

APPENDIX L

**STREAMLINED HUMAN HEALTH RISK ASSESSMENT
FIGURE AND TABLES**

FIGURE

Figure L-1
Human Health Conceptual Site Exposure Model
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Calhoun County, Alabama

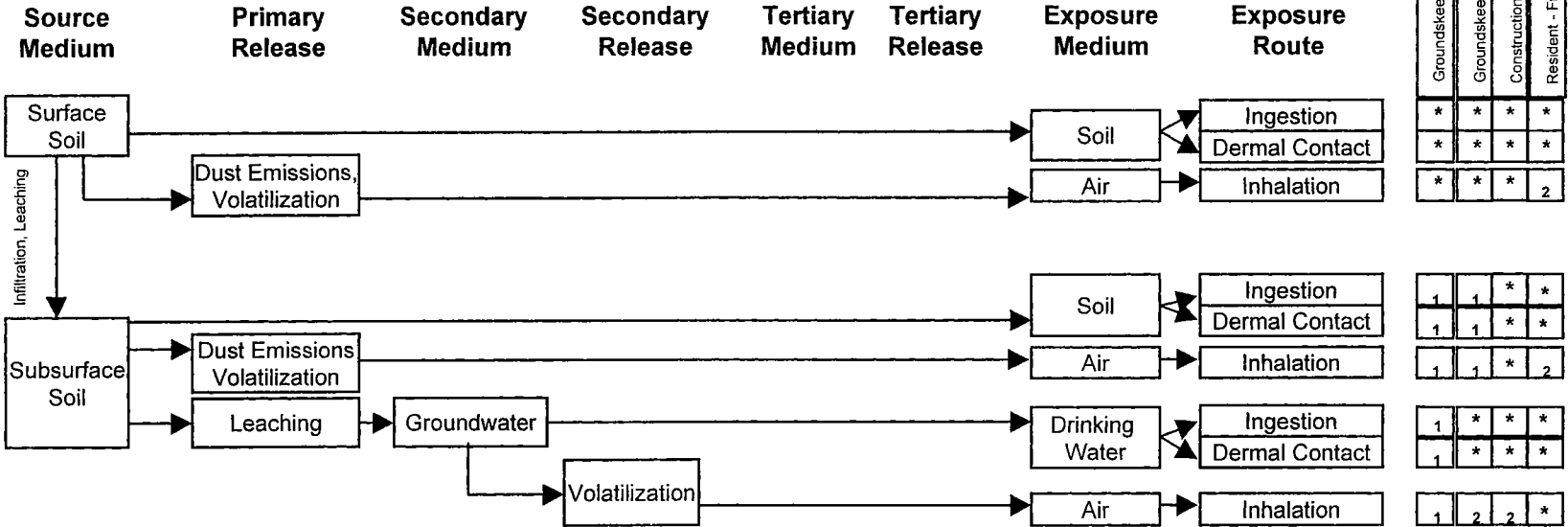


Figure L-1

* = Complete exposure pathway evaluated in the streamlined risk assessment.
 1 = Incomplete exposure pathway.
 2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

TABLES

Table L-1

**Surface Soil Samples Used in Streamlined Risk Assessment
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| Sample Location | Sample Number | Sample Date | Depth of sample (ft) | Chemical Analyses Performed |
|------------------------|----------------------|--------------------|-----------------------------|--|
| PPMP-75-GP01 | KJ0001 | 18-Jan-1999 | 0 - 1 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP02 | KJ0005 | 18-Jan-1999 | 0 - 1 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP03 | KJ0007 | 18-Jan-1999 | 0 - 1 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |

CL Herb = Chlorinated Herbicides

CL Pest = Chlorinated Pesticides

OP Pest = Organophosphate Pesticides

PCBs = Polychlorinated Biphenyls

SVOCs = Semivolatile Organic Compounds

VOCs = Volatile Organic Compounds

ft = Feet

Table L-2

Selection of Site-Related Chemicals for Surface Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama

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| Chemical | Detection Frequency | Percent hits | Range of values (mg/kg) | | | | Arithmetic Mean (mg/kg) | Background Screening Criteria | | Site-Related? ^d |
|---------------------------------------|---------------------|--------------|-------------------------|----------|------------------|----------|-------------------------|-------------------------------|------------------------------|----------------------------|
| | | | Detected Concentration | | Reporting Limits | | | 2x Mean ^b (mg/kg) | 95% UTL ^c (mg/kg) | |
| | | | Minimum | Maximum | Minimum | Maximum | | | | |
| Metals | | | | | | | | | | |
| Aluminum | 3 / 3 | 100 | 6.34E+03 | 1.18E+04 | 2.18E+01 | 2.66E+01 | 9.95E+03 | 1.63E+04 | 2.29E+04 | N (a) |
| Arsenic | 2 / 2 | 100 | 5.00E+00 | 6.30E+00 | 1.10E+00 | 1.30E+00 | 5.65E+00 | 1.37E+01 | 2.54E+01 | N (a) |
| Barium | 3 / 3 | 100 | 4.65E+01 | 1.01E+02 | 2.18E+01 | 2.66E+01 | 7.09E+01 | 1.24E+02 | 1.94E+02 | N (a) |
| Beryllium | 3 / 3 | 100 | 4.60E-01 | 1.20E+00 | 5.50E-01 | 6.70E-01 | 8.23E-01 | 8.00E-01 | 1.19E+00 | N (e) |
| Calcium | 3 / 3 | 100 | 3.71E+02 | 2.46E+04 | 5.46E+02 | 6.66E+02 | 9.39E+03 | 1.72E+03 | 3.55E+03 | N (d) |
| Chromium | 3 / 3 | 100 | 7.60E+00 | 1.71E+01 | 1.10E+00 | 1.30E+00 | 1.38E+01 | 3.70E+01 | 6.44E+01 | N (a) |
| Cobalt | 3 / 3 | 100 | 1.30E+00 | 2.39E+01 | 5.50E+00 | 6.70E+00 | 9.67E+00 | 1.52E+01 | 3.25E+01 | N (b) |
| Copper | 3 / 3 | 100 | 6.50E+00 | 4.51E+01 | 2.70E+00 | 3.30E+00 | 2.41E+01 | 1.27E+01 | 2.25E+01 | N (e) |
| Iron | 3 / 3 | 100 | 4.37E+03 | 3.05E+04 | 1.09E+01 | 1.33E+01 | 2.08E+04 | 3.42E+04 | 5.54E+04 | N (a) |
| Lead | 3 / 3 | 100 | 1.08E+01 | 2.60E+01 | 3.30E-01 | 4.00E-01 | 1.61E+01 | 4.01E+01 | 6.38E+01 | N (a) |
| Magnesium | 3 / 3 | 100 | 1.13E+03 | 7.90E+03 | 5.46E+02 | 6.66E+02 | 5.02E+03 | 1.03E+03 | 2.16E+03 | N (d) |
| Manganese | 3 / 3 | 100 | 1.54E+01 | 3.63E+02 | 1.60E+00 | 2.00E+00 | 1.96E+02 | 1.58E+03 | 4.66E+03 | N (a) |
| Mercury | 3 / 3 | 100 | 1.70E-02 | 4.10E-02 | 3.60E-02 | 4.40E-02 | 2.80E-02 | 8.00E-02 | 1.25E-01 | N (a) |
| Nickel | 3 / 3 | 100 | 3.30E+00 | 4.58E+01 | 4.40E+00 | 5.30E+00 | 1.90E+01 | 1.03E+01 | 2.00E+01 | N (e) |
| Potassium | 3 / 3 | 100 | 4.04E+02 | 5.31E+02 | 5.46E+02 | 6.66E+02 | 4.64E+02 | 8.00E+02 | 1.83E+03 | N (d) |
| Selenium | 2 / 3 | 67 | 1.40E+00 | 1.60E+00 | 5.50E-01 | 6.70E-01 | 1.09E+00 | 4.80E-01 | 5.63E-01 | N (e) |
| Vanadium | 3 / 3 | 100 | 9.40E+00 | 2.87E+01 | 5.50E+00 | 6.70E+00 | 2.09E+01 | 5.88E+01 | 9.94E+01 | N (a) |
| Zinc | 3 / 3 | 100 | 1.61E+01 | 1.00E+02 | 2.20E+00 | 2.70E+00 | 4.59E+01 | 4.06E+01 | 7.37E+01 | N (e) |
| Semivolatile Organic Compounds | | | | | | | | | | |
| Anthracene | 1 / 3 | 33 | 7.90E-02 | 7.90E-02 | 3.60E-01 | 4.40E-01 | 1.63E-01 | | | Y |
| Benzo(a)anthracene | 2 / 3 | 67 | 4.10E-02 | 7.30E-01 | 3.60E-01 | 4.40E-01 | 3.30E-01 | | | Y |
| Benzo(a)pyrene | 1 / 3 | 33 | 1.60E+00 | 1.60E+00 | 3.60E-01 | 4.40E-01 | 6.70E-01 | | | Y |
| Benzo(b)fluoranthene | 2 / 3 | 67 | 6.70E-02 | 2.10E+00 | 3.60E-01 | 4.40E-01 | 7.96E-01 | | | Y |
| Benzo(ghi)perylene | 1 / 3 | 33 | 1.10E+00 | 1.10E+00 | 3.60E-01 | 4.40E-01 | 5.03E-01 | | | Y |
| Benzo(k)fluoranthene | 1 / 3 | 33 | 6.10E-01 | 6.10E-01 | 3.60E-01 | 4.40E-01 | 3.40E-01 | | | Y |
| Chrysene | 2 / 3 | 67 | 4.00E-02 | 9.40E-01 | 3.60E-01 | 4.40E-01 | 4.00E-01 | | | Y |
| Dibenz(a,h)anthracene | 1 / 3 | 33 | 2.70E-01 | 2.70E-01 | 3.60E-01 | 4.40E-01 | 2.27E-01 | | | Y |
| Fluoranthene | 2 / 3 | 67 | 8.10E-02 | 1.10E+00 | 3.60E-01 | 4.40E-01 | 4.67E-01 | | | Y |
| Indeno(1,2,3-cd)pyrene | 1 / 3 | 33 | 1.20E+00 | 1.20E+00 | 3.60E-01 | 4.40E-01 | 5.37E-01 | | | Y |
| Phenanthrene | 1 / 3 | 33 | 1.80E-01 | 1.80E-01 | 3.60E-01 | 4.40E-01 | 1.97E-01 | | | Y |
| Pyrene | 2 / 3 | 67 | 6.50E-02 | 1.10E+00 | 3.60E-01 | 4.40E-01 | 4.62E-01 | | | Y |

Table L-2

Selection of Site-Related Chemicals for Surface Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama

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| Chemical | Detection Frequency | Percent hits | Range of values (mg/kg) | | | | Arithmetic Mean (mg/kg) | Background Screening Criteria | | Site-Related? ^d |
|-----------------------------------|---------------------|--------------|-------------------------|----------|------------------|----------|-------------------------|-------------------------------|------------------------------|----------------------------|
| | | | Detected Concentration | | Reporting Limits | | | 2x Mean ^b (mg/kg) | 95% UTL ^c (mg/kg) | |
| | | | Minimum | Maximum | Minimum | Maximum | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| 2-Butanone | 1 / 1 | 100 | 5.80E-03 | 5.80E-03 | 2.20E-02 | 2.20E-02 | 5.80E-03 | | | Y |
| Acetone | 1 / 1 | 100 | 1.50E-01 | 1.50E-01 | 2.30E-02 | 2.30E-02 | 1.50E-01 | | | Y |
| Carbon disulfide | 1 / 3 | 33 | 1.70E-03 | 1.70E-03 | 5.50E-03 | 6.70E-03 | 2.63E-03 | | | Y |
| Toluene | 1 / 3 | 33 | 2.00E-03 | 2.00E-03 | 5.50E-03 | 6.70E-03 | 2.73E-03 | | | Y |
| Chlorinated Pesticides | | | | | | | | | | |
| Aldrin | 1 / 3 | 33 | 1.00E-03 | 1.00E-03 | 2.30E-03 | 9.30E-03 | 2.85E-03 | | | Y |
| Endrin | 1 / 3 | 33 | 5.20E-03 | 5.20E-03 | 2.30E-03 | 9.30E-03 | 3.08E-03 | | | Y |
| Methoxychlor | 1 / 3 | 33 | 1.20E-02 | 1.20E-02 | 4.40E-03 | 1.80E-02 | 6.57E-03 | | | Y |

Notes:

mg/kg = Milligrams per kilogram

^a Surface soil at Parcel 66(7) is defined as the interval from 0 to 1 foot below ground surface.^b 2 times the mean background concentration (Science Applications International Corporation [SAIC], 1998, *Background Metals Survey Report*, Fort McClellan, Anniston, Alabama, July).^c 95% Upper Tolerance Limit (UTL) based on statistical distribution of raw background metal data (IT, 2002, *Draft Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, Revision 2, Prepared for U.S. Army Corps of Engineers, Mobile District, February).^d N = Chemical is determined not to be site-related ; Y = Chemical is determined to be site-related.

Rationale for exclusion of a chemical as site-related:

N (a) = maximum detected concentration is equal to or less than 2 x mean background.

N (b) = maximum detected concentration is equal to or less than the background upper tolerance limit.

N (c) = detection frequency is less than 5 percent, detected only at low concentrations, and not expected to be site-related based on historical information.

N (d) = essential nutrient.

N (e) = site data set and background data set are drawn from the same population as determined by statistical testing and/or geochemical evaluation.

Table L-3

Selection of Chemicals of Potential Concern for Surface Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama

| Site-Related Chemical | Maximum Detected Concentration (mg/kg) | Applicable SSSL (mg/kg) | | | | Source-Term Concentration (mg/kg) | |
|---------------------------------------|---|-------------------------|-------|----------|-------|---|--|
| | | Groundskeeper | | | | | |
| | | Noncancer | COPC? | Cancer | COPC? | | |
| Semivolatile Organic Compounds | | | | | | | |
| Anthracene | 7.90E-02 | 3.04E+04 | N | NA | NA | 1.60E+00 | |
| Benzo(a)anthracene | 7.30E-01 | NA | NA | 3.85E+00 | N | | |
| Benzo(a)pyrene | 1.60E+00 | NA | NA | 3.85E-01 | Y | | |
| Benzo(b)fluoranthene | 2.10E+00 | NA | NA | 3.85E+00 | N | | |
| Benzo(ghi)perylene | 1.10E+00 | 3.03E+03 | N | NA | NA | | |
| Benzo(k)fluoranthene | 6.10E-01 | NA | NA | 3.85E+01 | N | | |
| Chrysene | 9.40E-01 | NA | NA | 3.86E+02 | N | | |
| Dibenz(a,h)anthracene | 2.70E-01 | NA | NA | 3.86E-01 | N | | |
| Fluoranthene | 1.10E+00 | 4.05E+03 | N | NA | NA | | |
| Indeno(1,2,3-cd)pyrene | 1.20E+00 | NA | NA | 3.85E+00 | N | | |
| Phenanthrene | 1.80E-01 | 3.03E+04 | N | NA | NA | | |
| Pyrene | 1.10E+00 | 3.05E+03 | N | NA | NA | | |
| Volatile Organic Compounds | | | | | | | |
| 2-Butanone | 5.80E-03 | 5.86E+04 | N | NA | NA | | |
| Acetone | 1.50E-01 | 1.02E+04 | N | NA | NA | | |
| Carbon disulfide | 1.70E-03 | 1.01E+04 | N | NA | NA | | |
| Toluene | 2.00E-03 | 1.96E+04 | N | NA | NA | | |
| Chlorinated Pesticides | | | | | | | |
| Aldrin | 1.00E-03 | 3.03E+00 | N | 1.63E-01 | N | | |
| Endrin | 5.20E-03 | 3.03E+01 | N | NA | NA | | |
| Methoxychlor | 1.20E-02 | 5.08E+02 | N | NA | NA | | |

SSSL = Site-specific screening level developed as described in the *Human Health & Ecological Screening Values & PAH Background Summary Report* (IT, August 2000).

COPC = Chemical of potential concern.

N = Chemical is determined not to be a COPC ; Y = Chemical is determined to be COPC; NA = not applicable.

^a Surface soil is defined for Parcel 66(7) as the interval from 0 to 1 foot below ground surface.

mg/kg = Milligrams per kilogram

Table L-4

**Cancer Risk and Noncancer Hazard Estimates for the Groundskeeper Exposed to Surface Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COPC | Source-Term Concentration (mg/kg) | Total Noncancer Hazard / Cancer Risk Groundskeeper | |
|---------------------------------------|---|---|-----------------|
| | | HI | ILCR |
| Semivolatile Organic Compounds | | | |
| Benzo(a)pyrene | 1.60E+00 | NA | 4.16E-06 |
| Total HI / ILCR | | NA | 4.16E-06 |

^a Surface soil is defined for Parcel 66(7) as the interval from 0 to 1 foot below ground surface.

COPC = Chemical of potential concern

HI = Hazard index

ILCR = Incremental lifetime cancer risk

NA = Not applicable

Table L-5

**Remedial Goal Options Based on Cancer for the Groundskeeper
Surface Soil
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COC | Source-Term Concentration (mg/kg) | ILCR (all pathways) for COC | Cancer | | |
|---------------------------------------|---|-----------------------------------|-------------------------------|----------|----------|
| | | | Remedial Goal Options (mg/kg) | | |
| | | | Based on an ILCR of : | | |
| | | | 1.00E-06 | 1.00E-05 | 1.00E-04 |
| Semivolatile Organic Compounds | | | | | |
| Benzo(a)pyrene | 1.60E+00 | 4.16E-06 | 3.85E-01 | 3.85E+00 | 3.85E+01 |

COC = Chemical of concern.

ILCR = Incremental lifetime cancer risk.

mg/kg = Milligrams per kilogram

Table L-6

**Groundwater Samples Used in Streamlined Risk Assessment
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| Sample Location | Sample Number | Sample Date | Chemical Analyses Performed |
|-----------------|---------------|-------------|--|
| PPMP-66-MW01 | HN3001 | 8-Mar-2001 | VOCs |
| PPMP-66-MW02 | HN3002 | 6-Mar-2001 | VOCs |
| PPMP-66-MW03 | HN3005 | 7-Mar-2001 | VOCs |
| PPMP-66-MW04 | HN3006 | 5-Mar-2001 | VOCs |
| PPMP-66-MW05 | HN3007 | 8-Mar-2001 | VOCs |
| PPMP-66-MW06 | HN3008 | 14-Mar-2001 | VOCs |
| PPMP-66-MW07 | HN3009 | 5-Mar-2001 | VOCs |
| PPMP-66-MW08 | HN3010 | 6-Mar-2001 | VOCs |
| PPMP-66-MW09 | HN3011 | 7-Mar-2001 | VOCs |
| PPMP-66-MW10 | HN3012 | 6-Mar-2001 | VOCs |
| PPMP-66-MW11 | HN3013 | 16-Mar-2001 | VOCs |
| PPMP-66-MW12 | HN3014 | 21-Mar-2001 | VOCs |
| PPMP-66-MW13 | HN3015 | 14-Mar-2001 | VOCs |
| PPMP-66-MW14 | HN3016 | 18-Oct-2001 | VOCs |
| PPMP-66-MW15 | HN3018 | 17-Oct-2001 | VOCs |
| PPMP-66-MW16 | HN3019 | 17-Oct-2001 | VOCs |
| PPMP-75-GP01 | KJ3001 | 24-Feb-1999 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP02 | KJ3002 | 24-Feb-1999 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP03 | KJ3003 | 24-Feb-1999 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |

CL Herb = Chlorinated Herbicides

CL Pest = Chlorinated Pesticides

OP Pest = Organophosphate Pesticides

PCBs = Polychlorinated Biphenyls

SVOCs = Semivolatile Organic Compounds

VOCs = Volatile Organic Compounds

Table L-7

**Selection of Site-Related Chemicals for Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| Chemical | Detection Frequency | Percent hits | Range of values (mg/L) | | | | Arithmetic Mean (mg/L) | Background Screening Criteria | | Site-Related? ^c |
|-----------------------------------|---------------------|--------------|------------------------|----------|------------------|----------|------------------------|-------------------------------|-----------------------------|----------------------------|
| | | | Detected Concentration | | Reporting Limits | | | 2x Mean ^a (mg/L) | 95% UTL ^b (mg/L) | |
| | | | Minimum | Maximum | Minimum | Maximum | | | | |
| Metals | | | | | | | | | | |
| Aluminum | 3 / 3 | 100 | 7.57E-02 | 1.39E+00 | 2.00E-01 | 2.00E-01 | 5.23E-01 | 2.34E+00 | 5.95E+00 | N (a) |
| Barium | 3 / 3 | 100 | 2.10E-02 | 8.02E-02 | 2.00E-01 | 2.00E-01 | 4.42E-02 | 1.27E-01 | 4.72E-01 | N (a) |
| Calcium | 3 / 3 | 100 | 3.24E+01 | 2.71E+02 | 5.00E+00 | 5.00E+00 | 1.41E+02 | 5.65E+01 | 7.14E+01 | N (d) |
| Iron | 2 / 3 | 67 | 1.22E+00 | 1.83E+00 | 1.00E-01 | 1.00E-01 | 1.03E+00 | 7.04E+00 | 2.20E+01 | N (a) |
| Magnesium | 3 / 3 | 100 | 2.19E+01 | 1.54E+02 | 5.00E+00 | 5.00E+00 | 8.13E+01 | 2.13E+01 | 2.20E+01 | N (d) |
| Manganese | 3 / 3 | 100 | 5.46E-02 | 1.15E+00 | 1.50E-02 | 1.50E-02 | 5.33E-01 | 5.81E-01 | 4.13E+00 | N (b) |
| Nickel | 1 / 3 | 33 | 1.25E-02 | 1.25E-02 | 4.00E-02 | 4.00E-02 | 1.75E-02 | | 3.43E-02 | N (b) |
| Potassium | 3 / 3 | 100 | 2.42E+00 | 1.23E+01 | 5.00E+00 | 5.00E+00 | 6.18E+00 | 7.20E+00 | 1.60E+01 | N (d) |
| Sodium | 3 / 3 | 100 | 2.65E+01 | 1.67E+02 | 5.00E+00 | 5.00E+00 | 1.01E+02 | 1.48E+01 | 4.90E+01 | N (d) |
| Volatile Organic Compounds | | | | | | | | | | |
| 1,1,1-Trichloroethane | 2 / 19 | 11 | 5.00E-04 | 3.60E-02 | 1.00E-03 | 5.00E-03 | 3.63E-03 | | | Y |
| 1,1-Dichloroethane | 3 / 19 | 16 | 4.60E-03 | 8.80E-02 | 1.00E-03 | 5.00E-03 | 6.82E-03 | | | Y |
| 1,1-Dichloroethene | 3 / 19 | 16 | 1.80E-03 | 3.10E-01 | 1.00E-03 | 2.50E-01 | 1.85E-02 | | | Y |
| 1,2-Dichloroethane | 1 / 19 | 5 | 1.10E-03 | 1.10E-03 | 1.00E-03 | 5.00E-03 | 1.79E-03 | | | Y |
| Acetone | 1 / 9 | 11 | 8.40E-02 | 8.40E-02 | 2.00E-02 | 2.00E-02 | 1.82E-02 | | | Y |
| cis-1,2-Dichloroethene | 3 / 19 | 16 | 7.50E-03 | 5.00E-01 | 1.00E-03 | 2.50E-01 | 2.94E-02 | | | Y |
| Methylene chloride | 1 / 16 | 6 | 1.50E-03 | 1.50E-03 | 1.00E-03 | 5.00E-03 | 1.97E-03 | | | Y |
| Toluene | 2 / 19 | 11 | 1.40E-03 | 2.60E-03 | 1.00E-03 | 5.00E-03 | 1.82E-03 | | | Y |
| trans-1,2-Dichloroethene | 3 / 19 | 16 | 6.40E-03 | 1.70E-02 | 1.00E-03 | 5.00E-03 | 3.60E-03 | | | Y |
| Trichloroethene | 4 / 19 | 21 | 2.30E-03 | 9.20E+00 | 1.00E-03 | 2.50E-01 | 4.88E-01 | | | Y |
| Vinyl chloride | 2 / 19 | 11 | 3.70E-02 | 6.00E-02 | 1.00E-03 | 5.00E-03 | 6.87E-03 | | | Y |

mg/L = Milligrams per liter

^a Background criterion for inorganic constituents is 2 times the mean background concentration (Science Applications International Corporation, 1998, *Background Metals Survey Report, Fort McClellan*, Anniston, Alabama, July).

^b 95% Upper Tolerance Limit (UTL) based on statistical distribution of raw background metal data (IT, 2002, *Draft Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, Revision 2, Prepared for U.S. Army Corps of Engineers, Mobile District, February).

^c N = Chemical is determined not to be site-related ; Y = Chemical is determined to be site-related.

Rationale for exclusion of a chemical as site-related:

N (a) = maximum detected concentration does not exceed 2 times background mean.

N (b) = maximum detected concentration does not exceed the background upper tolerance limit.

N (c) = detection frequency is less than 5 percent, detected only at low concentrations, and not expected to be site-related based on historical information.

N (d) = essential nutrient.

Table L-8

**Selection of Chemicals of Potential Concern for Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| Site-Related Chemical | Maximum Detected Concentration (mg/L) | Applicable SSSL (mg/L) | | | | | | | | | | | | Statistical Distribution ^a | 95% UCL ^b (mg/L) | Source-Term Concentration ^c (mg/L) |
|-----------------------------------|--|------------------------|-------|----------|-------|---------------|-------|----------|-------|---------------------|-------|----------|-------|--|--------------------------------|---|
| | | Resident | | | | Groundskeeper | | | | Construction Worker | | | | | | |
| | | Noncancer | COPC? | Cancer | COPC? | Noncancer | COPC? | Cancer | COPC? | Noncancer | COPC? | Cancer | COPC? | | | |
| Volatile Organic Compounds | | | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | 3.60E-02 | 3.05E-01 | N | NA | NA | 1.91E+00 | N | NA | NA | 1.91E+00 | N | NA | NA | | | |
| 1,1-Dichloroethane | 8.80E-02 | 1.54E-01 | N | NA | NA | 9.86E-01 | N | NA | NA | 9.86E-01 | N | NA | NA | | | |
| 1,1-Dichloroethene | 3.10E-01 | 1.38E-02 | Y | 9.36E-05 | Y | 8.63E-02 | Y | 4.48E-04 | Y | 8.63E-02 | Y | 1.12E-02 | Y | NP | 9.09E-02 | 9.09E-02 |
| 1,2-Dichloroethane | 1.10E-03 | 4.88E-03 | N | 4.48E-04 | Y | 3.00E-01 | N | 3.08E-03 | N | 3.00E-01 | N | 7.69E-02 | N | NP | 2.78E-03 | 1.10E-03 |
| Acetone | 8.40E-02 | 1.56E-01 | N | NA | NA | 1.02E+00 | N | NA | NA | 1.02E+00 | N | NA | NA | | | |
| cis-1,2-Dichloroethene | 5.00E-01 | 1.55E-02 | Y | NA | NA | 9.91E-02 | Y | NA | NA | 9.91E-02 | Y | NA | NA | NP | 1.46E-01 | 1.46E-01 |
| Methylene chloride | 1.50E-03 | 9.32E-02 | N | 7.85E-03 | N | 6.02E-01 | N | 3.75E-02 | N | 6.02E-01 | N | 9.37E-01 | N | | | |
| Toluene | 2.60E-03 | 2.59E-01 | N | NA | NA | 1.73E+00 | N | NA | NA | 1.73E+00 | N | NA | NA | | | |
| trans-1,2-Dichloroethene | 1.70E-02 | 3.07E-02 | N | NA | NA | 1.95E-01 | N | NA | NA | 1.95E-01 | N | NA | NA | | | |
| Trichloroethene | 9.20E+00 | 9.15E-03 | Y | 4.51E-03 | Y | 5.72E-02 | Y | 2.42E-02 | Y | 5.72E-02 | Y | 6.06E-01 | Y | NP | 2.65E+00 | 2.65E+00 |
| Vinyl chloride | 6.00E-02 | 4.64E-03 | Y | 4.41E-05 | Y | 2.98E-02 | Y | 3.86E-04 | Y | 2.98E-02 | Y | 9.65E-03 | Y | NP | 2.24E-02 | 2.24E-02 |

SSSL = Site-specific screening level developed as described in the *Human Health & Ecological Screening Values & PAH Background Summary Report* (IT, August 2000).

mg/L = Milligrams per liter

COPC = Chemical of potential concern.

UCL = Upper confidence limit.

N = Chemical is determined not to be a COPC ; Y = Chemical is determined to be COPC; NA = not applicable.

^a Statistical distribution testing performed only for COPC:

N = Normal distribution.

L = Lognormal distribution.

NP = Nonparametric distribution (if data set fails normal and lognormal).

^b 95% UCL calculated only for COPC with at least 5 samples.

^c The 95% UCL or maximum concentration, whichever is lower, is selected as the source-term concentration.

Table L-9

**Cancer Risk and Noncancer Hazard Estimates for the Resident Exposed to Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COPC | Source-Term Concentration (mg/L) | Total Noncancer Hazard / Cancer Risk Resident | |
|-----------------------------------|--|--|-----------------|
| | | HI | ILCR |
| Volatile Organic Compounds | | | |
| 1,1-Dichloroethene | 9.09E-02 | 6.61E-01 | 9.71E-04 |
| 1,2-Dichloroethane | 1.10E-03 | NA | 2.45E-06 |
| cis-1,2-Dichloroethene | 1.46E-01 | 9.46E-01 | NA |
| Trichloroethene | 2.65E+00 | 2.90E+01 | 5.88E-04 |
| Vinyl chloride | 2.24E-02 | 4.83E-01 | 5.09E-04 |
| Total HI / ILCR | | 3.11E+01 | 2.07E-03 |

COPC = Chemical of potential concern
 mg/L = Milligrams per liter
 HI = Hazard index
 ILCR = Incremental lifetime cancer risk
 NA = Not applicable

Table L-10

**Separation of Noncancer Hazard by Target Organ
for the Resident
Former Small Weapons Repair Shop
Fort McClellan, Alabama**

| COPC | Target Organ Hazard* | | |
|-------------------------------------|----------------------|-----------------|-----------------|
| | Liver | Kidney | Erythrocyte |
| <i>For Groundwater:</i> | | | |
| Volatile Organic Compounds | | | |
| 1,1-Dichloroethene | 6.61E-01 | NA | NA |
| cis-1,2-Dichloroethene | NA | NA | 9.46E-01 |
| Trichloroethene | 2.90E+01 | 2.90E+01 | NA |
| Vinyl chloride | 4.83E-01 | NA | NA |
| Resident HI by Target Organ: | 2.96E+01 | 2.90E+01 | 9.46E-01 |

COPC = Chemical of potential concern

* See Toxicological Profiles for data regarding selection of target organs.

NA = Not applicable

Table L-11

**Remedial Goal Options Based on Noncancer for the Resident
Groundwater
Former Small Weapons Repair Shop
Fort McClellan, Alabama**

| COC | Source-Term | | HI (all pathways) for COC | Noncancer | | |
|-----------------------------------|-------------------------|----------------------------|---------------------------------|------------------------------|----------|----------|
| | Concentration (mg/L) | MCL ^a (mg/L) | | Remedial Goal Options (mg/L) | | |
| | | | | Based on an HI of: | | |
| | | | | 0.1 | 1 | 3 |
| Volatile Organic Compounds | | | | | | |
| 1,1-Dichloroethene | 9.09E-02 | 7.00E-03 | 6.61E-01 | 1.38E-02 | 1.38E-01 | 4.13E-01 |
| Trichloroethene | 2.65E+00 | 5.00E-03 | 2.90E+01 | 9.15E-03 | 9.15E-02 | 2.74E-01 |
| Vinyl Chloride | 2.24E-02 | 2.00E-03 | 4.83E-01 | 4.64E-03 | 4.64E-02 | 1.39E-01 |

mg/L = Milligrams per liter

COC = Chemical of concern.

HI = Hazard index

MCL = Maximum contaminant level.

^a US Environmental Protection Agency, *Drinking Water Standards and Health Advisories*, Summer 2000

Table L-12

Remedial Goal Options Based on Cancer for Resident
Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama

| COC | Source-Term | | ILCR (all pathways) for COC | Cancer | | |
|-----------------------------------|-------------------------|----------------------------|-----------------------------------|------------------------------|----------|----------|
| | Concentration (mg/L) | MCL ^a (mg/L) | | Remedial Goal Options (mg/L) | | |
| | | | | Based on an ILCR of : | | |
| | | | 1.00E-06 | 1.00E-05 | 1.00E-04 | |
| Volatile Organic Compounds | | | | | | |
| 1,1-Dichloroethene | 9.09E-02 | 7.00E-03 | 9.71E-04 | 9.36E-05 | 9.36E-04 | 9.36E-03 |
| 1,2-Dichloroethane | 1.10E-03 | 5.00E-03 | 2.45E-06 | 4.48E-04 | 4.48E-03 | 4.48E-02 |
| Trichloroethene | 2.65E+00 | 5.00E-03 | 5.88E-04 | 4.51E-03 | 4.51E-02 | 4.51E-01 |
| Vinyl chloride | 2.24E-02 | 2.00E-03 | 5.09E-04 | 4.41E-05 | 4.41E-04 | 4.41E-03 |

mg/L = Milligrams per liter

COC = Chemical of concern.

ILCR = Incremental lifetime cancer risk.

MCL = Maximum contaminant level.

^a US Environmental Protection Agency, *Drinking Water Standards and Health Advisories*, Summer 2000

Table L-13

**Cancer Risk and Noncancer Hazard Estimates for the Groundskeeper Exposed to Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COPC | Source-Term Concentration (mg/L) | Total Noncancer Hazard / Cancer Risk Groundskeeper | |
|-----------------------------------|--|---|-----------------|
| | | HI | ILCR |
| Volatile Organic Compounds | | | |
| 1,1-Dichloroethene | 9.09E-02 | 1.05E-01 | 2.03E-04 |
| cis-1,2-Dichloroethene | 1.46E-01 | 1.48E-01 | NA |
| Trichloroethene | 2.65E+00 | 4.64E+00 | 1.09E-04 |
| Vinyl chloride | 2.24E-02 | 7.54E-02 | 5.82E-05 |
| Total HI / ILCR | | 4.97E+00 | 3.71E-04 |

COPC = Chemical of potential concern
 mg/L = Milligrams per liter
 HI = Hazard index
 ILCR = Incremental lifetime cancer risk
 NA = Not applicable

Table L-14

**Separation of Noncancer Hazard by Target Organ
for the Groundskeeper
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COPC | Target Organ Hazard* | | |
|--|----------------------|----------|-------------|
| | Liver | Kidney | Erythrocyte |
| <i>For Groundwater:</i> | | | |
| Volatile Organic Compounds | | | |
| 1,1-Dichloroethene | 1.05E-01 | NA | NA |
| cis-1,2-Dichloroethene | NA | NA | 1.48E-01 |
| Trichloroethene | 4.64E+00 | 4.64E+00 | NA |
| <i>For Surface Soil:</i> | | | |
| NA | NA | NA | NA |
| Groundskeeper HI by Target Organ: | 4.74E+00 | 4.64E+00 | 1.48E-01 |

COPC = Chemical of potential concern

* See Toxicological Profiles for data regarding selection of target organs.

NA = Not applicable

Table L-15

**Remedial Goal Options Based on Noncancer for Groundskeeper
Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COC | Source-Term | | HI (all pathways) for COC | Noncancer | | |
|-----------------------------------|-------------------------|----------------------------|---------------------------------|------------------------------|----------|----------|
| | Concentration (mg/L) | MCL ^a (mg/L) | | Remedial Goal Options (mg/L) | | |
| | | | | Based on an HI of: | | |
| | | | 0.1 | 1 | 3 | |
| Volatile Organic Compounds | | | | | | |
| 1,1-Dichloroethene | 9.09E-02 | 7.00E-03 | 1.05E-01 | 8.63E-02 | 8.63E-01 | 2.59E+00 |
| Trichloroethene | 2.65E+00 | 5.00E-03 | 4.64E+00 | 5.72E-02 | 5.72E-01 | 1.71E+00 |

COC = Chemical of concern.

mg/L = Milligrams per liter

HI = Hazard index

MCL = Maximum contaminant level.

^a US Environmental Protection Agency, *Drinking Water Standards and Health Advisories*, Summer 2000

Table L-16

**Remedial Goal Options Based on Cancer for the Groundskeeper
Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COC | Source-Term | | ILCR (all pathways) for COC | Cancer | | |
|-----------------------------------|-------------------------|----------------------------|-----------------------------------|------------------------------|----------|----------|
| | Concentration (mg/L) | MCL ^a (mg/L) | | Remedial Goal Options (mg/L) | | |
| | | | | Based on an ILCR of : | | |
| | | | 1.00E-06 | 1.00E-05 | 1.00E-04 | |
| Volatile Organic Compounds | | | | | | |
| 1,1-Dichloroethene | 9.09E-02 | 7.00E-03 | 2.03E-04 | 4.48E-04 | 4.48E-03 | 4.48E-02 |
| Trichloroethene | 2.65E+00 | 5.00E-03 | 1.09E-04 | 2.42E-02 | 2.42E-01 | 2.42E+00 |
| Vinyl chloride | 2.24E-02 | 2.00E-03 | 5.82E-05 | 3.86E-04 | 3.86E-03 | 3.86E-02 |

COC = Chemical of concern.

mg/L = Milligrams per liter

ILCR = Incremental lifetime cancer risk.

MCL = Maximum contaminant level.

^a US Environmental Protection Agency, *Drinking Water Standards and Health Advisories*, Summer 2000

Table L-17

**Cancer Risk and Noncancer Hazard Estimates for the Construction Worker Exposed to Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COPC | Source-Term Concentration (mg/L) | Total Noncancer Hazard / Cancer Risk Construction Worker | |
|-----------------------------------|--|---|-----------------|
| | | HI | ILCR |
| Volatile Organic Compounds | | | |
| 1,1-Dichloroethene | 9.09E-02 | 1.05E-01 | 8.12E-06 |
| cis-1,2-Dichloroethene | 1.46E-01 | 1.48E-01 | NA |
| Trichloroethene | 2.65E+00 | 4.64E+00 | 4.37E-06 |
| Vinyl chloride | 2.24E-02 | 7.54E-02 | 2.33E-06 |
| Total HI / ILCR | | 4.97E+00 | 1.48E-05 |

COPC = Chemical of potential concern
 mg/L = Milligrams per liter
 HI = Hazard index
 ILCR = Incremental lifetime cancer risk
 NA = Not applicable

Table L-18

**Separation of Noncancer Hazard by Target Organ
for the Construction Worker
Former Small Weapons Repair Shop
Fort McClellan, Alabama**

| COPC | Target Organ Hazard* | | |
|--|----------------------|----------|-------------|
| | Liver | Kidney | Erythrocyte |
| <i>For Groundwater:</i> | | | |
| Volatile Organic Compounds | | | |
| 1,1-Dichloroethene | 1.05E-01 | NA | NA |
| cis-1,2-Dichloroethene | NA | NA | 1.48E-01 |
| Trichloroethene | 4.64E+00 | 4.64E+00 | NA |
| <i>For Total Soil:</i> | | | |
| NA | NA | NA | NA |
| Construction Worker HI by Target Organ: | 4.74E+00 | 4.64E+00 | 1.48E-01 |

COPC = Chemical of potential concern

* See Toxicological Profiles for data regarding selection of target organs.

NA = Not applicable

Table L-19

**Remedial Goal Options Based on Noncancer for the Construction Worker
Groundwater
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COC | Source-Term | | HI (all pathways) for COC | Noncancer | | |
|-----------------------------------|-------------------------|----------------------------|---------------------------------|------------------------------|----------|----------|
| | Concentration (mg/L) | MCL ^a (mg/L) | | Remedial Goal Options (mg/L) | | |
| | | | | Based on an HI of: | | |
| | | | 0.1 | 1 | 3 | |
| Volatile Organic Compounds | | | | | | |
| 1,1-Dichloroethene | 9.09E-02 | 7.00E-03 | 1.05E-01 | 8.63E-02 | 8.63E-01 | 2.59E+00 |
| Trichloroethene | 2.65E+00 | 5.00E-03 | 4.64E+00 | 5.72E-02 | 5.72E-01 | 1.71E+00 |

COC = Chemical of concern.

mg/L = Milligrams per liter

HI = Hazard index

MCL = Maximum contaminant level.

^a US Environmental Protection Agency, *Drinking Water Standards and Health Advisories*, Summer 2000

Table L-20

**Total Soil^a Samples Used in Streamlined Risk Assessment
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| Sample Location | Sample Number | Sample Date | Depth of sample (ft) | Chemical Analyses Performed |
|-----------------|---------------|-------------|----------------------|--|
| PPMP-75-GP01 | KJ0001 | 18-Jan-99 | 0 - 1 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP02 | KJ0005 | 18-Jan-99 | 0 - 1 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP03 | KJ0007 | 18-Jan-99 | 0 - 1 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP01 | KJ0004 | 18-Jan-99 | 5 - 7 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP02 | KJ0006 | 18-Jan-99 | 3 - 5 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |
| PPMP-75-GP03 | KJ0008 | 18-Jan-99 | 3 - 5 | CL Herb, CL Pest, Metals, OP Pest, PCBs, SVOCs, VOCs |

^a Total Soil for Parcel 66 is defined as the interval of 0 to 7 feet below ground surface.

CL Herb = Chlorinated Herbicides

CL Pest = Chlorinated Pesticides

OP Pest = Organophosphate Pesticides

PCBs = Polychlorinated Biphenyls

SVOCs = Semivolatile Organic Compounds

VOCs = Volatile Organic Compounds

ft - Feet

Table L-21

Selection of Site-Related Chemicals for Total Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama

| Chemical | Detection Frequency | Percent hits | Range of values (mg/kg) | | | | Arithmetic Mean (mg/kg) | Background Screening Criteria | | Site-Related? ^d |
|---------------------------------------|---------------------|--------------|-------------------------|----------|------------------|----------|-------------------------|-------------------------------|------------------------------|----------------------------|
| | | | Detected Concentration | | Reporting Limits | | | 2x Mean ^b (mg/kg) | 95% UTL ^c (mg/kg) | |
| | | | Minimum | Maximum | Minimum | Maximum | | | | |
| Metals | | | | | | | | | | |
| Aluminum | 6 / 6 | 100 | 6.34E+03 | 1.49E+04 | 2.18E+01 | 2.66E+01 | 1.18E+04 | 1.50E+04 | 1.80E+04 | N (a) |
| Arsenic | 5 / 5 | 100 | 2.60E+00 | 6.30E+00 | 1.10E+00 | 1.30E+00 | 4.64E+00 | 1.60E+01 | 3.24E+01 | N (a) |
| Barium | 6 / 6 | 100 | 4.65E+01 | 1.73E+02 | 2.18E+01 | 2.66E+01 | 9.28E+01 | 1.76E+02 | 2.42E+02 | N (a) |
| Beryllium | 6 / 6 | 100 | 4.60E-01 | 2.00E+00 | 5.50E-01 | 6.70E-01 | 1.26E+00 | 8.31E-01 | 1.50E+00 | N (e) |
| Calcium | 6 / 6 | 100 | 3.71E+02 | 2.46E+04 | 5.46E+02 | 6.66E+02 | 5.25E+03 | 1.20E+03 | 2.27E+03 | N (d) |
| Chromium | 6 / 6 | 100 | 7.60E+00 | 1.94E+01 | 1.10E+00 | 1.30E+00 | 1.59E+01 | 3.76E+01 | 5.63E+01 | N (a) |
| Cobalt | 6 / 6 | 100 | 1.30E+00 | 3.74E+01 | 5.50E+00 | 6.70E+00 | 1.82E+01 | 1.63E+01 | 3.63E+01 | N (e) |
| Copper | 6 / 6 | 100 | 6.50E+00 | 4.51E+01 | 2.70E+00 | 3.30E+00 | 2.78E+01 | 1.59E+01 | 2.59E+01 | N (e) |
| Iron | 6 / 6 | 100 | 4.37E+03 | 3.46E+04 | 1.09E+01 | 1.33E+01 | 2.52E+04 | 3.92E+04 | 5.63E+04 | N (a) |
| Lead | 6 / 6 | 100 | 1.08E+01 | 2.60E+01 | 3.30E-01 | 4.00E-01 | 1.59E+01 | 3.93E+01 | 6.05E+01 | N (a) |
| Magnesium | 6 / 6 | 100 | 1.13E+03 | 7.90E+03 | 5.46E+02 | 6.66E+02 | 5.44E+03 | 9.06E+02 | 2.16E+03 | N (d) |
| Manganese | 6 / 6 | 100 | 1.54E+01 | 3.63E+02 | 1.60E+00 | 2.00E+00 | 2.02E+02 | 1.47E+03 | 4.12E+03 | N (a) |
| Mercury | 6 / 6 | 100 | 1.70E-02 | 5.40E-02 | 3.60E-02 | 4.40E-02 | 3.15E-02 | 7.04E-02 | 9.40E-02 | N (a) |
| Nickel | 6 / 6 | 100 | 3.30E+00 | 7.18E+01 | 4.40E+00 | 5.30E+00 | 3.68E+01 | 1.16E+01 | 1.69E+01 | N (e) |
| Potassium | 6 / 6 | 100 | 3.80E+02 | 5.31E+02 | 5.46E+02 | 6.66E+02 | 4.48E+02 | 7.57E+02 | 8.31E+02 | N (d) |
| Selenium | 5 / 6 | 83 | 1.00E+00 | 1.60E+00 | 5.50E-01 | 6.70E-01 | 1.23E+00 | 4.80E-01 | 5.71E-01 | N (e) |
| Thallium | 2 / 6 | 33 | 4.30E-01 | 6.10E-01 | 1.10E+00 | 1.30E+00 | 5.57E-01 | 2.45E+00 | 6.62E+00 | N (a) |
| Vanadium | 6 / 6 | 100 | 9.40E+00 | 2.87E+01 | 5.50E+00 | 6.70E+00 | 2.01E+01 | 6.17E+01 | 9.05E+01 | N (a) |
| Zinc | 6 / 6 | 100 | 1.61E+01 | 1.11E+02 | 2.20E+00 | 2.70E+00 | 6.56E+01 | 3.79E+01 | 7.13E+01 | N (e) |
| Chlorinated Pesticides | | | | | | | | | | |
| Aldrin | 1 / 6 | 17 | 1.00E-03 | 1.00E-03 | 1.90E-03 | 9.30E-03 | 2.23E-03 | | | Y |
| Endrin | 1 / 6 | 17 | 5.20E-03 | 5.20E-03 | 1.90E-03 | 9.30E-03 | 2.35E-03 | | | Y |
| Methoxychlor | 1 / 6 | 17 | 1.20E-02 | 1.20E-02 | 3.70E-03 | 1.80E-02 | 4.84E-03 | | | Y |
| Semivolatile Organic Compounds | | | | | | | | | | |
| Anthracene | 1 / 6 | 17 | 7.90E-02 | 7.90E-02 | 3.60E-01 | 4.40E-01 | 1.77E-01 | | | Y |
| Benzo(a)anthracene | 2 / 6 | 33 | 4.10E-02 | 7.30E-01 | 3.60E-01 | 4.40E-01 | 2.60E-01 | | | Y |
| Benzo(a)pyrene | 1 / 6 | 17 | 1.60E+00 | 1.60E+00 | 3.60E-01 | 4.40E-01 | 4.30E-01 | | | Y |
| Benzo(b)fluoranthene | 2 / 6 | 33 | 6.70E-02 | 2.10E+00 | 3.60E-01 | 4.40E-01 | 4.93E-01 | | | Y |
| Benzo(ghi)perylene | 1 / 6 | 17 | 1.10E+00 | 1.10E+00 | 3.60E-01 | 4.40E-01 | 3.47E-01 | | | Y |
| Benzo(k)fluoranthene | 1 / 6 | 17 | 6.10E-01 | 6.10E-01 | 3.60E-01 | 4.40E-01 | 2.65E-01 | | | Y |
| Chrysene | 2 / 6 | 33 | 4.00E-02 | 9.40E-01 | 3.60E-01 | 4.40E-01 | 2.95E-01 | | | Y |
| Dibenz(a,h)anthracene | 1 / 6 | 17 | 2.70E-01 | 2.70E-01 | 3.60E-01 | 4.40E-01 | 2.08E-01 | | | Y |
| Fluoranthene | 2 / 6 | 33 | 8.10E-02 | 1.10E+00 | 3.60E-01 | 4.40E-01 | 3.29E-01 | | | Y |
| Indeno(1,2,3-cd)pyrene | 1 / 6 | 17 | 1.20E+00 | 1.20E+00 | 3.60E-01 | 4.40E-01 | 3.63E-01 | | | Y |
| Phenanthrene | 1 / 6 | 17 | 1.80E-01 | 1.80E-01 | 3.60E-01 | 4.40E-01 | 1.93E-01 | | | Y |
| Pyrene | 2 / 6 | 33 | 6.50E-02 | 1.10E+00 | 3.60E-01 | 4.40E-01 | 3.26E-01 | | | Y |

Table L-21

Selection of Site-Related Chemicals for Total Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama

| Chemical | Detection Frequency | Percent hits | Range of values (mg/kg) | | | | Arithmetic Mean (mg/kg) | Background Screening Criteria | | Site-Related? ^d |
|-----------------------------------|---------------------|--------------|-------------------------|----------|------------------|----------|-------------------------|-------------------------------|------------------------------|----------------------------|
| | | | Detected Concentration | | Reporting Limits | | | 2x Mean ^b (mg/kg) | 95% UTL ^c (mg/kg) | |
| | | | Minimum | Maximum | Minimum | Maximum | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| 2-Butanone | 2 / 2 | 100 | 3.80E-03 | 5.80E-03 | 2.20E-02 | 2.40E-02 | 4.80E-03 | | | |
| Acetone | 2 / 2 | 100 | 1.50E-01 | 2.70E-01 | 2.30E-02 | 2.40E-02 | 2.10E-01 | | | Y |
| Carbon disulfide | 1 / 6 | 17 | 1.70E-03 | 1.70E-03 | 5.50E-03 | 6.70E-03 | 2.76E-03 | | | Y |
| cis-1,2-Dichloroethene | 1 / 6 | 17 | 1.80E-02 | 1.80E-02 | 5.50E-03 | 6.70E-03 | 5.43E-03 | | | Y |
| Toluene | 1 / 6 | 17 | 2.00E-03 | 2.00E-03 | 5.50E-03 | 6.70E-03 | 2.81E-03 | | | Y |
| trans-1,2-Dichloroethene | 1 / 6 | 17 | 3.20E-03 | 3.20E-03 | 5.50E-03 | 6.70E-03 | 2.96E-03 | | | Y |

N = Chemical is determined not to be site-related ; Y = Chemical is determined to be site-related.

^a Total Soil for Parcel 66 is defined as the interval of 0 to 7 feet below ground surface.

^b Background criterion for inorganic constituents is 2 times the mean background concentration

(*Science Applications International Corporation, 1998, Background Metals Survey Report, Fort McClellan, Anniston, Alabama, July*).

^c 95% Upper Tolerance Limit (UTL) based on statistical distribution of raw background metal data (IT, 2002, *Draft Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, Revision 2, Prepared for U.S. Army Corps of Engineers, Mobile District, February).

^d N = Chemical is determined not to be site-related ; Y = Chemical is determined to be site-related.

Rationale for exclusion of a chemical as site-related:

N (a) = maximum detected concentration does not exceed background screening criterion.

N (b) = maximum detected concentration does not exceed the upper tolerance limit.

N (c) = detection frequency is less than 5 percent, detected only at low concentrations, and not expected to be site-related based on historical information.

N (d) = essential nutrient.

N (e) = site data set and background data set are drawn from the same population as determined by statistical testing and/or geochemical evaluation.

Table L-22

Selection of Chemicals of Potential Concern for Total Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama

| Site-Related Chemical | Maximum Detected Concentration (mg/kg) | Applicable SSSL (mg/kg) | | | | | | | | Statistical Distribution ^b | 95% UCL ^c (mg/kg) | Source-Term Concentration ^d (mg/kg) |
|---------------------------------------|---|-------------------------|-------|----------|-------|-----------|-------|----------|-------|--|---------------------------------|--|
| | | Construction Worker | | | | Resident | | | | | | |
| | | Noncancer | COPC? | Cancer | COPC? | Noncancer | COPC? | Cancer | COPC? | | | |
| Chlorinated Pesticides | | | | | | | | | | | | |
| Aldrin | 1.00E-03 | 1.46E+00 | N | 1.96E+00 | N | 2.32E-01 | N | 3.65E-02 | N | | | |
| Endrin | 5.20E-03 | 1.46E+01 | N | NA | NA | 2.32E+00 | N | NA | NA | | | |
| Methoxychlor | 1.20E-02 | 2.49E+02 | N | NA | NA | 3.89E+01 | N | NA | NA | | | |
| Semivolatile Organic Compounds | | | | | | | | | | | | |
| Anthracene | 7.90E-02 | 1.48E+04 | N | NA | NA | 2.33E+03 | N | NA | NA | | | |
| Benzo(a)anthracene | 7.30E-01 | NA | NA | 4.62E+01 | N | NA | NA | 8.51E-01 | N | | | |
| Benzo(a)pyrene | 1.60E+00 | NA | NA | 4.62E+00 | N | NA | NA | 8.51E-02 | Y | NP | 1.48E+00 | 1.48E+00 |
| Benzo(b)fluoranthene | 2.10E+00 | NA | NA | 4.62E+01 | N | NA | NA | 8.51E-01 | Y | NP | 1.93E+00 | 1.93E+00 |
| Benzo(ghi)perylene | 1.10E+00 | 1.46E+03 | N | NA | NA | 2.32E+02 | N | NA | NA | | | |
| Benzo(k)fluoranthene | 6.10E-01 | NA | NA | 4.62E+02 | N | NA | NA | 8.51E+00 | N | | | |
| Chrysene | 9.40E-01 | NA | NA | 4.71E+03 | N | NA | NA | 8.61E+01 | N | | | |
| Dibenz(a,h)anthracene | 2.70E-01 | NA | NA | 4.71E+00 | N | NA | NA | 8.61E-02 | Y | NP | 2.68E-01 | 2.68E-01 |
| Fluoranthene | 1.10E+00 | 1.94E+03 | N | NA | NA | 3.09E+02 | N | NA | NA | | | |
| Indeno(1,2,3-cd)pyrene | 1.20E+00 | NA | NA | 4.62E+01 | N | NA | NA | 8.51E-01 | Y | NP | 1.11E+00 | 1.11E+00 |
| Phenanthrene | 1.80E-01 | 1.46E+04 | N | NA | NA | 2.32E+03 | N | NA | NA | | | |
| Pyrene | 1.10E+00 | 1.48E+03 | N | NA | NA | 2.33E+02 | N | NA | NA | | | |
| Volatile Organic Compounds | | | | | | | | | | | | |
| 2-Butanone | 5.80E-03 | 2.86E+04 | N | NA | NA | 4.66E+03 | N | NA | NA | | | |
| Acetone | 2.70E-01 | 4.95E+03 | N | NA | NA | 7.76E+02 | N | NA | NA | | | |
| Carbon disulfide | 1.70E-03 | 4.92E+03 | N | NA | NA | 7.77E+02 | N | NA | NA | | | |
| cis-1,2-Dichloroethene | 1.80E-02 | 4.98E+02 | N | NA | NA | 7.77E+01 | N | NA | NA | | | |
| Toluene | 2.00E-03 | 9.62E+03 | N | NA | NA | 1.55E+03 | N | NA | NA | | | |
| trans-1,2-Dichloroethene | 3.20E-03 | 9.96E+02 | N | NA | NA | 1.55E+02 | N | NA | NA | | | |

SSSL = Site-specific screening level developed as described in the *Human Health & Ecological Screening Values & PAH Background Summary Report* (IT, August 2000).

COPC = Chemical of potential concern.

UCL = Upper confidence limit.

N = Chemical is determined not to be a COPC ; Y = Chemical is determined to be COPC.

^a Total Soil for Parcel 66 is defined as the interval of 0 to 7 feet below ground surface.

^b Statistical distribution testing performed only for COPC:

N = Normal distribution.

L = Lognormal distribution.

NP = Nonparametric distribution (if data set fails normal and lognormal).

^c 95% UCL calculated only for COPC with at least 5 samples.

^d The 95% UCL or maximum concentration, whichever is lower, is selected as the source-term concentration.

Table L-23

**Cancer Risk and Noncancer Hazard Estimates for the Resident Exposed to Total Soil^a
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| COPC | Source-Term Concentration (mg/kg) | Total Noncancer Hazard / Cancer Risk Resident | |
|---------------------------------------|---|--|-----------------|
| | | HI | ILCR |
| Semivolatile Organic Compounds | | | |
| Benzo(a)pyrene | 1.48E+00 | NA | 1.74E-05 |
| Benzo(b)fluoranthene | 1.93E+00 | NA | 2.27E-06 |
| Dibenz(a,h)anthracene | 2.68E-01 | NA | 3.12E-06 |
| Indeno(1,2,3-cd)pyrene | 1.11E+00 | NA | 1.31E-06 |
| Total HI / ILCR | | NA | 2.40E-05 |

^a Total soil is defined as the interval from 0 to 7 feet below ground surface for Parcel 66(7)

COPC = Chemical of potential concern

HI = Hazard index

ILCR = Incremental lifetime cancer risk

NA = Not applicable

Table L-24

Remedial Goal Options Based on Cancer for Resident
 Total Soil
 Former Small Weapons Repair Shop, Parcel 66(7)
 Fort McClellan, Alabama

| COC | Source-Term Concentration (mg/kg) | ILCR (all pathways) for COC | Cancer | | |
|---------------------------------------|---|-----------------------------------|-------------------------------|----------|----------|
| | | | Remedial Goal Options (mg/kg) | | |
| | | | Based on an ILCR of : | | |
| | | | 1.00E-06 | 1.00E-05 | 1.00E-04 |
| Semivolatile Organic Compounds | | | | | |
| Benzo(a)pyrene | 1.48E+00 | 1.74E-05 | 8.51E-02 | 8.51E-01 | 8.51E+00 |
| Benzo(b)fluoranthene | 1.93E+00 | 2.27E-06 | 8.51E-01 | 8.51E+00 | 8.51E+01 |
| Dibenz(a,h)anthracene | 2.68E-01 | 3.12E-06 | 8.61E-02 | 8.61E-01 | 8.61E+00 |
| Indeno(1,2,3-cd)pyrene | 1.11E+00 | 1.31E-06 | 8.51E-01 | 8.51E+00 | 8.51E+01 |

COC = Chemical of concern.
 ILCR = Incremental lifetime cancer risk.
 mg/kg = Milligrams per kilogram

Table L-25

**Selection of Chemicals For Future Groundwater Analysis
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| Groundwater Residential COPCs | Total Soil ^a MDC (mg/kg) | EPA Soil-Screening Level ^b (mg/kg) | Included for Future Groundwater Analyses? ^c |
|-------------------------------------|---|--|---|
| Volatile Organic Compounds | | | |
| 1,1-Dichloroethene | ND | 0.06 | N (c) |
| 1,2-Dichloroethane | ND | 0.02 | N (c) |
| cis-1,2-Dichloroethene | 0.018 | 0.4 | N (b) |
| Trichloroethene | ND | 0.06 | N (c) |
| Vinyl chloride | ND | 0.01 | N (c) |

COPC = Chemical of potential concern; MDC = maximum detected concentration; ND = not detected in soil.

^a Total soil is defined as surface soil data and subsurface soil data combined.

^b Based on Soil Screening Level (SSLs) for a dilution attenuation factor of 20 (EPA, 1996, *Technical Background Document for Soil Screening Guidance*, EPA 540/R-95/128, May)

^c Rationale for exclusion or inclusion of chemical for future groundwater analyses:

Y = Chemical is selected for future groundwater analysis

N(a) = No, soil MDC within background concentration

N(b) = No, soil MDC is less than SSL

N(c) = No, chemical not detected in soil

N(d) = No, chemical is not included on Table A-1 of the *Soil Screening Guidance* (EPA, 1996)

Table L-26

**Cancer Risk and Noncancer Hazard Estimates Across All Media
Former Small Weapons Repair Shop, Parcel 66(7)
Fort McClellan, Alabama**

| Medium | Resident | | Groundskeeper | | Construction Worker | |
|------------------------|-----------------|-----------------|-----------------|-----------------|---------------------|-----------------|
| | HI | ILCR | HI | ILCR | HI | ILCR |
| Surface Soil | NA | NA | NH | 4.16E-06 | NA | NA |
| Total Soil | NH | 2.40E-05 | NA | NA | NH | NR |
| Groundwater | 3.11E+01 | 2.07E-03 | 4.97E+00 | 3.71E-04 | 4.97E+00 | 1.48E-05 |
| Total HI / ILCR | 3.11E+01 | 2.10E-03 | 4.97E+00 | 3.75E-04 | 4.97E+00 | 1.48E-05 |

HI = Hazard index
 ILCR = Incremental lifetime cancer risk
 NA = Not applicable
 NH = No hazard
 NR = No risk