30E-01	5.96E+00	MCL	avg below SSL	
163	Nickel	7.81E+01	3.70E+01	30	10	2.10E+01	7.73E+01	NAL	avg below SSL	
163	Total PAH	2.85E-01	2.42E-01	2	1		2.46E-01	NAL	avg below SSL	
163	Vanadium	3.75E+01	2.72E+01	5	5	3.70E+01	4.03E+00	NAL	Average<bkg	
165	Arsenic	1.30E+02	2.72E+01	19	18	7.90E+00	1.66E+01	MCL	COPC	
165	Naphthalene	4.70E+00	5.84E-01	17	4		3.30E-02	NAL		Excluded
165	Silver	8.33E+01	1.14E+01	19	4	2.30E+00	2.50E+00	NAL		Excluded
165	Total PAH	1.87E+00	1.87E+00	31	5		2.46E-01	NAL		Excluded
165	Cobalt	1.31E+01	3.99E+00	12	12	1.30E+01	8.06E-01	NAL	Average<bkg	
165	Manganese	6.96E+02	2.34E+02	13	13	8.20E+02	9.11E+01	NAL	Average<bkg	
165	PCB, Total	5.10E+01	1.16E+00	132	18		4.4574	RSLMCL	avg below SSL	
165	Vanadium	3.48E+01	1.22E+01	13	13	3.70E+01	4.03E+00	NAL	Average<bkg	
169	Molybdenum	6.27E+00	6.27E+00	38	7		6.00E+00	NAL		Excluded
169	Arsenic	2.03E+01	7.04E+00	58	46	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
169	Cobalt	7.80E+01	8.58E+00	26	22	1.30E+01	8.06E-01	NAL	Average<bkg	
169	Iron	4.16E+04	1.53E+04	58	58	2.80E+04	36594	RSL	avg below SSL and bkg	
169	Manganese	1.58E+03	2.95E+02	58	56	8.20E+02	9.11E+01	NAL	Average<bkg	
169	Mercury	7.87E+00	3.02E+00	58	7	1.30E-01	5.96E+00	MCL	avg below SSL	
169	Nickel	8.04E+02	6.61E+01	58	43	2.10E+01	7.73E+01	NAL	avg below SSL	
169	PCB, Total	1.00E+01	1.68E+00	31	20		4.4574	RSLMCL	avg below SSL	
169	Vanadium	4.49E+01	2.43E+01	26	26	3.70E+01	4.03E+00	NAL	Average<bkg	
172	Cobalt	1.09E+01	7.75E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkg	
172	Manganese	8.52E+02	5.42E+02	2	2	8.20E+02	9.11E+01	NAL	Average<bkg	
172	Vanadium	3.60E+01	3.13E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkg	
176	Arsenic	4.86E+01	8.77E+00	16	8	7.90E+00	1.66E+01	MCL	avg below SSL	
176	Cobalt	9.70E+00	6.30E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkg	

avg = average
bkg = background (DOE 2011)
COPC = chemical of potential concern
MCL = maximum contaminant level (DOE 2011)
NAL = no action level (DOE 2011)
RSL = regional screening level
ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
176	Manganese	3.01E+02	1.86E+02	16	16	8.20E+02	9.11E+01	NAL	Average<bkg	
176	Nickel	1.07E+02	4.71E+01	16	6	2.10E+01	7.73E+01	NAL	avg below SSL	
176	Vanadium	2.81E+01	2.81E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkg	
177	Silver	1.44E+01	4.54E+00	9	4	2.30E+00	2.50E+00	NAL		Excluded
177	Cobalt	6.80E+00	6.70E+00	3	3	1.30E+01	8.06E-01	NAL	Average<bkg	
177	Manganese	9.58E+02	4.40E+02	9	9	8.20E+02	9.11E+01	NAL	Average<bkg	
177	Mercury	1.05E+01	4.22E+00	9	4	1.30E-01	5.96E+00	MCL	avg below SSL	
177	Nickel	8.47E+01	3.89E+01	9	6	2.10E+01	7.73E+01	NAL	avg below SSL	
177	Vanadium	3.44E+01	2.79E+01	3	3	3.70E+01	4.03E+00	NAL	Average<bkg	
180	Silver	1.17E+01	4.90E+00	129	18	2.30E+00	2.50E+00	NAL		Excluded
180	Arsenic	1.38E+02	8.23E+00	129	60	7.90E+00	1.66E+01	MCL	avg below SSL	
180	Cobalt	1.96E+01	8.34E+00	11	11	1.30E+01	8.06E-01	NAL	Average<bkg	
180	Lead	1.99E+03	4.70E+01	129	121	2.30E+01	798	RSL MCL	avg below SSL	
180	Manganese	1.99E+03	3.35E+02	129	124	8.20E+02	9.11E+01	NAL	Average<bkg	
180	Mercury	8.28E+00	4.68E+00	129	15	1.30E-01	5.96E+00	MCL	avg below SSL	
180	Nickel	1.08E+02	3.95E+01	129	42	2.10E+01	7.73E+01	NAL	avg below SSL	
180	Vanadium	4.85E+01	2.93E+01	11	11	3.70E+01	4.03E+00	NAL	Average<bkg	
181	Cobalt	8.70E+00	7.18E+00	54	54	1.30E+01	8.06E-01	NAL	Average<bkg	
181	Manganese	5.51E+02	4.35E+02	54	54	8.20E+02	9.11E+01	NAL	Average<bkg	
181	Vanadium	2.52E+01	1.58E+01	54	54	3.70E+01	4.03E+00	NAL	Average<bkg	
194	Molybdenum	1.96E+01	6.94E+00	734	70		6.00E+00	NAL		Excluded
194	Naphthalene	4.80E-02	4.80E-02	73	1		3.30E-02	NAL		Excluded
194	Silver	1.70E+01	4.97E+00	742	122	2.30E+00	2.50E+00	NAL		Excluded
194	Arsenic	3.52E+01	6.75E+00	742	346	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
194	Cobalt	8.31E+01	8.35E+00	76	76	1.30E+01	8.06E-01	NAL	Average<bkg	
194	Iron	4.73E+04	1.22E+04	741	741	2.80E+04	36594	RSL	avg below SSL and bkg	
194	Manganese	3.11E+04	4.08E+02	741	734	8.20E+02	9.11E+01	NAL	Average<bkg	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
194	Mercury	8.94E+00	4.58E+00	742	79	1.30E-01	5.96E+00	MCL	avg below SSL	
194	Nickel	1.08E+02	3.55E+01	742	168	2.10E+01	7.73E+01	NAL	avg below SSL	
194	PCB, Total	1.80E+01	2.29E+00	732	2		4.4574	RSLMCL	avg below SSL	
194	Vanadium	8.63E+01	2.88E+01	77	77	3.70E+01	4.03E+00	NAL	Average<bkg	
195	Silver	1.31E+01	4.77E+00	489	53	2.30E+00	2.50E+00	NAL		Excluded
195	Arsenic	2.46E+01	6.06E+00	489	139	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
195	Cobalt	2.77E+01	6.86E+00	40	40	1.30E+01	8.06E-01	NAL	Average<bkg	
195	Iron	4.60E+04	1.05E+04	489	489	2.80E+04	36594	RSL	avg below SSL and bkg	
195	Manganese	1.42E+03	2.19E+02	489	478	8.20E+02	9.11E+01	NAL	Average<bkg	
195	Mercury	8.43E+00	4.64E+00	489	43	1.30E-01	5.96E+00	MCL	avg below SSL	
195	Nickel	1.02E+02	3.58E+01	489	95	2.10E+01	7.73E+01	NAL	avg below SSL	
195	Vanadium	7.97E+01	2.66E+01	40	40	3.70E+01	4.03E+00	NAL	Average<bkg	
196	Naphthalene	1.10E+00	1.78E-01	31	2		3.30E-02	NAL		Excluded
196	Total PAH	9.04E+00	1.13E+00	29	6		2.46E-01	NAL		Excluded
196	Antimony	1.21E+02	7.81E+00	74	30	2.10E-01	1.55E+01	MCL	avg below SSL	
196	Cadmium	1.16E+02	1.95E+00	80	40	2.10E-01	2.14E+01	MCL	avg below SSL	
196	Cobalt	1.12E+02	6.50E+00	72	72	1.30E+01	8.06E-01	NAL	Average<bkg	
196	Manganese	1.98E+03	3.41E+02	72	72	8.20E+02	9.11E+01	NAL	Average<bkg	
196	Nickel	5.87E+02	3.91E+01	74	74	2.10E+01	7.73E+01	NAL	avg below SSL	
196	Selenium	6.29E+01	1.40E+00	80	50	7.00E-01	1.48E+01	MCL	avg below SSL	
196	Silver	6.54E+01	1.21E+00	80	18	2.30E+00	2.50E+00	NAL	avg below SSL and bkg	
196	Thallium	1.14E+02	1.78E+00	72	10	2.10E-01	8.12E+00	MCL	avg below SSL	
196	Vanadium	4.38E+01	2.11E+01	72	72	3.70E+01	4.03E+00	NAL	Average<bkg	
196	Zinc	1.65E+03	8.01E+01	74	74	6.00E+01	1.11E+03	NAL	avg below SSL	
200	Silver	9.47E+00	4.63E+00	63	7	2.30E+00	2.50E+00	NAL		Excluded
200	Cobalt	8.20E+00	5.95E+00	6	6	1.30E+01	8.06E-01	NAL	Average<bkg	
200	Manganese	1.21E+03	3.03E+02	63	63	8.20E+02	9.11E+01	NAL	Average<bkg	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
200	Mercury	6.93E+00	4.62E+00	63	8	1.30E+01	5.96E+00	MCL	avg below SSL	
200	Nickel	2.60E+02	5.00E+01	63	25	2.10E+01	7.73E+01	NAL	avg below SSL	
200	Vanadium	3.57E+01	2.31E+01	6	6	3.70E+01	4.03E+00	NAL	Average<bkg	
204	Antimony	1.72E+01	6.18E+00	18	4	2.10E+01	1.55E+01	MCL	avg below SSL	
204	Cobalt	9.02E+00	4.77E+00	18	16	1.30E+01	8.06E-01	NAL	Average<bkg	
204	Iron	4.19E+04	1.40E+04	18	18	2.80E+04	36594	RSL	avg below SSL and bkg	
204	Manganese	4.84E+02	2.67E+02	18	18	8.20E+02	9.11E+01	NAL	Average<bkg	
204	PCB, Total	7.90E+01	1.41E+00	80	7		4.4574	RSLMCL	avg below SSL	
204	Uranium	1.31E+04	6.12E+02	16	16	4.60E+00	7.70E+02	MCL	avg below SSL	
204	Vanadium	7.55E+01	2.56E+01	18	18	3.70E+01	4.03E+00	NAL	Average<bkg	
211	Cobalt	4.95E+01	1.32E+01	6	6	1.30E+01	8.06E-01	NAL		Excluded
211	PCB, Total	1.40E+02	5.51E+00	35	10		4.4574	RSLMCL		Excluded
211	Manganese	6.41E+02	2.14E+02	26	24	8.20E+02	9.11E+01	NAL	Average<bkg	
211	Nickel	8.87E+01	3.48E+01	26	10	2.10E+01	7.73E+01	NAL	avg below SSL	
211	Vanadium	2.51E+01	2.10E+01	6	6	3.70E+01	4.03E+00	NAL	Average<bkg	
212	Silver	1.55E+01	4.24E+00	18	6	2.30E+00	2.50E+00	NAL		Excluded
212	Cobalt	1.76E+01	7.72E+00	8	8	1.30E+01	8.06E-01	NAL	Average<bkg	
212	Iron	4.14E+04	1.93E+04	18	18	2.80E+04	36594	RSL	avg below SSL and bkg	
212	Manganese	1.44E+03	3.55E+02	18	18	8.20E+02	9.11E+01	NAL	Average<bkg	
212	Mercury	6.94E+00	3.20E+00	18	6	1.30E+01	5.96E+00	MCL	avg below SSL	
212	Nickel	8.69E+01	2.91E+01	18	10	2.10E+01	7.73E+01	NAL	avg below SSL	
212	Vanadium	5.33E+01	2.82E+01	8	8	3.70E+01	4.03E+00	NAL	Average<bkg	
213	Silver	1.32E+01	6.12E+00	19	5	2.30E+00	2.50E+00	NAL		Excluded
213	Cobalt	3.80E+00	3.80E+00	1	1	1.30E+01	8.06E-01	NAL	Average<bkg	
213	Manganese	2.10E+03	3.20E+02	19	18	8.20E+02	9.11E+01	NAL	Average<bkg	
213	Nickel	9.10E+01	3.98E+01	19	5	2.10E+01	7.73E+01	NAL	avg below SSL	
213	Vanadium	1.31E+01	1.31E+01	1	1	3.70E+01	4.03E+00	NAL	Average<bkg	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
214	Cobalt	4.70E+00	4.70E+00	1	1	1.30E+01	8.06E-01	NAL	Average<bkg	
214	Manganese	6.12E+02	5.39E+02	2	2	8.20E+02	9.11E+01	NAL	Average<bkg	
214	Vanadium	1.70E+01	1.70E+01	1	1	3.70E+01	4.03E+00	NAL	Average<bkg	
215	Silver	9.51E+00	4.55E+00	20	4	2.30E+00	2.50E+00	NAL		Excluded
215	Total PAH	5.00E-01	4.04E-01	11	11		2.46E-01	NAL		Excluded
215	Cobalt	6.80E+00	5.07E+00	3	3	1.30E+01	8.06E-01	NAL	Average<bkg	
215	Iron	3.87E+04	1.36E+04	20	20	2.80E+04	36594	RSL	avg below SSL and bkg	
215	Manganese	6.72E+02	3.49E+02	20	20	8.20E+02	9.11E+01	NAL	Average<bkg	
215	Vanadium	2.05E+01	1.63E+01	3	3	3.70E+01	4.03E+00	NAL	Average<bkg	
216	Cobalt	6.00E+00	6.00E+00	1	1	1.30E+01	8.06E-01	NAL	Average<bkg	
216	Manganese	6.64E+02	4.16E+02	1	1	8.20E+02	9.11E+01	NAL	Average<bkg	
216	Vanadium	2.66E+01	2.66E+01	1	1	3.70E+01	4.03E+00	NAL	Average<bkg	
217	Cobalt	1.90E+02	1.38E+01	32	31	1.30E+01	8.06E-01	NAL		Excluded
217	Silver	1.61E+01	4.14E+00	95	16	2.30E+00	2.50E+00	NAL		Excluded
217	Arsenic	2.13E+01	5.82E+00	90	48	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
217	Iron	6.04E+04	1.57E+04	95	95	2.80E+04	36594	RSL	avg below SSL and bkg	
217	Manganese	2.05E+03	3.59E+02	95	92	8.20E+02	9.11E+01	NAL	Average<bkg	
217	Mercury	9.20E+00	3.60E+00	95	15	1.30E-01	5.96E+00	MCL	avg below SSL	
217	Nickel	1.31E+02	3.53E+01	95	51	2.10E+01	7.73E+01	NAL	avg below SSL	
217	Total PAH	7.37E-01	1.76E-01	30	8		2.46E-01	NAL	avg below SSL	
217	Vanadium	4.38E+01	2.14E+01	32	31	3.70E+01	4.03E+00	NAL	Average<bkg	
219	Cobalt	3.70E+00	2.90E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkg	
219	Manganese	2.12E+02	1.15E+02	3	3	8.20E+02	9.11E+01	NAL	Average<bkg	
219	Vanadium	1.52E+01	1.35E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkg	
221	Cobalt	1.44E+02	4.05E+01	4	4	1.30E+01	8.06E-01	NAL		Excluded
221	Silver	9.74E+00	4.58E+00	32	5	2.30E+00	2.50E+00	NAL		Excluded
221	Total PAH	1.02E+00	1.02E+00	1	1		2.46E-01	NAL		Excluded

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
221	Vanadium	1.08E+02	4.57E+01	4	4	3.70E+01	4.03E+00	NAL		Excluded
221	Arsenic	2.84E+01	7.13E+00	32	17	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
221	Iron	7.99E+04	1.62E+04	32	32	2.80E+04	36594	RSL	avg below SSL and bkg	
221	Manganese	1.31E+04	6.68E+02	32	32	8.20E+02	9.11E+01	NAL	Average<bkg	
221	Mercury	1.23E+01	4.80E+00	32	5	1.30E+01	5.96E+00	MCL	avg below SSL	
221	Nickel	1.39E+02	3.84E+01	32	7	2.10E+01	7.73E+01	NAL	avg below SSL	
222	Cobalt	1.01E+01	6.68E+00	10	10	1.30E+01	8.06E-01	NAL	Average<bkg	
222	Manganese	8.89E+02	3.08E+02	37	37	8.20E+02	9.11E+01	NAL	Average<bkg	
222	Nickel	9.19E+01	3.66E+01	37	19	2.10E+01	7.73E+01	NAL	avg below SSL	
222	Vanadium	3.00E+01	2.14E+01	10	10	3.70E+01	4.03E+00	NAL	Average<bkg	
224	Naphthalene	6.00E-01	2.27E-01	4	3		3.30E-02	NAL		Excluded
224	PCB, Total	4.75E+02	1.90E+01	33	11		4.4574	RSLMCL		Excluded
224	Total PAH	4.53E+01	1.16E+01	4	4		2.46E-01	NAL		Excluded
224	Cobalt	7.81E+00	7.04E+00	5	5	1.30E+01	8.06E-01	NAL	Average<bkg	
224	Manganese	1.94E+03	4.11E+02	24	24	8.20E+02	9.11E+01	NAL	Average<bkg	
224	Mercury	6.89E+00	4.25E+00	24	5	1.30E-01	5.96E+00	MCL	avg below SSL	
224	Nickel	1.08E+02	3.62E+01	24	10	2.10E+01	7.73E+01	NAL	avg below SSL	
224	Vanadium	3.05E+01	2.46E+01	5	5	3.70E+01	4.03E+00	NAL	Average<bkg	
225	Cobalt	7.30E+00	7.30E+00	1	1	1.30E+01	8.06E-01	NAL	Average<bkg	
225	Manganese	8.55E+02	5.09E+02	3	3	8.20E+02	9.11E+01	NAL	Average<bkg	
225	Vanadium	2.69E+01	2.69E+01	1	1	3.70E+01	4.03E+00	NAL	Average<bkg	
226	Molybdenum	2.09E+01	7.10E+00	44	6		6.00E+00	NAL		Excluded
226	Cobalt	1.23E+01	6.87E+00	6	6	1.30E+01	8.06E-01	NAL	Average<bkg	
226	Manganese	2.35E+03	4.36E+02	44	44	8.20E+02	9.11E+01	NAL	Average<bkg	
226	Mercury	9.74E+00	4.48E+00	44	5	1.30E-01	5.96E+00	MCL	avg below SSL	
226	Nickel	5.96E+02	7.72E+01	44	26	2.10E+01	7.73E+01	NAL	avg below SSL	
226	PCB, Total	5.00E+00	1.66E+00	67	12		4.4574	RSLMCL	avg below SSL	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
226	Uranium	1.29E+03	9.45E+01	45	34	4.60E+00	7.70E+02	MCL	avg below SSL	
226	Vanadium	2.92E+01	1.94E+01	6	6	3.70E+01	4.03E+00	NAL	Average<bkg	
227	Silver	1.01E+01	4.06E+00	70	6	2.30E+00	2.50E+00	NAL		Excluded
227	Cobalt	2.44E+01	6.51E+00	19	18	1.30E+01	8.06E-01	NAL	Average<bkg	
227	Manganese	2.39E+03	3.67E+02	70	70	8.20E+02	9.11E+01	NAL	Average<bkg	
227	Mercury	8.41E+00	3.78E+00	70	6	1.30E-01	5.96E+00	MCL	avg below SSL	
227	Nickel	6.53E+02	6.31E+01	70	38	2.10E+01	7.73E+01	NAL	avg below SSL	
227	PCB, Total	1.26E+01	1.93E+00	142	54		4.4574	RSLMCL	avg below SSL	
227	Total PAH	3.38E-01	1.83E-01	19	7		2.46E-01	NAL	avg below SSL	
227	Vanadium	3.92E+01	2.23E+01	19	19	3.70E+01	4.03E+00	NAL	Average<bkg	
228	Silver	1.16E+01	4.58E+00	28	5	2.30E+00	2.50E+00	NAL		Excluded
228	Arsenic	2.79E+01	6.49E+00	28	11	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
228	Cobalt	6.30E+00	4.60E+00	6	6	1.30E+01	8.06E-01	NAL	Average<bkg	
228	Iron	3.77E+04	1.21E+04	28	28	2.80E+04	36594	RSL	avg below SSL and bkg	
228	Manganese	9.97E+02	2.92E+02	28	28	8.20E+02	9.11E+01	NAL	Average<bkg	
228	Mercury	9.37E+00	4.18E+00	28	4	1.30E-01	5.96E+00	MCL	avg below SSL	
228	Nickel	7.92E+01	3.58E+01	28	13	2.10E+01	7.73E+01	NAL	avg below SSL	
228	Vanadium	2.51E+01	1.28E+01	6	6	3.70E+01	4.03E+00	NAL	Average<bkg	
229	Naphthalene	9.00E-02	9.00E-02	4	1		3.30E-02	NAL		Excluded
229	Total PAH	1.69E+00	4.66E-01	4	3		2.46E-01	NAL		Excluded
229	Arsenic	2.12E+01	6.94E+00	38	16	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
229	Cobalt	7.70E+00	5.18E+00	4	4	1.30E+01	8.06E-01	NAL	Average<bkg	
229	Manganese	6.81E+02	2.94E+02	38	38	8.20E+02	9.11E+01	NAL	Average<bkg	
229	Mercury	9.27E+00	4.69E+00	38	5	1.30E-01	5.96E+00	MCL	avg below SSL	
229	Nickel	9.93E+01	4.04E+01	38	13	2.10E+01	7.73E+01	NAL	avg below SSL	
229	Vanadium	3.13E+01	1.95E+01	4	4	3.70E+01	4.03E+00	NAL	Average<bkg	
483	Silver	1.12E+01	4.42E+00	12	3	2.30E+00	2.50E+00	NAL		Excluded

avg = average
bkg = background (DOE 2011)
COPC = chemical of potential concern
MCL = maximum contaminant level (DOE 2011)
NAL = no action level (DOE 2011)
RSL = regional screening level
ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
483	Cobalt	1.10E+01	7.43E+00	3	3	1.30E+01	8.06E-01	NAL	Average<bkkg	
483	Manganese	7.61E+02	2.48E+02	12	11	8.20E+02	9.11E+01	NAL	Average<bkkg	
483	Nickel	1.17E+02	3.76E+01	12	5	2.10E+01	7.73E+01	NAL	avg below SSL	
483	Vanadium	2.16E+01	1.98E+01	3	3	3.70E+01	4.03E+00	NAL	Average<bkkg	
488	Cobalt	5.00E+00	3.75E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkkg	
488	Manganese	3.64E+02	1.80E+02	7	7	8.20E+02	9.11E+01	NAL	Average<bkkg	
488	PCB, Total	1.03E+01	2.81E+00	8	1		4.4574	RSLMCL	avg below SSL	
488	Vanadium	2.47E+01	2.00E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkkg	
489	Cobalt	7.30E+00	6.90E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkkg	
489	Manganese	6.80E+02	3.59E+02	3	3	8.20E+02	9.11E+01	NAL	Average<bkkg	
489	Nickel	7.88E+01	3.77E+01	3	3	2.10E+01	7.73E+01	NAL	avg below SSL	
489	Vanadium	2.70E+01	2.53E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkkg	
492	PCB, Total	4.41E+01	5.28E+00	15	3		4.4574	RSLMCL		Excluded
492	Cobalt	1.07E+01	6.35E+00	7	7	1.30E+01	8.06E-01	NAL	Average<bkkg	
492	Manganese	4.26E+02	3.40E+02	7	7	8.20E+02	9.11E+01	NAL	Average<bkkg	
492	Uranium	1.77E+03	2.13E+02	16	6	4.60E+00	7.70E+02	MCL	avg below SSL	
492	Vanadium	4.32E+01	2.30E+01	7	7	3.70E+01	4.03E+00	NAL	Average<bkkg	
493	Total PAH	5.00E-01	4.22E-01	15	13		2.46E-01	NAL		Excluded
493	Cobalt	3.79E+01	5.81E+00	22	21	1.30E+01	8.06E-01	NAL	Average<bkkg	
493	Manganese	3.55E+03	4.29E+02	24	24	8.20E+02	9.11E+01	NAL	Average<bkkg	
493	Nickel	2.13E+02	2.45E+01	24	22	2.10E+01	7.73E+01	NAL	avg below SSL	
493	Vanadium	4.05E+01	2.52E+01	22	22	3.70E+01	4.03E+00	NAL	Average<bkkg	
517	Fluoranthene	6.70E+02	3.50E+02	4	1		9.12E+01	NAL		Excluded
517	Pyrene	5.40E+02	3.18E+02	4	1		3.61E+01	NAL		Excluded
517	Cobalt	9.80E+00	5.68E+00	6	6	1.30E+01	8.06E-01	NAL	Average<bkkg	
517	Manganese	5.62E+02	2.98E+02	7	7	8.20E+02	9.11E+01	NAL	Average<bkkg	
517	Nickel	1.72E+02	3.92E+01	7	6	2.10E+01	7.73E+01	NAL	avg below SSL	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
517	Vanadium	2.67E+01	2.54E+01	6	6	3.70E+01	4.03E+00	NAL	Average<bkg	
517	Zinc	1.25E+03	1.87E+02	7	7	6.00E+01	1.11E+03	NAL	avg below SSL	
518	Total PAH	1.27E+01	1.88E+00	27	2		2.46E-01	NAL		Excluded
518	Acenaphthene	3.10E+01	2.03E+00	27	7		8.07E+00	NAL	avg below SSL	
518	Cobalt	1.76E+01	5.35E+00	11	11	1.30E+01	8.06E-01	NAL	Average<bkg	
518	Fluorene	2.70E+01	1.83E+00	27	6		9.41E+00	NAL	avg below SSL	
518	Manganese	4.93E+02	3.40E+02	11	11	8.20E+02	9.11E+01	NAL	Average<bkg	
518	Pyrene	1.50E+02	1.19E+01	27	17		3.61E+01	NAL	avg below SSL	
518	Vanadium	2.54E+01	1.60E+01	11	11	3.70E+01	4.03E+00	NAL	Average<bkg	
520	Anthracene	1.56E+02	1.56E+02	14	1		1.20E+02	NAL		Excluded
520	Fluoranthene	6.36E+02	3.32E+02	8	1		9.12E+01	NAL		Excluded
520	Nickel	8.10E+02	7.89E+01	154	82	2.10E+01	7.73E+01	NAL		Excluded
520	Pyrene	6.63E+02	2.99E+02	14	1		3.61E+01	NAL		Excluded
520	Silver	1.40E+01	4.52E+00	154	17	2.30E+00	2.50E+00	NAL		Excluded
520	Cobalt	1.79E+01	4.87E+00	30	30	1.30E+01	8.06E-01	NAL	Average<bkg	
520	Manganese	1.76E+03	3.00E+02	154	153	8.20E+02	9.11E+01	NAL	Average<bkg	
520	Mercury	1.19E+01	4.23E+00	154	18	1.30E-01	5.96E+00	MCL	avg below SSL	
520	Vanadium	6.25E+01	2.14E+01	30	30	3.70E+01	4.03E+00	NAL	Average<bkg	
531	Arsenic	4.68E+01	9.97E+00	14	9	7.90E+00	1.66E+01	MCL	avg below SSL	
531	Cobalt	6.60E+00	4.90E+00	2	2	1.30E+01	8.06E-01	NAL	Average<bkg	
531	Iron	5.68E+04	1.55E+04	14	14	2.80E+04	36594	RSL	avg below SSL and bkg	
531	Manganese	8.65E+02	2.83E+02	14	14	8.20E+02	9.11E+01	NAL	Average<bkg	
531	Nickel	1.62E+02	5.37E+01	14	6	2.10E+01	7.73E+01	NAL	avg below SSL	
531	Vanadium	2.52E+01	1.71E+01	2	2	3.70E+01	4.03E+00	NAL	Average<bkg	
531	Zinc	2.45E+03	7.78E+02	14	14	6.00E+01	1.11E+03	NAL	avg below SSL	
541	Naphthalene	1.80E+00	2.71E-01	64	2		3.30E-02	NAL		Excluded
541	PCB, Total	9.40E+01	1.40E+01	437	93		4.4574	RSLMCL		Excluded

avg = average
bkg = background (DOE 2011)
COPC = chemical of potential concern
MCL = maximum contaminant level (DOE 2011)
NAL = no action level (DOE 2011)
RSL = regional screening level
ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
541	Arsenic	2.33E+01	5.60E+00	67	58	7.90E+00	1.66E+01	MCL	avg below SSL and bkg	
541	Cobalt	1.23E+01	6.06E+00	67	67	1.30E+01	8.06E-01	NAL	Average<bkg	
541	Manganese	8.21E+02	3.15E+02	67	67	8.20E+02	9.11E+01	NAL	Average<bkg	
541	Total PAH	7.63E+00	1.67E-01	435	60		2.46E-01	NAL	avg below SSL	
541	Uranium	2.02E+04	7.22E+02	436	411	4.60E+00	7.70E+02	MCL	avg below SSL	
541	Vanadium	5.17E+01	2.66E+01	67	67	3.70E+01	4.03E+00	NAL	Average<bkg	
561	Naphthalene	5.50E-01	2.05E-01	150	2		3.30E-02	NAL		Excluded
561	Antimony	2.20E+01	6.05E-01	162	156	2.10E-01	1.55E+01	MCL	avg below SSL	
561	Arsenic	3.96E+01	9.00E+00	162	158	7.90E+00	1.66E+01	MCL	avg below SSL	
561	Cobalt	3.10E+01	6.85E+00	162	162	1.30E+01	8.06E-01	NAL	Average<bkg	
561	Iron	4.85E+04	1.37E+04	162	162	2.80E+04	36594	RSL	avg below SSL and bkg	
561	Manganese	5.23E+03	5.90E+02	162	162	8.20E+02	9.11E+01	NAL	Average<bkg	
561	PCB, Total	7.90E+01	9.88E-01	676	57		4.4574	RSLMCL	avg below SSL	
561	Total PAH	2.63E+00	2.18E-01	151	13		2.46E-01	NAL	avg below SSL	
561	Uranium	6.41E+03	6.17E+01	685	268	4.60E+00	7.70E+02	MCL	avg below SSL	
561	Vanadium	8.69E+01	2.53E+01	162	162	3.70E+01	4.03E+00	NAL	Average<bkg	
561	Zinc	1.13E+03	6.97E+01	162	162	6.00E+01	1.11E+03	NAL	avg below SSL	
562	Cobalt	9.29E+00	4.74E+00	27	27	1.30E+01	8.06E-01	NAL	Average<bkg	
562	Manganese	5.49E+02	3.81E+02	27	27	8.20E+02	9.11E+01	NAL	Average<bkg	
562	Vanadium	2.80E+01	1.48E+01	27	27	3.70E+01	4.03E+00	NAL	Average<bkg	
563	Cobalt	8.91E+00	6.72E+00	8	8	1.30E+01	8.06E-01	NAL	Average<bkg	
563	Manganese	5.80E+02	4.00E+02	8	8	8.20E+02	9.11E+01	NAL	Average<bkg	
563	Vanadium	2.53E+01	1.96E+01	8	8	3.70E+01	4.03E+00	NAL	Average<bkg	
564	Arsenic	4.30E+01	2.54E+01	4	4	7.90E+00	1.66E+01	MCL	COPC	
564	Molybdenum	7.84E+00	6.88E+00	3	3		6.00E+00	NAL		Excluded
564	Vanadium	8.06E+01	6.87E+01	4	4	3.70E+01	4.03E+00	NAL		Excluded
564	Cobalt	6.60E+00	5.58E+00	4	4	1.30E+01	8.06E-01	NAL	Average<bkg	

avg = average
bkg = background (DOE 2011)
COPC = chemical of potential concern
MCL = maximum contaminant level (DOE 2011)
NAL = no action level (DOE 2011)
RSL = regional screening level
ssl = soil screening level

Table D1.1 Step 1 Groundwater Protection Screening Process for RGA Modeling (Continued)

SWMU	Chemical	Maximum	Average of All Samples	Total Samples	Total Detects	Background (mg/kg)	RGA SSL (mg/kg)	Basis	Screening, Step 1	Step 2
564	Iron	3.66E+04	2.59E+04	4	4	2.80E+04	36594	RSL	avg below SSL and bkg	
564	Manganese	4.87E+02	3.77E+02	4	4	8.20E+02	9.11E+01	NAL	Average<bkg	
567	Cobalt	1.13E+01	6.79E+00	11	11	1.30E+01	8.06E-01	NAL	Average<bkg	
567	Manganese	1.32E+03	5.83E+02	11	11	8.20E+02	9.11E+01	NAL	Average<bkg	
567	Vanadium	3.05E+01	2.27E+01	11	11	3.70E+01	4.03E+00	NAL	Average<bkg	

avg = average
 bkg = background (DOE 2011)
 COPC = chemical of potential concern
 MCL = maximum contaminant level (DOE 2011)
 NAL = no action level (DOE 2011)
 RSL = regional screening level
 ssl = soil screening level