2.0 Identification of Constituents of Potential Ecological Concern

The SLERA for the IMR ranges initially identified a number of COPECs in soil for each of the ranges as well as the surface water and sediment for Remount Creek and its tributaries. COPECs were initially identified by calculating screening-level hazard quotients, which were developed via a three-step process as follows:

- Comparison of maximum detected constituent concentrations to ecological screening values (ESV);
- Identification of essential macro-nutrients; and
- Comparison to naturally occurring background concentrations.

Constituents that were detected in environmental media at the IMR ranges were evaluated against the ESVs by calculating a screening-level hazard quotient (HQ_{screen}) for each constituent in each environmental medium. A HQ_{screen} was calculated by dividing the maximum detected constituent concentration in each environmental medium by its corresponding ESV as follows:

$$HQ_{screen} = \frac{MDCC}{ESV}$$

where:

HQ_{screen} = screening-level hazard quotient
$MDCC$ = maximum detected constituent concentration
ESV = ecological screening value.

A calculated HQ_{screen} value of one or less indicated that the maximum detected constituent concentration (MDCC) was equal to or less than the chemical's conservative ESV, and was interpreted in the SLERA as a constituent that does not pose a potential for adverse ecological risk. Conversely, a HQ_{screen} value greater than one indicated that the MDCC was greater than the ESV and that the chemical might pose adverse ecological hazards to one or more receptors.

In order to better understand the potential risks posed by chemical constituents at the ranges, a mean hazard quotient was also calculated in the SLERA by comparing the arithmetic mean constituent concentration in each environmental medium to the corresponding ESV. The calculated screening-level hazard quotients for surface soil, groundwater, surface water, and

sediment at the IMR ranges are presented in Tables 2-1 through 2-7. A summary of the COPECs that were initially identified at the IMR ranges is presented in Table 2-8.

The EPA recognizes several constituents in abiotic media that are necessary to maintain normal function in many organisms. These essential macronutrients are iron, magnesium, calcium, potassium, and sodium. Most organisms have mechanisms designed to regulate nutrient fluxes within their systems; therefore, these nutrients are generally only toxic at very high concentrations. Although iron is an essential nutrient and is regulated within many organisms, it may become increasingly bioavailable at lower soil pH values, thus increasing its potential to elicit adverse affects. Therefore, iron was not evaluated as an essential nutrient in the SLERA. Essential macronutrients were only considered COPECs if they were present in site samples at concentrations ten times the naturally occurring background concentration.

A study of the natural geochemical composition associated with Fort McClellan (FTMC) (Science Applications International Corporation [SAIC], 1998) determined the mean concentrations of 24 metals in surface soil, surface water, and sediment samples collected from presumably un-impacted areas. Per agreement with EPA Region IV, the background threshold value (BTV) for each metal was calculated as two times the mean background concentration for that metal. The BTV for each metal was used to represent the upper boundary of the range of natural background concentrations expected at FTMC, and was used as the basis for evaluating metal concentrations measured in site samples.

Thus, constituents were initially identified as COPECs within the SLERA if all of the following conditions were met:

- The maximum detected constituent concentration exceeded the ESV;
- The maximum detected constituent concentration was 10-times the BTV if constituent is a macro-nutrient; and
- The maximum detected constituent concentration exceeded the BTV for inorganics.

If a constituent in a given environmental medium did not meet all of these conditions, then it was not considered a COPEC at the IMR ranges and was not considered for further assessment. Again, identification of a constituent as a COPEC in the SLERA simply indicated that further assessment of that particular constituent in a given environmental medium was deemed appropriate, and did not imply that a particular constituent posed a definite risk to ecological receptors.

Table 2-1

Constituents of Potential Ecological Concern in Surface Soil[a] at the Skeet Range (Parcel 69Q) Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Metals									
Aluminum	1.63E+04	5.00E+01	1.02E+04	1.39E+03	6.76E+03	16 / 16	204.00	135.11	3
Antimony	1.99E+00	3.50E+00	4.97E+00	5.20E-01	3.10E+00	7 / 16	1.42	0.89	YES
Arsenic	1.37E+01	1.00E+01	1.23E+01	2.70E+00	6.32E+00	11 / 11	1.23	0.63	3
Barium	1.24E+02	1.65E+02	1.18E+02	7.61E+00	6.61E+01	16 / 16	0.72	0.40	1,3
Beryllium	8.00E-01	1.10E+00	1.40E+00	5.20E-01	7.72E-01	14 / 14	1.27	0.70	YES
Calcium	1.72E+03	NA	4.84E+03	6.65E+01	5.70E+02	16 / 16	ND	ND	2
Chromium	3.70E+01	4.00E-01	2.14E+01	5.10E+00	1.05E+01	16 / 16	53.50	26.18	3
Cobalt	1.52E+01	2.00E+01	2.49E+01	2.50E+00	6.72E+00	15 / 15	1.25	0.34	YES
Copper	1.27E+01	4.00E+01	1.34E+02	3.70E+00	2.52E+01	16 / 16	3.35	0.63	YES
Iron	3.42E+04	2.00E+02	2.84E+04	7.84E+03	1.33E+04	16 / 16	142.00	66.73	3
Lead	4.01E+01	5.00E+01	1.78E+03	1.00E+01	2.25E+02	37 / 37	35.60	4.50	YES
Magnesium	1.03E+03	4.40E+05	4.20E+02	6.98E+01	2.38E+02	16 / 16	0.00095	0.00054	1,2,3
Manganese	1.58E+03	1.00E+02	1.93E+03	6.31E+01	6.01E+02	16 / 16	19.30	6.01	YES
Mercury	8.00E-02	1.00E-01	7.70E-02	2.90E-02	5.03E-02	14 / 16	0.77	0.50	1,3
Nickel	1.03E+01	3.00E+01	1.59E+01	1.63E+00	6.91E+00	16 / 16	0.53	0.23	1
Potassium	8.00E+02	NA	9.43E+02	6.14E+01	2.20E+02	15 / 15	ND	ND	2
Thallium	3.43E+00	1.00E+00	1.20E+00	7.00E-01	8.35E-01	5 / 11	1.20	0.83	3
Vanadium	5.88E+01	2.00E+00	3.36E+01	9.87E+00	1.67E+01	16 / 16	16.80	8.36	3
Zinc	4.06E+01	5.00E+01	6.24E+01	1.04E+01	2.81E+01	16 / 16	1.25	0.56	YES
Semivolatile Organic Compounds									
Anthracene	NA	1.00E-01	5.00E-02	5.00E-02	1.94E-01	1 / 16	0.50	1.94	1
Benzo(a)anthracene	NA	5.21E+00	8.80E-01	8.40E-02	2.40E-01	2 / 16	0.17	0.05	1
Benzo(a)pyrene	NA	1.00E-01	1.90E+00	1.70E-01	3.09E-01	2 / 16	19.00	3.09	YES
Benzo(b)fluoranthene	NA	5.98E+01	5.70E-01	7.10E-02	2.19E-01	2 / 16	0.0095	0.0037	1
Benzo(ghi)perylene	NA	1.19E+02	9.20E-01	9.20E-02	2.43E-01	2 / 16	0.0077	0.0020	1
Benzo(k)fluoranthene	NA	1.48E+02	2.40E-01	2.40E-01	2.06E-01	1 / 16	0.0016	0.0014	1
Chrysene	NA	4.73E+00	1.20E+00	1.20E-01	2.62E-01	2 / 16	0.25	0.06	1
Dibenz(a,h)anthracene	NA	1.84E+01	4.10E-01	4.10E-01	2.17E-01	1 / 16	0.022	0.012	1
Fluoranthene	NA	1.00E-01	1.60E-01	1.60E-01	2.01E-01	1 / 16	1.60	2.01	YES
Indeno(1,2,3-cd)pyrene	NA	1.09E+02	2.90E-01	2.90E-01	2.09E-01	1 / 16	0.0027	0.0019	1
n-Nitrosodiphenylamine	NA	2.00E+01	2.00E-01	2.00E-01	2.04E-01	1 / 16	0.0100	0.0102	1

Table 2-1

Constituents of Potential Ecological Concern in Surface Soil[a] at the Skeet Range (Parcel 69Q) Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Phenanthrene	NA	1.00E-01	2.40E-01	2.40E-01	2.06E-01	1 / 16	2.40	2.06	YES
Pyrene	NA	1.00E-01	1.20E+00	1.30E-01	2.63E-01	2 / 16	12.00	2.63	YES
Volatile Organic Compounds									
2-Butanone	NA	8.96E+01	5.60E-03	5.60E-03	1.15E-02	1 / 13	0.00006	0.00013	1
Acetone	NA	2.50E+00	1.50E-01	1.80E-02	7.32E-02	5 / 7	0.0600	0.0293	1
p-Cymene	NA	NA	2.30E-02	9.90E-04	4.64E-03	6 / 16	ND	ND	4
Styrene	NA	1.00E-01	5.70E-03	1.20E-03	3.04E-03	2 / 16	0.057	0.030	1

[a] Surface soil at Parcel 69Q is defined as the interval from 0 to 0.5 feet below ground surface.
[b] Background threshold value is 2-times the arithmetic mean background concentration as reported in "Final Background Metals Survey Report, Ft. McClellan, Alabama" (SAIC, 1998).
[c] Ecological screening values are presented in "Human Health and Ecological Screening Values and PAH Background Summary Report" (IT Corp., 2000).
NA - Not Available. ND - Not Determined.
Rationale for inclusion / exclusion as COPEC:
1 - Maximum detected concentration is less than ecological screening value (ESV).
2 - Essential macronutrient, only toxic at extremely high concentrations (i.e. 10-times naturally-occurring background concentration).
3 - Maximum detected concentration is less than background threshold value.
4 - No ESV available; however, maximum detected concentration is similar to concentrations of other VOAs which are below their respective ESVs.

mg/kg - milligrams per kilogram.

Table 2-2

Constituents of Potential Ecological Concern in Surface Soil at Range 12 (Parcel 70Q)
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Metals									
Aluminum	1.63E+04	5.00E+01	1.20E+04	4.52E+03	7.38E+03	5 / 5	240.00	147.52	3
Antimony	1.99E+00	3.50E+00	2.03E+01	6.00E-01	8.30E+00	4 / 5	5.80	2.37	YES
Arsenic	1.37E+01	1.00E+01	1.98E+01	2.50E+00	7.77E+00	5 / 5	1.98	0.78	YES
Barium	1.24E+02	1.65E+02	8.96E+01	2.22E+01	5.56E+01	5 / 5	0.54	0.34	1,3
Calcium	1.72E+03	NA	1.80E+03	9.29E+01	5.51E+02	5 / 5	ND	ND	2
Chromium	3.70E+01	4.00E-01	1.95E+01	6.90E+00	1.32E+01	5 / 5	48.75	32.95	3
Cobalt	1.52E+01	2.00E+01	1.21E+01	2.20E+00	6.22E+00	5 / 5	0.61	0.31	1,3
Copper	1.27E+01	4.00E+01	3.70E+02	3.00E+00	1.14E+02	5 / 5	9.25	2.86	YES
Iron	3.42E+04	2.00E+02	2.05E+04	7.04E+03	1.29E+04	5 / 5	102.50	64.34	3
Lead	4.01E+01	5.00E+01	8.12E+03	1.15E+01	7.18E+02	18 / 18	162.40	14.36	YES
Magnesium	1.03E+03	4.40E+05	6.53E+02	9.12E+01	3.66E+02	5 / 5	0.0015	0.0008	1,2,3
Manganese	1.58E+03	1.00E+02	9.03E+02	9.60E+01	5.28E+02	5 / 5	9.03	5.28	3
Mercury	8.00E-02	1.00E-01	4.40E-02	2.40E-02	4.15E-02	4 / 5	0.44	0.42	1,3
Nickel	1.03E+01	3.00E+01	8.88E+00	2.20E+00	5.25E+00	5 / 5	0.30	0.18	1,3
Potassium	8.00E+02	NA	4.89E+02	5.18E+01	2.56E+02	5 / 5	ND	ND	2,3
Sodium	6.34E+02	NA	5.18E+01	4.70E+01	1.93E+02	2 / 5	ND	ND	2,3
Thallium	3.43E+00	1.00E+00	9.19E-01	9.19E-01	1.04E+00	1 / 2	0.92	1.04	1,3
Vanadium	5.88E+01	2.00E+00	2.42E+01	8.60E+00	1.51E+01	5 / 5	12.10	7.56	3
Zinc	4.06E+01	5.00E+01	1.64E+02	8.30E+00	6.49E+01	5 / 5	3.28	1.30	YES
Chlorinated Herbicides									
2,4-DB	NA	1.00E-01	3.20E-02	1.80E-02	2.50E-02	2 / 2	0.32	0.25	1
4,4'-DDT	NA	2.50E-03	2.80E-03	2.80E-03	2.55E-03	1 / 2	1.12	1.02	YES
Semivolatile Organic Compounds									
Benzo(a)anthracene	NA	5.21E+00	7.00E-02	7.00E-02	1.68E-01	1 / 5	0.013	0.032	1
Benzo(a)pyrene	NA	1.00E-01	7.30E-02	7.30E-02	1.69E-01	1 / 5	0.73	1.69	1
Benzo(b)fluoranthene	NA	5.98E+01	7.20E-02	7.20E-02	1.68E-01	1 / 5	0.0012	0.0028	1
Benzo(ghi)perylene	NA	1.19E+02	3.90E-02	3.90E-02	1.62E-01	1 / 5	0.00033	0.00136	1
Benzo(k)fluoranthene	NA	1.48E+02	6.10E-02	6.10E-02	1.66E-01	1 / 5	0.0004	0.0011	1
Chrysene	NA	4.73E+00	9.10E-02	9.10E-02	1.72E-01	1 / 5	0.019	0.036	1
Di-n-butyl phthalate	NA	2.00E+02	2.10E-01	1.00E-01	1.67E-01	3 / 5	0.0011	0.0008	1
Fluoranthene	NA	1.00E-01	7.80E-02	7.80E-02	1.70E-01	1 / 5	0.78	1.70	1

Table 2-2

Constituents of Potential Ecological Concern in Surface Soil at Range 12 (Parcel 70Q)
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
n-Nitrosodiphenylamine	NA	2.00E+01	2.30E-01	1.90E-01	2.05E-01	3 / 5	0.012	0.010	1
Pyrene	NA	1.00E-01	8.70E-02	8.70E-02	1.71E-01	1 / 5	0.87	1.71	1
Volatile Organic Compounds									
2-Butanone	NA	8.96E+01	1.30E-02	9.60E-03	1.15E-02	2 / 5	0.00015	0.00013	1
Acetone	NA	2.50E+00	1.40E-01	1.30E-01	9.40E-02	2 / 3	0.056	0.038	1
Toluene	NA	5.00E-02	1.80E-03	1.80E-03	2.74E-03	1 / 5	0.036	0.055	1
Trichlorofluoromethane	NA	1.00E-01	1.60E-02	8.70E-03	8.34E-03	2 / 5	0.16	0.08	1

[a] Surface soil at Parcel 70Q is defined as the interval from 0 to 0.5 feet below ground surface.
[b] Background threshold value is 2-times the arithmetic mean background concentration as reported in "Final Background Metals Survey Report, Ft. McClellan, Alabama" (SAIC, 1998).
[c] Ecological screening values are presented in "Human Health and Ecological Screening Values and PAH Background Summary Report" (IT Corp., 2000).
NA - Not Available. ND - Not Determined.
Rationale for inclusion / exclusion as COPEC:
1 - Maximum detected concentration is less than ecological screening value (ESV).
2 - Essential macronutrient, only toxic at extremely high concentrations (i.e. 10-times naturally-occurring background concentration).
3 - Maximum detected concentration is less than background threshold value.
4 - No ESV available; however, maximum detected concentration is similar to concentrations of other VOAs which are below their respective ESVs.

mg/kg - milligrams per kilogram.

Table 2-3

Constituents of Potential Ecological Concern in Surface Soil at Range 13 (Parcel 71Q)
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Metals									
Aluminum	1.63E+04	5.00E+01	1.28E+04	6.32E+03	8.77E+03	6 / 6	256.00	175.43	3
Antimony	1.99E+00	3.50E+00	3.91E+01	6.20E-01	8.75E+00	4 / 6	11.17	2.50	YES
Arsenic	1.37E+01	1.00E+01	3.37E+01	2.80E+00	1.06E+01	6 / 6	3.37	1.06	YES
Barium	1.24E+02	1.65E+02	6.80E+01	2.15E+01	4.52E+01	6 / 6	0.41	0.27	1,3
Calcium	1.72E+03	NA	5.87E+02	8.38E+01	3.01E+02	6 / 6	ND	ND	2,3
Chromium	3.70E+01	4.00E-01	2.12E+01	6.60E+00	1.25E+01	6 / 6	53.00	31.17	3
Cobalt	1.52E+01	2.00E+01	6.30E+00	2.50E+00	4.37E+00	6 / 6	0.32	0.22	1,3
Copper	1.27E+01	4.00E+01	4.56E+02	1.09E+01	1.05E+02	6 / 6	11.40	2.63	YES
Iron	3.42E+04	2.00E+02	2.87E+04	7.85E+03	1.61E+04	6 / 6	143.50	80.43	3
Lead	4.01E+01	5.00E+01	4.38E+03	1.30E+01	7.57E+02	22 / 22	87.60	15.14	YES
Magnesium	1.03E+03	4.40E+05	3.19E+02	1.90E+02	2.54E+02	6 / 6	0.00073	0.00058	1,2,3
Manganese	1.58E+03	1.00E+02	1.04E+03	1.60E+02	5.81E+02	6 / 6	10.40	5.81	3
Mercury	8.00E-02	1.00E-01	5.30E-02	2.20E-02	4.28E-02	5 / 6	0.53	0.43	1,3
Nickel	1.03E+01	3.00E+01	7.20E+00	3.30E+00	4.91E+00	6 / 6	0.24	0.16	1,3
Potassium	8.00E+02	NA	3.23E+02	7.91E+01	1.96E+02	6 / 6	ND	ND	2,3
Sodium	6.34E+02	NA	4.41E+01	4.41E+01	2.56E+02	1 / 6	ND	ND	2,3
Vanadium	5.88E+01	2.00E+00	3.86E+01	1.17E+01	2.29E+01	6 / 6	19.30	11.43	3
Zinc	4.06E+01	5.00E+01	1.10E+02	1.39E+01	4.40E+01	6 / 6	2.20	0.88	YES
Semivolatile Organic Compounds									
Di-n-butyl phthalate	NA	2.00E+02	1.00E-01	1.00E-01	1.83E-01	1 / 6	0.00050	0.00091	1
n-Nitrosodiphenylamine	NA	2.00E+01	2.40E-01	2.40E-01	2.06E-01	1 / 6	0.012	0.010	1

Table 2-3

Constituents of Potential Ecological Concern in Surface Soil at Range 13 (Parcel 71Q)
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Volatile Organic Compounds									
2-Butanone	NA	8.96E+01	2.20E-02	2.20E-02	1.38E-02	1 / 5	0.00025	0.00015	1
Acetone	NA	2.50E+00	3.40E-01	2.00E-01	1.41E-01	2 / 4	0.14	0.06	1
p-Cymene	NA	NA	6.50E-03	1.90E-03	3.68E-03	2 / 6	ND	ND	4
Trichlorofluoromethane	NA	1.00E-01	3.00E-03	3.00E-03	5.42E-03	1 / 6	0.030	0.054	1
Chlorinated Herbicides									
2,4-DB	NA	1.00E-01	9.30E-03	9.30E-03	9.30E-03	1 / 1	0.093	0.093	1

[a] Surface soil at Parcel 71Q is defined as the interval from 0 to 0.5 feet below ground surface.
[b] Background threshold value is 2-times the arithmetic mean background concentration as reported in "Final Background Metals Survey Report, Ft. McClellan, Alabama" (SAIC, 1998).
[c] Ecological screening values are presented in "Human Health and Ecological Screening Values and PAH Background Summary Report" (IT Corp., 2000).
NA - Not Available. ND - Not Determined.
Rationale for inclusion / exclusion as COPEC:
1 - Maximum detected concentration is less than ecological screening value (ESV).
2 - Essential macronutrient, only toxic at extremely high concentrations (i.e. 10-times naturally-occurring background concentration).
3 - Maximum detected concentration is less than background threshold value.
4 - No ESV available; however, maximum detected concentration is similar to concentrations of other VOAs which are below their respective ESVs.

mg/kg - milligrams per kilogram.

Table 2-4

Constituents of Potential Ecological Concern in Surface Soil at Range 19 (Parcel 75Q)
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Metals									
Aluminum	1.63E+04	5.00E+01	7.68E+03	2.15E+03	5.99E+03	8 / 8	153.60	119.80	3
Antimony	1.99E+00	3.50E+00	1.24E+03	9.20E-01	1.61E+02	4 / 8	354.29	46.08	YES
Arsenic	1.37E+01	1.00E+01	1.39E+01	3.43E+00	8.39E+00	8 / 8	1.39	0.84	YES
Barium	1.24E+02	1.65E+02	6.94E+01	2.40E+01	4.44E+01	8 / 8	0.42	0.27	1,3
Beryllium	8.00E-01	1.10E+00	6.70E-01	5.40E-01	6.17E-01	3 / 3	0.61	0.56	1,3
Calcium	1.72E+03	NA	8.19E+02	7.50E+01	3.03E+02	7 / 7	ND	ND	2,3
Chromium	3.70E+01	4.00E-01	3.58E+01	4.59E+00	1.44E+01	8 / 8	89.50	36.00	3
Cobalt	1.52E+01	2.00E+01	9.30E+00	8.60E-01	5.42E+00	8 / 8	0.47	0.27	1,3
Copper	1.27E+01	4.00E+01	9.91E+02	1.07E+01	1.83E+02	8 / 8	24.78	4.57	YES
Iron	3.42E+04	2.00E+02	3.09E+04	7.25E+03	1.67E+04	8 / 8	154.50	83.62	3
Lead	4.01E+01	5.00E+01	1.16E+05	1.32E+01	5.55E+03	23 / 23	2320.00	110.93	YES
Magnesium	1.03E+03	4.40E+05	5.96E+02	7.78E+01	2.81E+02	8 / 8	0.0014	0.0006	1,2,3
Manganese	1.58E+03	1.00E+02	6.58E+02	8.52E+01	2.79E+02	8 / 8	6.58	2.79	3
Mercury	8.00E-02	1.00E-01	6.80E-02	1.90E-02	4.53E-02	5 / 8	0.68	0.45	1,3
Nickel	1.03E+01	3.00E+01	1.17E+01	2.00E+00	7.00E+00	8 / 8	0.39	0.23	1
Potassium	8.00E+02	NA	7.53E+02	3.08E+01	3.29E+02	8 / 8	ND	ND	2,3
Silver	3.60E-01	2.00E+00	3.69E+00	3.69E+00	9.55E-01	1 / 8	1.85	0.48	YES
Sodium	6.34E+02	NA	5.83E+01	4.69E+01	2.00E+02	3 / 8	ND	ND	2,3
Thallium	3.43E+00	1.00E+00	2.76E+00	5.40E-01	1.03E+00	5 / 8	2.76	1.03	3
Vanadium	5.88E+01	2.00E+00	3.23E+01	1.11E+01	2.01E+01	8 / 8	16.15	10.04	3
Zinc	4.06E+01	5.00E+01	1.53E+02	1.69E+01	5.38E+01	8 / 8	3.06	1.08	YES

Table 2-4

Constituents of Potential Ecological Concern in Surface Soil at Range 19 (Parcel 75Q)
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [b] (mg/kg)	Ecological Screening Value [c] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Semivolatile Organic Compounds									
Di-n-butyl phthalate	NA	2.00E+02	2.00E-01	2.00E-01	1.89E-01	1 / 8	0.00100	0.00094	1
n-Nitrosodiphenylamine	NA	2.00E+01	2.60E-01	2.60E-01	1.96E-01	1 / 8	0.013	0.010	1
Volatile Organic Compounds									
Acetone	NA	2.50E+00	2.30E-01	8.00E-03	4.98E-02	4 / 6	0.092	0.020	1
p-Cymene	NA	NA	1.30E-01	1.30E-01	1.90E-02	1 / 8	ND	ND	4

[a] Surface soil at Parcel 75Q is defined as the interval from 0 to 0.5 feet below ground surface.
[b] Background threshold value is 2-times the arithmetic mean background concentration as reported in "Final Background Metals Survey Report, Ft. McClellan, Alabama" (SAIC, 1998).
[c] Ecological screening values are presented in "Human Health and Ecological Screening Values and PAH Background Summary Report" (IT Corp., 2000).
NA - Not Available. ND - Not Determined.
Rationale for inclusion / exclusion as COPEC:
1 - Maximum detected concentration is less than ecological screening value (ESV).
2 - Essential macronutrient, only toxic at extremely high concentrations (i.e. 10-times naturally-occurring background concentration).
3 - Maximum detected concentration is less than background threshold value.
4 - No ESV available; however, maximum detected concentration is similar to concentrations of other VOAs which are below their respective ESVs.

mg/kg - milligrams per kilogram.

Table 2-5

Constituents of Potential Ecological Concern in Surface Water at the Iron Mountain Road Ranges
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [a] (mg/L)	Ecological Screening Value [b] (mg/L)	Maximum Detected Conc. (mg/L)	Minimum Detected Conc. (mg/L)	Mean Detected Conc. (mg/L)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Metals									
Aluminum	5.26E+00	8.70E-02	5.22E-01	4.42E-01	4.82E-01	2 / 2	6.00	5.54	3
Barium	7.54E-02	3.90E-03	3.25E-02	1.23E-02	2.13E-02	9 / 9	8.33	5.46	3
Calcium	2.52E+01	1.16E+02	1.57E+01	2.88E-01	6.40E+00	9 / 9	0.14	0.06	1,2,3
Copper	1.27E-02	6.54E-03	4.60E-03	4.60E-03	1.15E-02	1 / 8	0.70	1.76	1,3
Iron	1.96E+01	1.00E+00	6.43E-01	6.34E-02	3.08E-01	9 / 9	0.64	0.31	1,3
Lead	8.67E-03	1.32E-03	8.71E-02	1.80E-03	1.50E-02	4 / 9	65.98	11.34	YES
Magnesium	1.10E+01	8.20E+01	2.78E+00	3.25E-01	1.41E+00	9 / 9	0.034	0.017	1,2,3
Manganese	5.65E-01	8.00E-02	8.81E-02	4.60E-03	2.90E-02	9 / 9	1.10	0.36	3
Potassium	2.56E+00	5.30E+01	3.99E-01	2.13E-01	3.21E-01	9 / 9	0.0075	0.0060	1,2,3
Sodium	3.44E+00	6.80E+02	1.05E+00	5.10E-01	7.75E-01	9 / 9	0.0015	0.0011	1,2,3
Zinc	4.04E-02	5.89E-02	1.75E-02	3.20E-03	9.47E-03	5 / 9	0.30	0.16	1,3

[a] Background threshold value is 2-times the arithmetic mean background concentration as reported in "Final Background Metals Survey Report, Ft. McClellan, Alabama" (SAIC, 1998).

[b] Ecological screening values are presented in "Human Health and Ecological Screening Values and PAH Background Summary Report" (IT Corp., 2000).

NA - Not Available. ND - Not Determined.

Rationale for inclusion / exclusion as COPEC:

1 - Maximum detected concentration is less than ecological screening value (ESV).

2 - Essential macronutrient, only toxic at extremely high concentrations (i.e. 10-times naturally-occurring background concentration).

3 - Maximum detected concentration is less than background threshold value.

mg/L - milligrams per liter.

Table 2-6

Constituents of Potential Ecological Concern in Sediment at the Iron Mountain Road Ranges
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [a] (mg/kg)	Ecological Screening Value [b] (mg/kg)	Maximum Detected Conc. (mg/kg)	Minimum Detected Conc. (mg/kg)	Mean Detected Conc. (mg/kg)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Metals									
Aluminum	8.59E+03	NA	7.16E+03	1.12E+03	4.07E+03	13 / 13	ND	ND	3
Antimony	7.30E-01	1.20E+01	1.04E+01	7.70E-01	4.61E+00	6 / 13	0.87	0.38	1
Arsenic	1.13E+01	7.24E+00	3.80E+01	2.10E+00	1.06E+01	13 / 13	5.25	1.46	YES
Barium	9.89E+01	NA	4.78E+02	9.00E+00	6.30E+01	13 / 13	ND	ND	YES
Beryllium	9.70E-01	NA	1.20E+00	4.10E-01	7.34E-01	9 / 9	ND	ND	YES
Calcium	1.11E+03	NA	1.37E+03	3.23E+01	3.99E+02	13 / 13	ND	ND	2
Chromium	3.12E+01	5.23E+01	5.03E+01	7.50E+00	1.69E+01	13 / 13	0.96	0.32	1
Cobalt	1.10E+01	5.00E+01	1.41E+01	1.60E+00	5.88E+00	13 / 13	0.28	0.12	1
Copper	1.71E+01	1.87E+01	1.53E+02	4.10E+00	2.80E+01	13 / 13	8.18	1.50	YES
Iron	3.53E+04	NA	6.25E+04	1.09E+04	2.32E+04	13 / 13	ND	ND	YES
Lead	3.78E+01	3.02E+01	2.42E+03	6.00E+00	4.16E+02	13 / 13	80.13	13.79	YES
Magnesium	9.06E+02	NA	3.82E+02	5.17E+01	1.70E+02	13 / 13	ND	ND	2,3
Manganese	7.12E+02	NA	2.83E+03	8.77E+01	5.41E+02	13 / 13	ND	ND	YES
Mercury	1.10E-01	1.30E-01	1.20E-01	9.80E-03	2.92E-02	9 / 12	0.92	0.22	1
Nickel	1.30E+01	1.59E+01	3.46E+01	2.30E+00	7.94E+00	13 / 13	2.18	0.50	YES
Potassium	1.01E+03	NA	6.13E+02	9.90E+01	2.78E+02	13 / 13	ND	ND	2,3
Thallium	1.30E-01	NA	2.70E+00	7.10E-01	8.24E-01	4 / 13	ND	ND	YES
Vanadium	4.09E+01	NA	4.30E+01	1.31E+01	2.41E+01	13 / 13	ND	ND	YES
Zinc	5.27E+01	1.24E+02	7.48E+01	1.03E+01	2.98E+01	13 / 13	0.60	0.24	1

[a] Background threshold value is 2-times the arithmetic mean background concentration as reported in "Final Background Metals Survey Report, Ft. McClellan, Alabama" (SAIC, 1998).

[b] Ecological screening values are presented in "Human Health and Ecological Screening Values and PAH Background Summary Report" (IT Corp., 2000).

NA - Not Available. ND - Not Determined.

Rationale for inclusion / exclusion as COPEC:

1 - Maximum detected concentration is less than ecological screening value (ESV).

2 - Essential macronutrient, only toxic at extremely high concentrations (i.e. 10-times naturally-occurring background concentration).

3 - Maximum detected concentration is less than background threshold value.

mg/kg - milligrams per kilogram.

Table 2-7

Constituents of Potential Ecological Concern in Groundwater at the Iron Mountain Road Ranges
Fort McClellan, Calhoun County, Alabama

Constituents	Background Threshold Value [a] (mg/L)	Ecological Screening Value [b] (mg/L)	Maximum Detected Conc. (mg/L)	Minimum Detected Conc. (mg/L)	Mean Detected Conc. (mg/L)	Frequency of Detection	Maximum Hazard Quotient	Mean Hazard Quotient	Constituent Of Potential Ecological Concern
Metals									
Aluminum	2.34E+00	8.70E-02	1.03E+00	6.44E-02	5.55E-01	5 / 6	11.84	6.38	3
Barium	1.27E-01	3.90E-03	1.29E-01	2.38E-02	6.09E-02	5 / 5	33.08	15.62	YES
Beryllium	1.25E-03	5.30E-04	3.21E-03	3.21E-03	4.70E-03	1 / 6	6.06	8.87	YES
Calcium	5.65E+01	1.16E+02	5.57E+01	1.40E+00	1.35E+01	6 / 6	0.48	0.12	1,2,3
Cobalt	2.34E-02	3.00E-03	3.59E-02	3.59E-02	1.43E-02	1 / 6	11.97	4.77	YES
Iron	7.04E+00	1.00E+00	3.54E+00	5.28E-01	1.66E+00	5 / 5	3.54	1.66	2,3
Lead	8.00E-03	1.32E-03	3.84E-03	2.07E-03	4.32E-03	2 / 6	2.91	3.27	3
Magnesium	2.13E+01	8.20E+01	2.83E+00	6.63E-01	1.36E+00	6 / 6	0.035	0.017	1,2,3
Manganese	5.81E-01	8.00E-02	5.60E+00	1.30E-01	1.42E+00	5 / 6	70.00	17.70	YES
Potassium	7.20E+00	5.30E+01	6.46E+00	1.15E+00	3.15E+00	4 / 6	0.12	0.06	1,2,3
Selenium	NA	5.00E-03	4.40E-03	4.40E-03	4.88E-03	1 / 5	0.88	0.98	1
Sodium	1.48E+01	6.80E+02	9.92E-01	8.47E-01	7.58E-01	3 / 5	0.0015	0.0011	1,2,3
Nitroaromatics									
2-Nitrotoluene	NA	NA	3.90E-03	1.20E-03	1.40E-03	3 / 6	ND	ND	YES
4-Amino-2,6-dinitrotoluene	NA	NA	4.70E-04	4.70E-04	2.45E-04	1 / 6	ND	ND	YES
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	NA	NA	3.60E-04	3.60E-04	4.77E-04	1 / 6	ND	ND	YES
1,2-Dimethylbenzene	NA	NA	4.60E-04	4.60E-04	4.93E-04	1 / 6	ND	ND	YES
Ethylbenzene	NA	4.53E-01	2.60E-04	2.60E-04	4.60E-04	1 / 6	0.00057	0.00102	1
m,p-Xylenes	NA	1.17E-01	5.90E-04	5.90E-04	9.32E-04	1 / 6	0.005	0.008	1

mg/L = Milligrams per liter

[a] Background threshold value is 2-times the arithmetic mean background concentration as reported in "Final Background Metals Survey Report, Ft. McClellan, Alabama" (SAIC, 1998).

[b] Ecological screening values are presented in "Human Health and Ecological Screening Values and PAH Background Summary Report" (IT Corp., 2000).

NA - Not Available.

Rationale for inclusion / exclusion as COPEC:

1 - Maximum detected concentration is less than ecological screening value (ESV).

2 - Essential macronutrient, only toxic at extremely high concentrations (i.e. 10-times naturally-occurring background concentration).

3 - Maximum detected concentration is less than background threshold value.

Table 2-8
Summary of COPECs at Iron Mountain Road Ranges
Fort McClellan, Calhoun County, Alabama

COPECs	Skeet Range Surface Soil	Range 12 Surface Soil	Range 13 Surface Soil	Range 19 Surface Soil	Remount Cr. & Tributaries Surface Water	Remount Cr. & Tributaries Sediment
antimony	X	X	X	X		
arsenic		O	O	O		X
barium						X
beryllium	O					O
cobalt	O					
copper	X	X	X	X		X
iron						O
lead	X	X	X	X	X	X
manganese	O					X
nickel						O
silver				O		
thallium						X
vanadium						O
zinc	X	X	X	X		
benzo(a)pyrene	O					
fluoranthene	O					
phenanthrene	O					
pyrene	O					
4,4'-DDT		O				

O - HQ_{screen} > 1.0, however additional lines of evidence indicate that this constituent is not a COPEC.
X - Constituent identified as a COPEC.