

# **USACE-LRL**

## DRAFT REPORT

**EVALUATION OF CHEMICAL RESIDUUM AT THE 40** MM RANGE, RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO 

PREPARED FOR

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03/30/2006

1	TABLE OF CONTENTS	
2		
3	LIST OF ACRONYMS	
4	EXECUTIVE SUMMARY	
5	1.0 Aoc Descrption	
6	2.0 SITE CHARACTERIZATION	11
7	2.1 OE Avoidance And Field Reconnaissance	
8	3.0 HUMAN HEALTH RISK ASSESSMENT APPROACH	
9	3.1 Data Evaluation/Chemical of Potential Concern Screening for HHRA	12
10	3.1.1 Chemicals of Potential Concern Screening Assumptions	15
11	3.1.2 Human Health Chemical of Potential Concern Screening Results	15
12	3.2 Risk characterization	
13	3.2.1 Exposure Assessment	17
14	3.2.2 Toxicity Assessment	28
15	3.2.3 Risk Characterization	30
16	3.3 Human Health Risk Characterization Results	32
17	3.3.1 Direct Contact	
18	3.3.2 Indirect Contact	
19	3.4 Uncertainties	
20	3.4.1 Human Health Uncertainties Associated With Data Evaluation	
21	3.4.2 Uncertainties Associated With Exposure Assessment	
22	3.4.3 Uncertainties Associated With The Toxicity Assessment	
23	3.4.4 Uncertainties Associated With Human Health Risk Characterization	
24	3.5 Summary And Conclusions	
25	3.5.1 Human Health Risk Assessment	
26	4.0 ECOLOGICAL SCREENING	
27	4.1 Screening for Contaminants of Potential Ecological Concern	
28	4.1.1 Ecological Screening Value Comparison Results	
29	4.2 Identification of Contaminants of Ecological Concern (COECs)	
30	4.2.1 COPECs Eliminated From Being COECs	
31	4.2.1.1 Evaluation of COECs Based on Receptor-specific Hazard Quotients	
32	4.2.1.2 COECs Based on An HQ Greater than One	
33	4.2.1.3 COECs Based On Absence Of TRVs	
34	4.3 Summary And Conclusions	
35	4.3.1 Ecological Risk Assessment	
36	4.3.2 Uncertainties For Ecological Risk Assessment	
37	4.3.2.1 Uncertainties Associated With Problem Formulation	
38	4.3.2.2 Uncertainties Associated With Exposure Assessment	
39	4.3.2.3 Uncertainties Associated With Effects Assessment	
40	4.3.2.4 Uncertainties Associated With Ecological Risk Characterization	
41	4.3.2.5 Summary of Ecological Risk Uncertainties	
42	4.3.2.6 Fate And Transport To Nearby Ponds	
43	5.0 LOCATIONS OF SAMPLES AND CONCENTRATIONS	
44	6.0 RECOMMENDATIONS	
45	7.0 REFERENCES	
16	THE EXERCES	08

1	
2	
3	LIST OF TABLES
4	Table 1. Summary of COPCs in Soil at 40 mm Range
5	Table 2 Parameters Used to Quantify Exposures for Each Medium and Receptor at the
6	40 mm Range <sup>a</sup>
7	Table 3. Summary of Risk Characterization Results for Direct Contact with Soil 33
8	Table 4. Summary of Risk Characterization Results for Indirect Contact with Shallow
9	Surface Soil (0-1 ft bgs)
10	Table 5. Summary of Soil COPECs Following the ESV Screening Step and COECs
11	Following HQ Calculations for the 40 mm Range, RVAAP 46
12	Table 6. Summary Table of Hazard Quotients Exceeding 1 in 40 mm Range Soils 48
13	Table 7. Further Evaluation of COECs in Soil at 40 mm Range at RVAAP 55
14	
15	
16	LIST OF FIGURES
17	Figure 1. Inorganic COPCs and COPECs in Shallow Surface Soil (0-1 ft)
18	Figure 2. Organic COPCs and COPECs in shallow Surface Soil (0 to 1 ft)64
19	Figure 3. Inorganic COPCs and COPECs in Subsurface Soil (1 to 3 ft)
20	Figure 4. Organic COPCs and COPECs in Subsurface Soil (1 to 3 ft)
21	
22	
23	APPENDIX A
24	
25	DATA EVALUATION
26	APPENDIX B
27	HUMAN HEALTH RISK CHARACTERIZATION
28	APPENDIX C
29	ECOLOGICAL RISK CHARACTERIZATION
30	APPENDIX D
31	Trespasser Scenario

# LIST OF ACRONYMS

2		
3	ADD	Average Daily Dose
4	AOC	Area of Concern
5	ATSDR	Agency for Toxic Substances and Disease Registry
6	AUF	Area Use Factor
7	BAF	Bioaccumulation Factor
8	BGS	Below Ground Surface
9	BHC	Benzene hexachloride
10	BHHRA	Baseline Human Health Risk Assessment
11	BRA	Base-line Risk Assessment
12	COC	Constituent of Concern
13	COEC	Constituent of Environmental Concern
14	COPC	Constituent of Potential Concern
15	COPEC	Constituent of Potential Environmental Concern
16	CSF	Cancer Slope Factor
17	DAD	Daily Adjusted Dose
18	DDD	Dichlorodiphenyldichloroethane
19	DDE	Dichlorodiphenyldichloroethylene
20	DDT	1,1,1-Trichloro-2,2-di(4-chlorophenyl)-ethane
21	DERR	Division of Emergency and Remedial Response
22	DQA	Data Quality Assessment
23	EPA	Environmental Protection Agency
24	EPC	Exposure Point Concentration
25	ESL	Ecological Screening Limit
26	ESV	Ecological Screening Value
27	EU	Exposure Unit
28	FBQ	Fuze and Booster Quarry
29	FWHHRAM	Facility-wide Human health Risk Assessor Manual
30	GAFs	Gastrointestinal Absorption Factor
31	HA	Hectares
32	HEAST	Health Effects Assessment Summary Tables
33	HI	Hazard Index
34	HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
35	HQ	Hazard Quotient
36	HSDB	Hazardous Substances Data Base
37	ILCR	Incremental Lifetime Cancer Risk
38	IRIS	Integrated Risk Information System
39	LOEC	Lowest Observed Effect Concentration
40	MDC	Maximum Detected Concentration
41	MEC	Munitions and Explosives of Concern
42	MOE	Ministry of Environment
43	NA	Not Applicable
44	NOAEL	No Adverse Effect Level

	45	NOEC	No Observed Effect Concentration
۲.	46	OHARNG	Ohio Army National Guard
	47	Ohio EPA	Ohio Environmental Protection Agency
	48	OE	Ordnance and Explosive
	49	OSWER	Office of Solid Waste Emergency Response
	50	PBT	Persistent, Bioavailable, Toxic
	51	PCB	Polychlorinated Biphenyls
	52	PEF	Particulate Emission Factor
	53	PNA	Polynuclear aromatic
	54	PPL	Plant Protection Level
	55	PRG	Preliminary Remediation Goal
	56	PQL	Project Quantitation Limit
	57	QC	Quality Control
	58	RAGS	Risk Assessment Guidance at Superfund
	59	RDA	Recommended daily Allowance
	60	RDI	Recommended Daily Intake
	61	RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
	62	RfC	Reference Concentration
	63	RfD	Reference Dose
	64	RME	Reasonable Maximum Exposure
	65	RTLS	Ravenna Training and Logistics Site
	66	RVAAP	Ravenna Army Ammunition Plant
ħ.	67	SAP	Sampling and Analysis Plan
D.	68	SMDP	Scientific Management Decision Point
	69	SRCs	Site Related Compound
	70	SVOC	Semi-volatile Organic Compound
	71	TRV	Toxicity Reference Value
	72	UCL	Upper Confidence Limit
	73	USACE	US Army Corps of Engineers
	74	UTL	Upper Tolerance Limit
	75	USEPA	United States Environmental Protection Agency
	76	UXO	Unexploded Ordnance
	77	VOC	Volatile Organic Compound

#### **EXECUTIVE SUMMARY**

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Chemical characterization of the 40 mm Range at RVAAP was completed with by obtaining and analyzing 40 soil samples locations. Each sample location uncovered more of the same constituents with organics usually at non-detects and metals at levels spanning the same order of magnitude of each other. Concentrations of chemical constituents identified in each of the 40 samples were similar. Concentrations of organics were low (at or below detection limit). Concentrations of metals were greater than those detected for organic compounds, but were similar in each sample. Data from the 40 sample locations were evaluated to determine presence or absence of Constituents of Potential Concern (COPCs) and Constituents of Potential Environmental Concern (COPECs).

 Respective to Human Health screening evaluation and risk analysis chemical data summary statistics are located in Appendix A. The COPC screening results are presented in Appendix B Tables B-1 through B-3 for shallow surface soil (0-1 ft bgs), deep surface soil (0-3 ft bgs), and subsurface soil (1-3 ft bgs). These tables provide summary statistics, including frequency of detection, range of detected concentrations, range of detection limits for non-detects, arithmetic average concentration, and UCL<sub>95</sub> on the mean concentration; all screening values (PRGs and background concentrations, as appropriate); and final COPC status.

The following 12 COPCs were identified in soil including:

 5 metals retained as COPCs because the maximum detected concentration exceeds the USEPA's Region 9 Residential PRG (arsenic) or 1/10<sup>th</sup> the USEPA Region 9 Residential PRG [aluminum, chromium, thallium, and vanadium (shallow and deep surface (0-3 ft bgs)soil only)];

1 explosive (nitrocellulose) retained because no PRG was available; and

 6 SVOCs retained because the maximum detection limit exceeds the USEPA Region 9 Residential PRG [benzo(a)pyrene, bis(2-chloroethyl)ether (deep surface and subsurface soil only), dibenz(a,h)anthracene, hexachlorobenzene, and n-nitroso-di-n-propylene] or 1/10<sup>th</sup> the USEPA Region 9 Residential PRG (2-methyl-4,6-dinitrophenol). All 6 of these SVOCs were non-detect in all soil samples.

Subsequent risk analysis of the 12 COPCs indicated there was no Constituent of Concern (COC) based on receptor direct contact with soil. But, for the Resident Farmer only, risk analysis identified 5 COCs based on indirect contact with soil.

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Receptor	ILCR	COCs	H	COCs
National Guard Trainee	6E-06	Arsenic 5E-06	0.4	None
Resident Farmer- adult	3E-05 (4E-05)	Arsenic 2E-05 Benzo(a)pyrene 4E-06 Dibenz(a,h)anthracene 4E-06 n-Nitroso-di-n-propylamine 3E-06	0.2 (0.2)	None
Resident Farmer child	3E-05 (4E-05)	Arsenic 2E-05 Benzo(a)pyrene 2E-06 Dibenz(a,h)anthracene 2E-06 n-Nitroso-di-n-propylamine 2E-06	<del>1</del> <del>(1)</del>	None
Security Guard/ Maintenance Worker	1E-05	Arsenic 5E-06 Benzo(a)pyrene 2E-06 Dibenz(a,h)anthracene 2E-06 n-Nitroso-di-n-propylamine 1E-06	0.05	None
Hunter	8E-08	None	0.0004	None

ILCR > 1E-05 shown in bold.

Risk/hazard results for surface and (subsurface) soil.

Note: Background criterion arsenic risk to Resident Farmer (surface soil) = 2E-05 (adult), 3E-05 (child).

The total HI for all receptors is ≤ 1. The total risk across all COPCs for the anticipated future land use (National Guard Trainee) exceeds 1E-06, due primarily to arsenic, but is less than Ohio EPA's level of concern of 1E-05. Similarly, the total risk to the Security Guard/Maintenance Worker exceeds 1E-06, due primarily to arsenic, but is equal to 1E-05.

The calculated ILCRs are compared to the range specified in the National Oil and Hazardous Substances Pollution Contingency Plan of 1E 06 to 1E 04, or 1 in 1 million to 1 in 10,000 exposed persons developing cancer (EPA 1990). ILCRs below 1E 04 are considered acceptable. ILCRs above 1E 04 are considered unacceptable. The range between 1E 06 and 1E 04 is of concern, and any decisions to address ILCRs further in this range, either through additional study or engineered control measures, should account for the uncertainty in the risk estimates. Ohio EPA Division of Emergency and Remedial Response (DERR), uses 1 E 05 as the official target risk goal for development of cleanup goals (Ohio EPA 2004)."

The total risk for Resident Farmer receptor exceeds 1E-05 due to arsenic and 3 SVOCs [benzo(a)pyrene, dibenz(a,h)anthracene, and n-nitroso-di-n-propylamine). Individual Incremental Lifetime Cancer Risk (ILCRs) for these SVOCs are each less than 1E-05 and all three of these SVOCs were non-detect in all soil samples.

The exposure point concentrations (EPCs) for arsenic (12 mg/kg in shallow surface soil, 19 mg/kg in subsurface soil) are similar to the background criteria of 15 mg/kg in shallow surface soil and 20 mg/kg in subsurface soil. Thus, the calculated cancer risk related to arsenic at the 40 mm Range does not exceed the cancer risk for arsenic estimated for facility-wide background.

Receptor	HLCR	COCs	H	COCs
Resident Farmer adult	5E-03	Arsenic 2E-03 Benzo(a)pyrene 4E-04 Dibenz(a,h)anthracene 9E-04 Hexachlorobenzene 5E-05 n-Nitroso-di-n-propylamine1E-03	24	Aluminum 4 Arsenic 13 Thallium 4 2 Methyl-4,6- dinitrophenol 2
Resident Farmer child	5E-03	Arsenic 2E-03 Benzo(a)pyrene 4E-04 Dibenz(a,h)anthracene 1E-03 Hexachlorobenzene 5E-05 n-Nitroso-di-n-propylamine 1E-03	110	Aluminum 18 Arsenic 61 Thallium 19 Vanadium 5 2-Methyl-4,6- dinitrophenol 12

ILCR > 1E-05 and HI > 1 shown in bold.

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The total HI is > 1 due to four metals and 2-methyl-4,6-dinitrophenol. The EPCs for arsenic and vanadium are less than background criteria. The EPC for chromium exceeds the background criterion. No background criterion is available for thallium. 2-Methyl-4,6-dinitrophenol was non-detect in all soil samples.

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The total risk across all COPCs exceeds 1E-05 due to arsenic and 4 SVOCs [benzo(a)pyrene, dibenz(a,h)anthracene, hexachlorobenzene, and n-nitroso-di-n-propylamine]. All four of these SVOCs were non-detect in all soil samples.

The EPCs for arsenic (12 mg/kg in shallow surface soil 19 mg/kg in subsurface soil) are similar to the background criteria of 15 mg/kg in shallow surface soil and 20 mg/kg in subsurface soil. Thus, the cancer risk related to arsenic at the 40 mm Range does not exceed the cancer risk for arsenic estimated for facility-wide background.

Twenty-three Site Related Compounds (SRCs) became Constituents of Potential Environmental Concern (COPECs) because they either had a maximum detected concentration or a maximum non-detected concentration above USEPA's Region 5 Ecological Screening Value (ESV) and the background criterion, had no ESV, or were Persistent, Bioavailable or Toxic (PBT) compounds detected above background. Respective to the environment, twenty-three SRCs the analytes below became COPECs because they met the following conditions: 1) had maximum detected or non-detected concentrations exceeding the eco-criteria (i.e., ecological screening value for soil) and background criteria, and were site related chemicals (SRC) (as indicated by army use records). In addition, detected SRCs above background criteria and that were classified as persistent, bioaccumulative, and toxic (PBT) were also identified as COPECs even if their concentrations were below eco-criteria. The COPECs are summarized below:

# Summary of Soil COPECs Following the ESV Screening Step and COECs Following HQ Calculations for the 40 mm Range, RVAAP

			Soil	Depth		
SRC	Shallow	Surface	Subsu	ırface	Deep S	urface
	COPEC	COEC	COPEC	COEC	COPEC	COEC
Organies-Explosives						- 6
2,6-Dinitrotoluene	X	X	X	X	X	X
Metals		-		-	-	-
Aluminum	X	X	X	X	X	X
Arsenic	X	X	X	X	X	X
Cadmium	X	777	X	711	X	***
Chromium	X	X	X	X	X	X
Chromium, hexavalent	X	X	X	X	X	X
Cobalt	Ter	***	X	X	X	X
Copper	X	777	X	***	X	117
Lead	X	111	X	***	X	***
Mercury	X	***	_	***	-	***
Nickel	-	***	P_ 0	777	X	***
Thallium	X	X	X	X	X	X
Vanadium	X	X	-	777	X	X
Zine	X	X	-	101	X	X
Organics Pesticides/PCB	5					-
4,4'-DDE	X	X	-	***	X	X
Aldrin	X	X	-	717	X	X
Dieldrin	X	X		***	X	X
Endrin aldehyde	X	X	_	777	X	X
Heptachlor	X	X	4	***	X	X
Lindane	X	X	2.7	7.77	X	X
Organics Semivolatiles					- ÷	-
3,3' Dichlorobenzidine			X	X	X	X
Bis(2-ethylhexyl)phthalate	X	X	-	100	X	X
Organics - Volatiles					4.	-
1,2-Dimethylbenzene	-	4	X	X	X	X

ESV = ecological screening value

RVAAP = Ravenna Army Ammunition Plant

COPEC = chemical of potential ecological concern

"X" = the analyte is a COPEC at this soil depth

"\_" = the analyte was not a COPEC at this soil depth

"..." = the COPEC was not a COEC at this soil depth

1 2 Five metal COPECs (cadmium, copper, lead, mercury, and nickel) were eliminated from being COECs due to having no HQs greater than 1 for any ecological receptor at any soil 3 4 depth. There were no COECs based on HQs greater than 1 for any explosives, pesticides/PCBs, SVOCs, or VOCs, nor any HQs greater than 1 for top predators. 5 6 However, Additional evaluation of 23 COPECs resulted in Constituents of 7 Environmental Concern (COECs) that consisted of the following 6 metals were COECs due to having an HO greater than 1, mostly for either earthworms, plants, or shrews, 8 9 including aluminum, arsenic, chromium, thallium, vanadium, and zinc. Of these metals 10 concentrations of aluminum and vanadium were less than the Upper Confidence Limit 11 (UCL)95 mean background concentrations and were eliminated. The remaining 4 metals were ruled out of being a concern to ecological receptors after being assessed respective 12 13 to bioavailability and having a proper chronic reproductive toxicity metric. Aluminum 14 had the highest HQs (861 for shrews and 272 for plants), followed by the HQ for 15 chromium (110) for earthworms. Several COECs were based on an absence of having a Toxicity Reference Value (TRV) for at least one receptor, including one explosive (2,6-16 17 dinitrotoluene), one metal (chromium, hexavalent), 6 pesticides, two SVOCs [3,3'-18 dichlorobenzidine and bis(2-ethylhexyl)phthalate, and one VOC (1,2-dimethylbenzene) (the uncertainties due to lacking a TRV for at least one receptor are discussed further in 19 Section 2.4.2.4). Thus, Ecological risks of the 6 metals are limited to receptors such as 20 21 plants, earthworms, and shrews and are caused by the 6 metals in the soil depths. 22 23 In summary, the calculated ILCRs are compared to the range specified in the National Oil 24 and Hazardous Substances Pollution Contingency Plan of 1E-06 to 1E-04, or 1 in 1 25 million to 1 in 10,000 exposed persons developing cancer (EPA 1990). ILCRs below 1E-26 04 are considered acceptable. ILCRs above 1E-04 are considered unacceptable. The 27 range between 1E-06 and 1E-04 is of concern, and any decisions to address ILCRs

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Several organics and inorganics were retained as COCs and COECs. Figures 1 through 4 (pp 62 - 65 in text) show that detected COPCs and COPECs (and, by inclusion, COCs and COECs) are distributed rather uniformly in surface and subsurface soil. The concentrations shown in these figures do not indicate any "hot spots" where risks would be much higher at other locations. Therefore, conclusions reached for RME concentrations are valid for any particular location as well as for the entire 40 mm Range. Calculated human health non-cancer HIs for direct contact exposure pathways are less than 1 for all human health receptors. Calculated ILCRs are less than or equal to 1E-05 for the representative National Guard Receptors (National Guard Trainee and Security

further in this range, either through additional study or engineered control measures, should account for the uncertainty in the risk estimates. Ohio EPA Division of

Emergency and Remedial Response (DERR), uses 1 E-05 as the official target risk goal

for the representative National Guard Receptors (National Guard Trainee and Security Guard/Maintenance Worker) and the recreational Hunter. Calculated ILCRs exceed 1E-

43 05 for the Resident Farmer scenario; however, risks are driven by background

concentrations of arsenic and the detection limits for 3 SVOCs not detected in any soil
 sample at the 40 mm Range. As discussed in the uncertainty analysis, these estimated

risks are more likely to be overestimates than underestimates of actual risk at the site.

Based on these results, there is no unacceptable human health risk at the 40 mm Range, and it is recommended for no further action.

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The ecological uncertainty discussion led to the conclusion that sources of exposure were greatly limited at the 40 mm Range because of low bioavailability of chemicals in the soil. Because the COPECs were not readily available to organisms that utilize this range, ecological risk are not likely. This later assumption about low to no risk is supported by the facts that the terrestrial ecosystem has abundant vegetation and animal life, that looks healthy and functioning. Most of the HQs calculated for organisms at 40 mm Range were less than 1. Only HQs for a few metals for plants, earthworms, shrews, and rabbits exceeded 1. None of the HQs calculated for upper level consumers such as foxes and hawks exceeded 1. The greatest HQs were for aluminum (as high as 861 to shrews), but the soil pH at RVAAP remains much higher than the low pHs assumed in the biological uptake numbers and in the laboratory experiments with toxicity measures that were used in the HQ estimates. This resulted in HQs for aluminum that were greatly overestimated. The rest of the few HQs were below one hundred and the 4 metals (arsenic, chromium, thallium, and zinc) remaining after the first four steps of the uncertainty analysis also have bioavailability issues and toxicity validity issues that show that they too are greatly over-estimated. Another potential source of risks to ecological receptors is the nearby Fuze and Booster Ponds (down gradient and within 500 feet). This study did not identify any chemical impacts based upon results of field assessments conducted by Ohio EPA and USACE studies that indicated the ponds contained healthy and functioning fish and other aquatic organisms. 1 Thus, there is no unacceptable risk at the 40 mm Range, and it is recommended that the 40 mm Range be a no further action location.

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In summary the 40 mm Range is recommended as a "no further action location". This recommendation is based on the following:

 Land Use Controls (e.g., no digging nor use of groundwater) will be institutionalized for the site and will reduce the potential for contact with low levels of chemicals identified at the site.

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 Results of the human health and ecological risk characterization performed on the relatively low concentrations of chemicals present, and the depth at which these analytes were found (0-3 ft bgs), indicate that there is no unacceptable risk likely to occur.

38 39 40 O Initial sampling evidenced no subsurface action from prior use (such as soil discoloration, trenches, buried debris that made its way to the surface, foul odors once surface was broken, and the like). Shallow rock is close to the surface with refusal (0-1 ft bgs) occurring at sample locations 69, 70, 72, 76, 78, 80, 81, 84, 89, 90, 91, 92, 93, and 99. Further surface detects did not evidence residuum, nor source release to subsurface (below 3').

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Further, groundwater is addressed facility-wide and developed to allow an exit strategy permitting a cyclic review of the 'no-use' groundwater control.

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#### 1.0 AOC DESCRIPTION

The 40 mm Range area of concern (AOC), Ravenna Army Ammunition Plant (RVAAP)-32, was used as a test firing range for 40 mm projectiles during the late 1960s and early 1970s. This AOC was reported by former workers at RVAAP to have been a test firing range for munitions. The dates of this operation were from 1969-71. No original file documentation exists for the operation. Munitions and Explosives of Concern (MEC) is suspected at this ~2-acre site.

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The site is partially covered; i.e., the impact area, with pole timber. Soil samples were collected by US Army Center for Health Promotion and Preventive Medicine (USACHPPM) in 1996 detected arsenic and cadmium above the Relative Risk Site Evaluation screening concentrations. Additional samples were collected by SpecPro in fall 2003. A site characterization report was submitted in January 2005 (SpecPro Jan 2004).

#### 2.0 SITE CHARACTERIZATION

The planned reuse for the 40 mm Range property will be training by the Ohio Army National Guard (OHARNG). The OHARNG will conduct mounted training and will not include digging. Because training involves minimal disturbance on the 40 mm Range (reducing the opportunity of OHARNG soldiers to contact site contaminants) soil was considered the primary exposure pathway. However other media of interest include impacts from the soil at the 40 mm Range. Surface water is not present at the 40 mm range, but does drain to the ponded areas of the Fuze and Booster Quarry Landfill/Ponds area of concern (AOC). Specifically, surface water flow, based upon the existing topographic maps, is expected to be radial in nature surface water drainage at the 40 mm Range flows radially toward the southern pond, the ditch south of the AOC, after which drainage occurs at Hinkley Creek. Ponds that receive drainage from the 40 mm AOC are hydraulically connected to the groundwater table, however, that was not investigated as part of the Fuze and Booster Quarry Landfill/Ponds effort. "Chemical residuum in the soil does not favor impact to groundwater at the 40 mm Range area, however, that was not investigated as part of the Fuze and Booster Quarry Landfill/Ponds effort."

 Therefore, soil was the primary media for site-characterization at the 40 mm Range. Nature and extent of chemical contamination at the 40 mm Range (RVAAP-32) was characterized during the remedial investigation for Fuze and Booster Quarry Landfill/Ponds at RVAAP. Soil analytical data for the 40mm Range is reported in the Draft Phase I/PhaseII Remedial Investigation of the Fuze and Booster Quarry landfill/Ponds Report prepared for US Army Corps of Engineers (USACE) by Spec Pro, Inc. dated January 2004.

Sampling strategy for soil characterization at the 40 mm Range was presented in the 2002 USACE, Work Plan and Sampling and Analysis Plan Addenda for the Phase I/Phase II RI at the Fuze and Booster Quarry Landfill/Ponds at RVAAP, Ravenna, Ohio (SAP Addendum). Specifically, surface and subsurface soil medium were aggregated on the basis of depth: surface soil from 0 to 0. 914 meter (0 to 3 feet) and subsurface soil defined as the soil interval of 0.3 to 0.914 meters (1 to 3 feet). For surface and

subsurface soil, the geographic area of the Fuze and Booster Quarry Pond AOC was separated into two aggregates: (1) The Fuze and Booster Quarry Ponds sample stations FBQ-1 through FBQ-60; and, (2) sample stations FBQ-61 through FBQ-100 for 40 mm Firing Range.

# 2.1 OE AVOIDANCE AND FIELD RECONNAISSANCE

Ordnance and explosives (OE) avoidance support staff were present during all field operations. The OE Team leader led an initial safety briefing on OE to train all field personnel to recognize and stay away from propellants and OE. Daily tailgate safety briefings included reminders regarding OE avoidance. Site visitors were briefed on OE avoidance before they were allowed access to the AOC. Prior to beginning sampling activities, access routes into areas from which samples were to be collected were assessed for potential OE using visual surveys and hand-held magnetometers. The OE Team leader, USACE technical representative, and SpecPro project manager located proposed sampling stations and monitoring wells within the AOC using pin flags of wooden stakes marked with the sample station identification number. The pin flag or stake was placed at a point approved by the OE technician. An OE technician remained with the sampling crews as work progressed. At stations where subsurface soil samples were to be collected from 0.3 to 0.9 meter (1 to 3 feet) bgs, a magnetometer was lowered into the borehole to screen for subsurface magnetic anomalies at the top of the subsurface interval. For monitoring well borings, OE technicians screened the locations by hand auguring to a minimum depth of at least 0.6 meters (2 feet) or original undisturbed native soil or bedrock encounter, whichever was greater. The OE technician remained onsite as drilling was performed to visually examine drill cuttings for any unusual materials indicative of potential OE.

# 3.0 HUMAN HEALTH RISK ASSESSMENT APPROACH

The Human Health Risk Assessment (HHRA) and associated documents presents risks calculated to humans that were exposed to chemicals detected in soil at the 40 mm Range. Detection limits of chemicals are also provided in these documents.

The HHRA is based on methods from the RVAAP's Facility-wide Human Health Risk Assessor Manual (FWHHRAM) (USACE 2004). Inorganic and organic COPCs identified in this HHRA are quantitatively analyzed (when possible) to characterize potential risks to human health from exposure to these chemicals. Results of the HHRA are used to (1) document and evaluate risks to human health; (2) determine the need, if any, for remedial action; and (3) identify COCs that may require the development of chemical-specific remediation levels.

# 3.1 DATA EVALUATION/CHEMICAL OF POTENTIAL CONCERN SCREENING FOR HHRA

In the data evaluation a set of chemical data suitable for use in the HHRA is developed. This Section provides a description of the data evaluation process used to identify COPCs for the 40 mm Range.

1 Soil data collected at the 40 mm Range were assessed based on sample depth. A 2 description of the soil depth aggregates for which human receptors are potentially 3 exposed follows:

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- Shallow surface soil was defined as soil from 0- to 1-ft BGS (shallow surface soil) for all receptors except the National Guard Trainee. Deep surface soil is defined as 0- to 4-ft BGS (deep surface soil) for the National Guard Trainee; however, soil samples were taken to a maximum depth of 3 ft BGS.
- Subsurface soil was defined as soil from 1- to 13-ft BGS for the Resident Subsistence Farmer. No samples are available below 3-ft BGS; therefore, soil samples collected from 1- to 3-ft BGS are evaluated for the Resident Subsistence Farmer. Proposed land-use at the 40 mm Range is mounted training/no digging; therefore, subsurface soil is not evaluated for the National Guard Trainee.
- 13 The 40 mm Range encompasses approximately 2 acres and is evaluated as a single exposure unit (EU) in this HHRA for surface and subsurface soil. Evaluation as a single 14 EU is appropriate for the potential current and future exposures at this site (i.e., National 15 16 Guard mounted training with possible occasional use by hunters). 17
- 18 The COPC screening process followed the method outlined in the FWHHRAM (USACE, 19 2004) with one exception – no frequency of detection screen was completed for soil data 20 at the 40 mm Range, rather, all chemicals analyzed for were carried through the COPC 21 screen and risk assessment regardless of their frequency of detection. This approach 22 results in several chemicals that were never detected being carried through the risk 23 assessment.
  - COPCs are identified for shallow and deep surface soil and subsurface soil. This data evaluation consists of the following four steps:
- 27 Data Quality Assessment - Analytical results were reported by the laboratory in 28 electronic form and loaded into a 40 mm Range database. Site data were then 29 extracted from the database so that only one result is used for each station and depth 30 sampled. QC data, such as sample splits and duplicates, and laboratory re-analyses and dilutions were not included in the determination of COPCs for this risk assessment. Samples rejected in the validation process are excluded from the risk assessment. The percentage of rejected data is 3.4%. A complete summary of data is presented in Appendix A.
- 35 Essential Nutrients - Chemicals that are considered essential nutrients (e.g., 36 calcium, chloride, iodine, iron, magnesium, potassium, phosphorus, and sodium) are an integral part of the human food supply and are often added to foods as 37 38 supplements. EPA recommends that these chemicals not be 39 evaluated as COPCs as long as they meet the following criteria:
- 40 Present at low concentrations (i.e., only slightly elevated above naturally 41 occurring levels) 42
  - · and toxic at very high doses (i.e., much higher than those that could be associated with contact at the site) (EPA 1989).

Recommended daily allowance (RDA) and recommended daily intake (RDI) values are available for seven of these metals. Based on these RDA/RDI values, a receptor ingesting 2 100 mg of soil per day would receive less than the RDA/RDI of calcium, magnesium, 3 phosphorous, potassium, and sodium, even if the soil consisted of the pure mineral (i.e., 4 5 soil concentrations > 1,000,000 mg/kg). Receptors ingesting 100 mg of soil per day would require soil concentrations of 1,500 mg/kg of iodine and 100,000 to 180,000 6 7 mg/kg of iron to meet their RDA/RDI for these metals. Concentrations of essential nutrients do not exceed these levels at the 40 mm Range; thus, these constituents are not 8 9 addressed as COPCs in this HHRA.

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- 3. Risk-based Screen The objective of this evaluation is to identify COPCs that may pose a potentially significant risk to human health. The risk-based screening values are conservative values published by USEPA. The Maximum Detected Concentration (MDC) of each chemical in each exposure medium was compared against the appropriate risk-based screening value. Chemicals detected below these concentrations are screened for further consideration. Detected chemicals without risk-based screening values are not eliminated from the COPC list. The risk-based screening values are the most current residential preliminary remediation goals (PRGs) published by EPA Region 9. To account for the potential effects of multiple chemicals, PRGs based on non-cancer endpoints were divided by 10. These screening values are very conservative [based on a 10<sup>-6</sup> risk level and a hazard quotient (HQ) of 0.1]. Region 9 Residential PRGs can be found on the EPA Region 9 World Wide Web site (http://www.epa.gov/region09/waste/sfund/prg/index.htm).
- 4. Background Screen For each inorganic constituent detected, concentrations in the 24 40 mm Range samples were screened against site specific background levels, 25 naturally occurring background levels. This screening step, which applies only to the 26 naturally occurring inorganics, is used to determine if concentrations of detected 27 inorganics were site related or naturally occurring. If the MDC of a constituent 28 exceeds the background value, the constituent is considered AOC-related. All 29 detected organic compounds are considered to be above background. Inorganic 30 chemicals with MDCs that were less than background levels were eliminated from the 31 COPC list. Background screening values are the final facility-wide background 32 values for RVAAP and were published in the Final Phase II RI Report for WBG 33 (USACE 2001). Background values for soil are available for two soil depths: shallow 34 surface (0- to 1-ft bgs) and subsurface (>1 ft bgs). Soil data at the 40 mm Range are 35 aggregated into three depth intervals: shallow surface soil (0- to 1-ft bgs), deep 36 surface soil (0- to 3-ft bgs), and subsurface soil (1- to 3-ft BGS). The following 37 background depth intervals are used for identifying COPCs in 40 mm Range AOC 38 39 soil.
  - For shallow surface soil (0- to 1-ft bgs) the background screen is performed using background values for shallow surface soil (0- to 1-ft bgs).
  - For deep surface soil (0- to 3-ft BGS) the background screen is performed using background values for either shallow surface soil (0- to 1-ft BGS) or subsurface soil (1- to 12-ft BGS), whichever is lower.

1 • For subsurface soil (1- to 3-ft BGS) the background screen is performed using 2 background values for subsurface soil (1- to 12-ft BGS). 3 Note - total chromium was evaluated conservatively by screening against the USEPA Region 9 Residential PRG for hexavalent chromium. This is a conservative assumption 4 5 because that sample analysis included total chromium as hexavalent chromium. Hexavalent 6 chromium is more toxic than trivalent chromium (the only other valence of chromium with 7 screening values), and hexavalent chromium is a less commonly occurring form of the metal. 8 3.1.1 CHEMICALS OF POTENTIAL CONCERN SCREENING ASSUMPTIONS 9 The following assumptions were used in the development of COPCs for this study: 10 Chemicals not detected in a medium were not considered to be COPCs. 11 Physical chemical data (e.g., alkalinity, pH, etc.) were not considered to be 12 COPCs for WBG. • Alpha-chlordane and gamma-chlordane were evaluated by screening against the 13 14 EPA Region 9 PRGs for chlordane. 15 Endosulfan I, endosulfan II, and endosulfan sulfate were evaluated by comparing 40 mm data against screening values (i.e., based on EPA Region 9 PRGs) for 16 endosulfan. 17 18 Endrin aldehyde and endrin ketone were evaluated by comparing 40 mm data 19 against screening values (i.e., based on EPA Region 9 PRGs) for endrin. 20 • 1,2-Dichloroethene (DCE) was evaluated by comparing 40 mm data against screening values (i.e., based on EPA Region 9 PRGs) for cis-1,2-DCE. 21 22 • cis-1,3-Dichloropropene and trans-1,3-dichloropropene were evaluated by comparing 40 mm data against screening values (i.e., based on EPA Region 9 23 24 PRGs) for 1,3-dichloropropene. 25 • Total chromium and hexavalent chromium were evaluated by comparing 40 mm 26 data against screening values (i.e., based on EPA Region 9 PRGs) for hexavalent 27 chromium. 28 29 3.1.2 HUMAN HEALTH CHEMICAL OF POTENTIAL CONCERN SCREENING RESULTS 30 The COPC screening results are presented in Appendix B Tables B-1 through B-3 for 31 32 shallow surface soil (0-1 ft bgs), deep surface soil (0-3 ft bgs), and subsurface soil (1-3 ft bgs). These tables provide summary statistics, including frequency of detection, range of 33 detected concentrations, range of detection limits for non-detects, arithmetic average 34 concentration, and  $UCL_{95}$  on the mean concentration; all screening values (PRGs and 35 36 background concentrations, as appropriate); and final COPC status. COPC screening results are summarized in Table 1. 37 38 39 40

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Table 1. Summary of COPCs in Soil at 40 mm Range

	S	oil Depth Aggregate	
COPC	Shallow Surface (0-1 ft bgs)	Deep Surface (0-3 ft bgs)	Subsurface (1-3 ft bgs)
0010	Metals		
Aluminum	X	X	X
Arsenic	X	X	X
Chromium	X	Х	X
Thallium	X	X	х
Vanadium	X	X	
	Soil Depth Aggr	egate	
COPC	Shallow Surface (0-1 ft bgs)	Deep Surface (0-3 ft bgs)	Subsurface (1-3 ft bgs)
	Explosives		
Nitrocellulose	X	X	X
	Organics		
Benzo(a)pyrene	Xa	Xª	Xª
Bis(2-chloroethyl)ether	**	Xª	Xª
Dibenz(a,h)anthracene	Xª	Xª	Xª
Hexachlorobenzene	Xª	Xª	Xª
2-Methyl-4,6-dinitrophenol	Xª	Xª	Xª
n-Nitroso-di-n-propylene	Xª	Xª	Xª

<sup>&</sup>lt;sup>a</sup>Chemical is non-detect in all samples, retained because maximum detection limit exceeds screening value.

6 Twelve COPCs were identified in soil including:

- 1 metal was retained as COPC because the maximum detected concentration exceeded USEPA Region 9 Residential PRG (arsenic).
- 4 metals were retained as COPCs because the maximum detected concentrations exceeded 1/10<sup>th</sup> the USEPA Region 9 Residential PRG [aluminum, chromium, thallium, and vanadium (shallow and deep surface (0-3 ft bgs) soil only)];
- 1 explosive (nitrocellulose) retained because no PRG was available; and,
- 6 SVOCs retained because the maximum detection limit exceeds the USEPA Region 9 Residential PRG [benzo(a)pyrene, bis(2-chloroethyl)ether (deep surface and subsurface soil only), dibenz(a,h)anthracene, hexachlorobenzene, and n-nitroso-di-n-propylene] or 1/10<sup>th</sup> the USEPA Region 9 Residential PRG (2-methyl-4,6-dinitrophenol). All 6 of these SVOCs were non-detect in all soil samples.

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COPC = chemical of potential concern

## 3.2 RISK CHARACTERIZATION

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#### 3.2.1 EXPOSURE ASSESSMENT

- The objectives of the exposure assessment are to estimate the magnitude, frequency, and duration of potential human exposure to COPCs. The four primary steps of the exposure
- 6 assessment are as follows:
- 7 1. identify current and future land-use;
- 8 2. identify potentially exposed populations, exposure media, and exposure pathways;
- 9 3. calculate exposure point concentrations (EPCs); and
- 10 4. estimate each receptor's potential intake of each COPC.

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#### Current and Future Land-use

- 13 Land-use within the RVAAP/RTLS is restricted access. Personnel from OHARNG may
- 14 occasionally travel through AOCs but training is and will continue to be restricted to areas
- 15 outside of the AOCs. No training exercises are currently conducted within the 40 mm
- 16 Range. This HHRA study focuses on the future land-use at the 40 mm Range, which is
- 17 mounted training/no digging (OHARNG, March 2003; USACE 2004). The 40 mm Range
- 18 may contain munitions and explosives of concern (MEC).

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#### Potentially Exposed Populations, Exposure Media, and Exposure Pathways

- 21 Given the intended future land-use, the 40 mm Range may be used in the future by three
- 22 receptor populations:
- 23 1. National Guard personnel for training (National Guard Trainee).
- 24 2. National Guard Security Guard/Maintenance Worker.
- 25 3. Recreational users involved in deer hunting.
- 26 Hunting is not currently allowed at the 40 mm Range. Hunters are not allowed at areas
- 27 that are restricted for environmental reasons (i.e., due to known contamination hazards or
- 28 during the RI process). Hunting at RVAAP/RTLS is also restricted for reasons other than
- 29 environmental including logistics, general safety, security, and military operations.
- 30 Military and training site employees are occasionally allowed hunting access to some
- 31 restricted areas under direct supervision of someone knowledgeable about the site and the
- 32 security and safety issues associated with it. If hunting is allowed at the 40 mm Range in
- 33 the future, hunters will be restricted under RVAAP/RTLS general hunting regulations.
- 34 Under these regulations, hunters are instructed where they can and cannot hunt. The
- 35 installation utilizes volunteers to ensure hunters know the boundaries of hunting areas
- 36 and to patrol the perimeter of hunting areas. All hunters are briefed before they are
- 37 allowed to hunt. They are also required to stay within their assigned areas and to keep
- vehicles on the roads. These three receptors are evaluated as outlined in Table 5 of the
- 39 Facility-Wide Human Health Risk Assessment Manual (FWHHRAM) (USACE 2004)
- 40 and exposure assumptions are summarized below.

- 42 National Guard Trainee National Guard Trainees may be present at the site up to 24
- 43 hr/day for 24 day/year on inactive duty training and/or 24 hr/day for 15 day/year during
- 44 annual training. As a conservative estimate for this study, the same individual was
- 45 assumed to be present at the 40 mm Range for both inactive duty training (24 day/year)

and annual training (15 day/year) for a total exposure frequency of 39 day/year. Because of the small size of 40 mm Range (approximately 2 acres), this is a very conservative assumption. This receptor is assumed to as an active Guardsman for 25 years (default worker exposure duration) and to train exclusively at the 40 mm Range for training every year of his/her enlistment. The 40 mm Range will be used for mounted training. Activities such as digging and/or occupying fighting positions, tank defilade positions, tank ditches, and battle positions that extend below ground surface will be prohibited. Because tracked and wheeled operations may result in maneuver damage up to 4-ft bgs. Because of this maneuver damage, as deep as 4 ft bgs, the National Guard Trainee is assumed to be exposed to deep surface soil defined as 0-to 3-ft bgs. This receptor is exposed to soil via incidental ingestion, dermal contact, and inhalation of vapors and fugitive dust.

National Guard Security Guard/Maintenance Worker - Current government activities at the 40 mm Range are limited to maintenance activities and environmental remediation activities. A 10 foot by 10 foot fixture that was previously used for munition storage remains to this day at the AOC. At the time of the sampling event the area was on a twice a year schedule for mowing. Security patrols occur daily across the installation, but not within the 40 mm Range; patrolmen usually remain within their vehicles during these patrols. Although the security guard is not currently exposed to contaminated media at the 40 mm Range on a daily basis, the potential exposure of this receptor is evaluated in this study. Therefore, as a worst-case assumption, it is assumed that a security guard leaves his or her vehicle on a daily basis and is exposed to surface soil. This scenario assumes a Security Guard/Maintenance Worker patrols the 40 mm Range every day for 1 hr. Given that the 40 mm Range is only approximately 2 acres, this is a very conservative assumption. The Security Guard/Maintenance Worker is assumed to be exposed to shallow surface soil (0- to 1-ft bgs) incidental ingestion, dermal contact, and inhalation of vapors and fugitive dust. Subsurface soil was not evaluated for this receptor because they do not engage in intrusive activities and are not exposed to this medium (FWHHRAM, USACE 2004).

Recreational Hunter – The 40 mm Range does not include any aquatic habitat; therefore, trapping and fishing were not evaluated for this receptor in this study. It was assumed that hunting is conducted annually for 6 hr/day for 2 days. The Hunter is assumed to visit the 40 mm Range every year that they live in the area (i.e., residential exposure duration of 30 years). The Hunter may be exposed to shallow surface soil (0 to 1 ft bgs) via incidental ingestion, dermal contact, and inhalation of vapors and fugitive dust. Subsurface soil was not evaluated for this receptor because they do not engage in intrusive activities and are not exposed to this medium (FWHHRAM, USACE 2004).

In addition to the representative receptors described above, a Resident Subsistence Farmer (adult and child)] is evaluated to provide a baseline for evaluating this site with respect to unrestricted release. Residential land-use is not anticipated due to physical constraints (e.g., potential MEC) and intended future land-use by OHARNG. The Resident Subsistence Farmer is assumed to be exposed to COPCs in shallow surface soil (0 to 1 ft bgs) and subsurface soil (1-3 ft bgs) via incidental ingestion, dermal contact,

and inhalation of vapors and fugitive dust. This receptor is also exposed via ingestion of 1 2 beef, milk, vegetables, and venison exposed to COPCs in surface soil. 3 The fifth receptor described in the FWHHRAM (Fire/Dust Suppression Worker) is not 4 evaluated for the 40 mm Range because no surface water is available at this AOC. 5 6 Exposure Point Concentrations 7 This HHRA evaluates the reasonable maximum exposure (RME). The RME is an 8 estimate of the greatest exposure reasonably expected to occur at the site. Because of the 9 uncertainty associated with any estimate of exposure concentration, the 95th % UCL<sub>95</sub> for 10 either a normal or lognormal distribution is the recommended statistic for evaluating the 11 RME. Instances where the UCL<sub>95</sub> exceeds the maximum detected concentration (MDC) 12 is used as an estimate of the RME. 13 14 EPCs in soil are calculated using equations from EPA guidance, Supplemental Guidance 15 to RAGS: Calculating the Concentration Term (EPA 1992). The data are tested using the 16 Shapiro-Wilk test to determine distribution, normal or lognormal, of the concentrations. 17 This guidance notes that environmental data are often lognormally distributed but does 18 not give specific guidance for data sets with unknown distributions. 19 20 For the 40 mm Range, the UCL<sub>95</sub> on the mean is calculated using the normal distribution 21 equation (see Equation 2-1) when the concentrations are normally distributed, when 22 concentrations are not judged to be normally or lognormally distributed, when the data set 23 contains fewer than five detections, or when the frequency of detection is less than 50%. 24 For these situations, the UCL<sub>95</sub> on the mean is calculated using the following equation:  $UCL_{95}(normal) = \frac{1}{x_n} + \frac{(t)(s_x)}{\sqrt{n}},$ 25 (2-1)26 where 27 Xn mean of the untransformed data. 28 student-t statistic. 29 standard deviation of the untransformed data, 30 number of sample results available. 31 32 EPA guidance Calculating Upper Confidence Limits for Exposure Point Concentrations 33 at Hazardous Waste Sites (EPA 2002) provides several methods for calculating the 34 UCL<sub>95</sub> for data sets that are neither normally nor log-normally distributed. All of the methods in this guidance are based on the assumption of random sampling. Sampling at 35 36 the 40 mm Range was biased toward areas with the greatest potential for contamination. 37 38 The t-distribution (i.e., assumption of normality) is used as a default when the distribution 39 cannot be determined because it is simple and robust. Instances where the underlying 40 distribution is assumed to be normal but is not, the UCL95 is still reasonably close to the 41 true value.

For lognormally distributed concentrations, the UCL95 on the mean is calculated using 2 3 the following equation:  $UCL_{95}(lognormal) = e\left(\frac{1}{x_I} + 0.5(x_I^2) + \frac{(S_I)(H)}{\sqrt{n+1}}\right),$ (2-2)4 5 where constant (base of the natural log, equal to 2.718), 6 e 7 mean of the transformed data  $[1 = \log(x)]$ , XI = standard deviation of the transformed data, 8 SI 9 H H-statistic, = 10 N number of sample results available. 11 EPA guidance (EPA 2002) suggests use of the H statistic may result in overestimating the 12 true UCL95 on the mean if the data are not lognormal. Even small deviations from 13 lognormal can greatly influence the results using the H-statistic, yielding upper bounds 14 that are much too large (Singh et al. 1997). EPCs for shallow surface soil (0-1 ft bgs), 15 deep surface soil (0-3 ft bgs), and subsurface soil (1-3 ft BGS) are provided in Appendix 16 B, Tables B-1 through B-3. 17 18 Direct sampling results are not available for the evaluation of ingestion of foodstuffs (i.e., 19 beef, milk, venison, and vegetables). Exposure concentrations were modeled for these 20 media using the equations presented below. The initial concentration of COPCs in soil is 21 equal to the EPC calculated for direct exposure pathways as described earlier. Other 22 23 parameter values are provided in Table 2. 24 Beef concentrations are calculated from the concentration in the cattle's food sources 25 due to soil contamination. The contaminant levels in pastures are estimated by the 26 27 equation:  $C_p = C_s \times (R_{upp} + R_{es}),$ (2-3)28 29 where = concentration of contaminant in pasture (mg/kg, calculated), 30 31  $C_s$  = concentration of contaminant in soil (mg/kg), R<sub>upp</sub> = multiplier for dry root uptake for pasture (unitless), 32 R<sub>es</sub> = resuspension multiplier (unitless). 33 The multiplier for dry root uptake for pasture, R<sub>upp</sub>, is chemical-specific and is estimated 34 35 as: Runn = Bvdry. (2-4)36 37 where R<sub>upp</sub> = multiplier for dry root uptake for pasture (unitless), 38  $Bv_{dry} = \text{soil-to-plant uptake, dry weight (kg/kg, chemical-specific, or 38 × <math>K_{ow}^{-0.58}$ ; 39 40 see Table B-4), K<sub>ow</sub> = octanol-water partitioning coefficient (unitless, chemical-specific). 41

			Por	Potential Receptor			
		National Guard Personnel			Resident Subsistence Farmer	ence Farmer	
Exposure Pathway and Parameter	Units	Security Guard/ Maintenance Worker	Trainee	Hunter <sup>6, c</sup>	Adult	Child	
	<i>S</i> 2	Shallow Surface Soil <sup>d</sup> (0-1 ft bgs) Incidental Ingestion	(0-1 ft bgs)				
Soil ingestion rate	kg/d	0.0001	0.0001	0.0001	0.0001	0.0002	
Exposure time	hr/d	1	24	99	24	24	
Exposure frequency	d/year	250	39	$2^e$	350	350	
Exposure duration	years	25	25	30	30	9	
Body weight	kg	70	70	70	70	15	
Carcinogen averaging time	Р	25,550	25,550	25,550	25.550	25,550	
Non-carcinogen averaging	P	9,125	9,125	10,950	10,950	2,190	
time							
Fraction ingested	unitless	1	1	1	1	1	
Conversion factor	d/hr	0.042	0.042	0.042	0.042	0.042	
		Dermal Contact	ct				
Skin area	m <sup>2</sup> /event	0.33	0.33	0.52	0.57	0.22	
Adherence factor	mg/cm <sup>2</sup>	0.7	0.3	0.3	0.4	0.2	
Absorption fraction	unitless		Chemical S	Chemical Specific - See Table B-4	ble B-4		
Exposure frequency	events/year	250	39	2°	350	350	
Exposure duration	years	25	25	30	30	9	
Body weight	kg	70	70	70	70	15	
Carcinogen averaging time	p	25,550	25,550	25,550	25,550	25,550	
Non-carcinogen averaging time	P	9,125	9,125	10,950	10,950	2,190	
Conversion factor	(kg-cm2)/(mg-m2)	0.01	0.01	0.01	10.0	0.01	
		Inhalation of VOCs and Dust	and Dust				
Inhalation rate	p/ <sub>E</sub> m	20	44.4	20	20	10	
Exposure time	hr/d	1	24	.9	24	24	
Exposure frequency	d/year	250	39	2.	350	350	
Exposure duration	years	25	25	30	30	9	
Body weight	kg	70	70	70	70	15	
Carcinogen averaging time	Р	25,550	25,550	25,550	25,550	25,550	
Non-carcinogen averaging time	P	9,125	9,125	10,950	10,950	2,190	
Conversion factor	- VF	6000	0,00	0000	0,00	0,00	

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	Units		Ь	Potential Receptor		
		National Guard Personnel	sonnel	Hunterb, c	Resident Subsistence Farmer	stence Farme
Exposure Pathway and Parameter	J	Security Guard/ Maintenance Worker Cubeurface Soil (1-3 ff box	Trainee		Adult	Child
		Incidental Ingestion				
Soil ingestion rate	kg/d	NA	NA	NA	0.0001	0.0002
Exposure time	hr/d	NA	NA	NA	24	24
Exposure frequency	d/year	NA	NA	NA	350	350
Exposure duration	vears	NA	NA	NA	30	9
Body weight	kg	NA	NA	NA	70	15
Carcinogen averaging time	Ф.	NA	NA	NA	25,550	25,55(
Non-carcinogen averaging time	р	NA	NA	NA	10,950	2,190
Fraction ingested	Unitless	NA	NA	NA	1	1
Conversion factor	d/hr	NA	NA	NA	0.042	0.042
		Dermal Contact				
Skin area	m <sup>2</sup> /event	NA	NA	NA	0.57	0.22
Adherence factor	mg/cm <sup>2</sup>	NA	NA	NA	0.4	0.2
Absorption fraction	Unitless	NA	VA	NA	Chem. Spec. S	ee Table B.
Exposure frequency	events/vear	NA	NA	NA	350	350
Exposure duration	vears	Y.Z	NA	NA	30	9
Body weight	Kg	NA	NA	NA	70	15
Carcinogen averaging time	Ф.	NA VA	NA	NA	25,550	25,55
Non-carcinogen averaging time	P	NA	NA	NA	10,950	2,190
Conversion factor	$(kg-cm^2)/(mg-m^2)$	NA	NA	NA	0.01	0.01
	Inh	Inhalation of VOCs and Du	181			
Inhalation rate	m <sub>3</sub> /d	NA	NA	NA	20	10
Exposure time	hr/d	NA	NA	NA	24	24
Exposure frequency	d/year	NA	NA	NA	350	350
Exposure duration	years	NA	NA	NA	30	9
Body weight	kg	NA	NA	NA	70	15
Carcinogen averaging time	Ф (	NA	NA	NA	25,550	25,55
Non-carcinogen averaging time	P	NA	NA	NA	10,950	2,190
0					4.04	0.00

Table 2 Parameters Used to Quantify Exposures for Each Medium and Receptor at the 40 mm Range" (continued)

Name of Paraction ingestion rate Exposure frequency Exposure frequency and ingestion material ingestion material ingestion rate duration beach of version frequency averaging time D NA NA NA 10,550 NA NA NA 25,550 NA NA NA Carcinogen averaging time D NA NA 10,550 NA NA NA NA 10,550 NA	Exposure Pathway and Parameter	Units	National Guard Personnel <sup>b</sup> Security Guard/ Trai Maintenance Worker Foodstuffs Ingestion of Waterfowl	nee	Potential Receptor Hunter <sup>6, c</sup>	Resident Subsistence Farmer Adult Child	tence Farmer Child
Unitless         NA         NA         1         NA           dyear         NA         NA         365         NA           Years         NA         NA         30         NA           Kg         NA         NA         70         NA           D         NA         NA         10,950         NA           Unitless         NA         NA         10,950         NA           Unitless         NA         NA         10,950         NA           Unitless         NA         NA         NA         0.03           Unitless         NA         NA         NA         0.03           Unitless         NA         NA         NA         1           Kg         NA         NA         NA         10,950           Kg dry weight/day         NA         NA         NA         10,950           Luitless         NA         NA         NA         10,950           Kg dry weight/day         NA         NA         NA         10,950           Unitless         NA         NA         NA         10,950           Unitless         NA         NA         NA         10,950	Waterfowl ingestion rate	kg/d	NA	NA	0.0132	NA	NA
dyear         NA         NA         365         NA           Kg         NA         NA         30         NA           D         NA         NA         70         NA           D         NA         NA         70         NA           D         NA         NA         NA         NA           Unitless         NA         NA         NA         0.25           Unitless         NA         NA         NA         0.25           Unitless         NA         NA         NA         0.03           Unitless         NA         NA         NA         0.03           Unitless         NA         NA         NA         0.03           Kg/day         NA         NA         NA         1           Vears         NA         NA         NA         1           Kg/day         NA         NA         NA         1           Kg         NA         NA         NA         1           Vears         NA         NA         NA         1           Kg         NA         NA         NA         1           Vg         NA         NA         NA	Fraction ingested	Unitless	NA	NA	1	NA	NA
Years         NA         NA         30         NA           D         NA         NA         70         NA           D         NA         NA         10,950         NA           D         NA         NA         10,950         NA           NA         NA         NA         NA         NA           Unitless         NA         NA         NA         0.08*           Unitless         NA         NA         NA         0.08*           Unitless         NA         NA         NA         0.08*           Unitless         NA         NA         NA         0.03           Unitless         NA         NA         NA         1           Kg dry weight/day         NA         NA         NA         10,950           Kg dry weight/day         NA         NA         NA         1           Unitless         NA         NA         NA         1           Kg dry weight/day         NA         NA         NA         1           Kg/day         NA         NA         NA         1           Kg/day         NA         NA         NA         0.09           Kg/day <td>Exposure frequency</td> <td>d/year</td> <td>NA</td> <td>NA</td> <td>365</td> <td>NA</td> <td>NA</td>	Exposure frequency	d/year	NA	NA	365	NA	NA
Kg         NA         NA         70         NA           D         NA         NA         10,950         NA           D         NA         NA         1.25         NA           Unitless         NA         NA         1.25         NA           kg dry weight/day         NA         NA         0.03         NA         0.03           Unitless         NA         NA         NA         0.03         NA         1           kg/day         NA         NA         NA         0.03         NA         1           days/year         NA         NA         NA         1         0.03           Unitless         NA         NA         NA         1         0.03           Kg         NA         NA         NA         10,950         0.25           kg dry weight/day         NA         NA         NA         1         0.25           kg/day         NA         NA         NA         NA         1           Unitless         NA         NA         NA         NA         1           Unitless         NA         NA         NA         0.9           kg/day         NA <t< td=""><td>Exposure duration</td><td>Years</td><td>NA</td><td>NA</td><td>30</td><td>NA</td><td>NA</td></t<>	Exposure duration	Years	NA	NA	30	NA	NA
D         NA         NA         25,550         NA           D         NA         NA         10,950         NA           Unitless         NA         NA         NA         NA           Unitless         NA         NA         NA         0.08*           Unitless         NA         NA         NA         0.03           kgday         NA         NA         NA         0.03           Unitless         NA         NA         NA         1           Kg         NA         NA         NA         10,950           Bays         NA         NA         NA         10,950           Kg dry weight/day         NA         NA         NA         10,950           Unitless         NA         NA         NA         10,950           Kg dry weight/day         NA         NA         NA         1           Unitless         NA         NA         NA         NA         1           Unitless         NA         NA         NA         1           Unitless         NA         NA         NA         1           Unitless         NA         NA         NA         1	Body weight	Kg	NA	NA	70	NA	NA
D         NA         NA         10,950         NA           Unitless         NA         NA         1.25           Kg dry weight/day         NA         NA         0.87           Unitless         NA         NA         0.08*           Unitless         NA         NA         0.03           kg/day         NA         NA         0.03           Unitless         NA         NA         0.03           Years         NA         NA         0.05           Years         NA         NA         0.075	Carcinogen averaging time	D	NA	NA	25,550	NA	NA
Lunitless         NA         NA         1.25           kg dry weight/day         NA         NA         0.87           Unitless         NA         NA         0.08*           Unitless         NA         NA         0.03           kg/day         NA         NA         0.03           Unitless         NA         NA         0.03           Vears         NA         NA         365           Years         NA         NA         10,950           Ingestion of beef, pork         NA         NA         NA           Unitless         NA         NA         NA         1           Unitless         NA         NA         NA         0.9           kg/day         NA         NA         NA	Non-carcinogen averaging time	D	NA	NA	10,950	NA	NA
Unitless         NA         NA         1.25           kg dry weight/day         NA         NA         0.87           Unitless         NA         NA         0.08*           Unitless         NA         NA         0.03           kg/day         NA         NA         0.03           Unitless         NA         NA         0.03           Kg         NA         NA         30           Kg         NA         NA         30           Kg         NA         NA         70           Days         NA         NA         70           Days         NA         NA         10,950           Unitless         NA         NA         NA         12           Voitless         NA         NA         NA         12           Unitless         NA         NA         NA         1           kg/day         NA         NA         NA         0.99           kg/day         NA         NA         NA         0.075			Ingestion of Venison				
kg dry weight/day         NA         NA         0.87           Unitless         NA         NA         0.08*           Unitless         NA         NA         0.03           kg/day         NA         NA         0.03           Unitless         NA         NA         0.03           Unitless         NA         NA         30           Kg         NA         NA         30           Kg         NA         NA         30           Kg         NA         NA         70           Days         NA         NA         10,950           Lingestion of beef, pork         NA         NA         12           Vuitless         NA         NA         NA         12           Unitless         NA         NA         NA         12           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         0.95           kg/day         NA         NA         NA         0.075	Conversion factor	Unitless	NA	NA	NA	1.25	1.25
Unitless         NA         NA         NA         0.08*           Unitless         NA         NA         0.2           kg/day         NA         NA         0.03           Unitless         NA         NA         0.03           Years         NA         NA         1           Adays/year         NA         NA         1           NA         NA         NA         365           Years         NA         NA         365           Years         NA         NA         365           NA         NA         NA         365           NA         NA         NA         365           NA         NA         NA         10,950           NA         NA         NA         10,950           Na         NA         NA         10,950           Na         NA         NA         10,950           Na         NA         NA         1           Na         NA         NA         1           NA         NA         NA         1           NA         NA         NA         1           NA         NA         NA	Browse ingestion rate	kg dry weight/day	NA	NA	NA	0.87	0.87
Unitless         NA         NA         NA         0.2           kg/day         NA         NA         NA         0.03           Unitless         NA         NA         NA         1           days/year         NA         NA         NA         365           Years         NA         NA         NA         365           Kg         NA         NA         NA         30           NA         NA         NA         NA         70           Days         NA         NA         NA         10,950           Lingestion of beef, pork         NA         NA         NA         7.2           Vg dry weight/day         NA         NA         NA         7.2           Unitless         NA         NA         NA         1           Kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.99           Kg/day         NA         NA         NA         0.075	Fraction browse ingested from site	Unitless	NA	NA	NA	880.0	0.08
kg/day         NA         NA         0.03           Unitless         NA         NA         1           days/year         NA         NA         1           days/year         NA         NA         365           Years         NA         NA         30           Kg         NA         NA         70           Days         NA         NA         75           Days         NA         NA         10,950           Days         NA         NA         10,950           Unitless         NA         NA         NA         7.2           Unitless         NA         NA         NA         1           Kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.99           Kg/day         NA         NA         0.075	Fat ratio (venison to beef)	Unitless	NA	NA	NA	0.2	0.2
Unitless         NA         NA         1           days/year         NA         NA         365           Years         NA         NA         30           Kg         NA         NA         70           Days         NA         NA         70           Days         NA         NA         10,950           Days         NA         NA         10,950           Unitless         NA         NA         7.2           Voilless         NA         NA         7.2           Unitless         NA         NA         NA         1           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         0.075	Venison ingestion rate	kg/day	NA	NA	NA	0.03	0.03
days/year         NA         NA         365           Years         NA         NA         30           Kg         NA         NA         70           Days         NA         NA         70           Days         NA         NA         25,550           Days         NA         NA         10,950           Lingestion of beef, pork         NA         NA         7.2           kg dry weight/day         NA         NA         NA         7.2           Unitless         NA         NA         NA         1           Unitless         NA         NA         NA         1           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         0.09	Fraction ingested	Unitless	NA	NA	NA	1	1
Years         NA         NA         30           Kg         NA         NA         70           Days         NA         NA         70           Days         NA         NA         70           Days         NA         NA         10,950           Lingestion of beef, pork         NA         NA         10,950           Vuitless         NA         NA         NA         7.2           Vuitless         NA         NA         NA         1           Vuitless         NA         NA         NA         1           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         0.09           NA         NA         NA         NA         0.075	Exposure frequency	days/year	NA	NA	NA	365	365
Kg         NA         NA         70           Days         NA         NA         70           Days         NA         NA         10,950           Ingestion of beef, pork           Unitless         NA         NA         NA           kg dry weight/day         NA         NA         7.2           Unitless         NA         NA         NA         1           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.075	Exposure duration	Years	NA	NA	NA	30	9
Days         NA         NA         25,550           Days         NA         NA         10,950           Days         Ingestion of beef, pork         NA         NA         10,950           Unitless         NA         NA         NA         7.2           Vulitless         NA         NA         NA         1           Vinitless         NA         NA         NA         0.9           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.075	Body weight	Kg	NA	NA	NA	70	15
Days         NA         NA         10,950           Ingestion of beef, pork         NA         NA         10,950           Unitless         NA         NA         NA         7.2           Unitless         NA         NA         NA         1           kg/day         NA         NA         NA         0.9           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         1	Carcinogen averaging time	Days	NA	NA	NA	25,550	25,550
Ingestion of beef, pork           Unitless         NA         NA         0.25           kg dry weight/day         NA         NA         7.2           Unitless         NA         NA         1           Unitless         NA         NA         NA         0.9           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.075	Non-carcinogen averaging time	Days	NA	NA	NA	10,950	2,190
Unitless         NA         NA         NA         0.25           kg dry weight/day         NA         NA         7.2           Unitless         NA         NA         1           Unitless         NA         NA         NA         0.9           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.075         0			ngestion of beef, pork				
kg dry weight/day         NA         NA         7.2           Unitless         NA         NA         NA         1           Unitless         NA         NA         NA         0.9           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.075	Resuspension multiplier	Unitless	NA	NA	NA	0.25	0.25
Unitless         NA         NA         1           Unitless         NA         NA         NA         0.9           kg/day         NA         NA         NA         1           kg/day         NA         NA         NA         0.075	Quantity of pasture ingested	kg dry weight/day	NA	NA	NA	7.2	7.2
Unitless         NA         NA         0.9           kg/day         NA         NA         1           kg/day         NA         NA         NA         0.075	Fraction of year cow is on-site	Unitless	NA	NA	NA	1	-
kg/day NA NA 1 kg/day NA NA 0.075	Fraction of cow's food from on-site	Unitless	NA	NA	NA	6.0	6.0
kg/day NA NA 0.075	Quantity of soil ingested by cow	kg/day	NA	NA	NA	1	1
	Beef ingestion rate	kg/day	NA	NA	NA	0.075	0.075



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Resident Subsistence Farmer	Child	_	365	9	15	25,550	2,190		0.25	16.1	-	9.0	1	0.509	-	365	9			2,190		0.26	0.2	0.4	365	9		25.550
Resident	Adult	1	365	30	70	25,550	10,950		0.25	16.1	1	9.0	1	0.305	1	365	30	70	25,550	10,950		0.26	0.2	0.4	365	30	70	25.550
Potential Receptor	Hunter".	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
	Trainee	NA	NA	NA	NA	NA	NA	S)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
National Guard Personnel <sup>6</sup>	Security Guard/ Maintenance Worker	NA	NA	NA	NA	NA	NA	Ingestion of milk products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Ingestion of vegetables	NA	NA	NA	NA	NA	NA	AZ
	Units	Unitless	days/year	Years	Kg	Days	Days		Unitless	kg dry weight/day	Unitless	Unitless	kg/day	kg/day	Unitless	days/year	Years	Kg	Days	Days		Unitless	kg/day	Unitless	days/year	Years	Kg	Days
í	Exposure Pathway and Parameter	Fraction ingested	Exposure frequency	Exposure duration	Body weight	Carcinogen averaging time	Non-carcinogen averaging time		Resuspension multiplier	Quantity of pasture ingested	Fraction of year cow is on-site	Fraction of cow's food from on-site	Quantity of soil ingested by cow	Milk ingestion rate	Fraction ingested	Exposure frequency	Exposure duration	Body weight	Carcinogen averaging time	Non-carcinogen averaging time		Resuspension multiplier	Vegetable ingestion rate	Fraction ingested	Exposure frequency	Exposure duration	Body weight	Carcinogen averaging time

<sup>a</sup> All parameters are from Table 5 of RVAAP's Facility-wide Human Health Risk Assessor Manual (FWHHRAM) (USACE 2004), unless otherwise noted.

b National Guard Trainee, Security Maintenance Worker, and Hunter are representative receptors at the 40 mm Range.

'No surface water is present at the 40 mm Range; therefore, the Hunter/Trapper/Fisher receptor is evaluated as a Hunter only.

Surface soil is defined as 0 to 1 ft below ground surface (bgs) (shallow surface soil) for all receptors except the National Guard Trainee. Surface soil is defined as 0 to 4 ft bgs (deep surface soil) for the National Guard Trainee; however, at the 40 mm Range, samples were collected to a maximum depth of 3 ft bgs.

\* Per the FWHHRAM the Hunter is assumed to be on-site 6 hrs/day for 2 days/year.

Exposure Factor Handbook (EPA 1997a) Dermal Contact for Hunter/ZFisher during wading is 0.52 based on head, hands, forearms and lower legs. Fraction browse for the 2 acres (0.8 ha) at the 40 mm Range is 0.0046 (0.8 ha/175 ha) based on a 175-ha home range for deer

NA = Not applicable for this scenario.

VOC = Volatile organic compound.

The concentration of contaminants in beef cattle from ingestion of contaminated pasture and soil was estimated using the following equation: 2  $C_b = BTF_{beef} \times [(C_p \times Q_{pb} \times f_{pb} \times f_{sb}) + (C_s \times Q_{sb} \times f_{pb})],$ (2-5)3 4 where 5 = concentration of contaminant in beef (mg/kg dry weight),  $C_b$ BTF<sub>beef</sub> = beef transfer coefficient (day/kg; see Table B-4), 6 = concentration of contaminant in pasture (mg/kg, calculated), 7 = quantity of pasture ingested by beef cattle (kg/day), 8 Qpb = fraction of year beef cattle is on-site (unitless), 9  $f_{pb}$ = fraction of beef cattle's food that is from the site (unitless), 10  $f_{sb}$ = concentration of contaminant in soil (mg/kg), Cs 11 = quantity of soil ingested by beef cattle (kg/day). 12 The BTF beef for metals is taken from available literature. The BTF beef for SVOCs is 13 calculated as 2.5 × 10-8 × Kow. No VOCs were identified as COPCs in soil at the 40 mm 14 15 Range. 16 Milk concentrations from dairy cattle were calculated from the concentration in the 17 cattle's food sources due to soil contamination. The contaminant levels in pastures are 18 estimated in the same fashion as for beef cattle. The concentration of contaminants in 19 dairy cattle's milk, from ingestion of contaminated pasture and soil is estimated using the 20 21 following equation:  $C_{m} = BTF_{milk} \times [(C_{p} \times Q_{pd} \times f_{pd} \times f_{sd}) + (C_{s} \times Q_{sd} \times f_{pd})],$ (2-6)22 23 where = concentration of contaminant in milk (mg/kg), 24  $C_m$ BTF<sub>milk</sub> = milk transfer coefficient (day/kg; see Table B-4), 25 = concentration of contaminant in pasture (mg/kg, calculated), 26  $C_p$ = quantity of pasture ingested by dairy cattle (kg/day), 27 Qpd = fraction of year dairy cattle is on-site (unitless), 28  $f_{pd}$ = fraction of dairy cattle's food that is from the site (unitless), 29  $f_{sd}$ = concentration of contaminant in soil (mg/kg), 30 = quantity of soil ingested by dairy cattle (kg/day). 31 The  $BTF_{milk}$  for metals is taken from available literature. The  $BTF_{milk}$  for SVOCs is 32 calculated as  $7.5 \times 10^{-9} \times K_{ow}$ . No VOCs were identified as COPCs in soil at the 40 mm 33 34 Range. 35 Venison concentrations were estimated by calculating the concentration in venison food 36 sources due to soil contamination. The contaminant levels in forage were estimated using 37 38 the following: (2-7) $C_n = (CF)(C_s)(B_n)$ 39 40 where concentration of contaminant in forage (mg/kg dry weight), 41 conversion factor to adjust for soil containing 20% moisture (1.25 unitless), CF 42 concentration of contaminant in soil (mg/kg), 43 soil-to-forage biotransfer factor (mg chemical per kg of dry plant/mg of 44

chemical per kg or dry soil)(chemical-specific; see Bv<sub>dry</sub> in Table B-4).

1 The B<sub>p</sub> for metals is available in literature. The B<sub>p</sub> for SVOCs was calculated using the 2 3 following formula:  $\log B_p = 1.588 - 0.578 \log K_{ow}$ (2-8)4 where 5  $B_p$ = soil-to-forage biotransfer factor (mg chemical per kg of dry plant/mg of 6 chemical per kg or dry soil)(chemical-specific; see Bvdry in Table B-4), 7 = octanol-water partitioning coefficient (unitless, chemical-specific). 8 No VOCs were identified as COPCs in soil at the 40 mm Range. The concentration of 9 contaminants in venison from ingestion of contaminated forage was estimated using the 10 11 following equation: 12  $C_v = (Q_p)(C_p)(FI_e)(B_v)$ (2-9)13 where 14  $C_{v}$ = contaminant concentration in venison (mg/kg), 15 = browse ingestion rate (0.87 kg dry weight/day), 16 = contaminant concentration in browse (mg/kg dry weight), = fraction browse ingested from the contaminated site (site area/home range), 17 18 biotransfer factor for venison (days/kg). 19 20 The B<sub>v</sub> for beef was used for deer due to a lack of available literature values for deer. Both 21 of these animals are ruminants; therefore, the uptake and bioaccumulation of contaminants 22 is similar. The meat of deer contains less fat than commercial beef — 14.4% fat for beef, 23 compared to 2.9% for venison. Organic chemicals have a greater affinity to fat and thus 24 would not accumulate as much in venison. Therefore, the beef biotransfer factors for 25 organics are adjusted by 2.9/14.4 (0.20) to reflect this lower accumulation rate. The fraction browse ingested from the contaminated site is exposure unit-specific. The 26 27 fraction browse for the 2 acres (0.8 ha) at the 40 mm Range is 0.0046 (0.8 ha/175 ha) 28 based on a 175 ha home range for deer. 29 30 The B<sub>v</sub> values for metals were developed from published values. The B<sub>v</sub> values for 31 organics are calculated as follows: 32  $B_v = R_f \times 10^{-7.6 + \log K_{ow}}$ (2-10)33 where 34  $B_v$  = biotransfer factor for venison (days/kg), 35  $R_f$  = ratio of the fat content in venison to the fat content of beef (0.20). 36 K<sub>ow</sub> = octanol-water partitioning coefficient (unitless, chemical-specific). 37 Homegrown vegetable concentration was estimated with the equation: 38  $C_{\text{veg}} = C_{\text{s}} \times (Bv_{\text{wet}} + MLF),$ (2-11)39 where 40 C<sub>veg</sub> = contaminant concentration in homegrown vegetable (mg/kg), 41  $C_s$  = concentration of contaminant in soil (mg/kg), 42  $Bv_{wet}$  = soil-to-plant uptake, wet weight (kg/kg, chemical-specific, or 7.7 ×  $K_{ow}$ <sup>-0.58</sup>; 43 see Table B-4), 44 K<sub>ow</sub> = octanol-water partitioning coefficient (unitless, chemical-specific), 45 MLF = plant mass loading factor (unitless, 0.26 for vegetables). No VOCs were identified as COPCs in soil at the 40 mm Range. 46

```
2
      Exposure Parameters and Calculations for Estimating Intakes
 3
      Standard intake equations from EPA guidance (EPA 1989) for ingestion, dermal contact,
      and inhalation of chemicals in soil (shown below) are used along with the exposure
 4
      parameters shown in Table 1. Exposure parameters and intake equations are provided in
 5
 6
      FWHHRAM (USACE 2005).
 7
 8
      Incidental ingestion of soil was estimated using Equation 2-14:
                        Chemical\ Intake\ (mg/kg-\ day) = \frac{C_S \times IR_S \times EF \times ED \times FI \times ET \times CF}{BW \times AT} \ ,
 9
                                                                                                          (2-14)
      where
10
           C<sub>s</sub> = chemical concentration in soil or sediment (mg/kg),
11
12
           IR_s = ingestion rate (kg/day),
13
           EF = exposure frequency (days/year),
           ED = exposure duration (years),
14
           FI = fraction ingested (value of 1, unitless),
15
           ET = exposure time (hr/day),
16
           CF = conversion factor for ET (day/hr),
17
           BW = body weight (kg),
18
           AT = averaging time (days) for carcinogens or non-carcinogens.
19
20
      The dermally absorbed dose (DAD) from chemicals in soil is calculated using Equation
21
22
      2-15:
                         Chemical DAD (mg/kg-day) = \frac{C_S \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}
                                                                                                          (2-15)
23
24
      where
                  = chemical concentration in soil or sediment (mg/kg),
25
           C_s
                      conversion factor [(10^{-6} \text{ kg/mg}) \times (10^4 \text{ cm}^2/\text{m}^2)],
26
           CF
                  = skin surface area exposed to soil (m<sup>2</sup>/event),
27
           SA
                      soil to skin adherence factor (mg/cm<sup>2</sup>),
28
           AF
           ABS = chemical-specific dermal absorption factor (unitless; see Table B-4),
29
                      exposure frequency (events/year),
30
           EF
                       exposure duration (years),
           ED
31
                      body weight (kg),
32
           BW
33
           AT
                       averaging time (days) for carcinogens or non-carcinogens.
34
      Inhalation of soil or sediment was calculated using Equation 2-16:
35
                 Chemical\ Intake\ (mg/kg-\ day) = \frac{C_S \times IR_a \times EF \times ED \times \left(VF^{-1} + PEF^{-1}\right) \times ET \times CF}{BW \times AT},
                                                                                                          (2-16)
36
37
      where
           C<sub>s</sub> = chemical concentration in soil or sediment (mg/kg),
38
           IR_a = inhalation rate (m^3/day),
39
           EF = exposure frequency (days/year),
40
41
           ED = exposure duration (years),
```

```
VF = chemical-specific volatilization factor (m<sup>3</sup>/kg; see Table B-4),
  1
 2
           PEF = particulate emission factor (m^3/kg).
 3
           ET = exposure time (hr/day)
 4
           CF = conversion factor for ET (day/hr),
 5
           BW = body weight (kg),
 6
           AT = averaging time (days) for carcinogens or non-carcinogens.
 7
 8
      Per the FWHHRAM (USACE, 2005) the general PEF value of 9.24 E+08 m<sup>3</sup>/kg (for
 9
      Cleveland, Ohio) was used for all receptors, except the National Guard Trainee, (USEPA
10
      Soil Screening Guidance on-line at http://risk.lsd.ornl.gov/epa/ssl1.htm). A smaller PEF
      value (1.67 E+06 m<sup>3</sup>/kg) is used for the National Guard Trainee receptor because they
11
12
      generate more dust during training. This PEF value was calculated from a dust-loading
      factor (DLF) of 600 µg/m<sup>3</sup> (DOE 1983) as:
13
14
              PEF = 1/(DLF \times Conversion Factor) = 1/(600 \mu g/m^3 \times 1E-09 kg/\mu g) = 1.67E+06
15
              m³/kg.
16
17
18
      Ingestion of foodstuffs (beef, milk, vegetables, and venison) is estimated using Equation 2-
19
      17:
                           Chemical Intake (mg/kg-day) = \frac{Cf \times IRf \times EF \times ED \times FI}{BW \times AT},
20
                                                                                                  (2-17)
21
      where
22
           C_f
                     chemical-specific concentration in food product (mg/kg),
23
           IR_f
                 = ingestion rate of food product (kg/day),
24
           EF
                 = exposure frequency (days/year).
25
           ED
                 = exposure duration (years),
26
          FI
                 = fraction ingested (value of 1, unitless).
27
          BW
                     body weight (kg),
28
           AT
                     averaging time (days) for carcinogens or non-carcinogens.
29
30
      3.2.2 TOXICITY ASSESSMENT
31
      The potential for COPCs to cause adverse health effects in exposed individuals is
32
      evaluated in this Toxicity Assessment. Generally, an estimate is made between the intake
33
      (dose) of a COPC and the likelihood of adverse health effects to a receptor as a result of
34
      the exposure. The USEPA have evaluated toxic effects extensively. This section
35
      provides the results of the evaluation of potential toxic effects of COPCs at the 40 mm
36
      Range.
37
38
      The primary source of toxicity information is Integrated Risk Information System (IRIS)
39
      which has information for numerous chemicals. The U.S. EPA - OSWER Directive
40
      (2003) and Ohio EPA DERR Technical Decision Compendium (2004), recommend the
41
      following additional sources for chemicals without values in IRIS:
      • Aluminum and 2-methyl-4,6-dinitrophenol - provisional values from EPA Superfund
42
43
          Health Risk Technical Support Center were used.
        Vanadium - values from the Health Effects Assessment Summary Tables (HEAST)
44
```

45

(EPA 1997) were used.

1 2

# Toxicity Information and U. S. Environmental Protection Agency Guidance for Non-carcinogens

Non-carcinogenic effects are evaluated by comparing an exposure or intake/dose with a reference dose (RfD) or reference concentration (RfC). The RfD and RfCs are determined using available dose-response data for individual chemicals. The exposure concentration or intake/dose below which no adverse effects occur are adjusted by the application of safety factors (from 10 to 1,000) to determine the RfD or RfC. The RfDs and RfCs are peered reviewed. The RfDs available for the COPCs present in the exposure media at the 40 mm Range are listed in Table B-5 (EPA 1997, 2005). In this HHRA, RfCs, measured in mg/m³, were converted to RfDs expressed in units of mg/kg body weight per day by using the default adult inhalation rate and body weight [i.e., (RfC × 20 m³/d)/70 kg = RfD] (EPA 1989).

Chronic RfDs are developed for protection from long-term exposure to a chemical (from 7 years to a lifetime); subchronic RfDs are used to evaluate short-term exposure (from 2 weeks to 7 years) (EPA 1989). Only chronic RfDs are used in this HHRA because receptors were assumed to have life-long exposure. Toxic effects are diverse and measured in various target body organs (e.g., they range from eye irritation to kidney or liver damage). EPA is currently reviewing methods for accounting for the difference in severity of effects; however, existing RfDs do not address this issue.

# Toxicity Information and U. S. Environmental Protection Agency Guidance for Carcinogens

The additional or excess risk from carcinogens at the site is the probability that an individual will develop cancer over a lifetime as a result of exposure to the carcinogen. Cancer risk in HHRA is expressed as excess or incremental cancer risk, which is cancer occurrence in addition to normally expected rates of cancer development. Excess cancer risk is estimated using a cancer slope factor (CSF). The CSF is defined as a plausible upper-bound estimate of the probability of a response (i.e., cancer) per unit intake of a chemical over a lifetime (EPA 1989).

EPA expresses inhalation cancer potency as the unit risk based on the chemical concentration in air [i.e., risk per microgram ( $\mu g$ ) of chemical per cubic meter ( $m^3$ ) of ambient air]. These unit risks were converted to CSFs expressed in units of risk per mg of chemical per kg body weight per day by using the default adult inhalation rate and body weight [i.e., (Unit Risk × 70 kg × 1,000  $\mu g/mg$ )/20  $m^3/day$ ]. CSFs used in the evaluation of risk from carcinogenic COPCs are listed in Table B-6 (EPA 1997, 2005).

## Estimated Toxicity Values for Dermal Exposure

Oral and inhalation RfDs and CSFs are currently available however; dermal RfDs and CSFs are often not available. If dermal values were estimated from oral toxicity values, the gastrointestinal absorption factors (GAFs) specific for a chemical was used to calculate total absorbed dose (Equations 2-18 and 2-19). Dermal toxicity factors are calculated from oral toxicity factors as shown below (EPA 2004):

 $RfD_{dermal} = RfD_{oral} \times GAF$ (2-18)1 2 CSF<sub>dermal</sub> = CSF<sub>oral</sub>/GAF (2-19)3 Not all COPCs have specific GAF values. A default GAF value of 1.0 for organic and 4 inorganic chemicals was used (EPA 2004) when quantitative data are insufficient. The 5 GAF and resulting dermal toxicity values used in this HHRA are listed in Tables B-5 and 6 7 B-6. 8 Chemicals Without U. S. Environmental Protection Agency Toxicity Values 9 Only one COPC (nitrocellulose) did not have available toxicity values. Although 10 Nitrocellulose-may contribute to health effects from exposure to contaminated media at 11 the 40 mm Range it's effects cannot be quantified at the present time; however, 12 nitrocellulose is generally considered to have low toxicity to mammals and relatively 13 non-toxic to wildlife when administered in low doses.. 14 15 3.2.3 RISK CHARACTERIZATION 16 The risk characterization phase provides an evaluation of information obtained in the 17 exposure and toxicity assessments to estimate potential risks and hazards. Potential 18 carcinogenic effects are characterized by using estimated intakes and chemical-specific, 19 dose-response data (i.e., CSFs) to estimate the probability that an individual may have an 20 additional chance to develop cancer over their lifetime if they are exposed to the COPC 21 as assumed in the exposure assessment. Potential non-carcinogenic effects are 22 characterized by comparing estimated intakes of COPCs (as assumed in the exposure 23 assessment) to toxicity values (i.e., RfDs). The risk and hazard estimates should be 24 interpreted in context of the uncertainties and assumptions associated with each estimate 25 26 and calculation completed in the risk assessment process. 27 28 Risk Characterization for Carcinogens For carcinogens, risk is expressed as the probability that an individual will develop 29 cancer over a lifetime as a result of exposure to the carcinogen. Cancer risk from 30 exposure to contamination is expressed as the incremental lifetime cancer risk (ILCR), or 31 the increased chance of cancer above the normal background rate of cancer. In the United 32 States, the background chance of contracting cancer is a little more than 3 in 10, or 33  $3 \times 10^{-1}$  (American Cancer Society 2003). The calculated ILCRs are compared to the 34 range specified in the National Oil and Hazardous Substances Pollution Contingency 35 Plan of 10<sup>-6</sup> to 10<sup>-4</sup>, or 1-in-1 million to 1-in-10,000 exposed persons developing cancer 36 (EPA 1990). ILCRs below 10<sup>-6</sup> are considered acceptable; ILCRs above 10<sup>-4</sup> are 37 considered unacceptable. The range between 10<sup>-6</sup> and 10<sup>-4</sup> is of concern, and any 38 decisions to address ILCRs further in this range, either through additional study or 39 engineered control measures, should account for the uncertainty in the risk estimates. 40 The ILCR is calculated using the equation below (EPA 1989): 41 (2-20) $ILCR = I \times CSF$ 42 43 where = chronic daily intake or DAD calculated in the exposure assessment (mg/kg-44 I day). 45 CSF = cancer slope factor  $(mg/kg-day)^{-1}$ . 46

For a given exposure pathway, the total risk to a receptor exposed to several carcinogenic COPCs is the sum of the ILCRs for each carcinogen, as shown in Equation 2-21 below:  $ILCR_{total} = \Sigma ILCR_{i} \tag{2-21}$  where

 $ILCR_{total}$  = total probability of cancer incidence associated with all carcinogenic COPCs,

 $ILCR_i = ILCR$  for the  $i^{th}$  COPC.

In addition to summing risks across all carcinogenic COPCs, risks are summed across all exposure pathways for a given environmental medium (e.g., ingestion, inhalation, and dermal contact with surface soil). Per EPA (1989) guidance, "there are two steps required to determine whether risks or hazard indices for two or more pathways should be combined for a single exposed individual or group of individuals. The first is to identify reasonable exposure pathway combinations. The second is to examine whether it is likely that the same individuals would consistently face the "reasonable maximum exposure" (RME) by more than one pathway." It is reasonable to assume the same individual may be exposed at the RME by multiple pathways to a given exposure medium. For example, a National Guard Trainee present at the 40 mm Range can reasonably be assumed to both ingest surface soil and inhale contaminated dust from the same area.

Risk Characterization for Non-carcinogens

In addition to developing cancer from exposure to contaminants, an individual may experience other toxic effects. The term "toxic effects" is used here to describe a wide variety of systemic effects ranging from minor irritations, such as eye irritation and headaches, to more substantial effects, such as kidney or liver disease and neurological damage. The risks associated with toxic (i.e., non-carcinogenic) chemicals are evaluated by comparing an estimated exposure (i.e., intake or dose) from site media to an acceptable exposure expressed as an RfD. The RfD is the threshold level below which no toxic effects are expected to occur in a population, including sensitive subpopulations. The ratio of intake over the RfD is the HQ (EPA 1989) and is calculated as:

The ratio of intake over the RfD is the HQ (EPA 1989) and is calculated as:

HQ = I/RfD (2-22)

33 where

 I = daily intake or DAD of a COPC (mg/kg-day),

RfD = reference dose (mg/kg-day).

The HQs for each COPC are summed to obtain a hazard index (HI), as shown below:

 $HI = \Sigma HQ_i \tag{2-23}$ 

38 where

HI = hazard index for all toxic effects, HO<sub>i</sub> = hazard quotient for the i<sup>th</sup> COPC.

An HI greater than 1 has been defined as the level of concern for potential adverse non-carcinogenic health effects (EPA 1989). This approach differs from the probabilistic approach used to evaluate carcinogens. An HQ of 0.01 does not imply a 1-in-100 chance of an adverse effect but indicates only that the estimated intake is 100 times less than the threshold level at which adverse health effects may occur.

In addition to summing hazards across all COPCs, hazards are summed across all exposure pathways for a given environmental medium.

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#### Identification of COCs

Risks are characterized for each exposure medium/receptor combination. COCs are identified if the total ILCR for a chemical exceeds 10<sup>-6</sup> or if total HIs exceed 1 for a medium/receptor combination.

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## 3.3 HUMAN HEALTH RISK CHARACTERIZATION RESULTS

#### 3.3.1 DIRECT CONTACT

## Table 3. Summary of Risk Characterization Results for Direct Contact with Soil

Receptor	ILCR	COCs	HI	COCs
National Guard Trainee	6E-06	Arsenic 5E-06	0.4	None
Resident Farmer – adult	3E-05 (4E-05)	Arsenic 2E-05 Benzo(a)pyrene 4E-06 Dibenz(a,h)anthracene 4E-06 n-Nitroso-di-n-propylamine 3E-06	0.2 (0.2)	None
Resident Farmer – child	3E-05 (4E-05)	Arsenic 2E-05 Benzo(a)pyrene 2E-06 Dibenz(a,h)anthracene 2E-06 n-Nitroso-di-n-propylamine 2E-06	1 (1)	None
Security Guard/ Maintenance Worker	1E-05	Arsenic 5E-06 Benzo(a)pyrene 2E-06 Dibenz(a,h)anthracene 2E-06 n-Nitroso-di-n-propylamine 1E-06	0.05	None
Hunter	8E-08	None	0.0004	None

ILCR > 1E-05 shown in bold.

Risk/hazard results for surface (0-1 ft bgs) and subsurface (1-3 ft bgs) soil.

Note: The estimated risks from exposure of these receptors to the background concentration of arsenic (15.4 mg/kg) in surface soil are:

National Guard Trainee 9E-06

Security Guard/Maintenance Worker 6E-06

On-Site Resident Farmer: Adult 2E-05

On-Site Resident Farmer: Child 3E-05

Risks to these receptors from arsenic at  $40\,$  MM AOC are below the risks associated with the background concentration of this metal.

The calculated ILCRs were compared to the range specified in the National Oil and Hazardous Substances Pollution Contingency Plan of 1E-06 to 1E-04, or 1 in 1 million to 1 in 10,000 exposed person's chance of developing cancer if exposed as assumed in the HHRA (EPA 1990). The ILCRs below 1E-04 are considered acceptable. ILCRs above 1E-04 are considered unacceptable. The range between 1E-06 and 1E-04 is of concern, and any decisions to address ILCRs further in this range, either through additional study or engineered control measures, should account for the uncertainty in the risk estimates. Ohio EPA Division of Emergency and Remedial Response (DERR), uses 1 E-05 as the official target risk goal for development of cleanup goals (Ohio EPA 2004).

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The total HI for all receptors assessed in this HHRA was  $\leq 1$ . This indicates that the COPC at 40 mm Range do not pose a non-carcinogenic risk to receptors.

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The total excess cancer risk for all COPCs for the anticipated future land-use (National Guard Trainee) exceeds 1E-06, due primarily to arsenic, but is less than Ohio EPA's target risk goal of 1E-05. Similarly, the total risk to the Security Guard/Maintenance Worker exceeds 1E-06, due primarily to arsenic, but is equal to 1E-05.

The total risk for Resident Farmer exceeds 1E-05 due to arsenic and 3 SVOCs [benzo(a)pyrene, dibenz(a,h)anthracene, and n-nitroso-di-n-propylamine). Individual ILCRs for these SVOCs are each less than 1E-05 and all three of these SVOCs were non-detect in all soil samples, removing them from further consideration.

The EPCs for arsenic (12 mg/kg in shallow surface soil (0-1 ft bgs), 19 mg/kg in subsurface soil (1-3 ft bgs)) are similar to the background criteria of 15 mg/kg in shallow surface soil (0-1 ft bgs) and 20 mg/kg in subsurface soil (1-3 ft bgs). This indicates, the calculated cancer risk related to arsenic at the 40 mm Range does not exceed the cancer risk for arsenic estimated for facility-wide background and will not be considered a Constituent of Concern.

## 3.3.2 INDIRECT CONTACT

Detailed hazard and risk results for the Resident Farmer's indirect contact with COPCs in surface soil are presented in Tables B-13 and B-14 and summarized in Table 4. Indirect contact includes ingestion of venison, beef, milk, and vegetables. The Resident Farmer is the only receptor potentially exposed by these indirect pathways.

Table 4. Summary of Risk Characterization Results for Indirect Contact with Shallow Surface Soil (0-1 ft bgs)

Receptor	ILCR	COCs	HI	COCs
Resident Farmer adult	5E-03	Arsenic 2E-03 Benzo(a)pyrene 4E-04 Dibenz(a,h)anthracene 9E-04 Hexachlorobenzene 5E-05 n-Nitroso-di-n-propylamine1E-03	23	Aluminum 4 Arsenic 13 Thallium 4 2-Methyl-4,6- dinitrophenol 2
Resident Farmer child	5E-03	Arsenic 2E-03 Benzo(a)pyrene 4E-04 Dibenz(a,h)anthracene 1E-03 Hexachlorobenzene 5E-05 n-Nitroso-di-n-propylamine 1E-03	115	Aluminum 18 Arsenic 61 Thallium 19 Vanadium 5 2-Methyl-4,6- dinitrophenol 12

30 ILCR > 1E-05 and HI > 1 shown in bold.

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The total HI is > 1 due to four metals and 2-methyl-4,6-dinitrophenol. The EPCs for arsenic and vanadium are less than background criteria. The EPC for chromium exceeds the background criterion. Thallium background criterion for shallow surface (0-1 ft bgs) soil was set to zero (0) because it was not detected in background. 2-Methyl-4,6-dinitrophenol was non-detect in all soil samples.

The total risk across all COPCs exceeds 1E-05 due to arsenic and 4 SVOCs [benzo(a)pyrene, dibenz(a,h)anthracene, hexachlorobenzene, and n-nitroso-di-n-propylamine]. All four of these SVOCs were non-detect in all soil samples.

The EPCs for arsenic (12 mg/kg in shallow surface soil (0-1 ft bgs) 19 mg/kg in subsurface soil (1-3 ft bgs)) are similar to the background criteria of 15 mg/kg in shallow surface soil (0-1 ft bgs) and 20 mg/kg in subsurface soil (1-3 ft bgs). Thus, the cancer risk related to arsenic at the 40 mm Range does not exceed the cancer risk for arsenic estimated for facility-wide background.

### 3.4 UNCERTAINTIES

This section identifies the uncertainties associated with each step of the human health risk assessment process, where possible. Uncertainties are not mutually exclusive.

# 3.4.1 HUMAN HEALTH UNCERTAINTIES ASSOCIATED WITH DATA EVALUATION

In addition to the normal analytical uncertainty associated with all laboratory analysis, the Data Evaluation process completed in the HHRA inserts more uncertainties. Detection limits required for certain chemicals is often limited due to analytical methods. Often detection limits are greater than risk-based screening levels (i.e., PRG concentrations). Six chemicals were assessed in the HHRA using one-half their detection limit. These chemicals were not detected in soil samples but their detection limits were greater than PRGs. Risks from these chemicals should be considered as overestimated based on the following observations:

- Very few organic chemicals were detected at the 40 mm Range. Only 2 SVOCs were
  detected and one of these [bis(2-ethylhexyl)phthalate] is a common laboratory
  contaminant.
- There is no known source for these six chemicals at the 40 mm Range (although PAHs do tend to be ubiquitous in the environment). There are no documented sources for these six chemicals at the 40 mm range. However, in addition to being ubiquitous in the environment, there is also the possibility that they are site-related due to previous Army activities.

The data evaluation includes comparison of MDC to background criteria. Five inorganic COPCs are identified based on this comparison; however, the EPCs for three of these metals (aluminum, arsenic, and vanadium) are less than the background criteria for all three soil depth horizons. Thallium background criterion for shallow surface (0-1 ft bgs) soil was set to zero (0) because it was not detected in background. This metal was detected in only 15% to 18% of shallow (0-1 ft bgs) and deep surface (0-3 ft bgs) soil

samples. The EPC for thallium in subsurface (1-3 ft bgs) soil 1.08 mg/kg is only slightly greater than the background criterion of 0.91 mg/kg. Only the EPCs for chromium in shallow (0-1 ft bgs) (43.9 mg/kg) and deep (0-3 ft bgs) (33.6 mg/kg) surface soil exceed the background criterion (17.4 mg/kg). The EPC for chromium in subsurface (1-3 ft bgs) soil (19.2 mg/kg) is less than the background criterion (27.2 mg/kg) for this depth. Therefore, risks calculated for all five of these metals are likely related to naturally occurring background.

# 3.4.2 UNCERTAINTIES ASSOCIATED WITH EXPOSURE ASSESSMENT

Several uncertainties associated with the various components of the exposure assessment include uncertainties about the exposure pathway equations, exposure parameters, and land-use scenarios.

For each primary exposure pathway chosen for analysis in this HHRA, assumptions are made concerning the exposure parameters (e.g., amount of contaminated media a receptor can be exposed to and intake rates for different routes of exposure) and the routes of exposure. In the absence of site-specific data, the assumptions used are consistent with Ohio EPA-approved default values, which are assumed to be representative of potentially exposed populations (USACE 2004). All contaminant exposures are assumed to be from site-related exposure media (i.e., no other sources contribute to the receptor's health risk). The exposure scenarios are intended to over- rather than under-estimate risk. For example, the intended future land-use includes National Guard Training; therefore, a National Guard Trainee is a representative receptor. The National Guard Trainee scenario assumes the same individual will train exclusively at the 40 mm Range for their entire period of enlistment. Thus, while the receptor is representative of land-use at the 40 mm Range, the details of the exposure scenario are conservative.

 There is a significant amount of uncertainty attached to the risk assessment evaluation of the ingestion of foodstuffs by the Resident Subsistence Farmer. The EPCs for aluminum (12,400 mg/kg), arsenic (12.5 mg/kg), and vanadium (22.7 mg/kg) in shallow surface (0-1 ft bgs) soil are less than the background criteria for the metals (17,700, 15.4, and 31.1 mg/kg respectively). Yet, the calculated HIs for these metals range from 4 to 61, and the calculated ILCR for arsenic is 2E-03 for the Resident Subsistence Farmer ingesting homegrown vegetables, beef, and milk products (the contribution from venison is negligible). These very high hazard and risk results for metals at concentrations below background are a symptom of the very conservative nature of the risk calculations for the food ingestion pathways. The risks to these receptors are hypothetical at best. In the United States, there are very few subsistence farmers and less subsistence farmers that grow up on a farm and then continue to live there as adults. The amount of land required to be a subsistence ranges from 0.25 acres to 2 acres per person for vegetarian diets (US Agronomics). Overestimation of risk from this pathway results from a variety of factors including:

Conservative biotransfer factors often extrapolated from other chemicals;

• Conservative mass loading factors that assume 25 percent of the chemical in soil is deposited on the vegetation and consumed by either an animal (beef and milk) or

- human receptor. In addition to this very high mass loading factor, it is assumed that 1 2 human receptors do not wash homegrown vegetables prior to consumption;
- 3 All of the chemicals are assumed to be 100 percent bioavailable at the detected or 1/2 4 detection limit concentrations, which would not occur for most chemicals;
  - Despite these very conservative uptake assumptions, no loss of contaminants from the soil over the 30-year exposure duration is assumed; and
- 7 Conservative ingestion rates that assume a receptor consumes a large quantity of beef, 8 milk, and vegetables, and much or all of this food is raised within the 2 acre 40 mm 9 Range AOC.
- While a land-use plan has been drafted for the RTLS, and OHARNG will control the 10 property, there is uncertainty in the details of the future land-use (e.g., if the perimeter 11 fence-is not maintained, land uses could change, a trespasser could enter the property, and 12
- the like). There is little to no uncertainty associated with the assumption that the 13
- RVAAP/RTLS will not be released for residential use; however, a Resident Subsistence 14 15 Farmer receptor was evaluated to provide a baseline scenario.

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# 3.4.3 UNCERTAINTIES ASSOCIATED WITH THE TOXICITY ASSESSMENT

The toxicological data (CSFs and RfDs) for dose-response relationships of chemicals are frequently updated and revised, which can lead to overestimation or underestimation of risks. These values are often extrapolations from animals to humans, and this can also cause uncertainties in toxicity values. It is likely differences can exist in chemical absorption, metabolism, excretion, and toxic response between animals and humans. The carcinogenic potential of a chemical can be estimated through a two-part evaluation

involving:

(1) a Weight-of-Evidence (WOE) assessment to determine the likelihood that a chemical is a human carcinogen, and

(2) a slope factor assessment to determine the quantitative dose-response relationship.

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Uncertainties occur with both assessments. Chemicals fall into one of five groups on the basis of WOE studies of humans and laboratory animals (EPA 2005):

- Group A known human carcinogen;
- Group B probable human carcinogen based on limited human data or sufficient evidence in animals, but inadequate or no evidence in humans;
- Group C possible human carcinogens;
- Group D not classified as to human carcinogenicity; and
- Group E evidence of no carcinogenic effects in humans. One COPC identified at the 40 mm Range is a Group A carcinogen (arsenic); five are Group B carcinogens [benzo(a)pyrene, bis(2-ethylhexyl)phthalate, dibenz(a,h)anthracene, hexachlororbenzene, and n-nitroso-di-n-propylene].

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No toxicity information is available for nitrocellulose. Therefore, until and unless additional toxicity information allows the derivation of toxicity factors, potential risk from this chemical cannot be quantified.

#### 3.4.4 UNCERTAINTIES ASSOCIATED WITH HUMAN HEALTH 1 2 RISK CHARACTERIZATION Risk assessment, as a scientific activity, is subject to uncertainty. This is true even though 3 the methodology used in this HHRA follows EPA guidelines. As noted previously, the 4 risk evaluation in this report is subject to uncertainty pertaining to sampling and analysis, 5 selection of COPCs, exposure estimates, and availability and quality of toxicity data. 6 The risk characterization integrates the findings of the data analysis, exposure 7 assessment, and toxicity assessment; therefore, all of the uncertainties associated with 8 each of these steps impact the risk characterization. And the compounding conservatism 9 of the upper-bound assumptions used to compensate for uncertainties in each of these 10

#### SUMMARY AND CONCLUSIONS 12 3.5

# 3.5.1 HUMAN HEALTH RISK ASSESSMENT

steps result in over- rather than under-estimation of risk.

13 Calculated non-cancer HIs for direct contact are less than 1 for all receptors. Calculated 14 ILCRs are less than or equal to 1E-05 for National Guard Receptors (National Guard 15 Trainee and Security Guard/Maintenance Worker). Calculated ILCRs exceed 1E-05 for 16 the Resident Farmer scenario; however, risks are driven by background concentrations of 17 arsenic and the detection limits for 3 SVOCs not detected in any soil sample at the 40 18

19 20 mm Range.

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# 4.0 ECOLOGICAL SCREENING

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## SCREENING FOR CONTAMINANTS OF POTENTIAL 4.1

ECOLOGICAL CONCERN

The screening to identify contaminants of potential ecological concern (COPECs) consists of three sequential questions as follows:

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1. Is maximum detected or maximum non-detected concentrations above the soil ecological screening value (ESV), or if detected and below the ESV or there was no ESV, is the analyte a persistent, bioaccumulative, and toxic (PBT) chemical?

No - eliminate Yes - go to step 2.

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2. Is maximum detected or maximum non-detected concentration above upper threshold limit (UTL) background criterion (most inorganics) or no background criterion (organics)?

No - eliminate

38 Yes - go to step 3.

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3. Is analyte a Site Related Chemical (SRC) From Army Usage?

No - eliminate 41 42 Yes - COPEC.

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Each step is now explained in greater detail below.

1	For Concentrations	Compared to	Background	And PBT	Evaluation	(Sten	1)
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- 2 In step 1, we ask: Is MDC concentration (if there was at least one detection in the
- 3 applicable soil depth) or maximum non detect (if there were no detections in the
- 4 applicable soil depth) above the soil ESV, or if detected and below the ESV or there was
- 5 no ESV, is the analyte a PBT chemical?
  - No eliminate from further consideration
- Yes go to step 2.

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- 8 Step 1 entailed comparing maximum soil concentrations from the applicable depths
- 9 against soil ESVs. Several sources of ESVs were used from which a preferred ESV was
- selected, except for substances that had a Plant Protection Level (PPL) as identified in
- 11 Report on the Draft Biological Field-Truthing Effort at Winklepeck Burning Grounds
- 12 (SAIC 2002). The hierarchy for selection of the ESV, in order of preference (Ohio EPA
- 13 2003) was as follows:
  - Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones, 1997a. Preliminary Remediation Goals for Ecological Endpoints. ES/ER/TM-162/R2.
- Efroymson, R.A., M.E. Will, and G.W. Suter II, 1997b. Toxicological
   Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil
   and Litter Invertebrates and Heterotrophic Process: 1997 Revision. ES/ER/TM 126/R2.
- Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten, 1997c.
   Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. ES/ER/TM-85/R3.
- U.S. EPA, 1999a. Ecological Data Quality Levels (EDQL), U.S. EPA, Region 5,
   Final Technical Approach for Developing EDQLs for RCRA Appendix IX
   Constituents and Other Significant Contaminants of Concern. However, that
   reference has been superseded by U.S.EPA, 2003. Ecological Screening Levels
   for Region 5 Corrective Action. Thus, updated EPA (2003a) values were used as
   the fourth source of ESVs.
- The soil ESVs and PPLs are presented in Appendix Table C-2. Results of the screening of chemicals in soil samples to ESVs for shallow surface (0 to 1 ft bgs), subsurface (1 to
- 31 3 ft bgs), and deep surface (0 to 3 ft bgs) are presented in Appendix Tables C-3 through
- 32 C-5, respectively.
- 34 PBT compounds as defined by Ohio EPA (2003) were identified at the AOC for
- 35 inorganics and included cadmium, lead, mercury, and zinc; whereas, organic PBTs are
- analytes whose log octanol-water partition coefficient (Log Kow) is greater than or equal to 3.0 (Appendix Table C-1). PBT chemicals are especially prone to bioaccumulate in
- biota; thereby, they are capable of being passed up the food chain and causing exposure
- 39 (and therefore potential adverse impacts) to animals that ingest prey that contain the
- 40 bioaccumulated analytes.41

# Comparison Against Background

- 2 In step 2 we ask: Is maximum detected or maximum non-detected concentration above
- 3 the background 95% UTL or are there no background data?
  - No eliminate from further consideration
  - Yes go to step 3.
- 6 Results of the screening against background UTL for shallow surface (0 to 1 ft bgs),
- 7 subsurface (1 to 3 ft bgs), and deep surface (0 to 3 ft bgs) are presented in Appendix
- 8 Tables C-3 through C-5, respectively.

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## Role of Site-related Compounds

- 11 In step 3 we ask: Is the analyte a SRC (from Army usage)?
- No eliminate from further consideration
- Yes COPEC.
- 14 The non-SRCs per Army usage include the following: metals iron; organics-
- 15 semivolatiles 2,4-dimethylphenol, 2-chloronaphthalene, benzo(a)pyrene,
- 16 dibenzo(a,h)anthracene, and hexachloro-butadiene. The concentrations of organic
- 17 compounds were less than instrument detection limits. Likewise 2,4-dimethylphenol, 2-
- 18 chloronaphthalene and hexachloro-butadiene are commonly found in transformer and
- 19 hydraulic fluids so if these chemicals were released at the site, their concentrations in soil
- 20 sample would be expected to exceed low instrument detection limits. Concentrations of
- 21 two chemicals, benzo(a)pyrene, and dibenzo(a,h)anthracene were less than those
- 22 commonly reported as anthropogenic levels.

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# Summary of Screening for COPECs

- COPECs were identified as analytes meeting all of the following criteria: (1) maximum
- detect or maximum non-detect concentrations exceeded the ESV (or if detected but
- maximum detect was below ESV or no ESV but was a PBT chemical), (2) maximum detect or maximum non-detect concentrations exceeded the background 95% UTL, and
- 29 (3) the analyte was a SRC. Results of the screening for SRCs and identification of the
- 30 COPECs for shallow surface (0 to 1 ft bgs), subsurface (1 to 3 ft bgs), and deep surface
- 31 (0 to 3 ft bgs) are presented in Appendix Tables C-3 through C-5, respectively. The
- 32 COPECs were carried forward for further evaluation of ecological receptor-specific risks
- 33 to identify contaminants of ecological concern (Section 4.2).

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# 4.1.1 ECOLOGICAL SCREENING VALUE COMPARISON

RESULTS

Chemicals identified as COPECs (App C, Tables C-3, C-4 and C-5) are summarized in Table 5 and below.

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# Explosives

 2,6-dinitrotoluene — Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs) maximum non detected concentrations (MNDC) for 2,6dinitrotoluene exceeded eco-criteria, there were no background concentrations, and the analyte is a SRC.

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2	Meta	ds
3		Aluminum — Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep
4		surface (0-3 ft bgs) MDCs for aluminum exceeded eco-criteria and background
5		concentrations and the analyte is a SRC.
6		Arsenic — Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface
7		(0-3 ft bgs) MDCs for arsenic exceeded eco-criteria and background
8		concentrations and the analyte may be SRC.
9		Cadmium — Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep
10		surface (0-3 ft bgs) MDCs for cadmium did not exceed eco-criteria but did exceed
11		background concentrations and the analyte is a PBT and may be SRC.
12		Chromium — Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep
13		surface (0-3 ft bgs) MDCs for chromium exceeded eco-criteria and background
14		concentrations and the analyte is a SRC.
15		Chromium, hexavalent — Shallow surface (0-1 ft bgs) MDCs for chromium,
16		hexavalent exceeded eco-criteria, there were background concentrations, and the
17		analyte is a SRC. Subsurface (1-3 ft bgs) and deep surface (0-3 ft bgs) MNDC
18		also exceeded eco-criteria, there were background concentrations, and the analyte
19		is a SRC.
20		Cobalt — Subsurface (1-3 ft bgs) and deep surface (0-3 ft bgs) MDCs for cobalt
21		exceeded eco-criteria and background concentrations and the analyte may be
22		SRC.
23	•	Copper — Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface
24		(0-3 ft bgs) MDCs for copper exceeded eco-criteria and background
25		concentrations and the analyte is a SRC.
26		Lead — Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs for lead
27		exceeded eco-criteria and background concentrations and the analyte is a PBT and
28		SRC. The subsurface (1-3 ft bgs) MDC for lead did not exceed the eco-criteria,
29		but did exceed background and the analyte is a PBT and SRC.
30		Mercury — Shallow surface (0-1 ft bgs) MNDC for mercury exceeded eco-
31		criteria and background concentrations and the analyte is a PBT and SRC.
32		Nickel — Deep surface (0-3 ft bgs) MDC for nickel exceeded eco-criteria and
33		background concentrations and the analyte is a PBT and SRC.
34		Thallium — Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep
35		surface (0-3 ft bgs) MDCs for thallium exceeded eco-criteria and background
36		concentrations and the analyte may be SRC.

- Vanadium Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs for
   vanadium exceeded eco-criteria and background concentrations and the analyte
   may be SRC.
  - Zinc Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs for zinc exceeded eco-criteria and background concentrations and the analyte is a PBT and SRC.

# 7 8 Pesticides/PCBs

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- 4,4'-DDE Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs for
   4,4-DDE did not exceed eco-criteria but there were no background concentrations
   and the analyte is a PBT and may be SRC.
- Aldrin Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs for
   aldrin did not exceed eco-criteria but there were no background concentrations
   and the analyte is a PBT and may be SRC.
- Dieldrin Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MNDCs for dieldrin exceeded eco-criteria, there were no background concentrations, and the analyte is a PBT and SRC.
- Endrin aldehyde Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs)
   MDCs for endrin aldehyde did not exceed eco-criteria but there were no
   background concentrations and the analyte is a PBT and may be SRC.
- Heptachlor Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs
   for heptachlor did not exceed eco-criteria but there were no background
   concentrations and the analyte is a PBT and may be SRC.
  - Lindane Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs for lindane did not exceed eco-criteria but there were no background concentrations and the analyte is a PBT and may be SRC.

## 27 Semivolatiles

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- 3,3'-dichlorobenzidine Subsurface and deep surface MNDCs for 3,3'-dichlorobenzidine exceeded eco-criteria, there were no background concentrations, and the analyte is a PBT and SRC.
- Bis(2-ethylhexyl)phthalate Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) MDCs for Bis(2-ethylhexyl)phthalate did not exceed eco-criteria, but there were no background concentrations, and the analyte is a PBT and SRC.

#### Volatiles

1,2-dimethylbenzene — Subsurface (1-3 ft bgs) and deep surface (0-3 ft bgs)
 MDCs for 1,2-dimethylbenzene had no eco-criteria but there were no background concentrations, and the analyte is a PBT and may be SRC.

1 2	Many analytes were eliminated from further consideration because they did not meet the criteria for COPECs. The eliminated analytes are summarized by analytical classes as
3	follows:
5	Explosives
7 8	• Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs) each had 16 explosives eliminated from further consideration.
9	Metals
10 11 12 13	<ul> <li>The shallow surface (0-1 ft bgs) had 13 metals eliminated from further consideration, whereas the subsurface had 14 metals eliminated and deep surface had 12 metals eliminated.</li> </ul>
14	Pesticides/PCBs
15 16 17 18	<ul> <li>The shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) each had 23 pesticides/PCBs eliminated from further consideration, whereas the subsurface had 29 pesticides/PCBs eliminated.</li> </ul>
19	Semivolatiles
20 21 22 23	<ul> <li>The shallow surface (0-1 ft bgs) had 54 SVOCs eliminated from further consideration, whereas the subsurface had 61 SVOCs eliminated and deep surface had 60 SVOCs eliminated.</li> </ul>
24	Volatiles .
25 26 27 28 29	<ul> <li>The subsurface and deep surface both had 45 VOCs eliminated from further consideration, whereas the shallow surface soil (0-1 ft bgs) had 46 VOCs eliminated.</li> </ul>
30	4.2 IDENTIFICATION OF CONTAMINANTS OF ECOLOGICAL CONCERN (COECs)
32 33 34 35	COPECs from the three soil depths were further evaluated to determine whether they posed receptor-specific risks. A ratio was calculated by dividing the expected exposure concentrations (estimated doses) to receptor-specific toxicity reference values (TRVs). The resulting ratio was deemed a hazard quotient (HQ). Because TRVs represent
36 37 38	concentrations below which adverse impacts are not expected to occur, exposure concentrations or doses that exceed the TRV, that result in HQs greater than 1, indicate the concentration of the chemical may have potential to impact ecological receptors.
10 11 12	Ecological Receptors Six terrestrial receptors, including plants, terrestrial invertebrates (i.e. earthworms), Eastern cottontail rabbits (Sylvilagus floridanus) (rabbits), short-tailed shrews (Blarina

brevicauda) (shrews), red foxes (Vulpes vulpes) (foxes), and red-tailed hawks (Buteo 1 2 jamaicensis) (hawks) were selected for evaluation of ecological risks to identify COECs.

3 The selection of the specific receptors is consistent with recommended guidance from 4 Ohio EPA (2003) and USACE (2003). Plants and earthworms represent receptors

5 exposed by direct contact to soil. Rabbits represent herbivores whereas shrews represent 6

insectivores. Foxes and hawks represent carnivores (top predators). Per Ohio EPA

(2003), only the PBT COPECs were evaluated for foxes and hawks.

Exposure

Detailed descriptions of the methods for calculating exposures for the terrestrial receptors in this study are presented in Ohio EPA (2003), so the methods are only briefly discussed herein. Exposures for all the receptors were calculated using the RME soil concentration for the applicable depth. The RME is defined as the lower value among the maximum detect concentration and the 95% UCL.

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> For plants and earthworms, the exposure concentration is the soil RME because these receptors are assumed to receive exposure via direct contact with the surrounding soil. Thus, these receptors have direct exposure to soil COPECs.

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For wildlife receptors (rabbits, shrews, foxes, and hawks), exposure doses to COPECs are indirect because they are based on calculated average daily doses (ADDs) for ingested plant food (ADD<sub>P</sub>), animal food (ADD<sub>A</sub>), and soil (ADD<sub>S</sub>) (Ohio EPA 2003). The ADDs represent doses of a COPEC ingested by a receptor and are expressed as mass of COPEC ingested concentration per kilogram body weight per day. The ADDs are based on the receptor's dietary, body weight, and home range parameters, as well as various bioaccumulation factors and area use factors (AUFs). More specifically, the ADDs are based on the receptor's daily food intake rates, which include fractions of diet that are plants, animals, and soil. Bioaccumulation factors used for calculating ADDs included soil-to-plant (vegetative parts) (SPv), soil-to-plant (reproductive parts) (SPr), soil-toinvertebrates (BAFi), and animal-to-mammal and animal-to-bird transfer factor (BAF TP). AUFs are ratios of the receptor's home range relative to the area of the exposure unit. AUFs greater than 1 are rounded to 1. The receptor parameters for rabbits, shrews, foxes, and hawks are presented in Appendix Tables C-6 through C-9, respectively. Bioaccumulation factors are presented in Appendix Table C-10. AUFs and receptor ingestion rates are presented in Appendix Tables C-11 and C-12, respectively. More details are available in the Ohio EPA (2003) and the Army COE (USACE 2003) on the exposure equations for each of the receptor.

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42 43 Ecological Effects

Ecological effects to the receptors are represented by receptor- and chemical-specific TRVs. The TRVs for plants and earthworms are mostly based on lowest observed adverse effect levels (LOAELs). The plant TRVs were obtained from Efroymsom et al. (1997c) (Appendix Table C-13), whereas the earthworm TRVs were obtained from Efroymson et al. (1997b) (Appendix Table C-14).

The TRVs for mammals and birds were based on no observed adverse effect levels
(NOAELs) and obtained from various sources (Appendix Tables C-15 through C-18).

Test studies based on chronic duration were the preferred duration, so TRVs for chemicals whose original studies were based on acute or subchronic durations were multiplied by 0.1 to correct for the shorter durations. The preferred endpoint from the test studies was a NOAEL, so if the endpoint was a LOAEL or other endpoint, the original toxicity benchmark was multiplied by 0.1 to obtain the estimated NOAEL.

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#### COEC Identification

- 10 COEC identification was performed by calculating receptor-specific HQs for the
- 11 COPECs from each of the soil depths. The HQs were obtained by dividing either the
- 12 RME soil concentrations (for plants and earthworms) or total ADDs (for wildlife
- 13 receptors) by the receptor-specific TRVs for the corresponding COPECs. COECs were
- 14 identified as any COPECs meeting one of the following conditions for at least one
- receptor at the applicable soil depth: 1) having an HQ greater than 1, or 2) not having a
- 16 TRV. Appendix Tables C-19 through C-33 shows the HQ calculations and COEC
- 17 identifications for all of the receptors for all three soil depths.

Table 5. Summary of Soil COPECs Following the ESV Screening Step and COECs Following HQ Calculations for the 40 mm Range, RVAAP

		Soil I	Depth (0-1f	t; 1-3 ft; 0		
SRC	Shallow	Surface	Subsu	ırface	Deep S	Surface
	COPEC	COEC	COPEC	COEC	COPEC	COEC
Organics-Explosives						
2,6-Dinitrotoluene	X	X	X	X	X	X
Metals						
Aluminum	X	X	X	X	X	X
Arsenic	X	X	X	X	X	X
Cadmium	X		X	- 100	X	
Chromium	X	X	X	X	X	X
Chromium, hexavalent	X	X	X	X	X	X
Cobalt	144		X	X	X	X
Copper	X		X		X	***
Lead	X		X		X	
Mercury	X				44	
Nickel		-00			X	
Thallium	X	X	X	X	X	X
Vanadium	X	X	12		X	X
Zinc	X	X	-		X	X
Organics-Pesticides/PCBs	s					
4,4'-DDE	X	X			X	X
Aldrin	X	X	12		X	X
Dieldrin	X	X	12.	***	X	X
Endrin aldehyde	Х	X			X	X
Heptachlor	Х	X			X	X
Lindane	X	X	Z=.		X	X
Organics - Semivolatiles						
3,3'-Dichlorobenzidine		***	X	X	X	X
Bis(2-ethylhexyl)phthalate	X	X			X	X
Organics - Volatiles						
1,2-Dimethylbenzene			X	X	X	X

ESV = ecological screening value

RVAAP = Ravenna Army Ammunition Plant

COPEC = chemical of potential ecological concern

"X" = the analyte is a COPEC at this soil depth

"--" = the analyte was not a COPEC at this soil depth

"..." = the COPEC was not a COEC at this soil depth

# 4.2.1 COPECS ELIMINATED FROM BEING COECS

- Several metals were eliminated from further consideration because their HQs were less than 1. The eliminated metals are summarized as follows:
  - Cadmium, copper, and lead were eliminated from further consideration for shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs).
  - Mercury was eliminated from further consideration for shallow surface (0-1 ft bgs) depth.
  - Nickel was eliminated from further consideration for the combined depth.

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# 4.2.1.1 EVALUATION OF COECS BASED ON RECEPTOR-SPECIFIC HAZARD QUOTIENTS

- Using RME soil concentrations and receptor-specific NOAEL TRVs [except for LOAELs for plants and earthworms], the following COECs were identified based on having an HQ greater than 1 for at least one receptor (Table 6) and are discussed below.
- 15 In addition, there are COECs identified that are based on having no TRVs for at least one
- 16 receptor, and those COECs are also summarized below.

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# 4.2.1.2 COECS BASED ON AN HQ GREATER THAN ONE

- 19 Explosives
- 20 Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs) each
- 21 had no COECs based on HQs greater than 1 for any receptor.

# Table 6. Summary Table of Hazard Quotients Exceeding 1 in 40 mm Range Soils

	H	Iazard Quotient Magnitu	ide
COEC With an HQ	1< HQ <10	10 < HQ <100	HQ > 100
	SI	hallow Surface Soil (0 to	( ft)
Organics-Explosives		-	-
Metals			
Aluminum	-	54 (rabbit)	785 (shrew) 248 (plant)
Arsenic	4 (shrew) 1 (plant)	-	
Chromium		44 (plant)	110 (earthworm)
Thallium	7 (shrew)		-
Vanadium	-	11 (plant) 10 (shrew)	
Zinc	1 (plant)	-	
Organics-Pesticides/PCBs	4		
Organics-Semivolatiles			
Organics-Volatiles			
		Subsurface Soil (1 to 3 ft	)
Organics-Explosives	- V-	4 4 4 4 4	
Metals			
Aluminum		59 (rabbit)	861 (shrew) 272 (plant)
Arsenic	7 (shrew) 1 (plant) 1 (rabbit)	-	
Chromium		48 (earthworm) 19 (plant)	-
Thallium	1 (plant)	10 (shrew)	
Vanadium	-	12 (plant) 11 (shrew)	
Organics-Pesticides/PCBs			
Organics-Semivolatiles		-	
Organics-Volatiles		-	
		Deep Surface Soil (0 to 3)	ft)
Organics-Explosives			44

Table 6. Summary Table of Hazard Quotients Exceeding 1 in 40 mm Range Soils (Continued)

	H	lazard Quotient Magnitud	de
COEC With an HQ	1< HQ <10	10 < HQ <100	HQ > 100
Metals			
Aluminum	-	55 (rabbit)	798 (shrew) 252 (plant)
Arsenic	5 (shrew) 2 (plant) 1 (rabbit)		-
Chromium		84 (earthworm) 34 (plant)	-
Thallium	7 (shrew)		
Vanadium	-	11 (plant) 10 (shrew)	***
Zinc	1 (plant)	-	
Organics-Pesticides/PCBs	-	-	-
Organics-Semivolatiles	_	-	
Organics-Volatiles	-	-	

COEC = chemical of ecological concern

HQ = hazard quotient

"--" = analyte either was not a COPEC or had COPEC = chemical of potential ecological

#### Metals

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- Aluminum Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs) RMEs for aluminum produced HQs > 100 for shrews and plants, with the highest HQs in the subsurface soil (861 for shrews, 272 for plants).
- Arsenic Subsurface and deep surface RMEs for arsenic produced HQs between 1 and 9 for shrews, plants, and rabbits, with the highest HQ in the subsurface soil (7) for shrews. The HQs for shrews and plants also were between 1 and 9 in shallow surface (0-1 ft bgs) soil.
- Chromium Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs) RMEs for chromium produced HQs between 10 and 110 for shrews and plants, with the highest HQ (110) for earthworms in the shallow surface (0-1 ft bgs) soil. The highest HQ for plants (44) was also in shallow surface (0-1 ft bgs) soil. Subsurface soil had the lowest HQs for chromium among the 3 depths.
- Thallium Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs) RMEs for thallium produced HQs between 1 and 10 for shrews, plus and HQ of 1 for plants in the subsurface soil. The highest HQ was for shrews (10) at the subsurface soil.

• Vanadium - Shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep 1 surface (0-3 ft bgs) RMEs for vanadium produced HQs between 10 and 100 for 2 shrews and plants, with the highest HQs in the subsurface soil (12 for plants, 11 3 4 for shrews). Zinc — Shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs) RMEs for zinc 5 produced an HQ of 1 for plants. No HQs exceeded 1 for any receptor for the 6 7 subsurface soil. 8 9 Pesticides/PCBs There were no HQs for pesticides/PCBs that exceeded 1 for any receptor exposed 10 to shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), or deep surface (0-3 ft 11 12 bgs). 13 SVOCs 14 There were no HQs for SVOCs that exceeded 1 for any receptor exposed to 15 shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), or deep surface (0-3 ft bgs). 16 17 VOCs There were no HQs for VOCs that exceeded 1 for any receptor exposed to 18 shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), or deep surface (0-3 ft bgs). 19 20 21 4.2.1.3 COECS BASED ON ABSENCE OF TRVS 22 23 they are summarized below. 24 25

There were COECs identified based on an absence of TRVs for at least one receptor, and

### Explosives

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2,6-Dinitrotoluene - This was the only COEC for explosives based on "No TRV" but was a COEC for shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs).

#### Metals

- Chromium, hexavalent This was a metal COEC based on "No TRV" for shallow surface (0-1 ft bgs), subsurface (1-3 ft bgs), and deep surface (0-3 ft bgs).
- · Cobalt This was a metal COEC based on "No TRV" for subsurface and deep surface.

### Pesticides/PCBs

Six pesticides were COECs based on "No TRV" for shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs), but there were no pesticide/PCBs COECs based on "No TRV" for subsurface.

### SVOCs

- 3,3' –dichlorobenzidine This was a SVOC COEC based on "No TRV" for subsurface and deep surface.
  - Bis(2-ethylhexyl)phthalate This was a SVOC COEC based on "No TRV" for shallow surface (0-1 ft bgs) and deep surface (0-3 ft bgs).

#### VOCs

 1,2-Dimethylbenzene — This was a VOC COEC based on "No TRV" for subsurface and deep surface.

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# 4.3 SUMMARY AND CONCLUSIONS

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## 4.3.1 ECOLOGICAL RISK ASSESSMENT

- 13 Twenty-three SRCs were identified as COPECs because their concentrations exceeded an
- 14 ESV, exceed background criterion, had no ESV, or were PBT compounds detected above
- 15 background (Table 5). HQs were calculated for exposure of ecological receptors to
- 16 COPECs using RME concentrations. Any COPEC that had at least one HQ greater than
- 17 1 or lacked a TRV for at least one receptor remained as a COEC. COECs are also shown

18 on Table 5.

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Five metal COPECs (cadmium, copper, lead, mercury, and nickel) were eliminated from being COECs based on low HQ values. There were no COECs based on HQs greater than 1 for explosives, pesticides/PCBs, SVOCs, or VOCs, nor any HQs greater than 1 for top predators (e.g., hawks and shrews).

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- Six metals were COECs because their HQ values exceeded 1. These are aluminum, arsenic, chromium, thallium, vanadium, and zinc. Aluminum had the highest HQs (861
- 27 for shrews and 272 for plants), followed by the HQ for chromium (110) for earthworms.
- 28 Several COECs were based on an absence of having a TRV for at least one receptor,
- 29 including one explosive (2,6-dinitrotoluene), one metal (chromium, hexavalent),
- 30 6 pesticides, two SVOCs [3,3'-dichlorobenzidine and bis(2-ethylhexyl)phthalate], and
- 31 one VOC (1,2-dimethylbenzene) (the uncertainties due to lacking a TRV for at least one
- 32 receptor are discussed further in Section 4.3.2.3).

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Based upon results of this ecological assessment, concentrations of six metals may exceed concentrations that are protective of certain ecological receptors if assumptions used in estimating exposure point concentrations are met. There is potential for impact for certain terrestrial receptors at 40 mm Range if exposure assumptions are met.

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# 4.3.2 UNCERTAINTIES FOR ECOLOGICAL RISK ASSESSMENT

- Uncertainties are discussed briefly in this section by the four interrelated steps of the EPA approach to a ERA: problem formulation, exposure assessment, effects assessment, and
- 42 risk characterization. There is also a section about the lack of influence of any runoff
- 43 from 40 mm Range to the nearby Fuze and Booster ponds.

# 4.3.2.1 UNCERTAINTIES ASSOCIATED WITH PROBLEM FORMULATION

 The concentrations of COECs in soil at the 40 mm Range were based on a limited number of samples, especially for organic chemicals. It was assumed that chemical concentrations were uniform over the 40 mm Range although concentrations actually differed from sample to sample. Variations among chemical constituents are expected in the environment because of compositional and distributional heterogeneity. Some constituents that may not be above background concentrations have been included in the conservative analysis (see Section 4.3.2.4). For other COECs, use of the 95<sup>th</sup> percentile upper confidence limit (UCL<sub>95</sub>) of the mean or the maximum concentration likely overestimates rather than underestimates the actual exposure concentrations of COECs.

Representative ecological receptors (plants, earthworms, cottontail rabbits, shrews, red foxes, and red-tailed hawks) were used to estimate risks. These receptors or those represented by these animals are known to be at the site. Other receptors at the site could be more or less sensitive to COEC exposure than the representative receptors. It is also uncertain that the receptors are uniformly distributed, as is implied in the problem formulation.

# 4.3.2.2 UNCERTAINTIES ASSOCIATED WITH EXPOSURE ASSESSMENT

Assumptions made in the exposure assessment include the assumption that all COECs in soil are completely bioavailable. This assumption likely overestimates exposure (refer to Sections 4.3.2.3 and 4.3.2.4). In addition, exposure models include bioaccumulation factors (BAFs) that are used to calculate the movement of COECs through the food chain. Measured BAFs are not available for some COECs at the 40 mm Range. Instead, BAFs may be calculated from empirical formulas or may be default values. For example, BAF-S values for metals that do not have measured values are 0.22, the mean of measured values reported by U.S. EPA (1999b). This mean value for published BAFs surely overestimates bioaccumulation for many of the metals for which values have not been published. Assumptions used to estimate how often a particular receptor utilizes a site are not fully addressed by application of AUFs. These type of assumptions are particularly true for upper level consumers such as foxes and hawks that have a large home range.

# 4.3.2.3 UNCERTAINTIES ASSOCIATED WITH EFFECTS ASSESSMENT

TRVs are intended to be the highest exposure concentrations that will not cause harm to individuals and ecological populations. However, none of the TRVs were derived from studies of populations. The best TRVs are NOAELs from chronic studies of reproductive success, but many of the TRVs are extrapolated from LOAELs, from subchronic or acute studies, and even from acute  $LD_{50}$  values. The conversion factors used to calculate TRVs are rather arbitrary, and there is uncertainty that they are reliable.

In addition, it is uncertain that laboratory toxicological studies accurately predict the toxicity of COPECs in environmental settings. For example, COPECs in nature may not be biologically available or they may not have the potential to impact usually more resistant wildlife. Comparisons of long term (chronic values) are generally not truly representative of long term studies for wildlife. Wild life are likely to be less accessible of certain reproductive effects when compared to laboratory a-reared animals. For example, wildlife has certain visual cues used to select their appropriate breeding area or nesting habitat. These visual cues are not activated in the laboratory – reared animals. The measured effect manifested in the test populations may not be seen in wildlife populations. This is particularly true of aluminum, which had HQs of 44 for plants, 110 for earthworms, 54 for cottontail rabbits, and 785 for shrews.

EPA (2003b) states "comparisons of total aluminum concentrations in soil samples to soluble aluminum-based screening values are deemed by EPA to be inappropriate." Rather than establishing a numerical value of a soil screening benchmark for aluminum. EPA and the Army recommend that aluminum is not a COPEC unless the soil pH is below 5.5 (EPA 2003b). In fact, soil pH at RVAAP is greater than 6. Therefore, the TRVs for aluminum likely do not represent actual toxicity to ecological receptors. In addition, populations may respond to chronic exposure by developing resistance to the toxic effects or by increasing reproductive rates to compensate for lower survival of offspring. For these and other reasons, TRVs used in the risk assessment may underestimate but usually overestimate the risk to ecological receptors. 

# 4.3.2.4 UNCERTAINTIES ASSOCIATED WITH ECOLOGICAL RISK CHARACTERIZATION

In this section all the various uncertainty elements combine to result in uncertainty about the findings in the risk characterization.

At the 40 mm Range, each of the receptors is at risk of toxicity from a few COECs, as indicated by HQs greater than 1 (Table 6, above) or by having no TRV. It is not certain that these criteria actually represent ecological risk, or if so, that the risks justify further actions such as any more study. The following discussion addresses uncertainties of the risk characterization phase of this ecological assessment. The application of these uncertainties is shown on Table 7.

### 1. COECs that were not detected

Concentrations of chemicals that were measured as non-detectable (non-detects) were carried through the risk assessment because of concern that they may be present at concentrations above ESLs but below detection limits. However, non-detected COECs cannot be remediated because neither their location nor their toxicity at that location is known. Therefore, non-detects provide some useful information for decision-making but are likely an overestimation of potential risk..

If the maximum reported detection limit of a COEC is below the ESV, it can safely be concluded that no sample whose concentration is below the detection limit exceeded the ESV. The non-detect COECs were 2,6-dinitrotoluene, hexavalent chromium, and

- dieldrin in shallow surface (0-1 ft bgs) soil; 2,6-dinitrotoluene, hexavalent chromium, and 2 3.3'-dichlorobenzidine in subsurface soil (1-3 FT BGS); and 2,6-dinitrotoluene, 3 hexavalent chromium, dieldrin, and 3,3'-dichlorobenzidine in deep surface soil (0-3 FT BGS) (Table 7). Of these, only dieldrin in subsurface soil had a maximum detection limit 4 5 (0.0021 mg/kg) that was below the ESV (0.0024 mg/kg). Therefore, dieldrin was eliminated as a COEC in subsurface soil (1 to 3 ft) but retained in shallow surface soil (0 6 - 1 ft bgs) and deep surface soil (0 - 3 ft bgs). 2,6-Dinitrotoluene, hexavalent chromium, 7 and 3.3'-dichlorobenzidine were not detected, but they were retained at all depths for 8 further evaluation because it is not certain that non-detected concentrations are below 9 10 ESVs. 11 12 COECs with HQs less than 1 The remaining COECs included several that were retained because a TRV for at least one receptor was not available. COPECs that lacked a TRV for any receptor were
- 13 14 conservatively classified COECs in the HQ screen. However, if there is evidence to 15
- 16 support that exposures are not harmful to receptors for which TRVs are available, it is likely that the COEC can safely be eliminated. COECs that had been retained because of 17
- a lack of published TRVs were 2,6-dinitrotoluene, hexavalent chromium, pesticides (4,4'-18
- DDE, aldrin, dieldrin, endrin aldehyde, heptachlor, and lindane) and 19
- bis(2-ethylhexyl)phthalate in shallow surface (0-1 ft bgs) soil; 2,6-dinitrotoluene, 20
- hexavalent chromium, cobalt, 3,3'-dichlorobenzidine, and 1,2-dimethylbenzene in 21
- subsurface soil (1-3 ft bgs); and 2,6-dinitrotoluene, hexavalent chromium, pesticides, 22 bis(2-ethylhexyl)-phthalate, cobalt, and 1,2-dimethylbenzene in deep surface soil (0-3 ft 23
- bgs) (Table 7). These COECs lack TRVs for plants and earthworms but have TRVs for 24
- mammals (except endrin aldehyde and 3,3'-dichlorobenzidine) and birds (except aldrin, 25
- endrin aldehyde, and 3,3'-dichlorobenzidine). The greatest reported HQ for any of these 26
- COECs was 0.002. There is no TRV for endrin aldehyde. However, if the TRV for 27
- endrin (Appendix Table C-16) is used as a surrogate for the endrin aldehyde TRV for 28
- mammals and birds, the maximum HQ is approximately 0.0003. Based on this analogy, 29
- 2.6-dinitrotoluene, hexavalent chromium, cobalt, the six pesticides, bis(2-ethylhexyl)-30
- phthalate, and 1,2-dimethylbenzene can safely be eliminated as COECs. Aldrin and 3,3'-31
- dichlorobenzidine remain as COECs because they lack a TRV. However, potential risks 32
- 33 from exposure to these COECs cannot be evaluated.

Table 7. Further Evaluation of COECs in Soil at 40 mm Range at RVAAP

			Back	Background comparison	rison		
COEC	Not detected <sup>a</sup>	No HQ >1	95% UCL mean background	Mean COEC concentration°	Mean COEC concentration < UCL mean background concentration	Additional information available on exposure and/or effects	Retained for further discussion
		Shallow	Shallow Surface soil (0 - 1 ft)	ft)			
Organics-Explosives							
2,6-Dinitrotoluene	×	pX					
Metals				v			
Aluminum			19200	11100	×		
Arsenic			12.2	11.4	X		
Chromium			14.4	26.5		×	×
Chromium, hexavalent	×	Xq					
Thallium			0.339	0.611		X	X
Vanadium			23.2	20.7	X		
Zinc			55.8	9.09		X	X
Organics-Pesticide/PCB							
4,4'-DDE		×					
Aldrin		X					
Dieldrin	×	Xq					
Endrin aldehyde		X				*	
Heptachlor		X					
Lindane		X					
Organics-Semivolatile							
Bis(2-ethylhexyl)phthalate		×					

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			Bac	Background comparison	ison		
COEC	Not detected*	No HQ >1 <sup>b</sup>	95% UCL mean background concentration	Mean COEC concentration	Mean COEC concentration < UCL mean background concentration	Additional information available on exposure and/or effects	Retained for further discussion
Organics-Explosives							
2,6-Dinitrotoluene	×	Xq					
Metals							
Aluminum			13300	12600	×		
Arsenic			13.4	17.5		×	×
Chromium			19	17.9	×		
Chromium, hexavalent	×	Xq					
Cobalt		X					
Thallium			0.409	0.759		×	×
Vanadium			22.3	22	×		
Organics-Semivolatile							
3,3'-Dichlorobenzidine	×	Xq					
Organics-Volatile							
1,2-Dimethylbenzene		×					
		Deep	Deep Surface soil (0 to 3 ft)	3 ft)			
Organics-Explosives							
2,6-Dinitrotoluene	×	$X^{q}$					
Metals							
Aluminum			19200	11700	×		
Arsenic			12.2	13.8		×	×
Chromium			14.4	23.1		×	×

Table 7. Further Evaluation of COECs in Soil at 40 mm Range at RVAAP (Continued)

			Back	Background comparison	rison		
COEC	Not detected <sup>a</sup>	No HQ >1	95% UCL mean background concentration <sup>c</sup>	Mean COEC concentration <sup>c</sup>	Mean COEC concentration < UCL mean background concentration	Additional information available on exposure and/or effects	Retained for further discussion
Chromium, hexavalent	X	pX					
Cobalt	-	X					
Thallium			0.339	0.669		×	×
Vanadium			23.2	21.2	X		
Zinc			55.8	60.5		×	X
Organics-Pesticide/PCB							
4,4'-DDE		×					
Aldrin		×					
Dieldrin	×	×					
Endrin aldehyde		×					
Heptachlor		×					
Lindane		×					
Organics-Semivolatile							
Bis(2-ethylhexyl)phtthalate		×					
3,3'-Dichlorobenzidine	×	×					
Organics-Volatile							
1,2-Dimethylbenzene		×					

COECs are those remaining after the HQ calculation (Table 5).

COEC was not detected in any sample.

<sup>b</sup> Either all HQs < 1 or no TRV

° From Appendix Table C-4

<sup>d</sup> Calculated using the lower of half of the maximum detection limit and the UCL<sub>95</sub> of the mean of 1/2 the detection limit for each sample.

- 1 3. COECs Whose Mean Concentrations are Below Background
- 2 The background screen for COPECs compared the maximum detected or non-detected
- 3 concentration of each metal to its background criterion, which is the 95th percentile UTL
- 4 of the background sampling results (see Section 4.1 and Appendix A). The use of the
- 5 UTL is the traditional statistic for this early comparison, but in the uncertainty section,
- another comparison used—the UCL95 of the mean background concentration. The UTL 6
- screen is a conservative screen intended to include any COEC with a maximum 7
- concentration that was higher than the background concentration distribution. However, 8
- 9 the chronic exposure of ecological receptors is unlikely to be to the maximum
- concentration, but rather to the mean concentration. Therefore, the UCL95 of the mean 10
- background concentration was calculated for each COEC. This is a conservative measure 11
- 12 of the background mean rather than a conservative measure of the measured background
- results (UTL). The mean concentration of each detected COEC that had an HQ above 1 13
- was compared to the UCL<sub>95</sub> of the mean background concentration (Appendix Table C-4) 14
- to determine whether chronic exposures are likely to be above background exposures. 15
- In shallow surface soil (0-1 ft bgs), mean aluminum, arsenic, and vanadium 16
- concentrations were below the UCL95 mean background concentrations. In subsurface 17
- soil (1-3 ft bgs), the mean aluminum, chromium, and vanadium concentrations were 18
- below the UCL95 mean background concentration. In deep surface soil (0-3 ft bgs), the 19
- mean aluminum and vanadium concentrations were below the UCL95 mean background 20
- concentration for shallow surface soil (0-1 ft bgs) (Table 7). COECs whose mean 21
- concentrations were less than the UCL95 mean background concentrations were 22 eliminated from further consideration.
- 23 24
  - 4. Further Discussion of Exposure and/or Effects of Remaining COECs
  - There is environmental information about the remaining COECs: arsenic, chromium,
- thallium, and zinc. By soil depth, the remaining COECs are chromium, thallium, and 27 zinc in shallow surface soil (0-1 ft bgs); arsenic and thallium in subsurface soil (1-3 ft 28
  - bgs); and arsenic, chromium, thallium, and zinc in deep surface soil (0-3 ft bgs).
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- The initial background screen compared the maximum detected concentration to an upper 31
- limit of the background concentration (UTL95). Another way to compare site-specific 32
- values to background is to compare the central tendency of each population (mean and 33
- UCL95 concentrations). In shallow surface soil (0-1 ft bgs), the mean chromium, 34
- thallium, and zinc concentrations were less than twice the UCL95 mean background 35
- concentration; the mean zinc concentration was approximately 10% above the 36
- background concentration. In subsurface soil (1-3 ft bgs), the mean arsenic and thallium 37
- concentrations were less than twice the UCL95 mean background concentrations. In deep 38
- surface soil (0-3 ft bgs), the mean arsenic, chromium, thallium, and zinc concentrations 39
- were less than twice the UCL95 mean background concentration. The mean arsenic 40
- concentration was 13% above the UCL95 mean background concentration, and the mean 41
- zinc concentration was approximately 9% above the UCL95 mean background 42
- 43 concentration.
- 44
- Laboratory measured concentrations of a chemical do not adequately represent its 45
- bioavailability. For example, laboratory analysis uses harsh digestion procedures to strip 46

all of the metal ions from the soil. However, bioavailability of the chemical in the soil matrix differs under different field conditions. Toxicity to ecological receptors requires the chemical to be bioavailable, but many chemical forms in nature are not bioavailable. Bioavailability of a chemical in a particular type of soil is affected by many factors such as the water content of the soil, carbon content of the soil, cation exchange capacity, soil pH, and solubility. Chemicals may also be bound to substances that make them unavailable for bio-transfer. For example, ions may be bound to ionically charged components of soil particles, and multivalent ions such as Cr<sup>+3</sup> may bind to organic components of soil such as humic and fulvic acids. All of these factors can markedly reduce the bioavailability of chemicals in soil.

4 5

Each of the retained COECs (arsenic, chromium, thallium, and zinc) is discussed separately in the following paragraphs, within the context of bioavailability of metals in soil.

Arsenic: Arsenic in soil has low bioavailability. Bioavailability in non-40 mm Range soil was studied by measuring the pharmacokinetics of arsenic administered to Capuchin monkeys either by injection or by ingestion of soil (Roberts et al. 2002). Exposure to equivalent concentrations resulted in blood and urine concentrations of 10% to 25% as much arsenic from soil as by direct injection.

The highest HQ for arsenic at the 40 mm Range was 7 for shrews (Table 6), approximately 2/3 of which came directly from ingestion of soil. Because the TRV was derived from ingestion of arsenic in water (Appendix Table C-15) rather than soil, the calculated TRV overestimates toxicity. If bioavailability of arsenic in soil is negligible compared to food, the actual exposure may be only the calculated 1/3 that came from food. Therefore, arsenic exposures may have been overestimated by up to 3-fold. The maximum HQs for other ecological receptors are 1.5 to 1.9 for plants. Confidence in the TRV for plants is characterized as moderate (Efroymson et al. 1997a), and several studies showed no toxicity at higher concentrations. Given the uncertainty in arsenic uptake and plant TRVs, both of which likely overestimate toxicity, it is unlikely that concentrations of arsenic in soil pose an unacceptable risk to biota at the 40 mm Range.

Chromium: Chromium is an example of a metal that occurs in different chemical forms with different bioavailabilities and toxicities. Chromium exists in different oxidation states, predominantly as trivalent chromium [Cr (III)] and hexavalent chromium [Cr (VI)]; Cr (III) is less bioavailable and less toxic than Cr (VI). Natural Cr (VI) is rare in nature (James 2002), and Cr (VI) was not detected in the soil samples. Nearly all naturally occurring chromium is in the form of the Cr<sup>+3</sup> (chromic) cation, which is in the Cr (III) oxidation state. Compounds of Cr (III) such as chromic acetate [Cr (CH<sub>3</sub>O<sub>2</sub>)<sub>3</sub>] or chromic sulfate [Cr<sub>2</sub> (SO<sub>4</sub>)<sub>3</sub>] are soluble in water because they disassociate into Cr<sup>+3</sup> ions and the corresponding anions (e.g., acetate and sulfate), which are soluble. However, Cr<sup>+3</sup> ions react with negatively charged ions in soil and sediment and can form insoluble precipitates, which are not bioavailable. For example, Cr<sup>+3</sup> reacts readily with hydroxide ions (OH) to form Cr(OH)<sub>3</sub>, which has a solubility of about 5×10<sup>-8</sup> μg Cr/L at pH 8 (James 2002) and is, therefore, not bioavailable. Some chromates, especially BaCrO<sub>4</sub>,

HgCrO<sub>4</sub>, and PbCrO<sub>4</sub> are also very poorly soluble in water (Clifford 1961) and, therefore, are not readily bioavailable. Thus, Cr(III) forms insoluble compounds in soil that are not bioavailable.

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The greatest HQs for chromium are 44 for plants and 110 for earthworms (Table 6); HQs for mammals and birds are less than 0.001. The TRV for plants was derived for hexavalent chromium (Efroymson et al. 1997c), which was not detected in the soil samples. No TRV for total chromium in soil was given (Efroymson et al. 1997c), but in studies in solution, hexavalent chromium was approximately 200 times as toxic to plants as trivalent chromium (the predominant form that is measured as total chromium). Therefore, it is unlikely that the reported HQ represents the true toxicity of chromium in soil at the 40 mm Range. The TRV for earthworms is 0.4 mg/kg for hexavalent chromium, including an uncertainty factor of 5-fold to account for the sparseness of toxicity data (Efroymson et al. 1997b). However, a study was reported in which the added chromium was allowed to equilibrate with soil for 8 weeks, a concentration of 1250 mg/kg had no effect on survival and reproduction (Efroymson et al. 1997b). The RME concentration of chromium in shallow surface soil (0-1 ft bgs) at the 40 mm Range was 44 mg/kg, about 1/28 of the 1250 mg/kg that was ineffective in the reported study. In summary, given the likely overestimates of toxicity to plants and earthworms and the low HQs for mammals and birds, it is unlikely that concentrations of chromium in soil pose an unacceptable risk to biota at the 40 mm Range.

Thallium: Thallium ions form complexes with soil particles that reduce the solubility of thallium in soil, as indicated by its rather high soil-water distribution coefficient (K<sub>D</sub>) of 1500 (Baes et al. 1984) to 19,000 (ATSDR 1992). Therefore, its bioavailability is likely to be low. The highest HQ for thallium is less than 10 for the shrew (Table 6). The majority of the exposure is by ingestion of earthworms that have take up thallium from soil. However, the thallium uptake factor (BAF-S) for earthworms is not a measured value (EPA 1999b). Instead, it is a default value (0.22 kg soil/kg tissue) calculated as the mean of all measured BAF-S values for metals reported by EPA (1999b), including readily available inorganics such as cadmium (0.96) and cyanide (1.12). Much lower BAF-S values were measured for metals whose properties are more similar to those of thallium; for example, chromium (0.01), copper (0.04), lead (0.03), and nickel (0.02) had much lower values (EPA 1999b). Thus, exposure of shrews is overestimated by use of the default BAF-S, and, therefore, the toxicity to shrews and other ecological receptors is overestimated. Consequently, it is unlikely that concentrations of thallium in soil pose an unacceptable risk to biota at the 40 mm Range.

Zinc: The greatest HQ for zinc is 1.3 for plants (Table 6). HQs for earthworms were less than 0.4, and HQs for mammals and birds were less than 0.01. Confidence in the TRV for plants is characterized as moderate (Efroymson et al. 1997c). Given the low HQs and only moderate confidence in the TRV for plants, it is unlikely that concentrations of zinc in soil pose an unacceptable risk to biota at the 40 mm Range.

# 4.3.2.5 SUMMARY OF ECOLOGICAL RISK UNCERTAINTIES

The context of the discussion is the standard four interrelated steps of an ERA: problem formulation, exposure assessment, effects assessment, and risk characterization.

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Problem formulation does not describe the precise distribution of all SRCs nor of ecological receptors at the 40 mm Range. However, the use of conservative SRC concentrations likely overestimated rather than underestimated the risks. The chosen ecological receptors were judged to be good representatives of the ecological populations at the site.

Uncertainties were introduced into the exposure assessment by assumptions about the bioavailability and bioaccumulation of COPECs at the 40 mm Range. The assumptions were conservative, so exposures were judged to be overestimated rather than underestimated.

The effects assessment includes uncertainties about how well laboratory toxicity tests measure toxicity to the ecological receptors in the field and how well the test results apply to conditions at the 40 mm Range. The TRVs used in the risk assessment may underestimate toxicity in some cases but usually are expected to overestimate toxicity to the ecological receptors in the field.

Within risk characterization, where all of the technical topics come to a head, there were four questions developed to deal with uncertainty. The questions touched on detection of the chemical, size of the HQ and especially relative to an HQ of 1, comparison of observed to background concentrations, and availability of pesticides (one semivolatile, and one volatile), and it ended with most COECs being eliminated. The remaining four (arsenic, chromium, thallium, and zinc) were further examined and none survived the next set of questions about being bioavailable (none was) and being based on a proper chronic reproductive toxicity metric (usually an inferior toxicity metric). See the full arguments in the full uncertainty section. Thus, each of the four metals was ruled out of being a concern to ecological receptors at the 40 mm Range.

## 4.3.2.6 FATE AND TRANSPORT TO NEARBY PONDS

Within 500 feet to the west of the 40 mm Range are two ponds (Fuze and Booster Quarry Ponds). If any COEC metals were to impact the aquatic environment, the likely impact would have occurred to the south pond of the Fuze and Booster Quarry Landfill/Ponds AOC. Aquatic impact at the 40 mm Range, if any, was studied at Fuze and Booster South Pond as part of the Facility Wide Surface Water AssessmentBiological and Water Quality Study 2003 (USACE 2005, Final). Surface water at the south pond was non-detect for explosive compounds, PCBs, pesticides and total cyanide. Detected concentrations of lead, copper, and pH Water Quality Standard (WQS) exceeded respective eco-criteria at the south pond. However, surface water quality was consistent with reference conditions and/or below water quality criteria.

Fuze and Booster Pond sediment sampling results indicated moderate contamination.

Two metal parameters (cadmium and copper) were reported at levels above the Threshold

Effect Concentration (TEC) and above the Sediment Reference Values (SRVs). In addition, lead (177 mg/kg) and zinc (632 mg/kg) were measured above the Probable Effect Concentration (PEC). Further, iron exceeded sediment criteria at 20 ppm (Ontario MOE-Low). DDT metabolites (4,4'-DDD; 4,4'-DDE; and 4,4'-DDT), di-n-butyl phthalate, fluoranthene, and Aroclor 1260 were the only organic parameters detected in Fuze and Booster Quarry Pond; however, levels were below screening levels. Explosive compounds were not detected in the sediment, and ammonia-N and total phosphorus levels were below screening guidelines.

Although Water and sediment quality (lead and zinc); (iron, lead, zinc, or chromium), respectively at the Fuze and Booster Quarry Pond suggests the potential for a negative impact. However, results from macroinvertebrate and attached algae (periphyton) community analysis indicate their community conditions were comparable to those determined for reference ponds. Therefore, based on the attainment status and the biological communities in the Fuze and Booster Quarry Ponds it was concluded that the ponds were not affected by chemical exposures from past activities at RVAAP.

Rather, Lead and zinc exceeded state surface water and sediment criteria. Additionally, antimony and copper failed sediment reference values (Ohio EPA 2003). However,

# 5.0 LOCATIONS OF SAMPLES AND CONCENTRATIONS

Figures 1 and 2 have sample locations and respective concentrations of inorganic and organic COPCs and COPECs, respectively, in surface soil. Likewise Figures 3 and 4 shave sample locations and respective concentrations of inorganic and organic COPCs and COPECs, respectively, in subsurface soil. Figures 1 through 4 show that detected COPCs and COPECs (and, be-by inclusion, COCs and COECs) are distributed rather uniformly in surface and subsurface soil. The concentrations shown in these figures do not indicate any "hot spots" where risks would be much higher at other locations. Therefore, conclusions reached for RME concentrations are valid for any particular location as well as for the entire 40 mm Range. Note that 2,6-Dinitrotoluene was analyzed for at 40 locations (surface soil) and 26 locations (subsurface soil), and there were no detects of this COPC and COPEC.

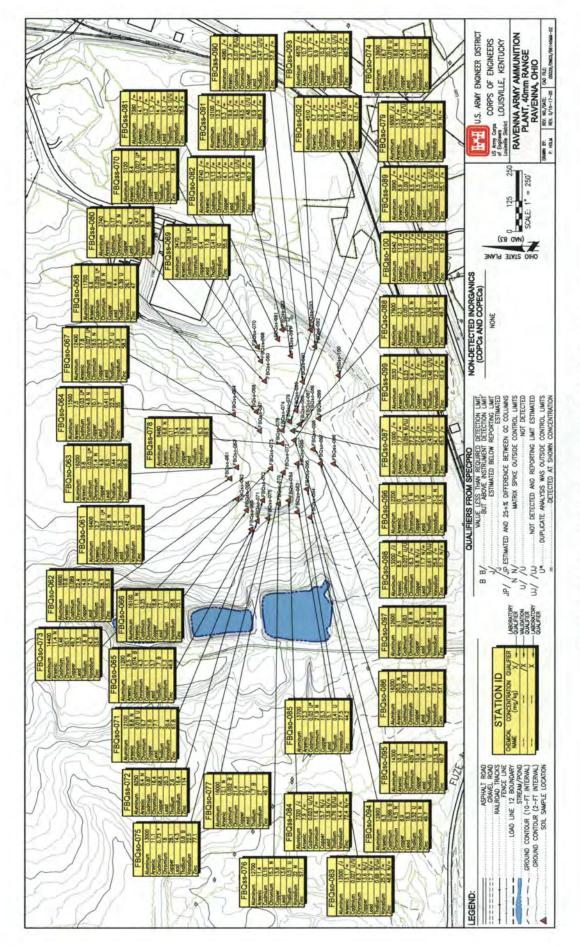
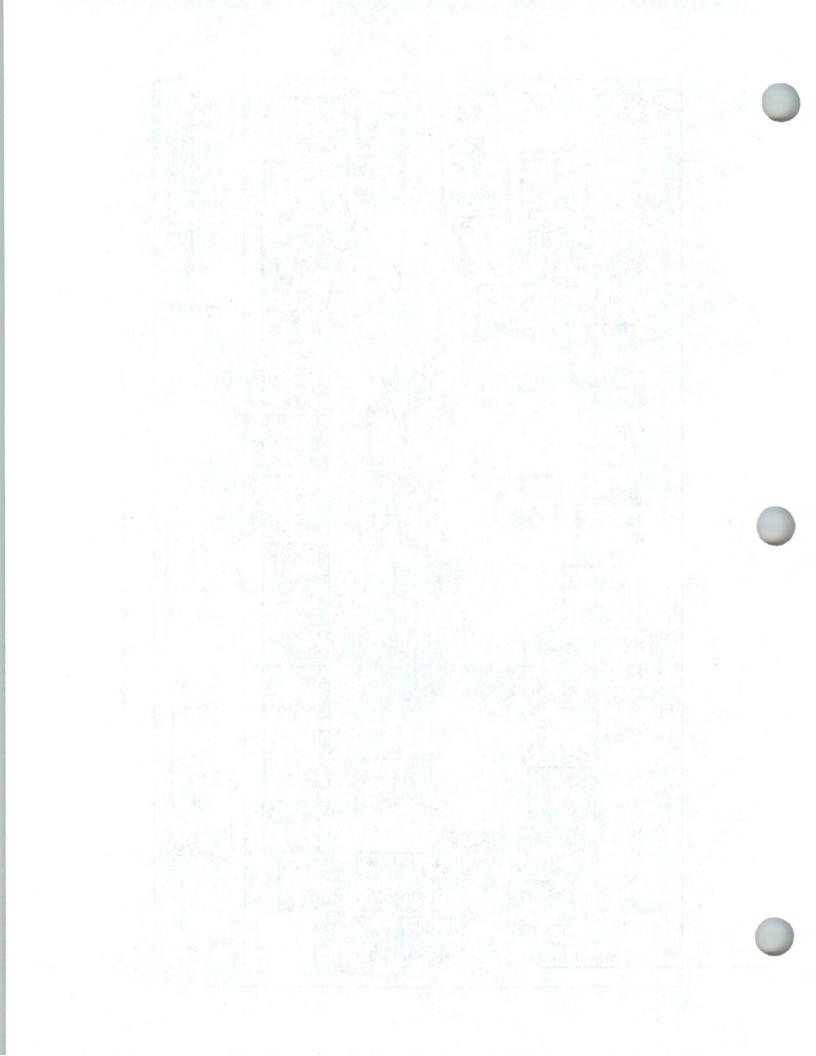


Figure 1. Inorganic COPCs and COPECs in shallow surface soil (0 to 1 ft) at the 40 mm Range.



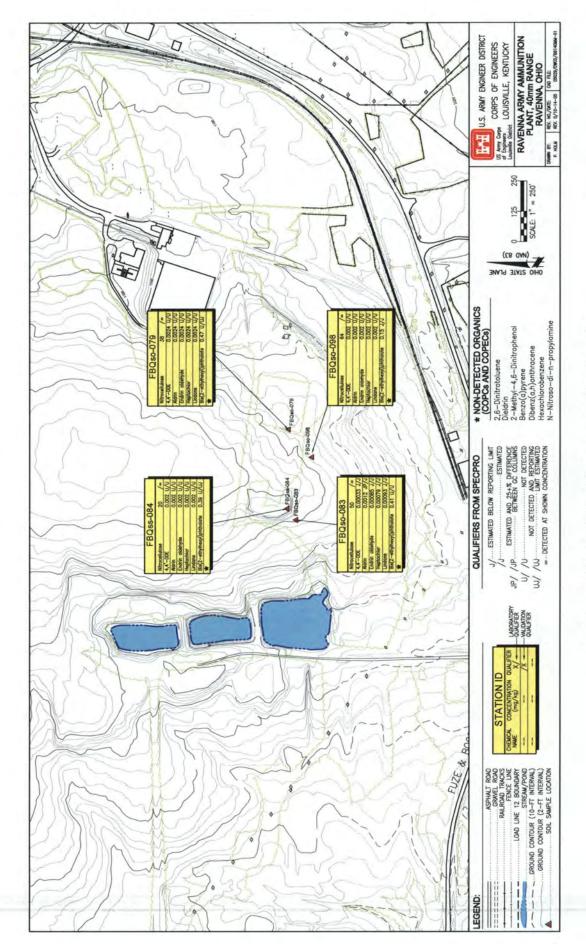
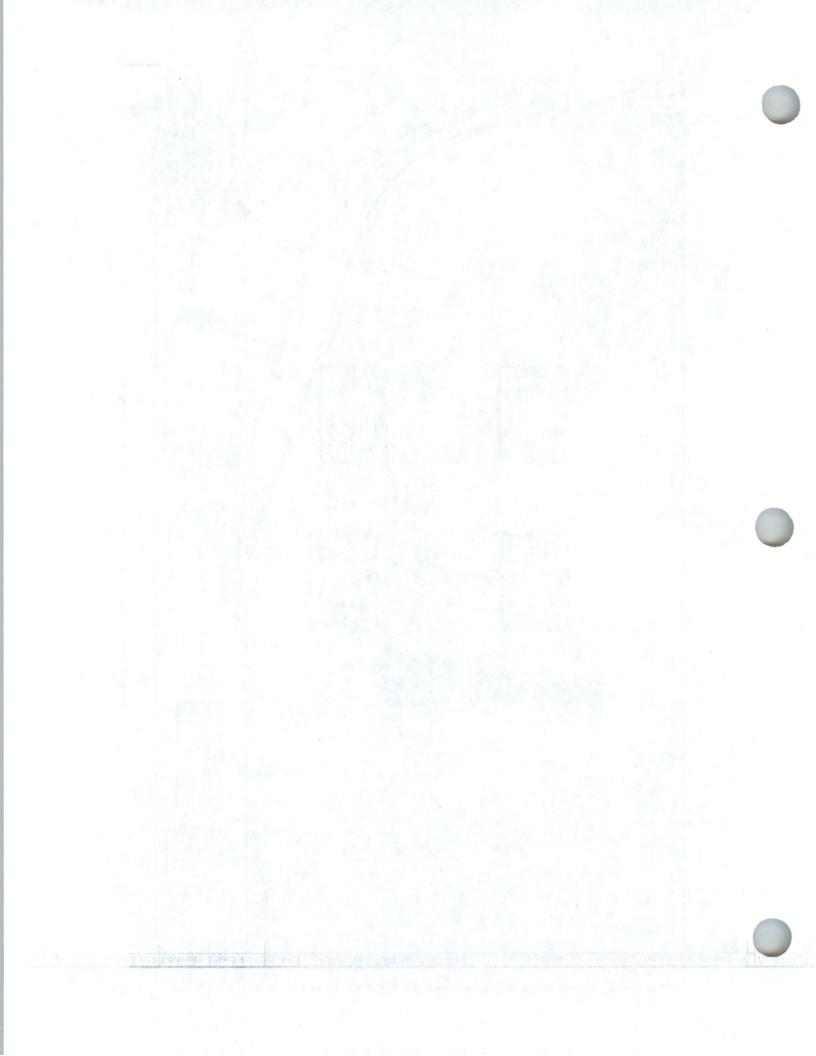


Figure 2. Organic COPCs AND COPECs in shallow surface soil (0 to 1 ft) at the 40 mm Range.



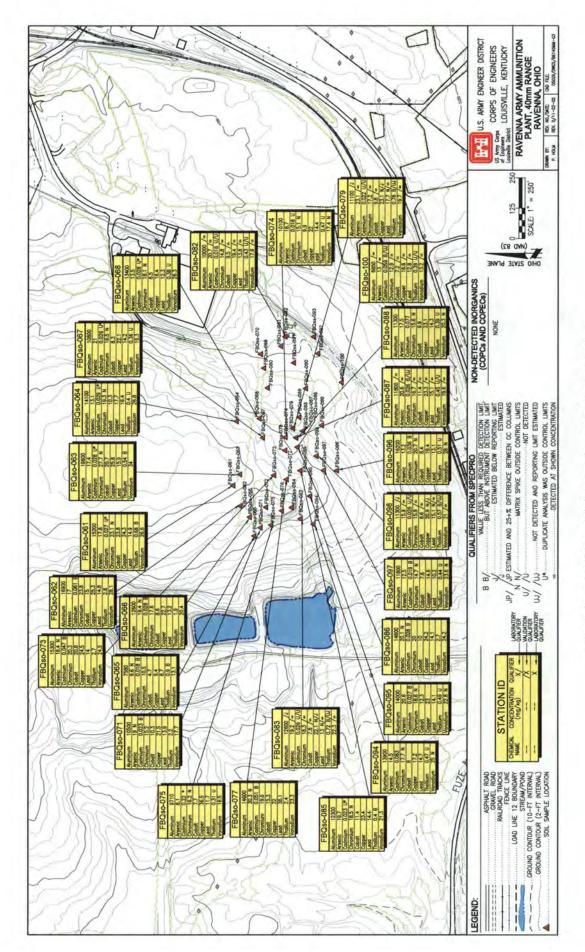
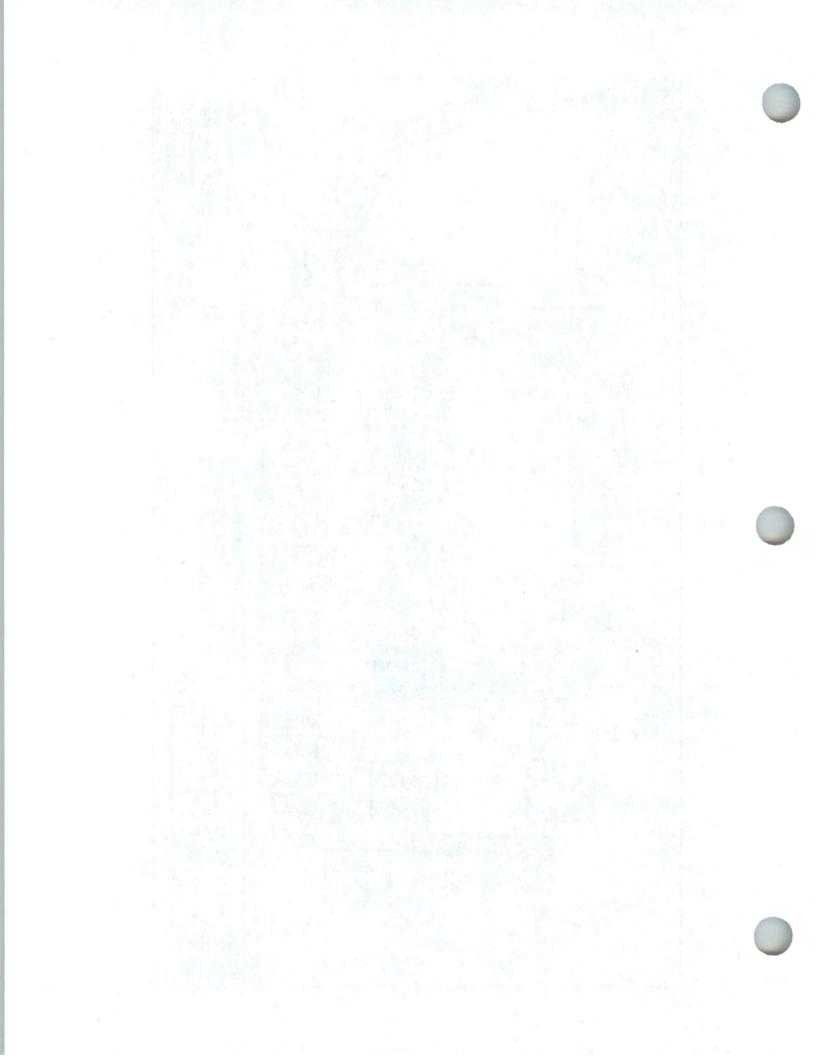


Figure 3. Inorganic COPCs and COPECs in subsurface soil (1 to 3 ft) at the 40 mm Range.



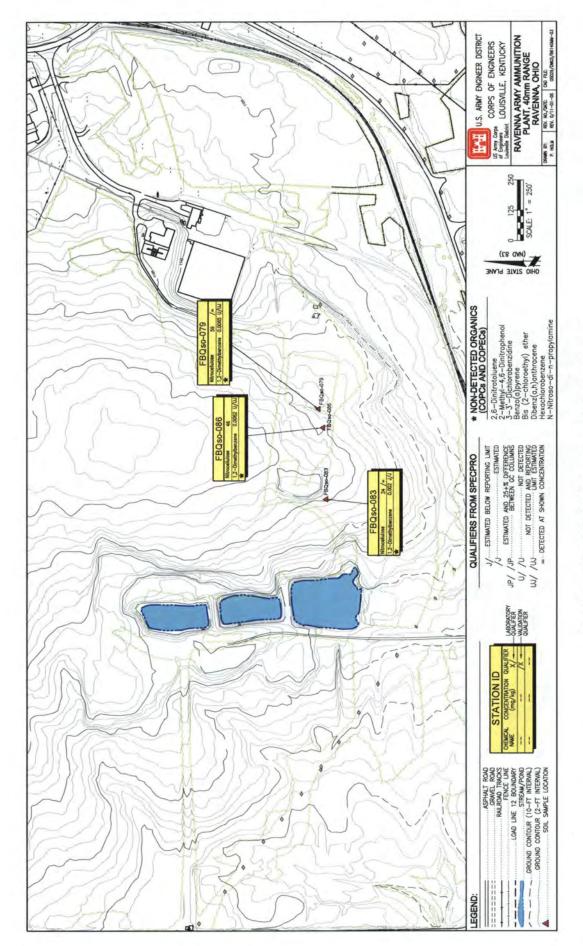
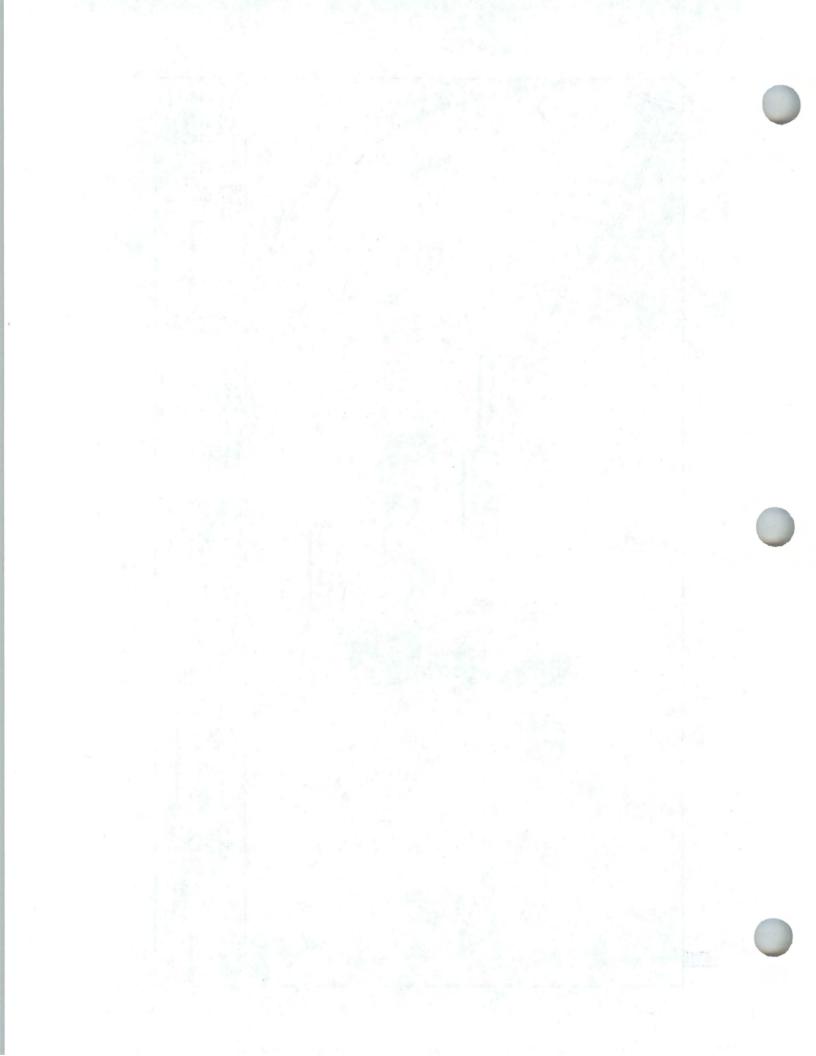


Figure 4. Organic COPCs AND COPECs in subsurface soil (1-3 ft) at the 40 mm Range.



## 6.0 RECOMMENDATIONS

2 The estimated human health non-cancer HIs for direct contact exposure pathways are less 3 than 1 for all human health receptors. Calculated ILCRs are less than or equal to 1E-05 for the representative National Guard Receptors (National Guard Trainee and Security 4 Guard/Maintenance Worker) and the Recreational Hunter. Calculated ILCRs exceed 1E-5 05 for the Resident Farmer scenario; however, risks are the result of background 6 7 concentrations of arsenic and the analytical detection limits for 3 SVOCs not detected in 8 any soil sample at the 40 mm Range. As discussed in the uncertainty analysis, these estimated risks are more likely to be overestimates than underestimates of actual risk at 9 10 the site. Based on these results, there is no unacceptable human health risk for the

probable land use at the 40 mm Range, and it is recommended for no further action.

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This later assumption about low to no risk is supported by the facts that the terrestrial ecosystem has abundant vegetation and animal life that looks healthy and functioning. Further, The majority of HQs estimated for ecological receptors were less than 1. The HO values that exceeded 1 were for a few metals only and were for lower-trophic level organisms not upper-level consumers such as foxes and hawks. The greatest HQs were for aluminum (as high as 861 to shrews), but the soil pH at RVAAP remains much higher than the low pHs assumed in the biological uptake numbers and in the laboratory experiments with toxicity measures that were used in the HQ estimates. This indicates that the HQs for aluminum were greatly overestimated. The rest of the few HQs were below one hundred and the 4 metals remaining after the first four steps of the uncertainty analysis (arsenic, chromium, thallium, and zinc) also may not be bioavailable. The ecological uncertainty discussion led to the conclusion that sources of exposure were greatly limited at the 40 mm Range because of low bioavailability of chemicals in the soil, and, therefore, it logically follows that there is low to no ecological risk at the 40 mm Range. Further, there was no evidence in the nearby Fuze and Booster Ponds (down gradient and within 500 feet) that any chemical had caused any ecological issues because the ponds contained healthy and functioning aquatic life such as fish according to biological field work conducted by the Ohio EPA and the Army ACE.

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In summary the 40 mm Range is recommended as a "no further action location". This recommendation is based on the following:

- Land Use Controls (e.g., no digging nor use of groundwater) will be institutionalized for the site and will reduce the potential for contact with low levels of chemicals identified at the site.
- Results of the human health and ecological risk characterization performed on the relatively low concentrations of chemicals present, and the depth at which these analytes were found (0-3 ft bgs), indicate that there is no unacceptable risk likely to occur.
  - O Initial sampling evidenced no subsurface action from prior use (such as soil discoloration, trenches, buried debris that made its way to the surface, foul odors once surface was broken, and the like). Shallow rock is close to the surface with refusal (0-1 ft bgs) occurring at sample locations 69, 70, 72, 76, 78, 80, 81, 84, 89, 90, 91, 92, 93, and 99. Further surface detects did not evidence residuum, nor source release to subsurface (below 3').

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ì	1		
7	2	•	Further, groundwater is addressed facility-wide and developed to allow an exit
	3		strategy permitting a cyclic review of the 'no-use' groundwater control.
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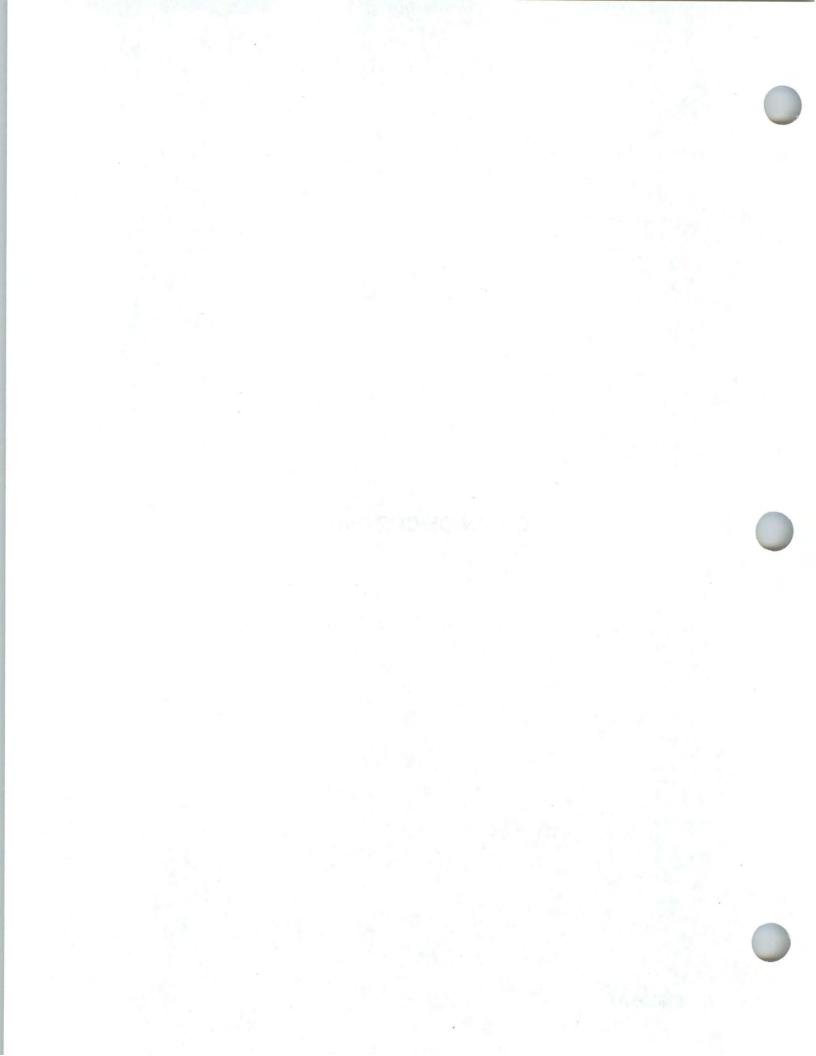
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Contract #/Billing Reference

202 Perry Parkway

9:40 CUENT Date/Time 200 多 'ON 40/000 987 Temp: to Received for Laboratory By: Airbill No .: Shipper Relinquished By: Gaithersburg, MD 20877 (301) 926-6802 Fax (301) 840-1209 Lab Comments: Date/Time 1.00 Turnaround Time # of Containers Container Type Preservative Used Type of Analysis Received By: Received By: Received By: Sampler's Initials Sample (1202) Pales Date/Time Date/Time Date/Time Time 1200 KayChna Sampled 330 358 20/12 Relinquished By: Relinquished Bys Send Results To. Relinquished By: Sample D# end ban Address: Project: Phone: Client

LABORATORIES, LLLP

2 y Parkway Gaithersourg, MD 20877 (301) 926-6802 Fax (301) 840-1209

Pgs. 6 Contract #/Billing Reference

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Gaithersburg, MD 20877 Contract #/Billing Reference (301) 926-6802 Fax (301) 840-1209

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S.P. W.O. 5/6/39

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Contract Milling Reference

Gaithersburg, MD 20877 (301) 926 6802

202 Perry Parkway

1 4'3' Qata/Time COMMENTS -4 CLIENT ON JOSOP VET Received for Laboratory By: Braso Airbill No. Shipper 在夏季湖 00 Relinquished By. Lab Conunents: Fax (301) 840-1209 Date/Time 13 SONS Turnavalind Time # of Containers Contrainer Type Ry Presenziive Used Type of Analysis Received By: Received By: Received By: Sampler's Initials Jap/ 1500 Canal Sample CED Date/Time Date/Time 500 Date/Time Con 1703 1058 1526 153 1515 300 Sampled Turns とのから Man TP/ 1621 67.3 Ha/ 12 1001 Date Sempled Mas 15102 1810 1021 10% 10:01 Kavenna 358 170 RQM BOOKHS Sp 大の付いの子 PER SERT OCT OF Project: To R.E. PALLE 1927-35P Production POS PSIOCHSE Fred Blank Relinquished By: A 50 14 14 14 15 15 Relinquide Led By Refraggished By 230 Send Pagnile Ter. Sample 104 Additions: Cient Phone:

202 Perry Parkway Gaithersburg, MD 20877

0,93 Pass Jate/Time COMMENTS CLENT Temp: CAN 201000 987 7 Received for Lythoratoxy By. Airbill No. Contract #/Billing Reference Shipper. Relinquished By: Lab Comments: (301) 926-6802 Fax (301) 840-1209 Date/Time (a) 18.43 Turnamound Time # of Containers Container Type Preservative Used Analysis Typeof Received By: Received By: Received By: Samplara Initials 1423 140C OLLO Semple Date/Time Date/Time Date/Ime 1,52 400 420 This 840 1560 SU MANTO 1123 17.3 Sampled 1023 (PE 197 Specpro Maller desista 1023 KOLPHIG FEBRUIS MEDIE FALS FHIZHSD 845i Per 12.7055:00 Sornel Rescults fo: F64-41551 Mark Box 126/2535 LBC Refinquished By: Relinquished By Relinquished B. 8-383 Sample ID# Acidresa: Project: Phoner. Clert

Contract #Billing Reference

20. y Parkway Gaithersburg, MD 20877

Pga, 8.0 Date/Time COMMENTS 5,0 CLENT Temp: ON TOOOD SEL 6 Received for Laboratory By: 400 一个 Airbil No.: Ula 3 000 1/LAW ALCO ! Themsel Grade Parace 3 2 Shipper Pedille Relinquished By: Lab Comments: (301) 926-6802 Mare / Ver Fax (301) 840-1209 Date/Time U modlas Amber 2 3 200 Turnaround Time # of Containers Container Type 3 Preservative Used Type of Analysis 2 Received By: Received By: Received By: Sampler's Initials 3 3 7 3 7 RUAMP-Fize /Boosler Date Sec. Sample Coper R 1/3 160 - ISA Date/Time Date/Time Date/Time drie! るれ 3 Firme 2 135 955 TB- COST 1/2 330 358-1 avenza Chambelle Date Sampled **MAN** Barriss rolls Addiese: 8451 S FROM - EL-6-201-20 FORM-Ne Contrat Send Results To: Relinquished By: Helinquished By Palinquished By Sample ID# Project: Phone: Client

G.P. W.O. 3/10/0

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.P. W.O. 31/010

G. L. LABORATORIES, LILP

Gaithershurg, AID 20877 Con

Esthurg, AID 20877 Contract #Bitting Reterence (301) 926-6802 Fax (301) 840-1209

05.0 COMMENTS CLIENT ON 18000 DET Temp: 7 Received for Laboratury By: 707 To be Next sons 700 Airbil No. 200 Son Pare, ARNO PO 100 Shipper. À Reilinquished By: CENES! 300 Lab Comments Date/Time T. J. Market 9 TOWN ! 3 Wil Kd Turnaround Trans # of Containers Container Type a C Preservative Used Type of Analysis 6 0 Received By: Received By: Received By: Sampler's Intrals 5 RB 8 8 Laker N Sample Cack というというと CC2) #/ Data/Time Datte/Time Date/Time 550-358-1753 FEGUNTY LONGS IN 850 920 555 Tene Tabada de Sa Sampled The 15 Carlier I Book 130 DARPSD temo bla Send Results for Relinquished By: Relinquished By: Sample ID# Project Address Phone Chart

G.P. W.O. 31/020

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202 Perry Parkway Gaithersburg, MD 20877 (301) 925-6802 Fax (301) 840-1209

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3.P. W.O. 31/020

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202 Perry Parkway Gaithersburg, MD 20877

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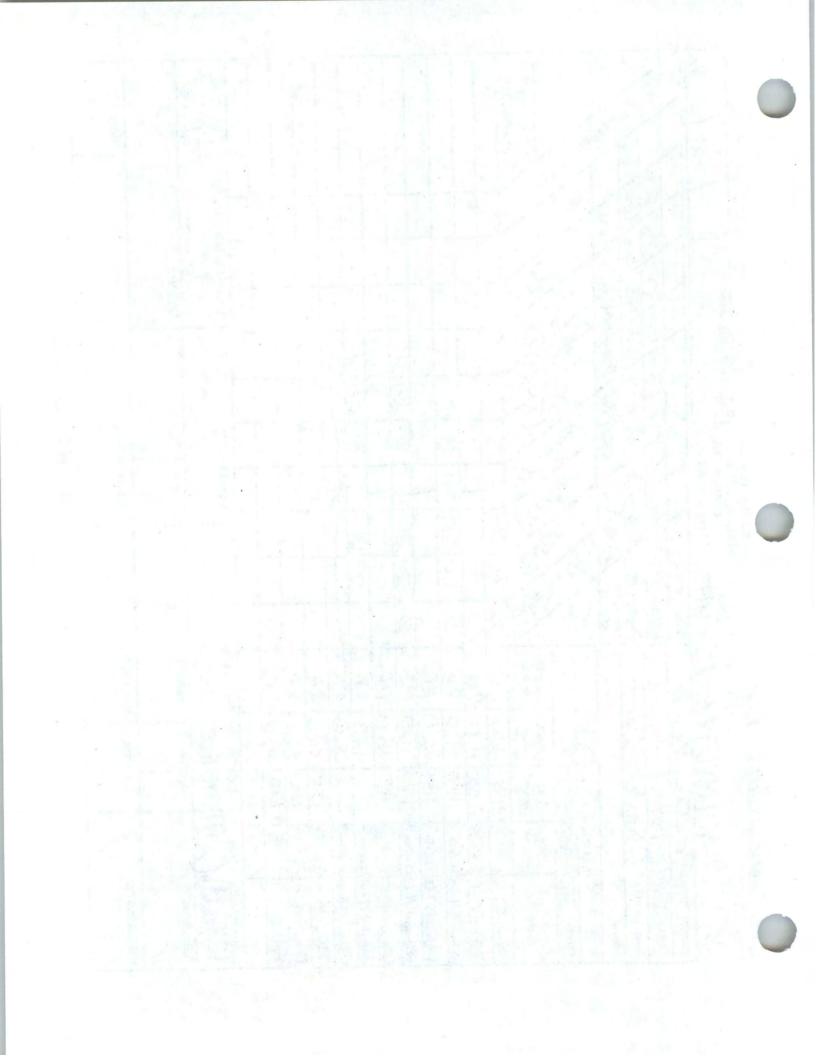
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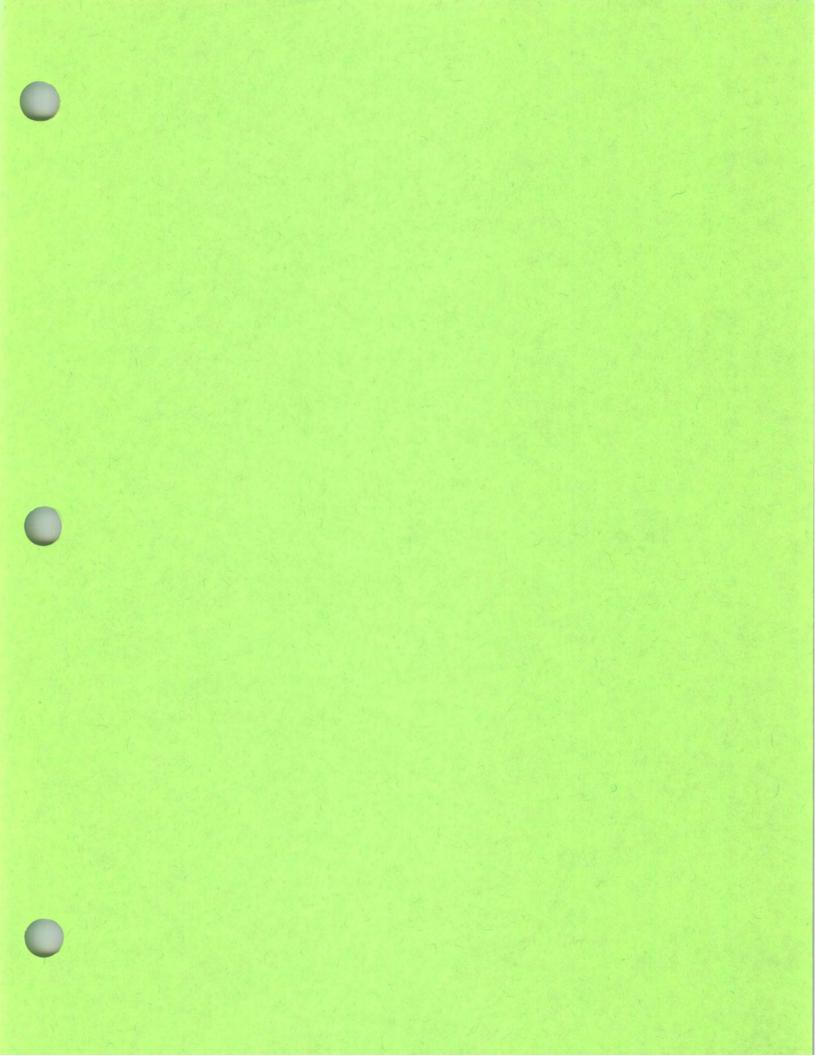
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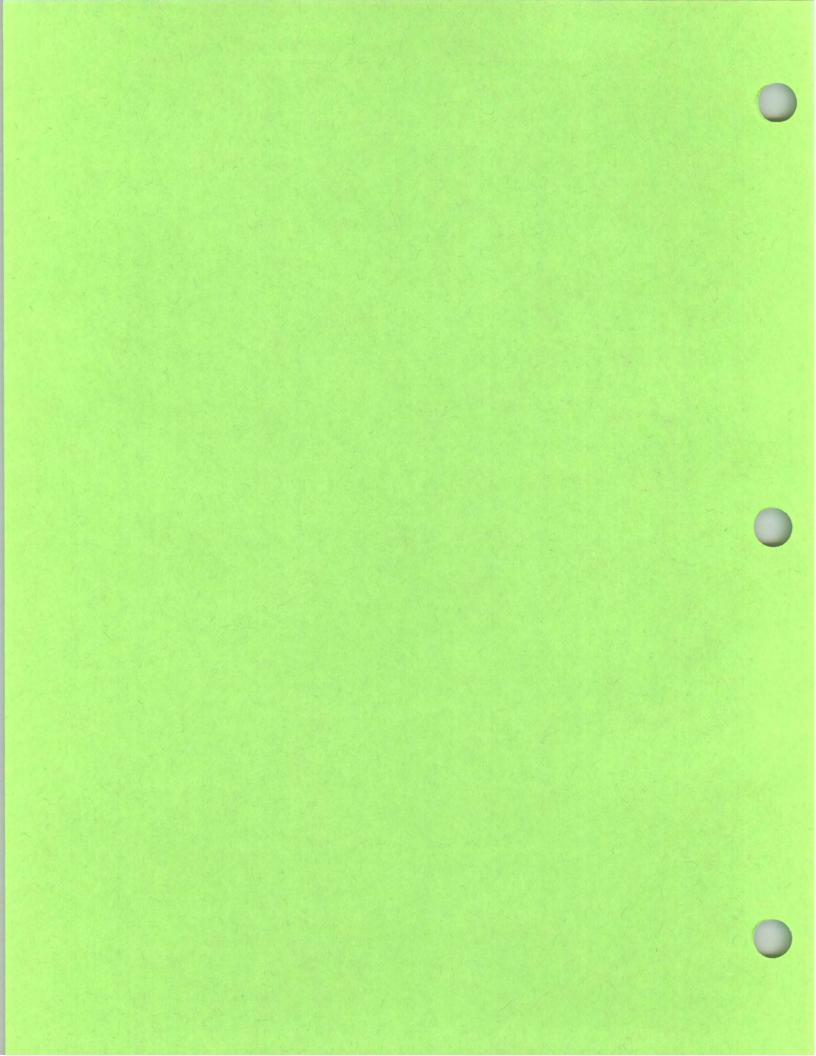
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## APPENDIX A 2 FUZE AND BOOSTER/40 MM SOIL SAMPLING LOGS

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## APPENDIX D2 SOIL SAMPLING LOG LOCATOR SHEET

Page Number	Site Number
5	82
8	81
11	91
14	90
17	93
20	92
23	100
26	99
29	89
32	88
35	87
38	74
41	79
44	98
47	96
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56	94
59	83

Page Number	Site Number
62	75
65	85
68	84
71	76
74	70
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83	61
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PROJECT NAME: Phase MI Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012
Dale (mm/dd/yy): 11-11-163 Suff (Tu) W Th F Sa PAGE OF 1  Task Team Members:  Cludy Con See King
Ronda Bailey  On a World Of
<u> </u>
Narrative (include time and location):  9,08 Quite CSSangle Tocation FBJ-080 (Share Cleans
9:05 Bosin January FB755-082-10/163-50
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9:55 Finish Sanghing, 50 to next Docarin
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Daily Weather Conditions: A.M. DUNCOT, PANDRUGH Dom, 485
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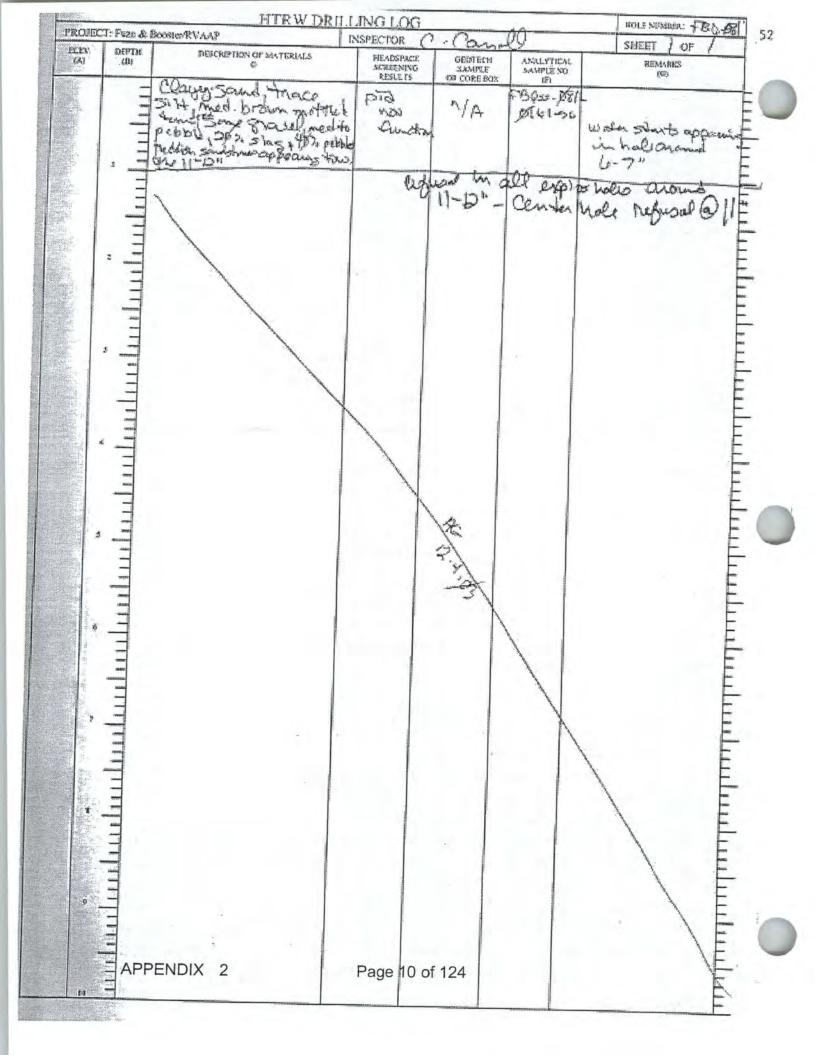
HTRW DRILLING LO		DISTRICT: L		•	HOLE NUMBER
1. COMPANY NAME: SpecPro, Inc.		2. DRILL SUB	CONTRACTOR:		SHEET OF
3. PROJECT: Fuze & Booster/RVA		4. LOCATION:	Fuze & Booster Quarry Landfi	ill/Pond	
5. NAME OF DRILLER:		6. MANUFACTU	RERS DESIGNATION OF DRILL:	14	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	3/2" arger by	cket	8. HOLE LOCAT	TION: FSD	
			9. SURFACE EL	EVATION: h/A	
			10. DATE START	TED: 1/11/83 11. DATE (	COMPLETED: 11/11/43
2. OVERBURDEN THICKNESS h	A		15. DEPTH GRO	UNDWATER ENCOUNTERED:	n/A
3. DEPTH DRILLED INTO ROCK	IA		16. DEPTH TO W	VATER AND ELAPSED TIME AFTER DRI	LLING COMPLETED:
TOTAL DEPTH OF HOLE 3 11			17. OTHER WATE	ER LEVEL MEASUREMENTS (SPECIFY)	16+
. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTUR		DTAL NUMBER OF CORE BOXES	
SAMPLES FOR CHEMICAL ANALYSIS	Voc N	METALS	OTHER (SPECIFY)	OTHER (SPECIFY) OTHER (SP	
DISPOSITION OF HOLE	BACKFILLED MONITO	ORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR	RECOVERY %
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	PPENDIX 2	Page 7	of 124			

PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012
Date (mm/dd/yy): 11-/1-32 Su M(Tu)W Th F Se PAGE OF 1
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Namelive (include time and location):
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Recorded By Dan Conall OA Checked By Ormy Anemaros

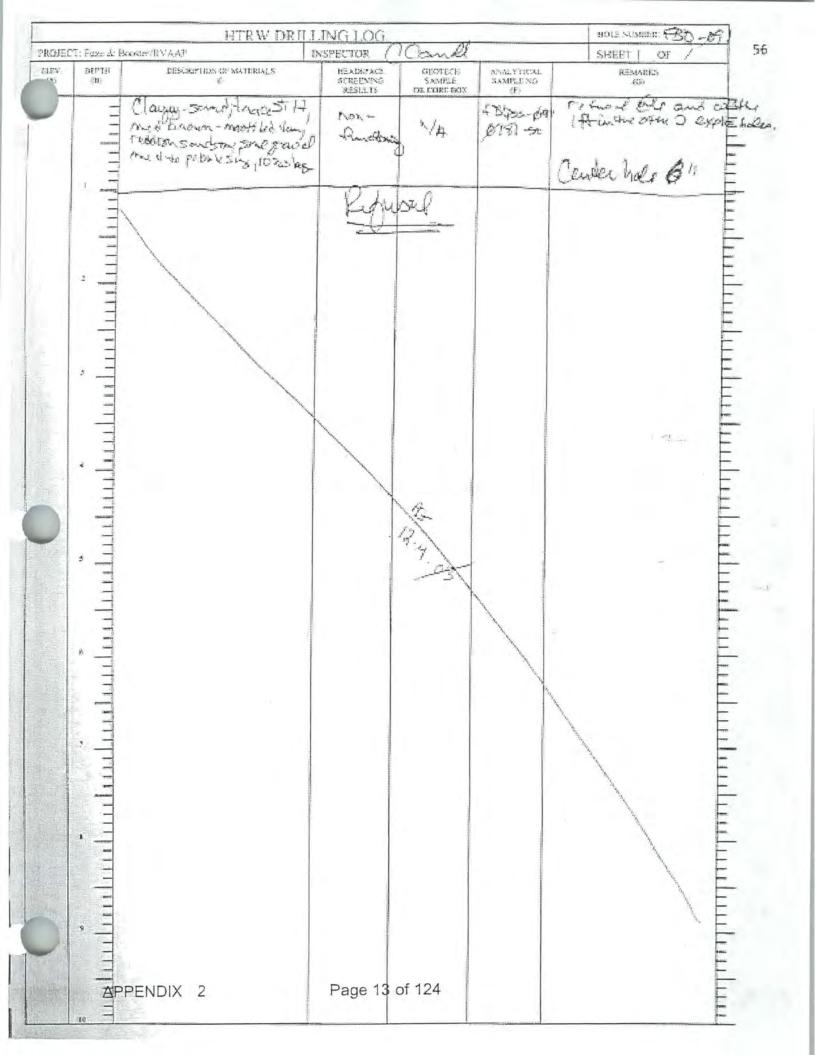
HTRW DRILLING LO	og	DISTRICT: L	DISTRICT: Louisville			HOLE NUMBER
OMPANY NAME: SpecPro, Inc. 2. DRILL SL			BCONTRACTOR:  SHEET			
3. PROJECT: Fuze & Booster/RV	AAP		4. LOCATION: F	uze & Booster Qua	rry Landfill/Pond	d
5. NAME OF DRILLER: Cund	6. MANUFACTURERS DESIGNATION OF DRILL:					
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	55 spoon / 60	sul	8. HOLE LOCAT	ION: DR7 -25	$\overline{\Omega}$	
AND SAMPLING EQUIPMENT	5 3/2" auger	buckey	9. SURFACE ELE	10 PC	) (	
				37.00	-	
			10. DATE START	ED: 1/11/83	11. DATE COMPLE	TED: "/" 63
12. OVERBURDEN THICKNESS	15		15. DEPTH GROU	JNDWATER ENCOUNTER	ED: N/A	
13. DEPTH DRILLED INTO ROCK	12		16. DEPTH TO W	ATER AND ELAPSED TIM	E AFTER DRILLING C	OMPLETED:
14, TOTAL DEPTH OF HOLE			17. OTHER WATE	er Level Measurement	TS (SPECIFY):	
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTUR	RBED 19. TO	TAL NUMBER OF GORE	BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS  JOHN ACT. 185	Voc	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21, TOTAL CORE RECOVERY %
22. DISPOSITION OF HOLE	BACKFILLED MC	ONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPEC	TOR Ca	0
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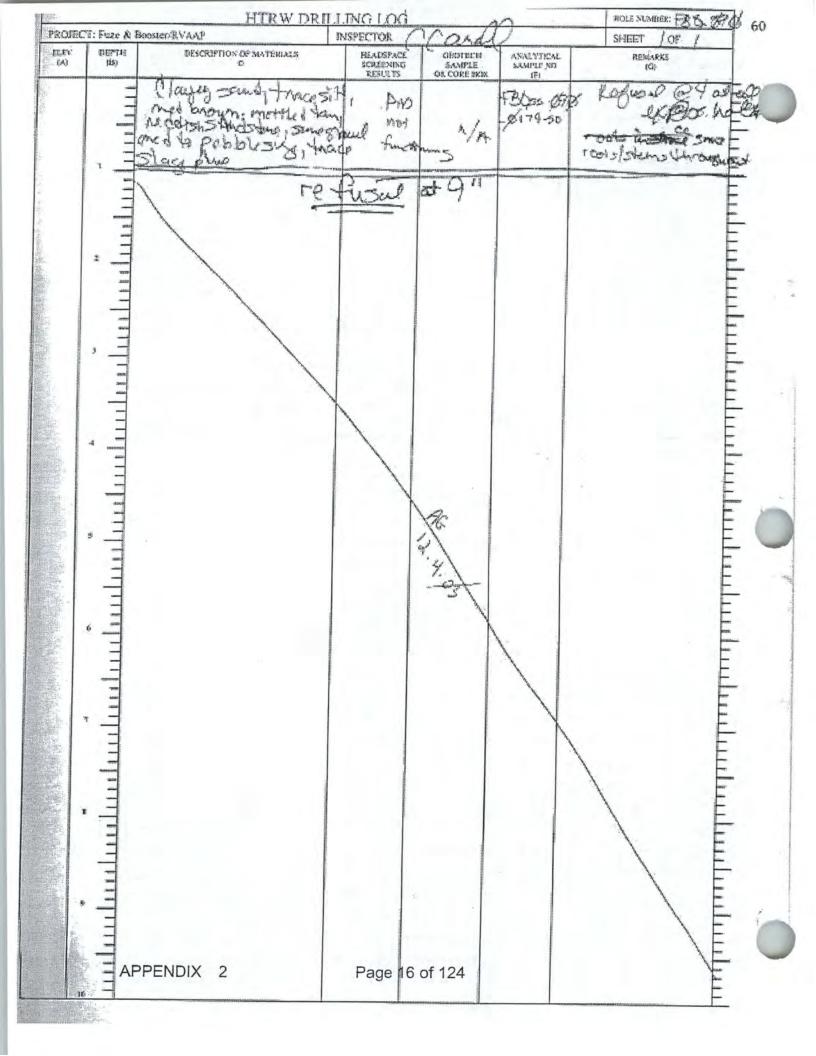
TASK TEAM ACTIVITY LOG SHEET	53
PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012	
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HTRW DRILLING LOG		DISTRICT:	DISTRICT: Louisville			HOLE NUMBER		
1. COMPANY NAME: SpecPro, I	2. DRILL S	UBCONTRACTOR:		SHEET OF				
3. PROJECT: Fuze & Booster/R	VAAP		4. LOCATION:	Fuze & Booster Qu	Jarry Landfill/Pond	1		
5. NAME OF DRILLER:	re Leen.			URERS DESIGNATION OF				
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	1 11-	287m	8. HOLE LOCA	-	461			
	STA CAMBE	V VICES	9. SURFACE E	LEVATION: h/h	(1)			
			10. DATE STAF	RTED YI /26	11. DATE COMPLET	TED: 1)/11/3		
12. OVERBURDEN THICKNESS	n/A		15. DEPTH GRO	OUNDWATER ENCOUNTE	RED: 9/A	(11/4)		
13. DEPTH DRILLED INTO ROCK	4		16. DEPTH TO	WATER AND ELAPSED TI	ME AFTER DRILLING CO	OMPLETED:		
14. TOTAL DEPTH OF HOLE	7.03			TER LEVEL MEASUREMEN	NTS (SPECIFY):			
8. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTU	IRBED 19. T	OTAL NUMBER OF CORE	BOXES W/W			
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2. DISPOSITION OF HOLE	BACKFILLED MO	ONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPE	CTOR C	00		
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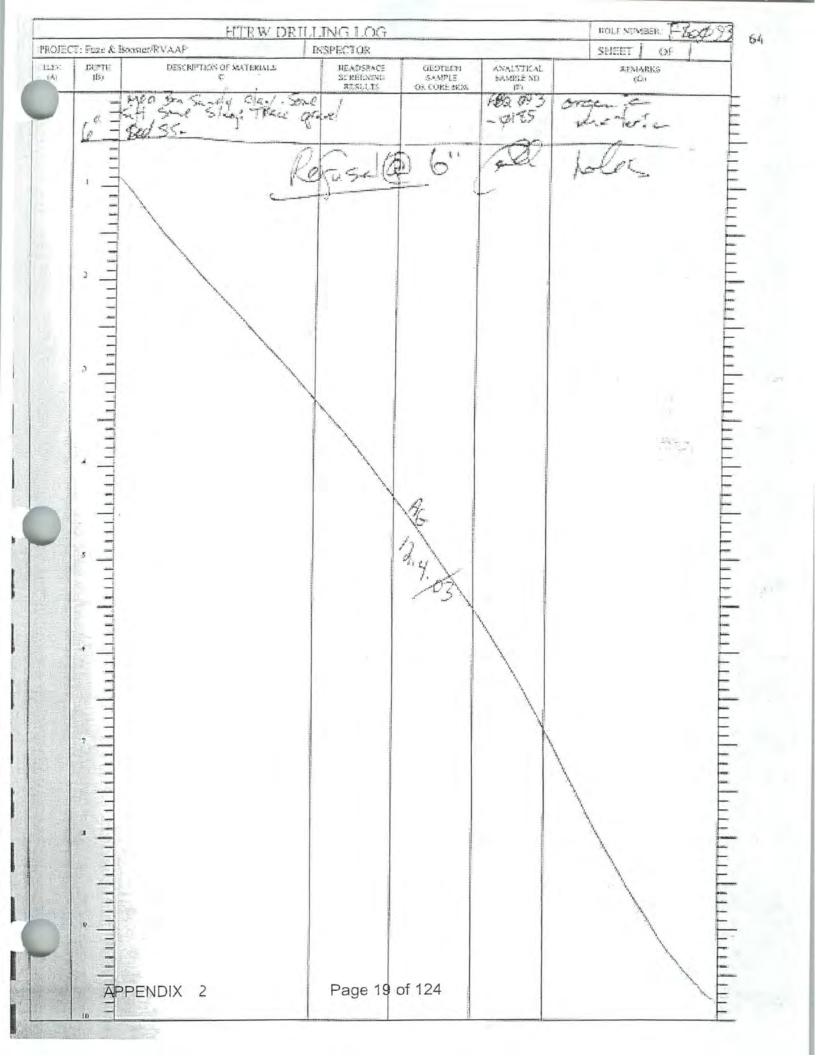
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PANY NAME: SpecPro,	Inc.	2. DRILL	SUBCONTRACT			SHEET 1_OF				
B. PROJECT: Fuze & Booster/	4. LOC/	ATION: F	uze & Booster	Quarry L	andfill/Pond	1				
NAME OF DRILLER:	du Lean		6. MAN	JFACTU	RERS DESIGNATION	OF DRILL	h/A			
SIZES AND TYPES OF DRILLING	55 bnd /	Sam	B. HOLE	LOCATI	ON: 780 -	090	8			
		C. Dr. Co. L.	9. SURF	ACE ELE	EVATION: A	A				
			10. DAT	E START	ED://-//-05	3 11.	DATE COMPLE	TED: 1/-1/-	0	
2. OVERBURDEN THICKNESS	12		15. DEP	TH GROL	INDWATER ENCOU		n/A	/		
. DEPTH DRILLED INTO ROCK	h / h				ATER AND ELAPSE					
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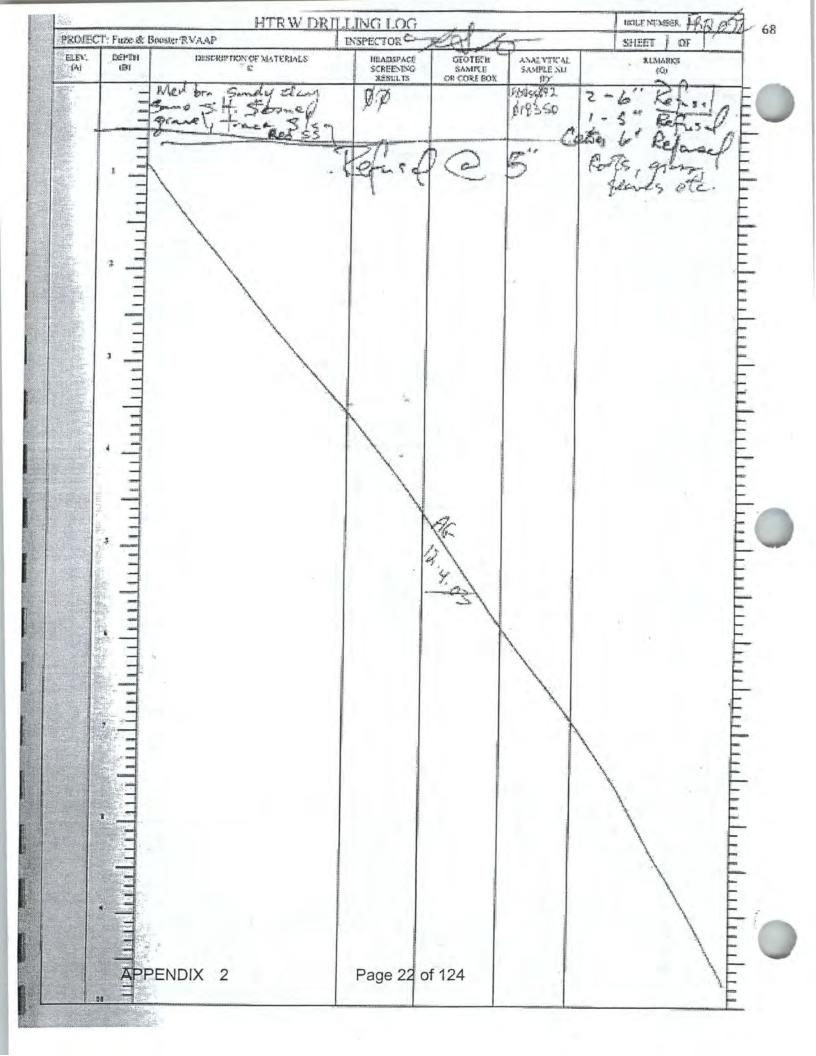
PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0	012
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3. PROJECT: Fuze & Booster/RVAAP								4. LO	CATION	v: Fuz	e & E	ooste	er Qu	arrv	Land	fill/P	ond	-		1								
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PROJECT NAME: Phase MI Fuze & Booster Quarry La	andfill/Pond DELIVERY ORDER: 001;
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Narrative (include time and location):	\$92. George
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Recorded By QA Chec	ked By army Huggertal
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HTRW DRILLING LO	OG	DISTRICT: L	HOLE NUMBER				
COMPANY NAME: SpecPro, In	ic.	UBCONTRACTOR:					
3. PROJECT: Fuze & Booster/RV	'AAP		4. LOCATION:	Fuze & Booster Qu	larny landfilling	SHEET O	
5. NAME OF DRILLER:	Variation			URERS DESIGNATION OF		0	
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PROJECT NAME: Priese INI Fuze & Booster Quarry Landisli/Pond DELIVERY ORDER: (
Date (mm/dd/yy): 111/0/3 Su M TU W Th F Sa PAGE OF 1
Task Team Members:
thicks been
Korrela Bailer
Steve Vine
Narrative (include time and location):
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Berin D-1' sangle FBDss 194/19950
1314 Begin 1-3' San De Channel by SKiz
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Daily Weather Conditions: A.M.
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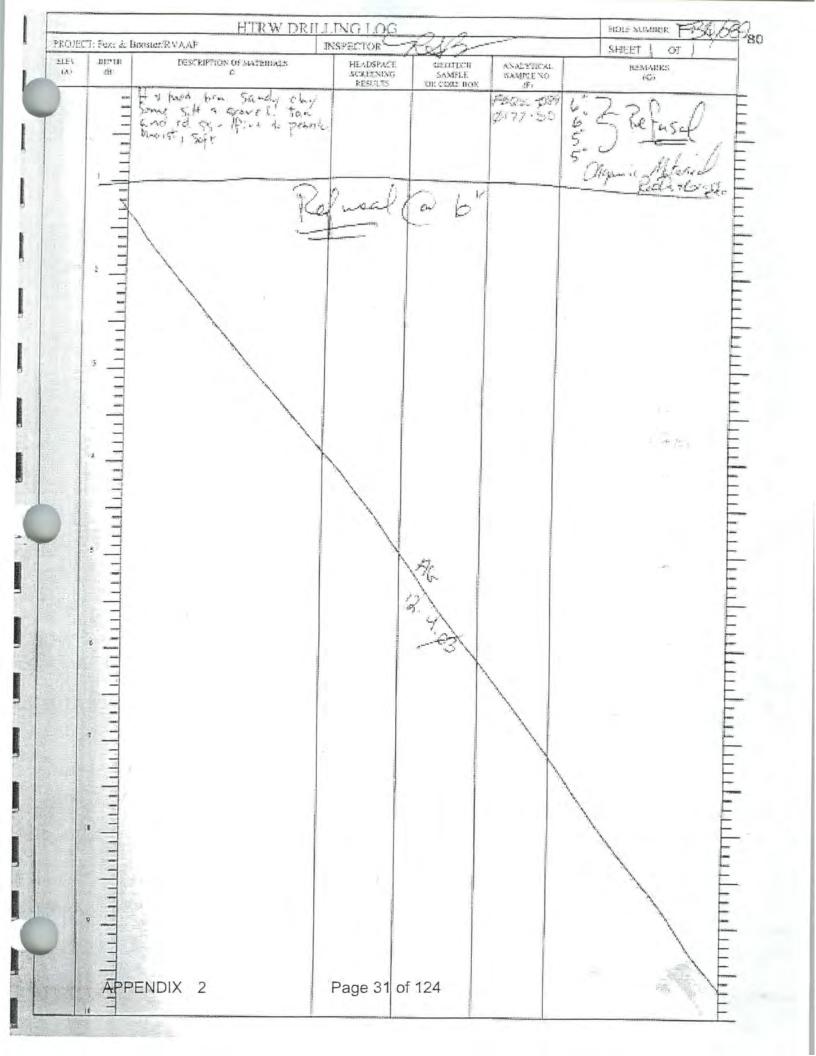
W DRILLING LOG	DISTRICT:	Louisville		FBQ 150		
BANY NAME: SpecPro, Inc.	2. DRILL SU	BCONTRACTOR:	SHEET 1 OF 1			
OJECT: Fuze & Booster/RVAAP		4. LOCATION: Fuze & Booster Q	uarry Landfill/Pond			
WE OF DRILLER: STOLE Ponc		6. MANUFACTURERS DESIGNATION O	F DRILL:			
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		10. DATE STARTED: 11193	11. DATE COMPLET	11-11-63		
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PTH DRILLED INTO ROOK		16. DEPTH TO WATER AND ELAPSED T	IME AFTER DRILLING CO	OMPLETED:		
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e G G OG VOC	METALS	OTHER (SPECIFY) OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %		
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PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012
Date (mm/dd/yy): 11 11 03 SU M TU W Th F Sa PAGE OF I Task Team Members:  Andre Lea
- Steve King
Narrative (include time and location): 1328 - Grand Co FRQ 1099. Closed by S. Ku
1338 - Physical C 8" Pe FB055-099-0197-50
1342- Leas Site
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11 A.M. Overrast high 40s
Recorded By 1816 QA Checked By any Fromawald

ADRILLING LOG	DISTRICT	DISTRICT: Louisville					
SpecPro, Inc.	2. DRILL S	UBCONTRACTOR:	BCONTRACTOR:				
Fuze & Booster/RVAAP		4. LOCATION:	Fuze & Booster Quarry La	ndfill/Pond			
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A STATE OF THE STA		8. HOLE LOCA	TION: ERO M	99			
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DEPTH DRILLED INTO ROCK		16. DEPTH TO V	WATER AND ELAPSED TIME AFTER	R DRILLING COMPLETED:			
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PROJECT NAME: Phase Milituze & Booster Quarry Landsil/Pond DELIVERY ORDER: 0012
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Task Team Members:
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Gur Kai
Narrative (include time and location):
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P.M. Uversest Ligh 40s
Recorded By Jon de Albanda OA Checked By Jon & Granda By

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3. PR	OJECT	Fuz	e &	Boos	ster/F	RVAA	Р.							4. (	.OGA	TION:	Fuze &	& Boos	ter Q	uarry l	andf	ill/Pond			
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3. PROJECT:	Fuze &	Boost	er/R	VAAP								4.	LOCA	TION:	Fuze	& Bo	oste	r Qua	irry L	andf	ill/Pon	d		
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13. DEPTH DR	ILLED INTO	ROCK										16.	DEPT	HTOV	VATER	AND E	LAPS	ED TIM	E AFTE	ER DR	ILLING (	COMPL	ETED:	
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TASK	TEAM	ACTIVITY	LOG	SHEET

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PRO IECT NAME: Phase III Fure & Boorter Output Landfill/Bond	0,0
PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012	
Date (mm/dd/yy): 11/10/3 Su M Tu W Th F.Sa PAGE 1 OF 1	
Task Team Members:	
May 12 14	
Hodre Leon L	
Store King	
Parrative (include time and location):	
1458 - Unit (2) +BB DET ( Gard by	
S. King. Bosin O-1 Smale HOW ON	1-0173
1514 1-3 Doesel by Solling Benin	
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1521 - Refuse D/D 21	
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PROJECT NAME: Phase VII RI Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER NO: 0012

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Teak Team Members:	
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Made 15-121	
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orded By James Houngard OA Checked By Umy Halmaurd	

APPENDIX 2

Page 38 of 124

HTRV	V DF	RILI	IN	G L	.OG	ì					DISTR	RICT: I	Louis	ville										HOLE	NUME	
OMPAN	IY NAM	E: Sp	ecP	ro, l	nc.						2. DRI	LL SUE	BCONT	RACT	OR:										1	
PROJECT	r: Fuz	e & E	Boost	ter/R	VAAF	•							4.	LOCA	TION:	Fuze	& B	ooste	er Qu	arry	and	fill/Pc	ond			
NAME OF	DRILL	ER:	1	ha	Gre	Le	200						6.	MANU	FACT	JRERS	DESI	SNATI	ON OF	DRILL	:					
SIZES AND T	TYPES O	F DRILLI MENT	NG		< < <	50	Ti.	-0	e )			_	В.	HOLE	LOCA	TION:	F	-/-	30	2	17	4				
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DEPTH D	RILLED	INTO	ROCK				1/4						16.	DEPT	нтои	VATER	RAND	ELAPS	ED TIM	ME AFT	ER DE	RILLING	CON	MPLETE	D:	
TOTAL DE	EPTH O	F HOL	E			2	, nº	1					17.	OTHE	R WAT	ER LE	VEL M	EASU	REMEN	ITS (S	PECIF	Y): L	Ye			
GEOTECH	HNICAL	SAMPL	ES		T	,	DISTL	JRBED	1	1	UNI	DISTUR	RBED		19. T	OTAL	NUMB	ER OF	CORE	BOXE	s					
AMPLES FO	IN CHEM	ICAL AN	ALYSIS				VOC			MET	ALS	1	OTHE	R (SPE	CIFY)		OTHER	(SPEC	FY)	0	THER (	SPECIFY	')		TAL COI	
SPOSITION	OF HOL	E	8		+	BAC	CKFILLE	D ~	МО	NITORI	NG WEL	-	DTHE	RISPEC	CIFY)	23	SIGNA	/	FINSPE	CTOR	5			RECO	/ERY	-
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PROJECT NAME: Phase I/II RI Fuzo & Booster Quarry Landfill/Pond DELIVERY ORDER NO: 0012

Date (mm/dd/yy): 1112 63 Su M Tu/W Th F Sa PAGE OF	
Task Team Members:	
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findre len	
Sterry Long	
Narrative (include time and location):	
29.0 anica FBQ/79. Chandle	
DOG FINE TIX - 61) FROM TO VIET CO	
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0955 - Por Would 1-3. Begin 5	24,
July Suite 5 pt 1-3 / 7-2050-079-015%	
1924 - Refusel Q'z'".	
1024 - Leave Site	
77	
4-4-	
Daily Weather Conditions: A.M	
P.M.	
Recorded By QA Checked By (IVm I seemdwrd)	

НТ	RW	DRI	LLI	NG	LC	OG					D	ISTRIC	T: Lo	ouisv	ille									+ FE	OLE NUI	ABER 79
1. COM	IPANY I	NAME:	Spe	cPro	o, In	c.					2.	DRILL	, SUBC	ONTR	ACTO	₹:									HEET [	OF
3. PRO	JECT:	Fuze	& Bo	oste	r/RV	AAP			-	- 5				4. L	OCATI	on: F	uze 8	k Boo	oster	Quar	ry La	ndfil	l/Pon	d		
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7. SIZES	AND TYP	ES OF D	RILLING		5	5	bis	ei nt						8. H	OLE L	OCATIO	ON:	F	30	2 4	7	9				
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-		H DRILLED INTO ROCK h/L								16.0	DEPTH	то w	ATER A	AND E	LAPSE	D TIME	AFTE	R DRII			ETED:					
14. TOT	OTAL DEPTH OF HOLE  SOTECHNICAL SAMPLES  DISTURBED  UNI  PLES FOR CHEMICAL ANALYSIS  VOC  METALS											17. 0	THER	WATE	RLEV	EL ME	ASUR	EMENT	S (SPE	CIFY)		1/4	-			
18. GEO	OTECHNICAL SAMPLES DISTURBED UN  PLES FOR CHEMICAL ANALYSIS VOC METALS  C. C.C.T. L.C.  OSITION OF HOLE BACKFILLED MONITORING WEL									UND	ISTUR	BED		19. TO	TAL N	UMBE	ROFO	ORE	OXES							
20. SAMPI	PLES FOR CHEMICAL ANALYSIS VOC METALS  PLES FOR CHEMICAL ANALYSIS  PLES FOR CHEMICAL ANALYSIS  VOC METALS  BACKFILLED MONITORING V								s	+	OTHER	R (SPEC	IFY)	0	THER (	SPECIF	Y)	ОТН	HER (SP	ECIFY)		1. TOTAL O				
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PROJECT NAME: Phase I/II RI Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER NO: 0012

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Acade Balen
Stave King
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1'+3'SWIBLA GAPLE
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Daily Weather Conditions: A.M. Partly Claudy, High 5ths
7 P.M. 2
Recorded By Hall OA Checked By any Homawall
APPENDIX 2 Page 44 of 124

HTRW DRILLING LOC	3		DISTRICT	: Louis	ville								LE NUME	
OMPANY NAME: SpecPro, Inc.			2. DRILL S	SUBCONT	RACTOR:							SHE	1	F_
PROJECT: Fuze & Booster/RVAA	(P			4.	LOCATION	Fuze	& Bo	oster Qu	arry L	andfi	II/Pond	д		
NAME OF DRILLER: Huche	Loca			6.	MANUFAC	TURERS	S DESIGI	NATION OF	DRILL:		1 1 1 1			
SIZES AND TYPES OF DRILLING D SAMPLING EQUIPMENT	Salven			В.	HOLE LOC	ATION:	ĩ	30	0	04	7			
3×	5 tures			9.	SURFACE	ELEVAT	ION:	,	/					
	1.00 Mg			10.	DATE STA	RTED:	1112	13	11.	DATE	COMPLE	TED:	-12-9	10
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TOTAL DEPTH OF HOLE	2'6"			17.	OTHER W	ATER LE	VEL ME	ASUREME	NTS (SP	ECIFY	):			
GEOTECHNICAL SAMPLES	DISTURBE	ED	UNDIS.	TURBED	19.	TOTAL	NUMBER	OF CORE	BOXES					
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DEPTH DESCRIPTION OF MAJERIALS HEARGAGE GEOTECH ANALYTICAL REMARKS	DEPTH DESCRIPTION OF MATERIALS READSPACE SCREENING REMARKS SAMPLE	DEPTH DESCRIPTION OF MATERIALS READSTACE SCREENING RESILETS OF CORE BOX OFF CORE BO		HTRW DR	ILLING LOG	, , , , , , , , , , , , , , , , , , ,		PALENTAMBER: FACE #99
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Alanda 26'	Reports 2'6'	Refuse 2'6'	1-3	Sanas above with in coisso of sand one sis grand de p. loss			FAGGO-893 \$196-50	
			3		fund	7 D 2	6.	
			Z	PPENDIX 2	Page 46	of 124		**************************************

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PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond	DELIVERY ORDER: 001
Date (mm/dd/yy): 11 12 #3 Su M Tu W Th F Sa PAGE Task Team Members:	EOF
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Andre Len	1700000
Steve Kine	***************************************
Narrative (include time and location):	
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нт	RW	DF	RIL	LIN	G L	.OG	i					DISTRICT: Louisville											HOLE NUMB			
1. CO	MPANY	NAM	E: S	oecF	Pro, I	nc.						2. DRILL SUBCONTRACTOR:										1	1			
3. PR	OJECT:	Fuz	e & 1	Boos	ter/R	VAAF	,							1 4	LOCA	ATION:	Fuze 8	& Boo	ster Q	uarry	Land	fill/Por	nd			
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12. OV	ERBUR	DEN 1	HICK	VESS		,	/ 6		_					15	. DEP	TH GRO	UNDWA	TER EN	COUNT	ERED:		4/	~			
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14. TOT	TAL DE	ртн о	F HOL	E		6	21	6	11					17	. OTH	ER WAT	ER LEV	EL MEA	SUREME	NTS (S	PECIFY	Y):	3/	2		
18. GEC	OTECH	VICAL	SAMP	LES				DISTL	JRBED			U	NDISTU	RBED		19. TC	TAL NI	JMBER	OF COR	E BOXE	s					
O. SAMP	LES FOR	CHEM	ICAL AN			+		voc	-	+	ME	TALS	-	ОТН	ER (SP	ECIFY)	0	THER (SP	ECIFY)	0	THER (S	SPECIFY)	2	1. TOTAL	CORE	
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TASK TEAM ACT	TIVITY LOG SHEET
PROJECT NAME: Phase I/II Fuze & Booster Qua	**
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Narrative (include time and location):	ACCORDING TO THE PARTY OF THE P
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1435 - Lear Site	) F4050-b97-9194-6
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P.M. A Checked By Tray & Usuau V

HTRW DRILLING LOG	DISTRICT:	Louisville	Louisville						
DMPANY NAME: SpecPro, Inc.	2. DRILL SU	UBCONTRACTOR:			SHEET OF				
3. PROJECT: Fuze & Booster/RVAAP		4. LOCATION: Fuze & Booster Quarry Landfill/Pond							
5. NAME OF DRILLER: Steve Kun (		6. MANUFACTURERS DESIGNATION OF DRILL:							
N. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	72	8. HOLE LOCATION: FGO 007							
45 lpo~	7	9. SURFACE ELEVATION:							
>> WAS	)	10. DATE STARTED: 11. DATE COMPLETED: 11-12-03							
2. OVERBURDEN THICKNESS		15. DEPTH GROL	UNDWATER ENCOUNTERE	:D: 4/2	11-12-03				
	1/2	16. DEPTH TO W	ATER AND ELAPSED TIME	AFTER DRILLING CO	MPLETED:				
4. TOTAL DEPTH OF HOLE 216	п	17. OTHER WATE	ER LEVEL MEASUREMENT		1/2				
8. GEOTECHNICAL SAMPLES DISTI	URBED UNDIST	URBED 19. TO	TAL NUMBER OF CORE B	OXES					
SAMPLES FOR CHEMICAL ANALYSIS VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %				
DISPOSITION OF HOLE BACKFILL	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR						
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Daily Weather Conditions: A.M
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Recorded By Any Holmann

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HTRW DRILLING LOG					1	DISTRICT: Louisville								FR 09 5													
1. COM	MPANY	NAME:	Sp	ecPr	ro, In	ic.					1	2. DRILL SUBCONTRACTOR:									SHEET	1 01	1				
3. PRO	JECT:	Fuze	& B	oost	er/RV	AAP	,					4. LOCATION: Fuze & Booster Quarry Landfill/Pond															
5. NAM	E OF D	RILLE	R:	Sit	DAK.	· X	in	(				6. MANUFACTURERS DESIGNATION OF DRILL:															
7. SIZES	AND TY	PES OF	DRILLIN		~	5	Ca	1.62	1.		_			8. HOLE LOCATION: FBQ D95													
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18. GEO	TECHI	NICAL S	SAMPL	ES				DISTU	RBED			UNI	DISTUR	RBED		19. T	OTAL I	NUMBE	R OF	CORE	BOXE	s					
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22. DISPO			+-/-	0		+	BAC	KFILLE		MOM	NITORI	NG WEL		OTHE	HER (SPECIFY) 23. SIGNATURE OF INSPECTOR		19	3									
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## TASK TEAM ACTIVITY LOG SHEET 113 PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012 Date (mm/dd/yy): 11 12 / 3 Task Team Members: \_\_Su M Tu/W)Th F Sa PAGE OF Narrative (include time and location): FED 35-094-0/37 TAL MOBILES FEGSS-014-0401-FBQ>>074-C the work concrusion Daily Weather Conditions: A.M. Recorded By QA Checked By

HTRW DRILLING LOG		DISTRICT: I	DISTRICT: Louisville							F B Q 69	
COMPANY NAME: SpecPro, Inc.		2. DRILL SUE	BCONTRACT	OR:					SHEET		
3. PROJECT: Fuze & Booster/RVAAP			4. LOCATION: Fuze & Booster Quarry Landfill/Pond								
5. NAME OF DRILLER: Steve &	in		6. MANUFACTURERS DESIGNATION OF DRILL								
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	unde		8. HOLE LOCATION: FRO 1094								
55	g. SURFACE ELEVATION:										
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3, DEPTH DRILLED INTO ROCK	7/6		1						4	14	
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HTRW DRILLING LOG	DISTRICT: L	Louisville	HOLE NUMBER
1. COMPANY NAME: SpecPro, Inc.	2. DRILL SUB	BCONTRACTOR: M//A.	SHEET OF _
3. PROJECT: Fuze & Booster/RVAAP		4. LOCATION: Fuze & Booster Quarry Landfill/Po	ond
5. NAME OF DRILLER:	Com	6. MANUFACTURERS DESIGNATION OF DRILL: 17/	4
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	of Girls Ducke	8. HOLE LOCATION: F-199 683	
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13. DEPTH DRILLED INTO ROCK  13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLIN	G COMPLETED:
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18. GEOTECHNICAL SAMPLES DISTURBE	D UNDISTU	RBED 19. TOTAL NUMBER OF CORE BOXES	
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ROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012	
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Steve Kins andre Lean	
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3. PRO.	JECT:	Fuze	& E	loos	ter/R	VAA	P								4. L	OCA"	TION:	Fuze	& B	ooste	r Qua	arry I	and	fill/Po	ond		
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## TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORD	166-0040
Date (mm/dd/yy): U-13-63 su M Tu W Th F Sa PAGE 1 OF 1 Task Team Members:  Live King Live Lean	The second second
Narrative (include time and location):  1185 Ga to FCU-85 (Stwo Clean Prior	)
11:06 Buran to Jample FBUES-1885-1814	!-50
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4. LOCATION: Fuze & Booster Quarry Landfill/Pond  4. LOCATION: Fuze & Booster Quarry Landfill/Pond  6. MANUFACTURERS DESIGNATION OF DRILL: 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/ 1/													
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E. MANUFACTURERS DESIGNATION OF DRILL IN A SHORT PROPERTY OF THE PROPERTY OF T	Euze & Booster/RVAAP		4. L	OCATION: Fuz	ze & Booster Quarry	y Landfill/Pond							
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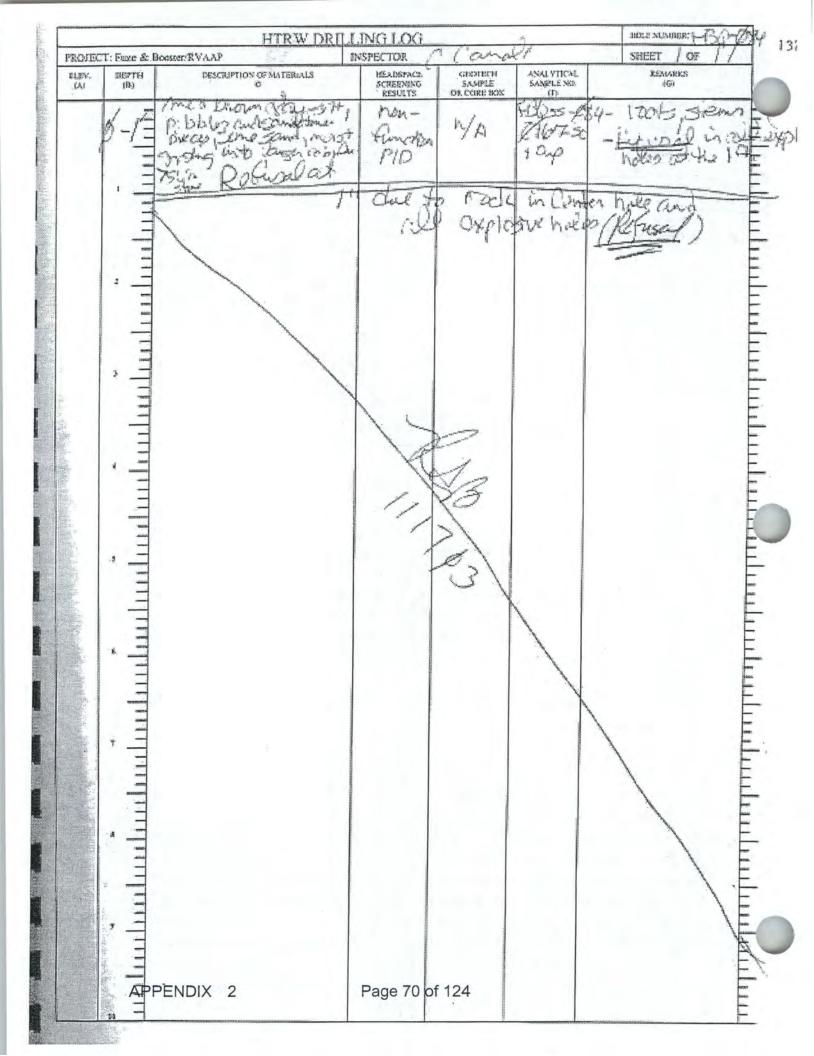
## TASK TEAM ACTIVITY LOG SHEET

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PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfili/Pond DELIVERY ORDER: 0012

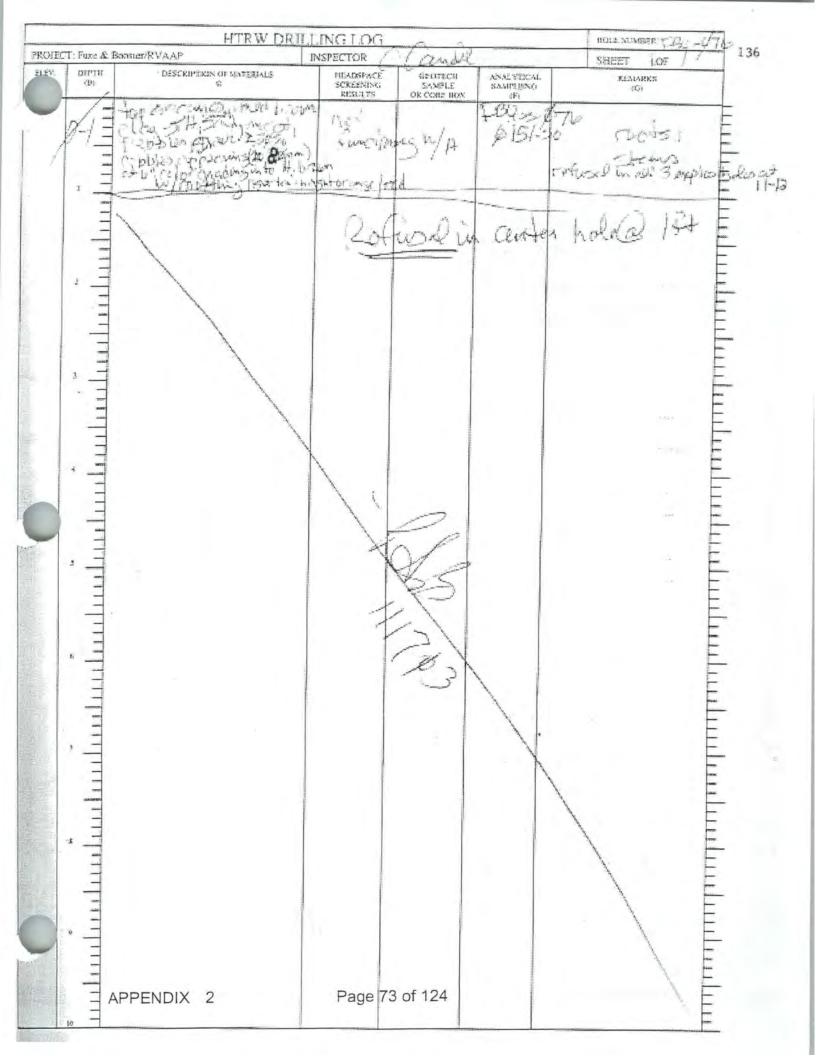
Changle Candy  Tractive (include time and location):  1358 Christ and location FBD - 584  LYBB Box on to surply FBD - 584-6167-50.  For a first party location (Colored Pollers) by and TAL Metals (Colored Pollers) and take a deplicate of (FBD - 684-0404-50) after Here Cleared Pollers Canived  1425 Stop due to refuse of rock at the 1-3 sample for Go to rost location  Weather Conditions: A.M.  Weather Conditions: A.M.  J. J. M. Jacks 1 1524 540 v Milon 53-35°	Change Lean  Change Lean  Change Lean  Change Candy  arrative (include time and location):  1358 Change and location):  1358 Change and location):  Lydy Box on to sample Frys-Byy-Byy-Byy-By-By-By-By-By-By-By-By-By-	nm/dd/yy): 11-13-63 Su M Tu W (TR) F Sa PAGE 1 OF 1	
Clean (Cande)  mative (include time and location):  1358 and to surply FBLOS BY-BILL 16167-30  for a first proper proper (CB) PCB/Pest BNO  and TAL Metals (CTU and Value  a deplicate of 1800 BY-0404-30) after  Here Cleared pinese carried  1425 Stop due to refuse of took at the 1-fort  unequal. Unable to get the 1-3 sample  427 Go to joint location  Weather Conditions: A.M.  A. P.M. Jacks, Lifet Snow Milan. 53-35°	Cleans a Candy  arrative (include time and location):  1358 arrive ad   exact of FBD-B84-8167-30.  Ly a fill Brite   orp   proper   PCB/Pest 500  and TAL Metals; Crth and Yake  a displicate (FBD-B44-0404-50) after  Hero Cleaned Direm arrived  1425 Stop due to refused of rack at the I foot  unequal. Unalle to get the 1-3 sample	Here Kinz	
1358 and and location FBD \$84 SYD Bos in to sangle FRASSBY-0167-50 for a fill Bride Oxp Proper PCB/Pest 500 and TAL Metalo (Crtu and Value a deplicate (FBDs-BYY-0404-50) after Here Cleared power arrived 1425 Itop due to refuse of rock at the 1 fort interval. Unable to get the 1-3 sample 427 Go to rosat location	1358 aniversal ocarm FBD-\$84 1468 Boxin to sample FRDS-BY-BILT-30 for a fill brite oxp 1 proper / PCB/Pest 500 and TAL Metalo, Coto and take a displicate (FBDs-BY-0404-50) after Steve Cleared Direm anived 1435 Stop due to refusion of rack at the I fort unaged. Unalleto get the 1-3 sample	Lude Lein	
1358 and and location FBD \$84 SYD Bos in to sangle FRASSBY-0167-50 for a fill Bride Oxp Proper PCB/Pest 500 and TAL Metalo (Crtu and Value a deplicate (FBDs-BYY-0404-50) after Here Cleared power arrived 1425 Itop due to refuse of rock at the 1 fort interval. Unable to get the 1-3 sample 427 Go to rosat location	1358 anise and Jacaston FBD-584.  1468 Box in to sample FRDS-BX4-BIWT-30  for a fill brite Jose Proper / PCB/Pest 500  and TAL Metalo, Coto and take  a displicate (FBDs-BX4-0404-50) after  Here Cleared Divencement  1435 Stop due to refuse of the 1-3 sample	drawla Canda	
Jana God Brite Dep Proper PCB/Fest 500 and TAL Metals, Crtu and take a dephase of (FBDs-644-0404-50) after Steve Cleared prhen arrived 1425 Itop due to refuse of rock at the I fort undered. Unable to get the 1-3 sample 427 Go to part location.	Jana G. O Brite   Oxp   proper   PCB/Pest   500 and TAL Metals Crth and Yake and Yake a duplicate (FB) 5614-0404-50) after Steve Cleared promounted  1425 Stop due to refuse of rock at the I fort under all of the I sample		
and TAL Metalo (Crtu and Value a duplicate (FBDx-BYY-0404-50) after Steve Cleared power amused 1495 Stop due to refuse of rock at the 1 fort interval. Unable to get the 1-3 sample 407 Go to root location  Weather Conditions: A.M.  J. B.M. Dr. BAB LIGHT SWOVEN 33-35°	and TAL Metalo, Coto and Value a deplicate (FRDs-1814-0404-50) after Sheve Cleaned Diren arrived 1425 Stop due to refuse of rack at the 1 fort underval. Unallesto get the 1-3 sample	60 Box in to sample FBO00-184-0107-50	
Show Cleaned Done arrived  1435 Stop due to refused of rack at the I fort  whenval. Unable to get the 1-3 sample 427 Go to rook location  Weather Conditions: A.M.  J. B.M. Durch Life & Show Min. 33-35°	Steve Clienced Divencement Jeve Clienced Divencement of 1455 Stop due to refuse of rock at the 1 fort underval. Underval get the 1-3 sample	La a fill bride / DKP TOROPEN / PCB/Pest Si	10c
Here Cleared power conved  1435 Stop due to refused by rock at the I fort  unequal. Unable to get the 1-3 sample 427 Go to royat location  Weather Conditions: A.M.  No. B.M. Dagad. Lifet Show Allon, 53-35°	Here Cleaned Other Cornined  1-125 Stop due to refuse of rock at the 1 fort  underval. Unallesto get the 1-3 sample	and TAI Metalo, Coto and take	
Weather Conditions: A.M	1405 Stop due to refuse of rock at the I fort		
Weather Conditions: A.M	underval. Unalleto get the 1-3 sample		
Weather Conditions: A.M.  B.M. D. WAS 1 1424 SWOUNTING 33-35°			P. C.
Weather Conditions: A.M.  P.M. DAMA LIGHT SWOUND 33-35°		interval. Unallesto get the 1-3 samp	10
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	LOG		DISTRICT: Louisville								Н	-13C	SER
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NECT: Fuze & Booster	/RVAAP			4. LOCA	ATION: F	uze &	Booster	Quarry	/ Landf	ill/Pon	d		
JE OF DRILLER:	eva Kin	1 /		6. MANUFACTURERS DESIGNATION OF DRILLY									
AND TYPES OF DRILLING WPLING EQUIPMENT	53 M	W/51-12	the it	B. HOLE LOCATION: K-30 084									
		3		9. SURFACE ELEVATION:									
10. DATE STARTED: 1 1-13 00 11. DATE COMPLETED:										ETED:	11-13-0	3	
OVERBURDEN THICKNESS \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \													
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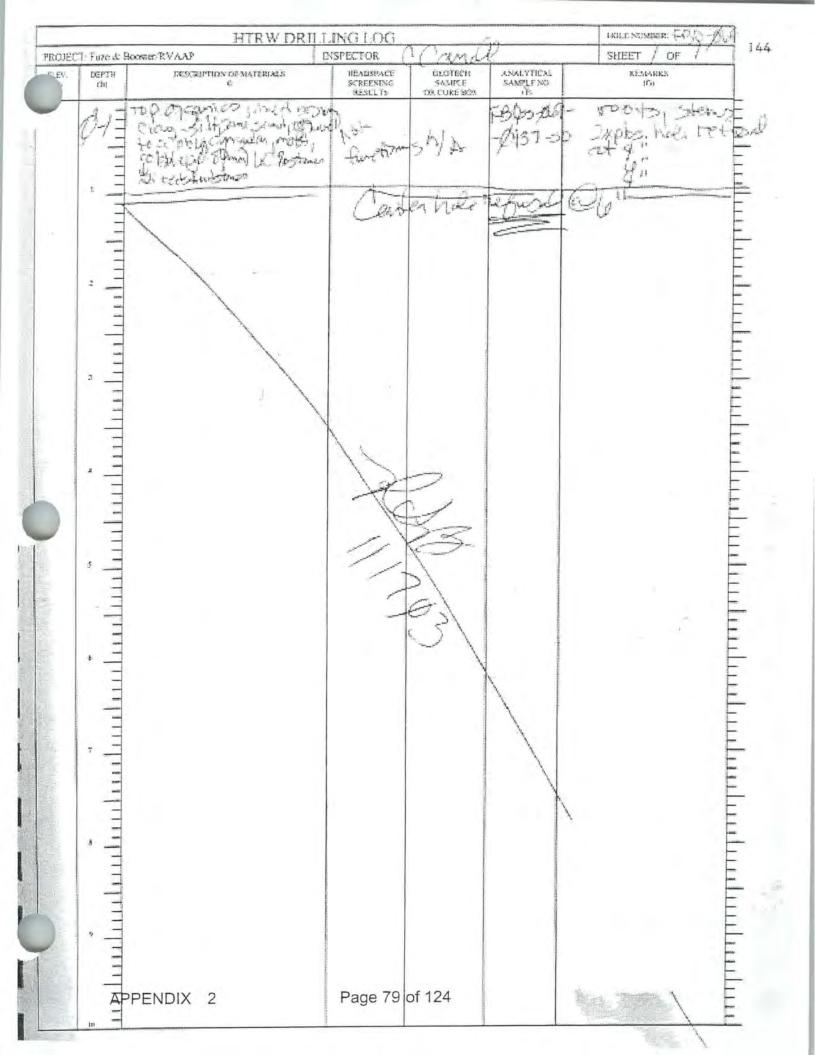
TASK TEAM ACTIVITY LOG SHEET	13
PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012	
Date (mm/dd/yy): 1 3 8 Su M Tu W Th B Sa PAGE OF 1	
Andrew /	
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Narrative (include time and location): 1509 (Vivive of FBO-670 (Steve classic))	(الان
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TRW DRILLING		DIST	RICT: Louis	ritle			HOLE NUMBER
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ROJECT: Fuze & Booster/F	RVAAP		4. L	OCATION:	Fuze & Booster (	Quarry Landfill/Pond	
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DISMIDN OF HOLE 17 / 14	BACKFILLED	MONITORING WELL	OTHER (S	PECIFY)	23. SIGNATURE OF INSE	PECTOR /	RECOVERY %
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APPENDIX 2	Page 76 of 124		

TASK TEAM ACTIVITY LOG SHEET	1000 (C)
PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 001:	2
Date (mm/dd/yy): 11-13-123 Su M Tu W (Tr) F Sa PAGE 1 OF 1  ask Team Members:  Undus Land	
arrative (include time and location): 15.45 Quitor at FBU-069 (Stewar Closued prior) 15.46 Boan to Souple FBU-5-069-0437-50	
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y Wealther Conditions: A.M.	
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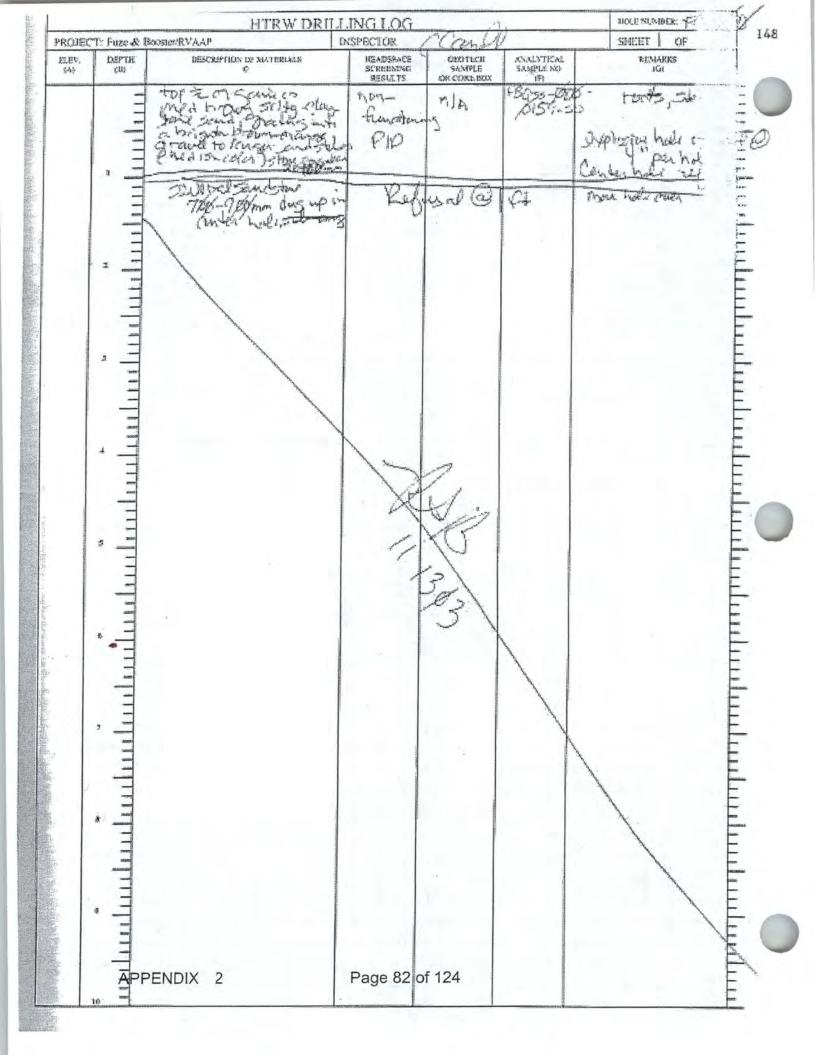
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TASK TEAM ACTIVITY LOG SHEET	
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## TASK TEAM ACTIVITY LOG SHEET

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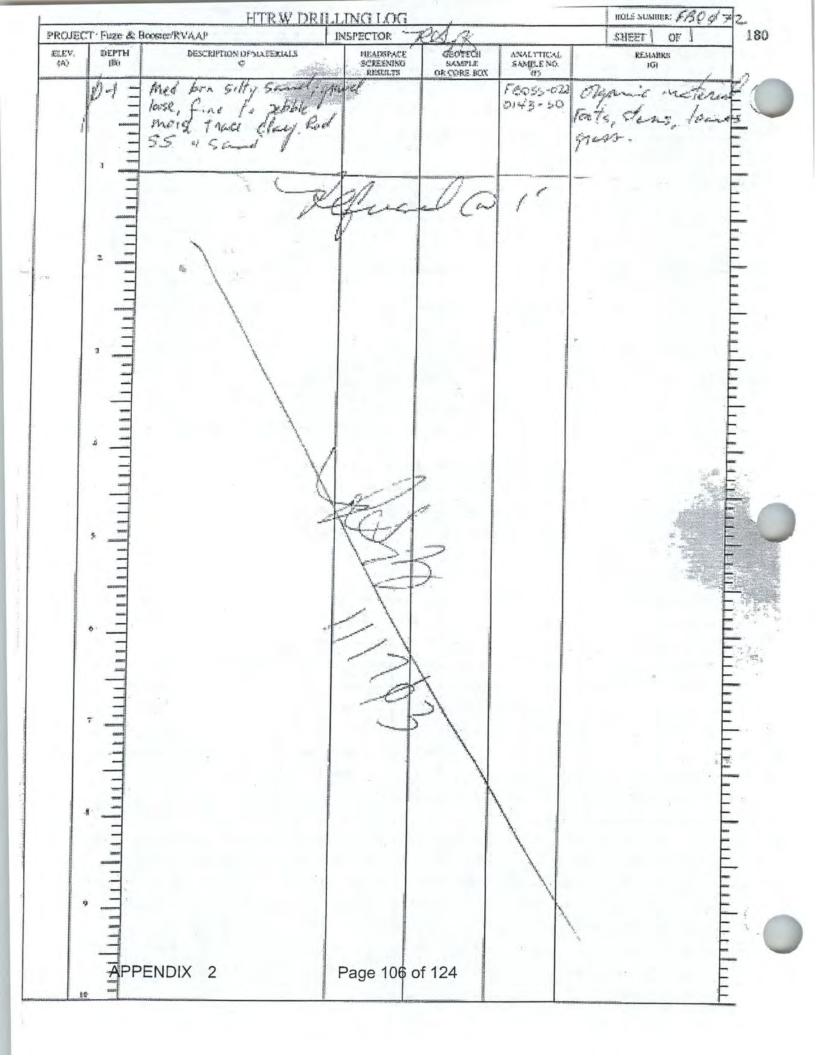
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PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012	And the second s
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RW DRILLING	LOG	DISTRICT: Louis	FIST GC										
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ROJECT: Fuze & Booster	/RVAAP	4.	4. LOCATION: Fuze & Booster Quarry Landfill/Pond										
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Date (mm/dd/yy): 11170 5 Su M Tu W Th F Sa FAGE OF Task Team, Members:
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Narrative (include time and location):
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APPENDIX 2 Page 104 of 124

TRW DRILLING LOG							ouisville.									HOLE NUMBER									
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PROJECT	Fuze	& B	ooster	/RVAAF	,		==					4. LOCATION: Fuze & Booster Quarry Landfill/Pond													
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Recorded By Army #100maura
APPENDIX 2 Page 107 of 124

HTR	HTRW DRILLING LOG									DISTRICT: Louisville											HOLE NUMBER						
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PROJE	ст: F	uze	& B	ooste	er/RV	AAP								1	4. LOC	ATION	: Fu	ze & E	Boos	ter Q	uarry	Land	fill/Pon	d			
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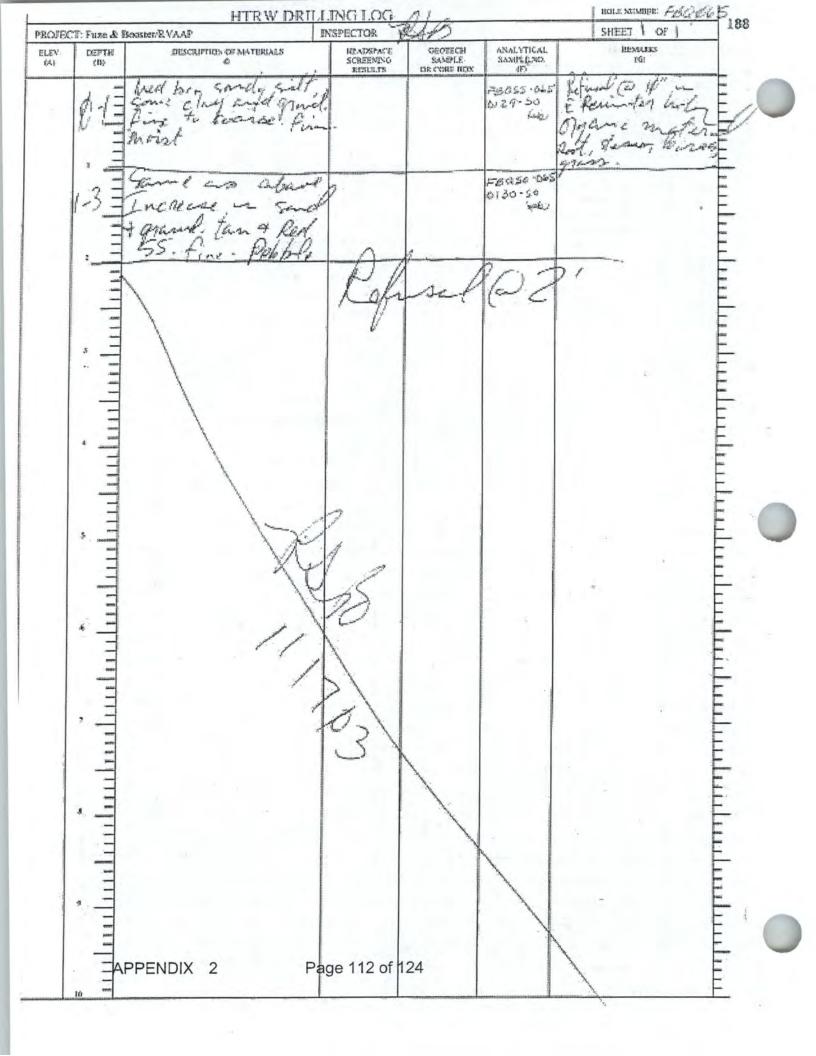
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Narrative (include time and location):
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APPENDIX 2

Page 110 of 124

4.												
TRW DRILLING LOG	DISTRICT: L	_ouisville	HOLE NUMBER									
OMPANY NAME SpecPro, Inc.	2. DRILL SUB	UBCONTRACTOR:										
ROJECT: Fuze & Booster/RVAAP		4. LOCATION: Fuze & Booster Quarry Landfill/Pond										
AME OF DRILLER: Steve King		6. MANUFACTURERS DESIGNATION OF DRILL!										
ES AND TYPES OF DRILLING SAIPLING EQUIPMENT		B. HOLE LOCATION: FBQ 065										
SAMPLING ENGINEERS	Ď.	9. SURFACE ELEVATION: N/										
35 aug	er	10. DATE STARTED: ///7/3 11. DATE COMPLETED: 11-17-0										
		10, DATE START	ED: ///7/95		11-17.03							
VERBURDEN THICKNESS			UNDWATER ENCOUNTER									
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POSITION OF HOLE BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPE	CTOR DOS	3							
ATION SKETCH/COMMENTS Se	e Pg 17,	/	SCALE:									



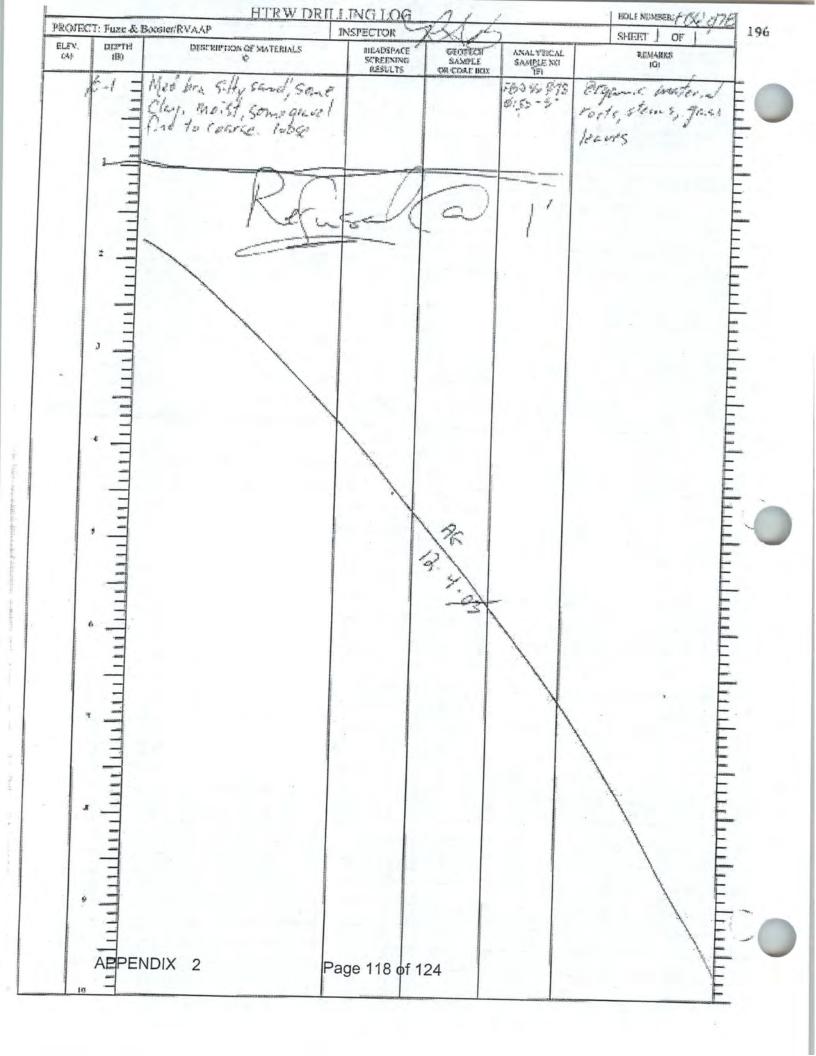
PROJECT NAME: Phase I/II Fuze & Booster Quarry Landfill/Pond DELIVERY ORDER: 0012
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Recorded By The Grant OA Checked By Unity HOOM WALL

TRW DRILLING	LOG	DISTRICT: I	DISTRICT: Louisville HOLE F60									
COMPANY NAME: SpecPr	o, Inc.	2. DRILL SUE	BCONTRACTOR:		SHEET OF							
PROJECT: Fuze & Booste	r/RVAAP		4. LOCATION:	Fuze & Booster Qua	arry Landfill/Pond	nd						
NAME OF DRILLER:	terre King		6. MANUFACTURERS DESIGNATION OF DRILL:									
IZES AND TYPES OF DRILLING SAMPLING EQUIPMENT	35 5000	1	8. HOLE LOCAT	TON: FBG F	6							
	\$5 ho	-P	9. SURFACE EL	EVATION: 4/c								
	73 (10.	7	10. DATE STAR	11. DATE COMPLET	TED: 13-17-03							
OVERBURDEN THICKNESS	n/e		15. DEPTH GRO	RED: h/L	11-17-03							
DEPTH DRILLED INTO ROCK	u/c		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRIL									
TOTAL DEPTH OF HOLE	2'		17. OTHER WAT	ER LEVEL MEASUREMEN	NTS (SPECIFY):	1/2						
GEOTECHNICAL SAMPLES	DISTURBED	UNDISTU	JRBED 19. T	OTAL NUMBER OF CORE	BOXES							
AMPLES FOR CHEMICAL ANALYSIS	vac	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %						
SPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPE	ECTOR 1	7						
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ELEY (A)	DEPTH (II)	DESCRIPTION OF MATERIALS	READSPACE SCREENING RESULTS	GEOTECH SAMPLE OR CORE INX	ANALYTICAL SAMPLE SO SEE	SEMARES (G)
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PROJECT N	AME: Phase I/II FL	ıze & Booster Qu	iarry Landfill/Po	nd DELI	VERY ORDER: 0012
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TRW DRILLING LOG		DISTRICT: Louisville  HOLE NUMBER FBC 478										
OMPANY NAME: SpecPro, Inc.		2. DRILL SUBC	ONTRACTOR:			SHEET OF						
DIMAR			4. LOCATION: Fu:	ze & Booster Quarr	ry Landfill/Pond							
PROJECT: Fuze & Booster/RVAAP	1/ .		6. MANUFACTURERS DESIGNATION OF DRILL:									
NAME OF DRILLER: SLP UP	Kini		B. HOLE LOCATION	N: FBQ do	9							
SIZES AND TYPES OF DRILLING ND SAMPLING EQUIPMENT	SPOOL		9. SURFACE ELEV	./								
<u> </u>	SOUTEN				11. DATE COMPLET	FD:						
	)		10. DATE STARTE			11-17-03						
2. OVERBURDEN THICKNESS	1/2			NDWATER ENCOUNTERS								
3. DEPTH DRILLED INTO ROCK	~/		16. DEPTH TO WA	ATER AND ELAPSED TIME	AFTER DRILLING CO	DMPLETED:						
4. TOTAL DEPTH OF HOLE	17		17. OTHER WATE	R LEVEL MEASUREMENT	TS (SPECIFY):	1/2						
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8. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTU	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %						
SAMPLES FOR CHEMICAL ANALYSIS			OTHER (SPECIFY)	23. SIGNATURE OF INSPE	CTOR A	2						
22. DISPOSITION OF HOLE	BACKFILLED	NITORING WELL	O (NEX 19FEU) 11	700	17							
LOCATION SKETCH/COMMENTS	Sè	e 721	191	SCALE:								
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PROJECT NAME: Phase I/II Fuze & Booster Quarry Land	fill/Pond DELIVERY ORDER: 0012
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HTRI	HTRW DRILLING LOG								DISTRICT: Louisville											HOLE NUMBER								
1. COMPA	NY NAI	ME: S	pec	Pro,	Inc.						2. DF	RILL S	UBCOM	VTRAC	TOR:		700							SHEET !	_ OF	1		
3. PROJEC	T: Fu	ze &	Воо	ster/	RVA	AP							1	4. LOC	ATION:	Fuz	& B	ooste	r Qu	arry	Land	fill/Pon	ıd					
5. NAME O	F DRIL	LER:	1	400	Pre	1	Lir	_							UFACT					_	_				_	_		
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3. DEPTH (	DRILLE	D INTO	ROC	K			1/	_					16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLIN							RILLING	G COMPLETED:							
4. TOTAL D	TOTAL DEPTH OF HOLE												17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):								Y):	n/c						
8. GEOTECHNICAL SAMPLES DISTURBED											UN	NDIST	JRBED		19. T	OTAL	NUMB	ER OF	CORE	BOXE	s							
SAMPLES FOR CHEMICAL ANALYSIS VOC							META	ALS	-	OTH	ER (SP	ECIFY)	+	OTHER	(SPECIF	Y	0	THER (S	SPECIFY)	_	21. TOTAL CORE RECOVERY %							
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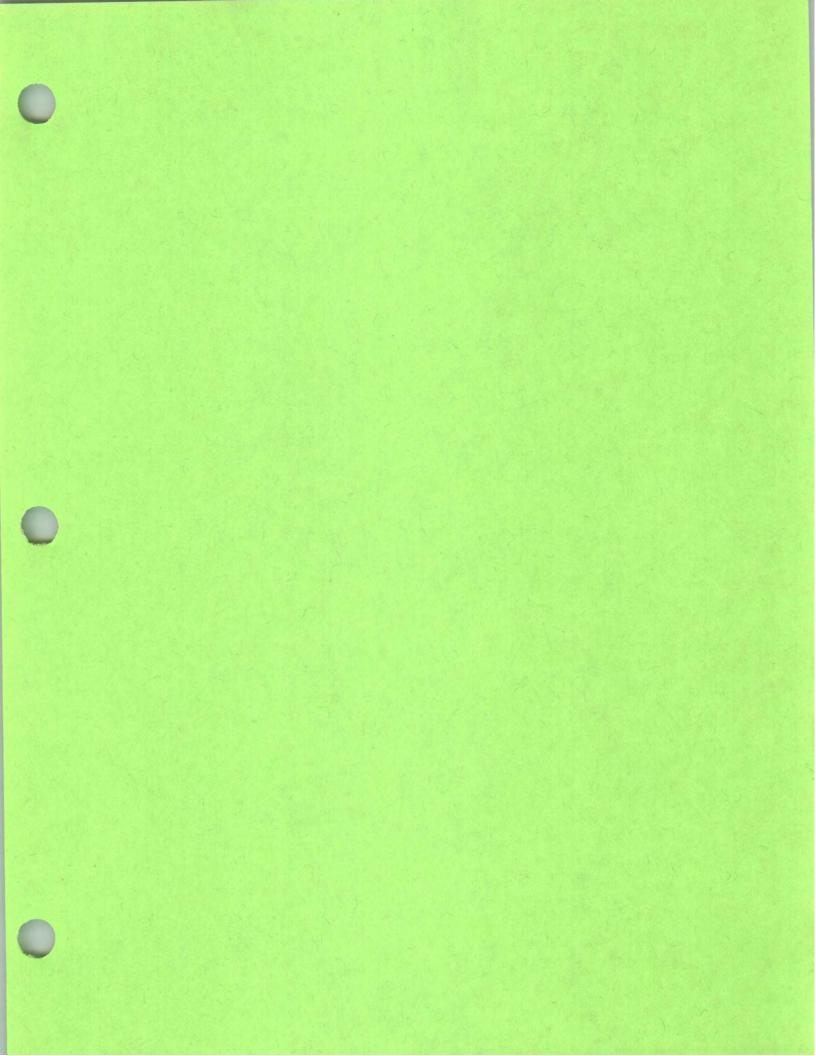
Date (mm/dd/yy): [1703] Su M Tu W Th F Sa PAGE 1 OF 1 Task Team Members:  Kondo I work  Sent May  Variety (include time and location):  1445 - Urning (2) FBQ 673 . Jeaned by  Sam of Febres-1073 - 1014	201
Date (mm/dd/yy): [1707] Su M/Tu W Th F Sa PAGE _ OF _ Task Team Members:    Now   No	
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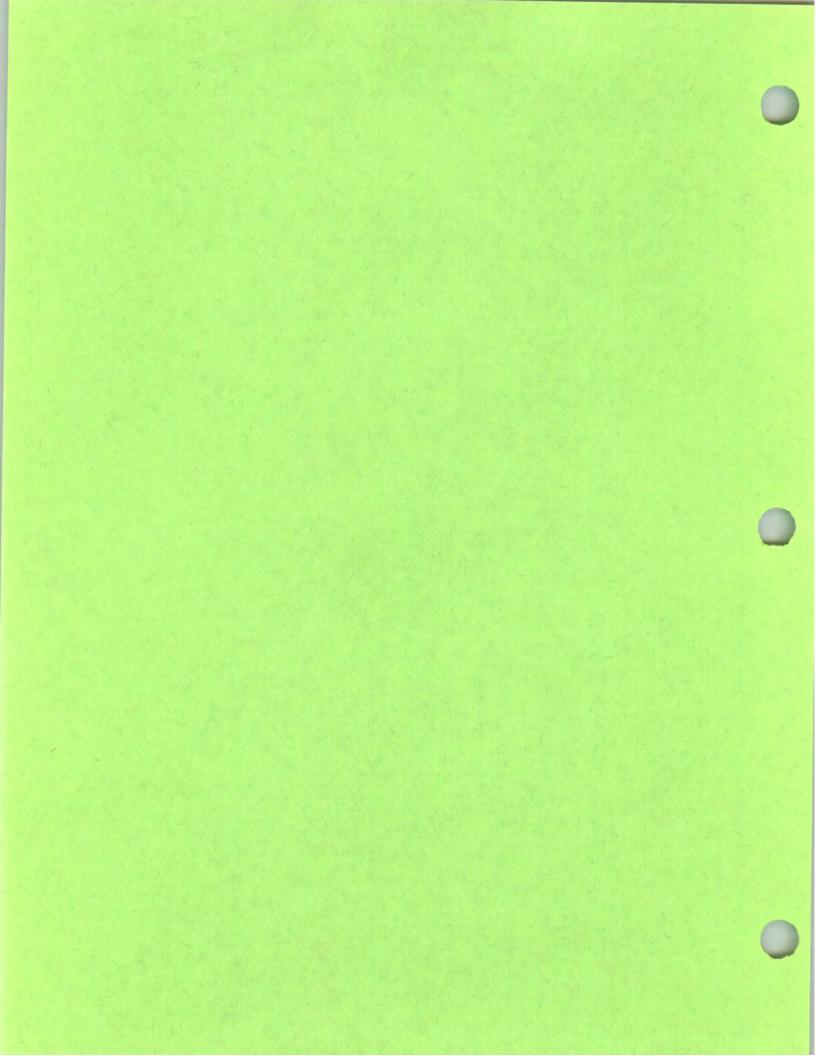
Daily Weather Conditions: A.M.

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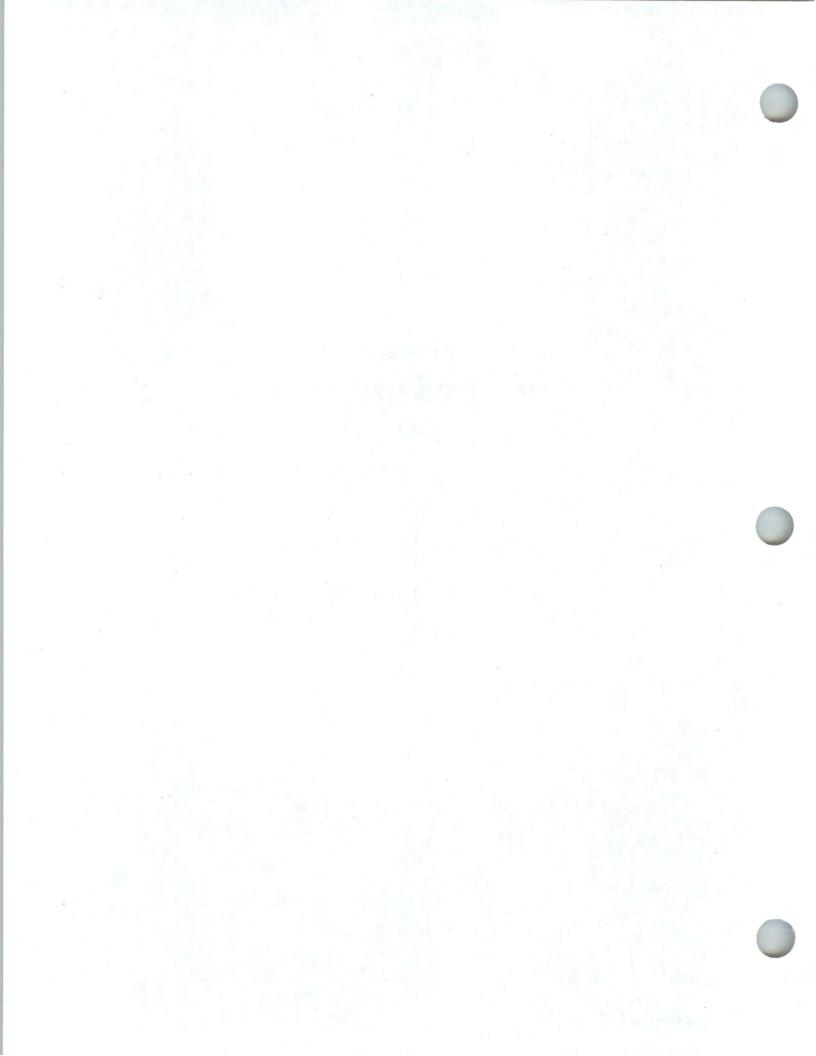
HTRW D	RILLIN	G LOC	3	-			DISTRIC	T: Lo	livaiu	е								_	FS	DE NUM	73
COMPANY NA	ME: SpecF	Pro, Inc.					2. DRILL	SUBC	ONTRAC	CTOR	t:								SH	EET 1	OF_
PROJECT: FI	uze & Boos	ster/RVAA	P						4. LO	CATIO	ON: F	uze &	Воо	ster	Quar	ry La	ndfil	I/Pond	Н		
NAME OF DRIL		Indre	- 1	Th.					6. MA	NUFA	CTUR	ERS D	ESIGN	AOITA	OF D	RILL:					
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OVERBURNE	NTHICKNESS		1/6						15. DE	PTH	GROU	NDWA	TER E	NCOU	NTER		in	k			
	ED INTO ROC	к	-	/c					16. DE	РТН	TO WA	ATER A	ND EL	APSE	D TIME	AFTE	R DRI	LLING		ETED:	
TOTAL DEPTH	H OF HOLE	,	2/						17. OT	HER	WATE	R LEVI	EL ME	ASURE	EMENT	S (SPI	ECIFY	0	1/2		
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		Booster/RVAAP	DASPECTOR DASPECTOR	Kal.	7	SHEET   OF ]	204
403 403	(B)	DESCRIPTION OF MATERIALS	HEALISPACE SCREENING	GEOTECH SAMPLE GEOORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (5)	
	Z-1 =	med ben silly sand gagarde charter to though down to 8". Sobble monde Fred	and the same	ON CORE BOX	F=0.5074 014 J - 50	non c Meterial alts stems, knis	
	2	It born Claryey selt  Typing a typing on the  First probably from  The Coarse Transport  The density complete  Sand with lepter  Sand with			F-60.30-578 66.45-50		
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## APPENDIX A-3 LABORATORY ANALYTICAL DATA



Fuze and booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 061	FBQ 062	FBQ 063	FBQ 064	FBQ 065
Sample ID		FBQSS-061-0121-SO	FBQSS-062-0123-SO	FBQSS-063-0125-SO	FBQSS-064-0127-SO	FBQSS-065-0129-SO
Date Collected		11/14/2003	11/17/2003	11/14/2003	11/14/2003	11/17/2003
Depth (ft)		0-1'	0-1'	.1-0	0-1,	0-1.
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
1,3,5-Trinitrobenzene	µg/kg	100U	1000	1000	100U	1000
1,3-Dinitrobenzene	µg/kg	100U	100U	100U	1000	1000
2,4,6-Trinitrotoluene	µg/kg	1000	100U	1001	1000	1000
2,4-Dinitrotoluene	µg/kg	1000	100U	100U	1000	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	100U	100U	1000	1000	1000
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	1000	1000	1000	1000	1000
4-Amino-2,6-Dinitrotolue	µg/kg	1000	1000	100U	1000	1000
4-Nitroaniline	µg/kg	N/A	N/A	N/A	N/A	N/A
HMX	µg/kg	200U	2000	280	200U	2000
m-Nitrotoluene	µg/kg	1001	200U	200U	200U	2000
Nitrobenzene	µg/kg	1000	331	1000	100N	1000
Nitrobenzene	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	2000	200U	200U
p-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
RDX	µg/kg	2000	200U	200U	200U	200U
Tetryl	µg/kg	200U	200U	200U	200U	200U

Surface Soil Explosives and Propellants Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 066	FBQ 067	FBQ 068	FBQ 069	FBQ 070
Sample ID		FBQSS-066-0131-SO	FBQSS-067-0133-SO	FBQSS-068-0135-SO	FBQSS-069-0137-SO	FBQSS-070-0139-SO
Date Collected		11/17/2003	11/14/2003	11/14/2003	11/13/2003	11/13/2003
Depth (ft)		0-1'	0-1,	0-1,	0-1,	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					olloodinoo
1,3,5-Trinitrobenzene	µg/kg	1000	100U	100U	1000	1000
1,3-Dinitrobenzene	µg/kg	1000	100U	1000	100U	1000
2,4,6-Trinitrotoluene	µg/kg	100U	100U	100U	1000	100N
2,4-Dinitrotoluene	µg/kg	100U	1000	100U	100U	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	100U	100U	100U	100U	100N
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	1000	100U	100U	100U	1000
4-Amino-2,6-Dinitrotolue µg/kg	µg/kg	100U	100U	100U	100U	100N
4-Nitroaniline	µg/kg	N/A	N/A	N/A	N/A	N/A
HMX	µg/kg	200U	200U	200U	2000	200U
m-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
Nitrobenzene	µg/kg	100U	100U	100U	100U	100U
Nitrobenzene	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
p-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
RDX	µg/kg	200U	200U	200U	200U	2000
Tetryl	µg/kg	200U	200U	200U	2000	2001

Page A3-2

Inface Soil Explosives and Propellants Analytical Results S Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

ary Table

Station ID		FBQ 071	FBQ 072	FBQ 073	FBQ 074	FBQ 075
Sample ID		FBQSS-071-0141-SO	FBQSS-072-0143-SO	FBQSS-073-0145-SO	FBQSS-074-0147-SO	FBQSS-075-0149-SO
Date Collected		11/17/2003	11/17/2003	11/17/2003	11/11/2003	11/13/2003
Depth (ft)		0-1,	0-1'	0-1'	0-1,	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
	Units					
1,3,5-Trinitrobenzene	µg/kg	1000	100U	1000	100U	10001
1,3-Dinitrobenzene	µg/kg	100U	100U	1000	1000	1000
2,4,6-Trinitrotoluene	µg/kg	1000	100U	1000	1000	1000
2,4-Dinitrotoluene	µg/kg	1000	1000	1000	1000	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	100U	1000	1000	100U	1000
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	100U	1000	1000	1000	1000
4-Amino-2,6-Dinitrotolue µg/kg	µg/kg	10001	10001	100U	100U	1000
4-Nitroaniline	µg/kg	N/A	N/A	N/A	N/A	N/A
HMX	µg/kg	2000	200U	200U	200U	200U
m-Nitrotoluene	µg/kg	2000	200U	200U	200U	200U
Nitrobenzene	µg/kg	100U	1000	623	100U	1000
Nitrobenzene	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
p-Nitrotoluene	µg/kg	200U	2000	200U	200U	200U
RDX	µg/kg	2000	200U	200U	200U	200U
Tetryl	µg/kg	200U	200U	200U	200U	1703

Surface Soil Explosives and Propellants Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 076	FBQ 077	FBQ 078	FBQ 079	FBO 080
Sample ID		FBQSS-076-0151-SO	FBQSS-077-0153-SO	FBQSS-078-0155-SO	FBQSS-079-0157-SO	FROSS-080-0159-SO
Date Collected		11/13/2003	11/17/2003	11/17/2003	11/12/2003	11/13/2003
Depth (ft)		0-1,	0-1,	0-1,	0-1,	0.41
Sample Type		Composite	Composite	Composito	- Francisco	5
	Units		o di co	alleodino	Composite	Composite
1,3,5-Trinitrobenzene	µg/kg	1000	1000	100U	1000	10011
1,3-Dinitrobenzene	µg/kg	100U	100U	1000	100N	1001
2,4,6-Trinitrotoluene	µg/kg	100U	1000	1000	100U	1000
2,4-Dinitrotoluene	µg/kg	100U	1000	100U	470U	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	1000	N/A
2,6-Dinitrotoluene	µg/kg	100U	100U	100U	470U	10001
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	100U	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	100U	100U	100U	100U	10011
4-Amino-2,6-Dinitrotolue	µg/kg	100U	100U	100U	100U	10011
4-Nitroaniline	µg/kg	N/A	N/A	N/A	470U	N/A
HMX	µg/kg	200U	200U	200U •	200U	2001
m-Nitrotoluene	µg/kg	200U	200U	200U	200U	2000
Nitrobenzene	µg/kg	100U	50J	f99	470U	1000
Nitrobenzene	µg/kg	N/A	N/A	N/A	100U	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	38	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	10000U	N/A
Nitroguanidine	µg/kg	N/A	N/A	ΝΆ	130U	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	2000	200U
p-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
RDX	µg/kg	200U	200U	200U	2000	200U
Tetryl	µg/kg	200U	200U	200U	2000	2001

Irface Soil Explosives and Propellants Analytical Results S Fuze and pooster Quarry Ponds Draft Remedial Investigation Report

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Station ID		FBQ 081	FBQ 082	FBQ 083	FBQ 084	FBQ 085
Sample ID		FBQSS-081-0161-SO	FBQSS-082-0163-SO	FBQSS-083-0165-SO	FBQSS-084-0167-SO	FBQSS-085-0169-SO
Date Collected		11/11/2003	11/11/2003	11/13/2003	11/13/2003	11/13/2003
Depth (ft)		0-1'	0-1'	0-1,	0-1,	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
	Units					
1,3,5-Trinitrobenzene	µg/kg	1000	100U	1000	1000	1000
1,3-Dinitrobenzene	µg/kg	1000	1000	100U	100N	1000
2,4,6-Trinitrotoluene	µg/kg	1000	1000	1000	1000	1000
2,4-Dinitrotoluene	µg/kg	100U	1000	410U	3900	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	100U	100U	N/A
2,6-Dinitrotoluene	µg/kg	1000	100U	4100	3900	1000
2,6-Dinitrotoluene	µg/kg	N/A	N/A	100U	1000	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	1000	10001	1000	1000	1000
4-Amino-2,6-Dinitrotolue	µg/kg	1000	1000	1000	1000	100U
4-Nitroaniline	µg/kg	N/A	N/A	4100	3900	N/A
HMX	µg/kg	200U	200U	200U	200U	200U
m-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
Nitrobenzene	µg/kg	70JB	37JB	4100	3900	1000
Nitrobenzene	µg/kg	N/A	N/A	1000	1000	N/A
Nitrocellulose	µg/kg	N/A	N/A	44	20	N/A
Nitroglycerine	µg/kg	N/A	N/A	10000U	10000U	N/A
Nitroguanidine	µg/kg	N/A	N/A	130U	130U	N/A
o-Nitrotoluene	µg/kg	2000	200U	200U	200U	200U
p-Nitrotoluene	µg/kg	2000	200U	200U	200U	200U
RDX	µg/kg	2000	200U	200U	200U	200U
Tetryl	µg/kg	200U	Z000	200U	200U	200U

Surface Soil Explosives and Propellants Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 086	FBQ 087	FBQ 088	FBQ 089	FBO 090
Sample ID		FBQSS-086-0171-SO	FBQSS-087-0173-SO	FBQSS-088-0175-SO	FBQSS-089-0177-SO	FBOSS-090-0179-SO
Date Collected		11/17/2003	11/17/2003	11/11/2003	11/11/2003	11/11/2003
Depth (ft)		0-1,	0-1,	0-1,	0-1,	0-1,
Sample Type		Composite	Composite	Composite	Composito	office among
Analyte	Units				preoduco	allegalle
1,3,5-Trinitrobenzene	µg/kg	100U	100U	100U	1000	1001
1,3-Dinitrobenzene	µg/kg	100U	100U	100U	1000	1001
2,4,6-Trinitrotoluene	µg/kg	1000	100U	100U	100U	1000
2,4-Dinitrotoluene	µg/kg	100U	100U	1000	100U	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	100U	100U	100U	1000	1000
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	100U	100U	100U	100U	1000
4-Amino-2,6-Dinitrotolue	µg/kg	100U	100U	100U	100U	1000
4-Nitroaniline	µg/kg	N/A	N/A	N/A	N/A	N/A
HMX	µg/kg	200U	200U	200U	200U	200U
m-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
Nitrobenzene	µg/kg	100U	100U	100U	1000	1000
Nitrobenzene	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A.	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
p-Nitrotoluene	µg/kg	200U	2000	200U	2000	2000
RDX	µg/kg	200U	200U	200U	200U	200U
Tetryl	µg/kg	2000	200U	200U	200U	20011

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Station ID		FBQ 091	FBQ 092	FBQ 093	FBQ 094	FBQ 095
Sample ID		FBQSS-091-0181-SO	FBQSS-092-0183-SO	FBQSS-093-0185-SO	FBQSS-094-0187-SO	FBQSS-095-0189-SO
Date Collected		11/11/2003	11/11/2003	11/11/2003	11/12/2003	11/12/2003
Depth (ft)		0-1'	0-1,	0-1'	0-1.	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
1,3,5-Trinitrobenzene	µg/kg	100U	100U	1000	1000	100U
1,3-Dinitrobenzene	µg/kg	1000	1000	100U	100U	1000
2,4,6-Trinitrotoluene	µg/kg	110	1000	1000	100U	1000
2,4-Dinitrotoluene	µg/kg	696	1000	1000	1000	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	1000	1000	1000	1000	1000
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	100U	1000	100U	1000	1000
4-Amino-2,6-Dinitrotolue	µg/kg	100U	1000	1000	100U	1000
4-Nitroaniline	µg/kg	N/A	N/A	N/A	N/A	N/A
HMX	µg/kg	200U	2000	200U	200U	200U
m-Nitrotoluene	µg/kg	200U	200U	2000	2000	200U
Nitrobenzene	µg/kg	1000	1000	1000	1000	1000
Nitrobenzene	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	2000	200U	200U	200U	2000
p-Nitrotoluene	µg/kg	2000	200U	2000	200U	200U
RDX	µg/kg	200U	200U	200U	200U	200U
Tetryl	µg/kg	2000	200U	200U	200U	2000

Surface Soil Explosives and Propellants Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 096	FBQ 097	FBQ 098	FBQ 099	FBQ 100
Sample ID		FBQSS-096-0191-SO	FBQSS-097-0193-SO	FBQSS-098-0195-SO	FBQSS-099-0197-SO	FBQSS-100-0199-SO
Date Collected		11/12/2003	11/12/2003	11/12/2003	11/11/2003	11/11/2003
Depth (ft)		0-1'	0-1'	0-1,	0-1'	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
1,3,5-Trinitrobenzene	µg/kg	100U	100U	100U	100U	100U
1,3-Dinitrobenzene	µg/kg	100U	100U	100U	1000	100U
2,4,6-Trinitrotoluene	µg/kg	100U	100U	100U	100U	100U
2,4-Dinitrotoluene	µg/kg	100U	100U	100U	1000	100U
2,4-Dinitrotoluene	µg/kg	N/A	N/A	100U	N/A	N/A
2,6-Dinitrotoluene	µg/kg	100U	100U	410U	100U	100U
2,6-Dinitrotoluene	µg/kg	N/A	N/A	100U	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	100U	100U	100U	1000	1000
4-Amino-2,6-Dinitrotolue	µg/kg	100U	1000	100U	1000	1000
4-Nitroaniline	µg/kg	N/A	N/A	410U	N/A	N/A
HMX	µg/kg	200U	200U	200U	200U	2000
m-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
Nitrobenzene	µg/kg	100U	100U	410U	100U	1000
Nitrobenzene	µg/kg	N/A	N/A	37JB	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	64	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	10000U	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	130U	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	200U	2000
p-Nitrotoluene	µg/kg	2000	200U	200U	200U	200U
RDX	µg/kg	200U	200U	200U	200U	200U
Tetryl	ug/kg	200U	200U	200U	200U	2001

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face Soil Inorganics Analytical Results Summary Tab	Fuze and Booster Quarry Ponds Draft Remedial Investigation Rep	

Station ID		FBQ 061	FBQ 062	FBQ 063	FBQ 064	FBQ 065
Sample ID		FBQSS-061-0121-SO	FBQSS-062-0123-SO	FBQSS-063-0125-SO	FBQSS-064-0127-SO	FBQSS-065-0129-SO
Date Collected		11/14/2003	11/17/2003	11/14/2003	11/14/2003	-
Depth (ft)		0-1,	0-1'	0-1,	0-1,	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	16400	16600	16200	11500	11200
Antimony	mg/kg	0.5BN	0.28UN	0.48BN	0.24BN	0.31IN
Arsenic	mg/kg	12.7	11N	9.8	7.5	12.5N
Barium	mg/kg	78.8N	90.3	N8.96	66.5N	55.7
Beryllium	mg/kg		0.73	0.73E	0.57E	0.52
Cadmium	mg/kg	0.03U*	0.07	0.03U*	0.03U*	0.078
Calcium	mg/kg	385	553	471	211	246
Chromium	mg/kg	22.8N	22.9	21.4N	14.6N	14.3
Chromium, Hexavalent	mg/kg	N/A	N/A	N/A	A/A	N/A
Cobalt	mg/kg	9.3	9.5	10.9	10.4	10.2
Copper	mg/kg	21.6	14.6	14.8	10.1	1 1
Iron	mg/kg	27600	25100	24700	16500	18800
Lead	mg/kg	21.3	15.8	18.5	17	13.7
Magnesium	mg/kg	2760N	3210N	2900N	1850N	24Z0N
Manganese	mg/kg	672	634	764	716	537
Mercury	mg/kg	0.03B	0.02B	0.03B	0.038	0.018
Nickel	mg/kg	17.8	20.7	18.8	15	16.2
Potassium	mg/kg	1480N	1460N	1350N	755N	N296
Selenium	mg/kg	0.68B	0.3U	0.678	0.518	0.310
Silver	mg/kg	0.050	0.06U	0.05U	0.05U	0.06U
Sodium	mg/kg	74.4	71.2	83.3	69.3	52.38
Thallium	mg/kg	0.42U	2.1	0.44U	0.410	1.78
Vanadium	mg/kg	30	28.6	28.2	22.5	21.3
Zinc	mg/kg	59	55	6.99	55	46.9

Page. 4-3-9

Suface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 066	FBQ 067	FBQ 068	FBQ 069	FBQ 070
Sample ID		FBQSS-066-0131-SO	FBQSS-067-0133-SO	FBQSS-068-0135-SO	FBQSS-069-0137-SO	FBQSS-070-0139-SO
Date Collected		11/17/2003	11/14/2003	11/14/2003	11/13/2003	11/13/2003
Depth (ft)		0-1,	0-1,	0-1,	0-1,	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	16100	12400	11700	3470	5120
Antimony .	mg/kg		0.22BN	0.42BN	0.35BN	0.25BN
Arsenic	mg/kg	11.	17.8	9.6	6.2	8.4
Barium	mg/kg		49.6N	72.3N	37.7N	34.4N
Beryllium	mg/kg	0.75	0.58E	0.58E	0.47E	0.45E
Cadmium	mg/kg		0.02U*	0.02U*	0.02U*	0.02U*
Calcium	mg/kg		307	1160	924	1420
Chromium	mg/kg		18.5N	16.8N	10N	10.4N
Chromium, Hexavalent	mg/kg		N/A	N/A	N/A	N/A
Cobalt	mg/kg	10.4	8.4	10.8	5.3	6.1
Copper	mg/kg		23.7	9.8	6.4	9.6
Iron	mg/kg		27800	20600	25800	21100
Lead	mg/kg	17.1	13.7	14.4	11.8	11.6
Magnesium	mg/kg		2680N	2050N	716N	1220N
Manganese	mg/kg		265	709	489	396
Mercury	mg/kg	0.010	0.02B	0.03B	0.010	0.010
Nickel	mg/kg		20.5	14.8	11.2	13
Potassium	mg/kg		1310N	831N	674N	813N
Selenium	mg/kg		0.42B	0.45B	0.5B	0.28B
Silver	mg/kg	0.06U	0.04U	0.04U	0.04U	0.04U
Sodium	mg/kg		6.69	68.6	49.2	26.7
Thallium	mg/kg		0.37U	0.39U	0.41B	0.37U
Vanadium	mg/kg	28.6	21.8	26.1	10	11.3
Zinc	ma/ka		58.3	47	55.8	58.4

Iface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 071	FBQ 072	FBQ 073	FBQ 074	FBQ 075
Sample ID		FBQSS-071-0141-SO	FBQSS-072-0143-SO	FBQSS-073-0145-SO	FBQSS-074-0147-SO	FBQSS-075-0149-SO
Date Collected		11/17/2003	11/17/2003		11/11/2003	11/13/2003
Depth (ft)		0-1,	0-1,	0-1.	0-1.	0-1,
Sample Type	1	Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	12100	8250	14400	13900	13100
Antimony	mg/kg	0.28UN	0.25UN	0.28UN	0.29UN	0.64BN
Arsenic	mg/kg		8.4N	11.4N	18.7	10.9
Barium	mg/kg	40.6	46.4	72.5	53N	104N
Beryllium	mg/kg	0.7	0.92	0.63	22.0	0.7E
Cadmium	mg/kg	0.010	0.87	0.46	0.010	0.94*
Calcium	mg/kg	413	1650	1510	358	531
Chromium	mg/kg	16.7	16.4	20.1	18.8N	18.1N
Chromium, Hexavalent	mg/kg	N/A	N/A	N/A	N/A	N/A
Cobalt	mg/kg	13	10.9	10.7	8.9	10.3
Copper	mg/kg	21.6	68.6	49.7	24.6	28.5
Iron	mg/kg	26800	30100	23000	30600	22800
Lead	mg/kg	17.1	20.3	13.5	17.1	14.5
Magnesium	mg/kg	2570N	2180N	3130N	2880N	2180N
Manganese	mg/kg	368	609	408	312	880
Mercury	mg/kg	0.028	0.010	0.01U	0.01U	0.02B
Nickel	mg/kg	21.6	19.2	18.8	21.4	18.6
Potassium	mg/kg	1270N	1040N	1300N	1370N	1210N
Selenium	mg/kg	0.3U	0.27U	0.3U	0.31U	0.48B
Silver	mg/kg	0.06U	0.05U	0.06U	0.06U	0.04U
Sodium	mg/kg	63	55.3	70.9	73.5	100
Thallium	mg/kg	2	2.6	1.8B	0.49U	0.38U
Vanadium	mg/kg	20.4	16.4	24.3	23.5N	22,4
Zinc	mg/kg	61.8	114	53.6	59.7	77.1

ಿ Suface Soil Inorganics AnalyticುI Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 076	FBQ 077	FBQ 078	FBQ 079	FBO 080
Sample ID		FBQSS-076-0151-SO	FBQSS-077-0153-SO	FBQSS-078-0155-SO	FBQSS-079-0157-SO	FBOS
Date Collected		11/13/2003	11/17/2003	11/17/2003	11/12/2003	+
Depth (ft)		0-1,	0-1,	0-1,	0-1,	0-1,
Sample Type	116	Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	12700	16000	8480	16500	3740
Antimony	mg/kg	0.3	0.27UN	0.28UN	0.31B	0.28UN
Arsenic	mg/kg		12.1N	16.8N	13.5	5.7
Barium	mg/kg		72.2	63	81N	29.8N
Beryllium	mg/kg		0.62	0.56	82.0	0.6
Cadmium	mg/kg	0.19	0.05B	0.11	0.02U	0.17
Calcium	mg/kg		970	1330	814	197
Chromium	mg/kg		21.4	13.4	23.8	7.5N
Chromium, Hexavalent	mg/kg		N/A	N/A	3.4U	NA
Cobalt	mg/kg		10	8.7	12.2	5.8
Copper	mg/kg		27.1	19.5	22N	9
Iron	mg/kg		24500	21400	30400	24800
Lead	mg/kg		12.7	11.8	18.5N	24.7
Magnesium	mg/kg		3100N	2610N	3410	575N
Manganese	mg/kg		347	374	524	625
Mercury	mg/kg		0.010	0.04B	0.02B	0.02B
Nickel	mg/kg		17.9	28.2	23.5	9.7
Potassium	mg/kg		1480N	1100N	1700N	578N
Selenium	mg/kg		0.29U	0.3U	0.68B	0.3U
Silver	mg/kg	0.06U	0.06U	0.06U	0.04U	0.06U
Sodium	· mg/kg		66.5	76	43.8	56.5
Thallium	mg/kg	0.51U	1.7B	2	1.18	0.47U
Vanadium	mg/kg		27	15.3	31.6	9.7N
Zinc	mg/kg		49.7	59.5	N69	55

Page #3-12

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Station ID		FBQ 081	FBQ 082	FBQ 083	FBQ 084	FBQ 085
Sample ID		FBQSS-081-0161-SO	FBQSS-082-0163-SO	FBQSS-083-0165-SO	FBQSS-084-0167-SO	FBQSS-085-0169-SO
Date Collected		11/11/2003	11/11/2003		11/13/2003	11/13/2003
Depth (ft)		0-1,	0-1,	0-1'	0-1,	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	7380	6740	13500	7320	13700
Antimony	mg/kg	0.28BN	0.45BN	0.25B	0.18U	0.27BN
Arsenic	mg/kg	14.1	11.3	13.1	7.9	12.3
Barium	mg/kg	144	49.3	61.5N	44.7N	N6.17
Beryllium	mg/kg	0.73	0.61	0.43	0.54	0.57E
Cadmium	mg/kg	0.2	0.13	0.02U	0.02U	0.03U*
Calcium	mg/kg	6380	4420	176	239	497
Chromium	mg/kg	11.3	10.4	18.3	11.6	21.9N
Chromium, Hexavalent	mg/kg	N/A	N/A	5.8U	2.90	N/A
Cobalt	mg/kg	6.7	6.7	8.4	8,6	9.3
Copper	mg/kg		14.1	13.6N	15.7N	15.3
Iron	mg/kg	21400	18300	26100	23000	25000
Lead	mg/kg	19.1	15.1	12.7N	13.8N	15.1
Magnesium	mg/kg	2180N	1870N	2260	1380	2250N
Manganese	mg/kg	635	383	437	519	489
Mercury	mg/kg	0.01B	0.01B	0.018	0.010	0.02B
Nickel	mg/kg	14.	15.2	14.9	14.2	14.8
Potassium	mg/kg		914N	1100N	881N	1160N
Selenium	mg/kg		0.45B	0.71B	0.47B	0.578
Silver	mg/kg	0.05	0.05U	0.04U	0.03U	0.05U
Sodium	mg/kg		70.2	51.6	30.4	76.2
Thallium	mg/kg	0.43U	0.42U	0.69B	0.76B	0.41U
Vanadium	mg/kg	12.4	11.8	25.7	14.4	27.5
Zinc	mg/kg		60.7	48.8N	72.4N	44.2

Suface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID	-	FBQ 086	FBQ 087	FBQ 088	FBQ 089	FBQ 090
Sample ID		FBQSS-086-0171-SO	FBQSS-087-0173-SO	FBQSS-088-0175-SO	FBQSS-089-0177-SO	FBOSS-090-0179-SO
Date Collected		11/17/2003	11/17/2003	11/11/2003	11/11/2003	11/11/2003
Depth (ft)		0-1,	0-1,	0-1.	0-1,	0.41
Sample Type		Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	16200	21000	17600	3800	0007
Antimony	mg/kg		0.34BN	0.23RM	0316	4080
Arsenic	mg/kg		17.7	12.1	NOC.0	0.28UN
Barium	mg/kg	55.7	79.8	68.5N	25.7	21.0
Beryllium	mg/kg		6.0	0.67	0.48	0.42
Cadmium	mg/kg		0.05B	0.05	0.09	0.078
Calcium	mg/kg		575	939	425	252
Chromium	mg/kg	21.7	27.2	21.6N	8.5	7.8
Chromium, Hexavalent	mg/kg		N/A	N/A	N/A	N/A
Cobalt	mg/kg		9.7	8.1	5.4	4.7
Copper	mg/kg	24	27.2	23.2	8.5	8.7
Iron	mg/kg	30400	34700	26500	20100	15200
Lead	mg/kg		15.6	13.1	14.6	16.9
Magnesium	mg/kg		4290N	2920N	771N	837N
Manganese	mg/kg		243	204	320	251
Mercury	mg/kg		0.02B	0.02B	0.03B	0.02B
Nickel	mg/kg		26.6	17.5	9.8	9.2
Potassium	mg/kg	1600N	2010N	1270N	777N	614N
Selenium	mg/kg		0.51B	0.79B	0.5B	0.37B
Silver	mg/kg		0.06U	0.04U	0.06U	0.06U
Sodium	mg/kg	70.2	78.9	68	52.2B	49.18
Thallium	mg/kg	2.4	0.45U	0.36U	0.51U	0.47U
Vanadium	mg/kg	27.6	34.1	33.8N	10.6	9.3
Zinc	mg/kg	57.1	65.5	49.3	55.1	57.8

Page #3-14

Industrial Policy Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 091	FBQ 092	FBQ 093	FBQ 094	FBQ 095
Sample ID		FBQSS-091-0181-SO	FBQSS-092-0183-SO	FBQSS-093-0185-SO	FBQSS-094-0187-SO	FBQSS-095-0189-SO
Date Collected		11/11/2003	11/11/2003	11/11/2003	11/12/2003	11/12/2003
Depth (ft)		0-1'	,1-0	0-1	0-1"	0-1,
Sample Type		Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	10100	4510	4870	12900	14300
Antimony	mg/kg		0.29UN	0.27UN	0.31UN	0.36BN
Arsenic	mg/kg	12.3	6.7	10.7	8.3	10.3
Barium	mg/kg	96.3	30.8	29.3	88.6N	N9.76
Beryllium	mg/kg	+	0.61	0.53	0.75	0.86
Cadmium	mg/kg	0.3	0.2	0.19	0.068	0.18
Calcium	mg/kg	9250	2860	1510	153	743
Chromium	mg/kg	19.6	8.3	6.6	14.5N	429N
Chromium, Hexavalent	mg/kg	N/A	N/A	N/A	N/A	N/A
Cobalt	mg/kg	7.2	4.4	6.2	11.8	12.3
Copper	mg/kg	18.5	7.6	10.2	8.9	10.4
Iron	mg/kg	20900	17800	23200	18600	19700
Lead	mg/kg	49.5	19.1	20.3	18.3	18.4
Magnesium	mg/kg	Z670N	1050N	1370N	1850N	2150N
Manganese	mg/kg		329	414	1000	1300
Mercury	mg/kg	0.03B	0.02B	0.03B	0.03B	0.02B
Nickel	mg/kg		9.2	13.2	14.3	16.7
Potassium	mg/kg		692N	858N	796N	878N
Selenium	mg/kg	0.93B	0.53B	0.83B	0.57B	0.65U
Silver	mg/kg		0.06U	0.06U	0.17B	0.14U
Sodium	mg/kg	118	57.9	52.1	114	80.6
Thallium	mg/kg	0.48U	0.49U	0.45U	0.52U	10
Vanadium	mg/kg	16.9	9.2	11.3	23.1N	23.5N
Zinc	mg/kg	69.3	63.1	69.5	49.7	60.7

! Suface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 096	FBQ 097	FBQ 098	FBQ 099	FBQ 100
Sample ID		FBQSS-096-0191-SO	FBQSS-097-0193-SO	FBQSS-098-0195-SO	FBQSS-099-0197-SO	FBQSS-100-0199-SO
Date Collected		11/12/2003	11/12/2003	11/12/2003	11/11/2003	-
Depth (ft)		0-1,	0-1,	0-1,	0-1.	0-1.
Sample Type		Composite	Composite	Composite	Composite	Composite
Aluminum	mg/kg	12200	12600	13200	3530	6340
Antimony	mg/kg	0.3UN	0.35BN	0.33B	0.29UN	0.35BN
Arsenic	mg/kg	10	9.1	8.5	7	11.9
Barium	mg/kg		86.6N	64.2N	25.4	34.4
Beryllium	mg/kg		0.67	0.42	0.81	0.48
Cadmium	mg/kg	0.12	0.08	0.02U	0.23	0.12
Calcium	mg/kg		196	326	663	671
Chromium	mg/kg	15N	18.9N	16.3	9.4	13.5
Chromium, Hexavalent	mg/kg		N/A	30	N/A	N/A
Cobalt	mg/kg	11.3	10.9	10.7	4.6	6.5
Copper	mg/kg		8.8	9.8N	7.6	12.2
Iron	mg/kg		18600	20500	26700	19300
Lead	mg/kg		14.5	11.7N	15.2	16.7
Magnesium	mg/kg		1680N	2090	757N	1390N
Manganese	mg/kg		958	456	271	334
Mercury	mg/kg		0.02B	0.02B	0.02B	0.02B
Nickel	mg/kg		15.8	14.6	9.4	13.7
Potassium	mg/kg		739N	N866	694N	1010N
Selenium	mg/kg	0.64U	0.75B	0.5B	0.73B	0.32U
Silver	mg/kg	0.14U	0.13B	0.040	0.06U	0.06U
Sodium	mg/kg	102	101	54.3	47.7B	59.6
Thallium	mg/kg		0.49U	0.61B	0.48U	0.50
Vanadium	mg/kg	21.	23.2N	25.6	12.3	12.8
Zinc	mg/kg	51.5	51.8	51.7N	82.9	63.5





rface Soil SVOCs Analytical Results Summary Table Fuze and Dooster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 032	FBQ 045	FBQ 060	FBQ 079	FBQ 083
Sample ID		FBQSS-032-0063-SO	FBQSS-045-0089-SO	FBQSS-060-0119-SO	FBQSS-079-0157-SO	FBQSS-083-0165-SO
Date Collected		10/8/2003	10/13/2003	10/13/2003	11/12/2003	11/13/2003
Depth (ft)		0-1'	0-1,	0-1,	0-1,	0-1,
Sample Type	1	Grab	Grab	Grab	Grab	Grab
Analyte	Units					
1,1- Biphenyl	µg/kg	420U	380U	430U	470U	410U
2,2-Oxybis(1-Chloroprop	µg/kg	420U	380U	430U	470U	410U
2,4,5-Trichlorophenol	µg/kg	420U	380U	430U	470U	410U
2,4,6-Trichlorophenol	µg/kg	420U	3800	430U	470U	410U
2,4-Dichlorophenol	µg/kg	420U	380U	430U	470U	410U
2,4-Dimethylphenol	µg/kg	420U	3800	430U	470U	410U
2,4-Dinitrophenol	µg/kg	8400	760U	870U	9400	820U
2,4-Dinitrotoluene	µg/kg	420U	380U	430U	470U	4100
2,4-Dinitrotoluene	µg/kg	1000	1000	100U	1000	1000
2,6-Dinitrotoluene	µg/kg	420U	3800	430U	470U	410U
2,6-Dinitrotoluene	µg/kg	1000	1000	100U	100U	100U
2-Chloronaphthalene	µg/kg	420U	380U	4300	470U	410U
2-Chlorophenol	µg/kg	420N	3800	4300	470U	410U
2-Methylnaphthalene	µg/kg	420U	380U	430U	470U	410U
2-methylphenol	µg/kg	420U	380U	430U	470U	410U
2-Nitroaniline	µg/kg	420U	380U	4300	470U	410U
2-Nitrophenol	µg/kg	420U	380U	430U	470U	410U
3,3-Dichlorobenzidine	µg/kg	840U	760U	870U	940U	820U
3-Nitroaniline	µg/kg	420N	380U	430U	470U	410U
4,6-dinitro-2-methyl pher µg/kg	µg/kg	840N	760U	U078 -	9400	820U
4-Bromophenyl-phenylet	µg/kg	420N	380U	4300	470U	4100
4-chloro-3-methylphenol	µg/kg	420N	380U	4300	470U	410U
4-Chloroaniline	µg/kg	420N	380U	430U	470U	410U
4-Chlorophenyl Phenyl E	µg/kg	420N	3800	430U	470U	410U
4-methylphenol	ug/kg	420U	3800	430U	470U	410U

Jage #3-17

<sup>‡</sup> Surface Soil SVOCs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 032	FBQ 045	FBQ 060	FBQ 079	FBQ 083
Sample ID		FBQSS-032-0063-SO	FBQSS-045-0089-SO	FBQSS-060-0119-SO	FBQSS-079-0157-SO	FBQSS-083-0165-SO
Date Collected		10/8/2003	10/13/2003	10/13/2003	11/12/2003	11/13/2003
Depth (ft)		0-1,	0-1,	0-1,	0-1,	11.0
Sample Type		Grab	Grab	Grab	Crah	- Acres
Analyte	Units				GBIO	Clab
4-Nitroaniline	µg/kg	420N	3800	430U	47011	44011
4-Nitrophenol	µg/kg	840N	760U	870U	940U	82011
Acenaphthene	µg/kg	420U	380U	430U	470U	41011
Acenaphthylene	µg/kg	420U	3800	430U	470U	41011
Acetophenone	µg/kg	420U	3800	430U	470U	4100
Anthracene	µg/kg	420U	380U	430U	470U	4100
Atrazine	µg/kg	420U	380U	430U	470U	410U
Benzaldehyde	µg/kg	420U	380U	430U	470U	410U
Benzo(a)anthracene	µg/kg	420U	380U	1907	470U	410U
Benzo(a)pyrene	µg/kg	420N	380U	84J	470U	410U
Benzo(b)fluoranthene	µg/kg	420N	380U	260J	470U	410U
Benzo(g,h,i)perylene	µg/kg	420U	380U	430U	470U	410U
Benzo(k)fluoranthene	µg/kg	420N	380U	85J	470U	410U
Benzyl Butyl Phthalate	µg/kg	420U	3800	430U	470U	410U
工	µg/kg	420U	380U	430U	470U	410U
	µg/kg	420U	380U	430U	470U	410U
bis(2-ethylhexyl) phthala	µg/kg	420N	380U	430U	470U	410U
Caprolactam	µg/kg	420U	380U	430U	470U	410U
Carbazole	µg/kg	420U	3800	430U	470U	410U
Chrysene	µg/kg	420U	3800	370J	470U	410U
Dibenz(a,h)Anthracene	µg/kg	420U	3800	430U	470U	410U
Dibenzofuran	µg/kg	420U	3800	430U	470U	410U
Diethyl Phthalate	µg/kg	420U	380U	430U	470U	410U
Dimethyl Phthalate	µg/kg	420U	380U	430U	470U	410U
di-n-Butyl Phthalate	µg/kg	2403	3800	430U	470U	410U

rface Soil SVOCs Analytical Results Summary Table Fuze and Gooster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 032	FBQ 045	FBQ 060	FBO 079	EBO 083
Sample ID		FBQSS-032-0063-SO	FBQSS-045-0089-SO	FBQSS-060-0119-SO	FROSC 070 0457 CO	500 000 0000
Date Collected		10/8/2003	10/13/2003	10/13/2003	44/42/2002	OS-0010-000-000-0
Depth (ft)		0-1,	0.41	10 10/2000	11/12/2003	11/13/2003
Sample Type			5		0-1,	0-1,
odí.		Grab	Grab	Grab	Grab	Grab
Anaiyie	Units					
di-n-Octyl Phthalate	µg/kg	420U	380U	4300	47011	44011
Fluoranthene	µg/kg	420U	3800	870	47011	4100
Fluorene	µg/kg	420U	3800	430U	47011	4100
Hexachlorobenzene	µg/kg	420U	3800	430U	47011	4100
Hexachlorobutadiene	µg/kg	420U	380U	43011	17011	4100
Hexachlorocyclopentadie µg/kg	µg/kg	420U	3800	43011	47011	4100
Hexachloroethane	ug/kg	420U	38011	1000	4700	4100
Indeno(12.3-c.d)Pyrene	110/60	11007		4300	4/00	410U
southern the old it yield	ha/kd	4200	3800	430U	470U	410U
sophorone	µg/kg	420U	380U	430U	47011	44011
Naphthalene	µg/kg	420U	380U	430U	11071	4100
Nitrobenzene	µg/kg	420U	380U	43011	47011	4100
Nitrobenzene	µg/kg	1000	1000	10011	4100	4100
n-Nitrosodi-n-Propylamir µg/kg	µg/kg	420U	38011	72011	1000	1000
n-Nitrosodiphenylamine	na/ka	42011	2000	0000	4/00	410U
Joseph Life	0	1200	2000	4300	470U	410U
Pentachlorophenol	µg/kg	840N	760U	870U	9400	82011
Phenanthrene	µg/kg	420N	380U	430U	470U	41011
Phenol	µg/kg	420U	3800	430U	470U	41011
Pyrene	µg/kg	420U	380U	640	47011	44011

Gurface Soil SVOCs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 084	FBQ 098
Sample ID		FBQSS-084-0167-SO	FBQSS-098-0195-SO
Date Collected		11/13/2003	11/12/2003
Depth (ft)		0-1,	0-1,
Sample Type		Grab	Grab
Analyte	Units		
1,1- Biphenyl	µg/kg	390U	410U
2,2-Oxybis(1-Chloroprop	µg/kg	390U	410U
2,4,5-Trichlorophenol	µg/kg	390U	410U
2,4,6-Trichlorophenol	µg/kg	390U	410U
2,4-Dichlorophenol	µg/kg	; 390U	410U
2,4-Dimethylphenol	µg/kg	, 390U	410U
2,4-Dinitrophenol	µg/kg	780U	810U
2,4-Dinitrotoluene	µg/kg	390U	410U
2,4-Dinitrotoluene	µg/kg	100U	1000
2,6-Dinitrotoluene	µg/kg	390U	4100
2,6-Dinitrotoluene	µg/kg	100U	100N
2-Chloronaphthalene	µg/kg	3900	410U
2-Chlorophenol	µg/kg	3900	4100
2-Methylnaphthalene	µg/kg	3900	410U
2-methylphenol	µg/kg	3900	410U
2-Nitroaniline	µg/kg	3900	410U
2-Nitrophenol	µg/kg	3900	410U
3,3-Dichlorobenzidine	µg/kg	780U	810U
3-Nitroaniline	µg/kg	3900	410U
4,6-dinitro-2-methyl pher	µg/kg	780U	810U
4-Bromophenyl-phenylet	µg/kg	390U	410U
4-chloro-3-methylphenol	µg/kg	3900	410U
4-Chloroaniline	µg/kg	3900	410U
4-Chlorophenyl Phenyl E	µg/kg	3900	410U
1-mothylphonol	ua/ka	3900	410U

Station ID		FBQ 084	FBQ 098
Sample ID		FBQSS-084-0167-SO	FBQSS-098-0195-SO
Date Collected		11/13/2003	11/12/2003
Depth (ft)		0-1,	0-1,
Sample Type		Grab	Grab
Analyte	Units		
4-Nitroaniline	ид/ка	390U	410U
4-Nitrophenol	µg/kg	780U	810U
Acenaphthene	µg/kg	3900	410U
Acenaphthylene	µg/kg	390U	4100
Acetophenone	µg/kg	390U	410U
Anthracene	µg/kg	390U	4100
Atrazine	µg/kg	3900	410U
Benzaldehyde	µg/kg	390U	410U
Benzo(a)anthracene	µg/kg	390U	410U
Benzo(a)pyrene	µg/kg	390U	410U
Benzo(b)fluoranthene	µg/kg	390U	410U
Benzo(g,h,i)perylene	µg/kg	390U	410U
Benzo(k)fluoranthene	µg/kg	390U	410U
Benzyl Butyl Phthalate	µg/kg	390U	410U
bis(2-chloroethoxy) meth	µg/kg	390U	410U
bis(2-chloroethyl) ether	µg/kg	3900	410U
bis(2-ethylhexyl) phthala	µg/kg	390U	150J
Caprolactam	µg/kg	390U	410U
Carbazole	µg/kg	390U	410U
Chrysene	µg/kg	. 390U	410U
Dibenz(a,h)Anthracene	µg/kg	390U	410U
Dibenzofuran	µg/kg	390U	410U
Diethyl Phthalate	µg/kg	390U	2600
Dimethyl Phthalate	µg/kg	390U	410U
di-n-Butyl Phthalate	ug/kg	3900	41011

Surface Soil SVOCs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 084	FBQ 098
Sample ID		FBQSS-084-0167-SO	FBQSS-098-0195-SO
Date Collected		11/13/2003	11/12/2003
Depth (ft)		0-1'	0-1,
Sample Type		Grab	Grab
Analyte	Units		
di-n-Octyl Phthalate	µg/kg	390U	410U
Fluoranthene	µg/kg	390U	4100
Fluorene	µg/kg	390U	410U
Hexachlorobenzene	µg/kg	390U	4100
Hexachlorobutadiene	µg/kg	390U	410U
Hexachlorocyclopentadie	µg/kg	390U	410U
Hexachloroethane	µg/kg	390U	410U
Indeno(1,2,3-c,d)Pyrene	µg/kg	390U	410U
Isophorone	µg/kg	390U	410U
Naphthalene	µg/kg	390U	410U
Nitrobenzene	pg/kg	390U	410U
Nitrobenzene	µg/kg	100U	37JB
n-Nitrosodi-n-Propylamir	µg/kg	390U	410U
n-Nitrosodiphenylamine	µg/kg	390U	410U
Pentachlorophenol	µg/kg	780U	810U
Phenanthrene	µg/kg	390U	410U
Phenol	µg/kg	390U	410U
Pyrene	µg/kg	390U	410U

Inface Soil VOCs Analytical REsults Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 032	FBQ 045	FBQ 060	FBQ 079	FRO 083
Sample ID		FBQSS-032-0063-SO	FBQSS-045-0089-SO	FBQSS-060-0119-SO	FBOSS-079-0457-SO	FBOSS 083 046F SO
Date Collected		10/8/2003	10/13/2003	10/13/2003		44.49.0000
Depth (ft)		0-1,	0-1,	0-1,	.+0	11/13/2003
Sample Type		Grab	Grab	Grah	1-0	·
Analyte	Units			Galo	Glab	Grab
1,1,1-Trichloroethane	µg/kg	6.3U	5.7U	6.5U	6 111	67
1,1,2,2-Tetrachloroethane	µg/kg	6.3U	5.7U	6.5U	6.10	13
1,1,2-Trichloroethane	µg/kg	6.3U	5.7U	6.50	6.10	6.10
1,1-Dichloroethane	µg/kg	6.3U	5.7U	6.50	6.10	2.5
1,1-Dichloroethene	µg/kg	6.3U	5.7U	6.5U	6.10	2.10
1,2,4-Trichlorobenzene	µg/kg	6.3U	5.7U	6.50	6.11	4.1
1,2-Dibromo-3-Chloropropan	µg/kg	6.3U	5.7U	6.5U	6.11	0.10
1,2-Dichlorobenzene	µg/kg	6.3U	5.7U	6.51.1	6.13	0.10
1,2-Dichloroethane	µg/kg	6.3U	5.70	651	0.10	0.10
1,2-Dichloropropane	µg/kg	6.3U	5.7U	6.5U	6.10	0.10
1,3-Dichlorobenzene	µg/kg	6.3U	5.7U	6.5U	6.10	0,10
1,4-Dichlorobenzene	µg/kg	6.3U	5.7U	6.511	6.11	0.10
2-Butanone	µg/kg	13U	110	1311	4311	0.10
2-Hexanone	ua/ka	13U	1111	121	120	120
4-Methyl-2-Pentanone	ua/ka	1311	1411	130	120	120
Acetone	IIa/ka	9.8.IB	1111	130	120	120
Benzene	IIa/ka	6311	011	3.01B	6.638	9.7JB
Bromoform	20/101	0.00	0.7.0	nc.a	6,10	6.10
Bromomora	pg/kg	6.30	5.70	6.5U	6.10	6.10
Digition entire	µg/kg	130	110	130	12U	12U
Carbon Disulfide	µg/kg	6.3U	5.70	69	6.1U	6.10
Carbon Tetrachloride	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Chlorobenzene	µg/kg	6.3U	5.7U	6.5U	6.10	6.111
Chloroethane	µg/kg	13U	110	13U	1211	1211
Chloroform	µg/kg	6.3U	5.7U	6.50	6.111	6.411
Chloromethane	µg/kg	1311	1411	1311	1100	01.0

Page 43-23

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Surface Soil VOCs Analytical REsults Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 032	FBQ 045	FBQ 060	FBQ 079	FBQ 083
Sample ID		FBQSS-032-0063-SO	FBQSS-045-0089-SO	FBQSS-060-0119-SO	FBQSS-079-0157-SO	FBQSS-083-0165-SO
Date Collected		10/8/2003	10/13/2003	10/13/2003		11/13/2003
Depth (ft)		.1-0	0-1'	0-1'	0-1,	. 0-1'
Sample Type		Grab	Grab	Grab	Grab	Grab
Analyte	Units					
cis-1,2-Dichloroethene	ug/kg	6.3U	5.7U	6.5U	6.1U	6.10
cis-1,3-Dichloropropene	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Cyclohexane	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Dibromochloromethane	µg/kg	6.3U	5.70	6.5U	6.10	6.10
Dichlorodifluoromethane	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Ethylbenzene	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Ethylene Dibromide	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Freon 113	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Isopropylbenzene	µg/kg	6.3U	5.70	6.5U	6.10	6.10
m,p-Xylenes	pg/kg	6.3U	5.7U	6.5U	6.10	6.10
Methyl Acetate	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Methylcyclohexane	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Methylene Chloride	µg/kg	9.7JB	5.6JB	10JB	12JB	12B
o-Xylene	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Styrene	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
tert-butyl methyl ether	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Tetrachloroethylene	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Toluene	µg/kg	6.3U	5.7U	6.5U	6.1U	2.3
trans-1,2-dichloroethene	ng/kg	6.3U	5.7U	6.5U	6.10	6.10
trans-1,3-dichloropropene	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Trichloroethene	µg/kg		5.7U	6.5U	6.10	6.10
Trichlorofluoromethane	µg/kg	6.3U	5.7U	6.5U	6.10	6.10
Vinyl Chloride	IIIa/ka	130	110	130	120	12U

Page #3-24

Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 084	FBQ 098
Sample ID		FBQSS-084-0167-SO	FBQSS-098-0195-SO
Date Collected		11/13/2003	11/12/2003
Depth (ft)		0-1,	0-1,
Sample Type		Grab	Grab
Analyte	Units		
1,1,1-Trichloroethane	µg/kg	5.9U	6.90
1,1,2,2-Tetrachloroethane	µg/kg	5.9U	6.90
1,1,2-Trichloroethane	µg/kg	5.9U	06.9
1,1-Dichloroethane	µg/kg	5.9U	6.9U
1,1-Dichloroethene	µg/kg	5.9U	06:9
1,2,4-Trichlorobenzene	µg/kg	5.9U	6.90
1,2-Dibromo-3-Chloropropan	µg/kg	5.9U	6.90
1,2-Dichlorobenzene	µg/kg	5.9U	06'9
1,2-Dichloroethane	µg/kg	5.9U	6.90
1,2-Dichloropropane	µg/kg	5.9U	6.90
1,3-Dichlorobenzene	µg/kg	5.9U	06.9
1,4-Dichlorobenzene	µg/kg	5.9U	6.90
2-Butanone	µg/kg	12U	140
2-Hexanone	µg/kg	120	14U
4-Methyl-2-Pentanone	µg/kg	12U	14U
Acetone	µg/kg	10JB	7.4JB
Benzene	µg/kg	5.9U	06'9
Bromoform	µg/kg	5.9U	06.9
Bromomethane	µg/kg	12U	14U
Carbon Disulfide	µg/kg	5.9U	06.9
Carbon Tetrachloride	µg/kg	5.9U	06:9
Chlorobenzene	µg/kg	5.9U	06.9
Chloroethane	µg/kg	12U	140
Chloroform	µg/kg	5.9U	6.90
Chloromethane	ug/kg	120	1411

Page A3-25

Surface Soil VOCs Analytical REsults Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 084	FBQ 098
Sample ID		FBQSS-084-0167-SO	FBQSS-098-0195-SO
Date Collected		11/13/2003	11/12/2003
Depth (ft)		0-1'	0-1,
Sample Type		Grab	Grab
Analyte	Units		
cis-1,2-Dichloroethene	µg/kg	5.9U	6.90
cis-1,3-Dichloropropene	µg/kg	5.9U	06.9
Cyclohexane	µg/kg	5.9U	06.9
Dibromochloromethane	µg/kg	5.9U	06.9
Dichlorodifluoromethane	µg/kg	5.9U	06.9
Ethylbenzene	µg/kg	5.9U	06.9
Ethylene Dibromide	µg/kg	5.9U	6.90
Freon 113	µg/kg	5.9U	6.90
Isopropylbenzene	µg/kg	5.9U	6.90
m,p-Xylenes	µg/kg	5.9U	06.9
Methyl Acetate	µg/kg	5.9U	06.90
Methylcyclohexane	µg/kg	5.9U	06.90
Methylene Chloride	µg/kg	6.5JB	12JB
o-Xylene	µg/kg	5.90	06.90
Styrene	µg/kg	5.90	06.9
tert-butyl methyl ether	µg/kg	5.9U	6.9U
Tetrachloroethylene	µg/kg	5.90	06.9
Toluene	µg/kg	3.9J	06:9
trans-1,2-dichloroethene	µg/kg	5.9U	06:9
trans-1,3-dichloropropene	µg/kg	5.9U	06:9
Trichloroethene	µg/kg	5.9U	2.5J
Trichlorofluoromethane	µg/kg	5.9U	6.90
Vinyl Chloride	µg/kg	12U	14U

Page A3-36

absurface Soil Explosives and Propellants Analytical Resurant Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 048	FBQ 051	FBQ 054	FBQ 056	FBQ 057
Sample ID		FBQSO-048-0096-SO	FBQSO-051-0102-SO	FBQSO-054-0108-SO	FBQSO-056-0112-SO	FBQSO-057-0114-SO
Date Collected		10/2/2003	10/6/2003	10/2/2003	10/2/2003	10/1/2003
Depth (ft)		1-3'	1-3'	1-3*	1-3*	1-3'
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
1,3,5-Trinitrobenzene	µg/kg	100U	1000	100U	1000	100U
1,3-Dinitrobenzene	µg/kg	100U	1000	1000	1000	1000
2,4,6-Trinitrotoluene	µg/kg	1000	10001	1000	10001	100U
2,4-Dinitrotoluene	µg/kg	1000	10001	1000	1000	100U
2,4-Dinitrotoluene	µg/kg	N/A	10001	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	10001	390U	1000	1000	1000
2,6-Dinitrotoluene	µg/kg	N/A	1000	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	1000	1000	100U	1000	1000
4-Amino-2,6-Dinitrotolue	µg/kg	1000	100U	1000	1000	100U
4-Nitroaniline	µg/kg	N/A	390U	N/A	N/A	N/A
HMX	µg/kg	200U	2000	, 200U	200U	200U
m-Nitrotoluene	µg/kg	200U	2000	200U	2000	200U
Nitrobenzene	µg/kg	1000	390U	1000	1000	1000
Nitrobenzene	µg/kg	N/A	100U	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	17.0	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	10000U	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	130U	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	2000	200U	2000	200U	2000
p-Nitrotoluene	µg/kg	200U	200U	200U	200U	2000
RDX	µg/kg	200U	200U	200U	200U	200U
Tetryl	µg/kg	200U	200U	2000	2000	2001

Subsurface Soil Explosives and Propellants Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 059	FBQ 060	FBQ 061	FBQ 062	FBQ 063
Sample ID		FBQSO-059-0118-SO	FBQSO-060-0120-SO	FBQSO-061-0122-SO	FBQSO-062-0124-SO	FBQSO-063-0126-SO
Date Collected		10/6/2003	10/13/2003	11/14/2003	11/17/2003	11/16/2003
Depth (ft)		1-3'	1-3'	1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
,3,5-Trinitrobenzene	µg/kg	1000	100U	100U	100U	100U
1,3-Dinitrobenzene	µg/kg	100U	100U	100U	100U	1000
2,4,6-Trinitrotoluene	µg/kg	1000	100U	1000	100U	1000
2,4-Dinitrotoluene	µg/kg	1000	100U	1000	100U	1000
2,4-Dinitrotoluene	µg/kg	N/A	100U	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	100U	390U	100U	100U	100N
2,6-Dinitrotoluene	µg/kg	N/A	100U	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	100U	100N	100U	100U	100U
4-Amino-2,6-Dinitrotolue	µg/kg	100U	1000.	, 100U	100U	100N
4-Nitroaniline	µg/kg	N/A	3900	N/A	N/A	N/A
HMX	µg/kg	200U	200U	200U	200U	200U
m-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
Nitrobenzene	pg/kg	100U	3900	1000	100U	100U
Nitrobenzene	µg/kg	. N/A	100U	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	26	N/A	N/A	NA
Nitroglycerine	µg/kg	N/A	10000U	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	130U	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
p-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
RDX	· µg/kg	200U	200U	200U	2000	200U
Tetryl	IIa/ka	20011	200U	200U	200U	200U

Absurface Soil Explosives and Propellants Analytical Resure Immary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 064	FBQ 065	FBQ 066	FBQ 067	FBO 068
Sample ID		FBQSO-064-0128-SO	FBQSO-065-0130-SO	FBQSO-066-0132-SO	FBQSO-067-0134-SO	FBOSO-068-0136-SO
Date Collected		11/14/2003	11/17/2003	11/17/2003	11/14/2003	11/14/2003
Depth (ft)		1-3'	1-3'	1-3'	1-31	4 21
Sample Type		Composite	diagona			0-1
	Units	ougodino.	COLIDOSIG	Composite	Composite	Composite
1,3,5-Trinitrobenzene	µg/kg	1000	1000	10011	11007	T TOO T
1,3-Dinitrobenzene	µg/kg	1000	1000	1001	1001	1000
2,4,6-Trinitrotoluene	µg/kg	1000	1000	1000	1000	1001
2,4-Dinitrotoluene	µg/kg	1000	1000	1000	1001	10011
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	NA
2,6-Dinitrotoluene	µg/kg	1000	1000	100U	1000	39011
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	1000	1000	1000	100N	1001
4-Amino-2,6-Dinitrotolue	µg/kg	1000	100U	1000	1000	10011
4-Nitroaniline	µg/kg	N/A	N/A	N/A	N/A	AIN
HMX	µg/kg	200U	200U	200U	2001	11006
m-Nitrotoluene	µg/kg	2000	200U	200U	98.1	2001
Nitrobenzene	µg/kg	1000	1000	100U	423	3900
Nitrobenzene	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	2000	2000
p-Nitrotoluene	µg/kg	2000	200U	200U	2000	2000
RDX	µg/kg	200U	200U	200U	200U	200U
Tetryl	µg/kg	2000	200U	200U	2000	2001

Page 13-39

Subsurface Soil Explosives and Propellants Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 071	FBQ 073	FBQ 074	FBQ 075	FBQ 077
Sample ID		FBQSO-071-0142-SO	FBQSO-073-0146-SO	FBQSO-074-0148-SO	FBQSO-075-0150-SO	FBQSO-077-0154-SO
Date Collected		11/17/2003	11/17/2003	11/11/2003	11/13/2003	11/17/2003
Depth (ft)		1-3'	1-3'	1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite	Composite	Composite
	Units					
1,3,5-Trinitrobenzene	µg/kg	100U	100U	100U	100U	100U
1,3-Dinitrobenzene	µg/kg	100U	1000	100U	1000	100U
2,4,6-Trinitrotoluene	µg/kg	100U	100U	100U	100U	100U
2,4-Dinitrotoluene	µg/kg	100U	1000	1000	100U	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	1000	100U	1000	100U	100U
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	1000	100U	100U	100U	1000
4-Amino-2,6-Dinitrotolue	µg/kg	1000	100U	100U	100U	100U
4-Nitroaniline	µg/kg	. N/A	N/A	N/A	N/A	N/A
HMX	µg/kg	200U	200U	200U	200U	200U
m-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
Nitrobenzene	µg/kg	100N	1000	1000	1000	L07
Nitrobenzene	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
p-Nitrotoluene	µg/kg	200U	200U	200U	200U	200U
RDX	µg/kg	200U	200U	200U	200U	200U
Tetryl	ua/ka	200U	200U	200U	200U	200U

Page #3-30

ubsurface Soil Explosives and Propellants Analytical Resureza and Booster Quarry Ponds Draft Remedial Investigation Report

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Station ID		FBQ 079	FBQ 082	FBQ 083	FRO 085	200 001
Sample ID		FBQSO-079-0158-SO	FBOSO-082-0164-SO	FROSO-083.0166.co	00 000 000 0000	FBQ 086
Date Collected		11/12/2003	11/11/2003	44/42/000	LBUSU-085-01/0-SO	FBQSO-086-0172-SO
Depth (#)		č	200231-111	11/13/2003	11/13/2003	11/17/2003
Sample Time		5-1	1-3	1-3'	1-3'	1-3
Sample Type		Composite	Composite	Composite	Composito	
Analyte	Units				Composite	Composite
1,3,5-Trinitrobenzene	µg/kg	1000	1001	10011	1000	
1,3-Dinitrobenzene	па/ка	10011	10011	0001	1000	1000
2,4,6-Trinitrotoluene	IIa/ka	1001	0001	1000	1000	1000
2 4-Dinitrotoluopo	0 1	0001	1000	1000	100U	1000
zi- Dimiololdene	µg/кд	420U	100U	390U	1000	40011
Z,4-Uinitrotoluene	µg/kg	1000	N/A	1000	N/A	10011
2,6-Uinitrotoluene	µg/kg	420U	1000	3900	1001	70011
2,6-Dinitrotoluene	µg/kg	1000	N/A	1000	N/A	4001
2-Amino-4,6-Dinitrotolue	µg/kg	100U	1000	1000	1001	0001
4-Amino-2,6-Dinitrotolue	µg/kg	1000	1000	10011	1000	0001
4-Nitroaniline	ua/ka	42011	611/4		0001	1000
HMX	11α/kα	2001	AW.	3800	N/A	400N
m-Nitrofoluene	0	2002	2000	200U	200U	200U
With-L	ружд	2000	2000	200U	200U	20011
Millobenzene	µg/kg	420N	52JB	3900	47.3	40011
Nitrobenzene	µg/kg	35JB	N/A	100U	N/A	10011
Nitrocellulose	µg/kg	59	N/A	24	A/N	46
Nitroglycerine	µg/kg	100000	N/A	1000001	N/A	100001
Nitroguanidine	µg/kg	130N	N/A	1300	A/M	4301
o-Nitrotoluene	µg/kg	2000	2000	20011	11000	1300
p-Nitrotoluene	µg/kg	2000	20011	0003	2000	2000
RDX	i ua/ka	20011	11000	2000	2000	200U
Tetrvi	0.00	0000	2000	2000	200U	200U
1000	HB/KB	2000	200	2000	200U	2000

Subsurface Soil Explosives and Propellants Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 087	FBQ 088	FBQ 094	FBQ 095	FBQ 096
Sample ID		FBQSO-087-0174-SO	FBQSO-088-0176-SO	FBQSO-094-0188-SO	FBQSO-095-0190-SO	FBQSO-096-0192-SO
Date Collected		11/11/2003	11/11/2003	11/12/2003	11/12/2003	11/12/2003
Depth (ft)		1-3'	1-3'	1-3'	1-3'	1-3
Sample Type		Composite	Composite	Composite	Composite	Composite
	Units					
1,3,5-Trinitrobenzene	µg/kg	100U	100U	100U	100U	100U
1,3-Dinitrobenzene	µg/kg	100U	1000	100U	100N	100U
0)	µg/kg	100U	1000	100U	1000	. 100U
2,4-Dinitrotoluene	µg/kg	100U	100U	100U	1000	1000
	µg/kg	N/A	N/A	N/A	N/A	N/A
	µg/kg	100U	100U	100U	100U	100U
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A	N/A	N/A
otolue	µg/kg	100U	100U	100U	100U	100U
	µg/kg	100U	1000	100N	100U	100U
4-Nitroaniline	µg/kg	N/A	N/A	N/A	N/A	N/A
HMX	µg/kg	200U	200U	200U	200U	200U
m-Nitrotoluene	µg/kg	200U	200U	Z00U	200U	200U
Nitrobenzene	µg/kg	100U	1000	100U	100N	100N
Nitrobenzene	µg/kg	N/A	N/A	N/A	A/N	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	2000	200U	200U	200U
p-Nitrotoluene	µg/kg	2000	200U	200U	200U	200U
RDX	µg/kg	200U	200U	200U	200U	200U
Tefryl	ua/ka	200U	200U	200U	200U	200U

Page #3-33

ammary Table ubsurface Soil Explosives and Propellants Analytical Resur. Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 097	FBQ 098	FBQ 100
Sample ID		FBQSO-097-0194-SO	FBQSO-098-0196-SO	FBQSO-100-0200-SO
Date Collected		11/12/2003	FBQSO-098-0196-SO	11/11/2003
Depth (ft)		1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite
Analyte	Units			
1,3,5-Trinitrobenzene	µg/kg	100U	1000	1000
1,3-Dinitrobenzene	µg/kg	1000	1000	1000
2,4,6-Trinitrotoluene	µg/kg	1000	1000	1000
2,4-Dinitrotoluene	µg/kg	1000	1000	1000
2,4-Dinitrotoluene	µg/kg	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/kg	1000	1000	1000
2,6-Dinitrotoluene	µg/kg	N/A	N/A	N/A
2-Amino-4,6-Dinitrotolue	µg/kg	1000	1000	1000
4-Amino-2,6-Dinitrotolue	µg/kg	1000	1000	1000
4-Nitroaniline	µg/kg	N/A	N/A	N/A
HMX	µg/kg	200U	200U	200U
m-Nitrotoluene	µg/kg	200U	200U	2000
Nitrobenzene	µg/kg	1000	52JB	1000
Nitrobenzene	µg/kg	N/A	N/A	N/A
Nitrocellulose	µg/kg	N/A	N/A	N/A
Nitroglycerine	µg/kg	N/A	N/A	N/A
Nitroguanidine	µg/kg	N/A	N/A	N/A
o-Nitrotoluene	µg/kg	200U	200U	200U
p-Nitrotoluene	µg/kg	200U	200U	200U
RDX	µg/kg	200U	200U	2000
Tetryl	µg/kg	200U	2000	2000

Sub-surface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 001	FBQ 002	FBQ 003	FBQ 004	FBQ 005
Sample ID		FBQSO-001-0002-SO	FBQSO-002-0004-SO	FBQSO-003-0006-SO	FBQSO-004-0008-SO	FBQSO-005-0010-SO
Date Collected		10/14/2003	10/14/2003	10/20/2003	10/20/2003	10/20/2003
Depth (ft)		1-3'	1-3'	1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
Aluminum	mg/kg	10800	16700	16500	14200	15300
Antimony	mg/kg		0.27UN	0.35BN	0.29	0.31UN
Arsenic	mg/kg		12.6	12.3NE*	13.2	12.8NE*
Barium	mg/kg	61.1	90.1	88N	78.6	85.6N
Beryllium	mg/kg		0.78	0.92	0.82	0.87
Cadmium	mg/kg		0.010	0.01U	0.019	0.02U
Calcium	mg/kg		1840	34500*	33300	32700*
Chromium	mg/kg	15.8	21.9	23.9*E	21	22.2*E
Chromium, Hexavalent	mg/kg		N/A	3.7	N/A	N/A
Cobalt	mg/kg		12.1	12.9*	14.1	13*
Copper	mg/kg	T	14.5	22.7	22.6	22.6
Iron	mg/kg		32800	30300	28400	29500
Lead	mg/kg		13.2	12.4E	13.2	12.5E
Magnesium	mg/kg	.,	3200N	*N0806	8180	8220N*
Manganese	mg/kg		918	369*	475	413*
Mercury	mg/kg	0.018	0.02B	0.01U	32.6	0.010
Nickel	mg/kg		17.5	31.7	2690	31.3
Potassium	mg/kg	1100N	1480N	3120N	1.2	2710N
Selenium	mg/kg		1.7	1.1	990.0	1.1B
Silver	mg/kg	0.05U	0.08B	0.06U	171	0.06U
Sodium	mg/kg	88	104	176	0.49	142
Thallium	mg/kg	0.44U	0.46U	0.81B	23.6	0.510
Vanadium	mg/kg	20.9N	31.4N	27.5N	65.7	24.9N
Zinc	mg/kg		47.2	65.5E	0.016	61.9E

Page 43-34

ub-surface Soil Inorganics Analytical Results Summary Tab. Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 059	FBQ 060	FRO 084	200 000	
Sample ID		FBQSO-059-0118-SO	FROSO-060-0120 CO	100 00 00 00 00 00 00 00 00 00 00 00 00	FBQ 062	FBQ 063
Date Collected		10/6/2003	40/42/2020	rBQSQ-061-0122-SQ	FBQSO-062-0124-SO	FBQSO-063-0126-SO
Depth (ft)		4 21	10/13/2003	11/14/2003	11/17/2003	11/16/2003
Sample Type		0-1	1-3	1-3'	1-3'	1-3'
Applied type		Composite	Composite	Composite	Composite	2
Analyte	Units				allenduro	Composite
Aluminum	mg/kg	12100	12300	15200	27400	
Antimony	mg/kg	1.9N	O SZIINI	00201	1/100	19600
Arsenic	ma/ka		V.27.0IN	0.37BN	0.52BN	0.37BN
Barium	ma/ka		13.6	17.8	17.5N	17.4
Bervllium	Bu/Bill		44.5N	94.3N	116	116N
Cadmium	U.B/Rg		0.55	0.93E	1.1	12F
Calcium	ing/kg		0.01U	0.02U*	0.068	*11600
Chromium	mg/kg		300	1570	1480	1370
- Incoming	mg/kg	19.6E	15.5	23.1N	24.2	0121
Criticinum, Hexavalent	mg/kg	N/A	2.9U	N/A	N/A	VI.:12
Cobalt	mg/kg	10	11.6	23.8		N/A
Copper	mg/kg	28.2	14.2	0.02	14	20.7
Iron	mg/kg	23100	00000	64.3	25.7	25.8
Lead	ma/ka	116	23200	32900	31400	36900
Magnesium	10 //cm	011	13.6	14.9	15.2	15.9
Asperson of the second of the	האינה האינה האינה	Z430N	1830	4190N	4660N	AAZONI
Marigariese	mg/kg	781	392	472	384	440
Mistol	mg/kg	0.76	0.010	0.028	0.010	0.018
Dotochim	mg/kg	15.2	13.3	33.1	37.3	35.1
olassium	mg/kg	1060N	841N	1890N	2350N	1.00 MODEC
Oelenium Oelenium	mg/kg	1,3	2	0.26U	0.3411	VIOUZZ
Silver	mg/kg	0.17B	0.068	0.0411	0.00	0.38B
Sodium	mg/kg	119	100	0400	0.060	0.04U
Thallium	ma/ka	0.4911	OAELINI	104	8.06	91.1
Vanadium	ma/ka	23 AN	N.430IN	0.668	2.8	0.54B
Zinč	0 1	VIC.2	24./N	26.6	28.9	34
	mg/kg	156	46.1	6.69	72.3	76.1

Page #3-35

Sub-surface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 064	FBQ 065	FBQ 066	FBQ 067	FBQ 068
Sample ID		FBQSO-064-0128-SO	FBQSO-065-0130-SO	FBQSO-066-0132-SO	FBQSO-067-0134-SO	FBQSO-068-0136-SO
Date Collected		11/14/2003	11/17/2003	11/17/2003	11/14/2003	11/14/2003
Depth (ft)		1-3'	1-3'	1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
m	mg/kg	14100	7580	12600	10800	13400
	mg/kg	0.41BN	0.25UN	0.26UN	0.45BN	0.45BN
Arsenic	mg/kg	13.1	9.6N	19.4N	21	13.5
Barium	mg/kg	62.1N	30.5	47	45.4N	52.2N
Beryllium	mg/kg	. 0.6E	0.32	0.64	0.57E	0.53E
Cadmium	ma/ka	0.02U*	0.018	0.02B	0.02U*	0.02U*
Calcium	mg/kg	342	144	491	227	400
Chromium	mg/kg	19.3N	10.5	17.6	16.5N	18.1N
Chromium. Hexavalent	mg/kg	N/A	N/A	N/A	N/A	N/A
Cobalt	ma/ka	10.3	4.7	8.6	8.3	6.5
Copper	ma/ka	17.7	9.4	22.7	22.1	16.4
Iron	mg/kg	25200	13300	27000	26800	25500
lead	ma/ka	16.4	8.7	13.2	14.2	12.3
Magnesium	ma/ka		1430N	3030N	2410N	2350N
Mandanese	ma/ka		152	256	275	200
Mercury	mg/kg	0.02B	0.01B	0.01B	0.010	0.018
Nickel	ma/ka		10.2	21.4	20.4	16
Potassium	mg/kg		N69Z	1200N	1170N	1060N
Selenium	ma/ka		0.27U	0.28U	0.4B	0.59B
Silver	mg/kg		0.050	0.05U	0.04U	0.04U
Sodium	ma/ka		53.2	60.4	288	71.4
Thallium	mg/kg		0.9B	1.9	0.36U	0.38U
Vanadium	ma/ka		13.1	20.4	19.3	26.3
	malka		29.2	57.4	61.8	44.1

Page #3-36

Ib-surface Soil Inorganics Analytical Results Summary Tab. Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 071	FBQ 073	FBQ 074	FRO 075	EDO 077
Sample ID		FBQSO-071-0142-SO	FBQSO-073-0146-SO	FBOSO-074-0148-50	EBOSO NZE 0450 SO	10000
Date Collected		11/17/2003	11/17/2003	14/14/1000	14.45.650.50	FBQSO-077-0154-SO
Depth (ft)		1 21	00071111	11/11/2003	11/13/2003	11/17/2003
Sample Tone	-	S-1	1-3	1-3'	1-3'	1-3'
Variable 19pe		Composite	Composite	Composite	Composite	Composite
Analyte	Units					Discouling
Aluminum	mg/kg	10500	15300	10100	9710	14800
Antimony	mg/kg	0.27UN	0.29UN	0.43BN	0.248M	14000
Arsenic	mg/kg	19N	18.4N	18.7	8.1	0.28UN
Barium	mg/kg	38.3	79.2	44.2N	103M	30.3N
Beryllium	mg/kg	0.65	-	0.68	100	00.7
Cadmium	mg/kg	0.028	0.04B	11100	U.30E	0.88
Calcium	mg/kg		880	0.0.0	0.22	0.05B
Chromium	ma/ka		500	4CZ	290	905
Chromium. Hexavalent	malka		20.3	15.1N	16.2N	19.6
Cohalt	BA/BIII		N/A	N/A	N/A	N/A
Copar	mg/kg		20.8	6.6	7.7	15.3
Copper	mg/kg		24.5	22	36.5	22
IIOII	mg/kg	24300	28400	26000	15700	27500
Lead	mg/kg		14	1111	7 7	27300
Magnesium	mg/kg	2320N	3640N	2440N	771	36.1
Manganese	ma/ka	260	NIO-LOC	N0447	1470N	3350N
Mercury	B. B. B.	11000	320	280	840	272
Nickel	BA/BIII	0.010	0.018	0.010	0.01B	0.02B
Dotocium	mg/kg	21.2	26.9	20.6	14.3	25.4
Polassium	mg/kg	1110N	1660N	1110N	769N	1630N
Selenium Selenium	mg/kg	0.28U	0,3U	0.30	0.34B	0.311
Silver	mg/kg	0.06U	0.06U	0.060	0.0311	11900
Sodium	mg/kg	59.9	75.1	76.7	0 99	0.000
Thallium	mg/kg	2.2	2.7	0.4711	0.00	08.7
Vanadium	mg/kg	17.7	24.5	17.4M	0.310	2.4
Zinc	ma/ka	62.2	0.17	N14.71	16.5	23.3
	Building	02.2	5.79	62.2	49.4	80.9

## Page M3-37

Sub-surface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 079	FBQ 082	FBQ 083	FBQ 085	FBQ 086
Sample ID		FBQSO-079-0158-SO	FBQSO-082-0164-SO	FBQSO-083-0166-SO	FBQSO-085-0170-SO	FBQSO-086-0172-SO
Date Collected		11/12/2003	11/11/2003		11/13/2003	11/17/2003
Depth (ft)		1-3'	1-3'	1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite	Composite	Composite
Analyte	Units					
Aluminum	mg/kg	11100	10000	12600	12300	14800
Antimony	mg/kg		0.3BN	0.22B	0.18UN	0.28UN
Arsenic	mg/kg	23.1	. 20.7	19.2	19.7	20.1N
Barium	mg/kg		49.7	45.8N	52.3N	59.3
Beryllium	mg/kg		0.62	0.55	0.69E	0.76
Cadmium	mg/kg	0.02U	0.010	·0.02U	0.02U*	0.02B
Calcium	mg/kg		1240	283	459	389
Chromium	mg/kg	17.2	14.8	18.3	18.5N	20
Chromium, Hexavalent	mg/kg		N/A	2.7U	N/A	2.9U
Cobalt	mg/kg		9.5	7.8	11.4	10
Copper	mg/kg		19.4	22.1N	23.4	24.2
Iron	mg/kg		25000	30400	29600	29300
Lead	mg/kg		13.8	13N	14.4	14.1
Magnesium	mg/kg	2510	2590N	2380	3000N	3260N
Manganese	mg/kg		373	200	285	240
Mercury	mg/kg		0.010	0.010	0.01B	0.010
Nickel	mg/kg		23.6	19.1	23.3	23.6
Potassium	mg/kg	g 1260N	1290N	1170N	1320N	1440N
Selenium	mg/kg		0.32B	0.68B	0.228	0.3U
Silver	mg/kg		0.05U	0.04U	0.03U	0.06U
Sodium	mg/kg		68.4	53.1	7.1	62.9
Thallium	mg/kg		0.43U	0.72B	0.4B	2.7
Vanadium.	mg/kg		17.6	22.3	21.3	24.2
Zinc	ma/ka		67.6	57.2N	64.6	77.4

Page 143-38

ub-surface Soil Inorganics Analytical Results Summary Table and Booster Quarry Ponds Draft Remedial Investigation Report

Sample ID		100,00	FBQ 088	FBQ 094	FBO 095	EDO DOG
Data Collected		FBQSO-087-0174-SO	FBQSO-088-0176-SO	FBOSO-004.0188 co	TEOCO OUT DADE	LDG 080
בינה בסווברובת		11/11/2003	11/11/2003	11/1/2/2003	r Bus O-095-0190-SO	FBQSO-096-0192-SO
Depth (ft)		1-3	7	11112/2003	11/12/2003	11/12/2003
Sample Type		officermon		1-3	1-3	1-3'
Analyte	Units	pisodino	Composite	Composite	Composite	Composite
Aluminum	ma/ka	11800	442000			
Antimony	ma/ka	1200	11300	13900	14000	16200
Arsenic	19/Ag		0.24UN	0.35BN	0.32BN	0.3UN
Daring	mg/kg		17.5	14.5	20.6	13.2
barrum	mg/kg		60.2N	51.4N	67.4N	85.7N
beryillum	mg/kg	0.75	0.66	0.6	0.01	2000
Cadmium	mg/kg	0.02B	0.07	0.08	0.078	0.00
Calcium	mg/kg	313	506	241	816	0.035
Chromium	mg/kg	16.7	15.6N	17.7N	18 61	(39
Chromium, Hexavalent	mg/kg	N/A	N/A	N/A	NI.0	Z0.7N
Cobalt	mg/kg	11.4	6.6	00	10.0	N/A
Copper	mg/kg	23.3	23.1	17.0	5.2	8.4
Iron	ma/ka	.,	26400	7.11	23	19.4
Lead	and/km		20400	78900	30400	29600
Magnonium	By/Bi	13.1	14.3	14.7	14.1	13.1
Magnesian	mg/kg	2	2510N	Z370N	3230N	3160N
Manganese	mg/kg	352	328	369	302	331
Mercury	mg/kg	0.010	0.010	0.028	0.010	0.018
Nickel	mg/kg	26.3	22	16.1	26.7	20.6
Potassium	mg/kg	1150N	1110N	1150N	1320N	1470N
Selenium	mg/kg	0.31B	0.29B	0.698	0.348	0.40B
Silver	mg/kg	0.06U	0.05U	0.078	0.0611	9700
Sodium	mg/kg	62.5	72.1	100	88.3	0.00
Thallium	mg/kg	0.45U	0.39U	11750	0.00.0	
Vanadium	mg/kg	19.6	20.3N	25N	0.490	0.510
Zinc	mg/kg	68	64	2014	NO.22	Z8N

Page 43-39

Sub-surface Soil Inorganics Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 097	FBQ 098	FBQ 100
Sample ID		FBQSO-097-0194-SO	FBQSO-098-0196-SO	FBQSO-100-0200-SO
Date Collected		11/12/2003	11/12/2003	11/11/2003
Depth (ft)		1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite
Analyte	Units			
Aluminum	mg/kg	11800	11300	6850
Antimony	mg/kg	0.26UN	0.34B	0.23UN
Arsenic	mg/kg	12.5	15.9	13
Barium	mg/kg	44.4N	52.9N	31.8
Beryllium	mg/kg	0.51	0.56	0.51
Cadmium	mg/kg		0.02U	0.05B
Calcium	mg/kg	293	322	490
Chromium	mg/kg		15.9	12.9
Chromium, Hexavalent	mg/kg		N/A	N/A
Cobalt	mg/kg	7.6	8.6	7.2
Copper	mg/kg		20.9N	16.6
Iron	mg/kg	22600	25800	20700
Lead	mg/kg	10.2	15.1N	12.8
Magnesium	mg/kg	Z000N	2280	1470N
Manganese	mg/kg		281	347
Mercury	mg/kg	0.010	0.018	0.02B
Nickel	mg/kg	15	20.2	16
Potassium	mg/kg	.1050N	1120N	N956
Selenium	mg/kg		0.38B	0.25U
Silver	mg/kg	0.078	0.04U	0.050
Sodium	mg/kg		50.5	46.3
Thallium	mg/kg		0.57B	0.39U
Vanadium	mg/kg	23.6N	21	13.2
Zinc	ma/ka		60.1N	59.8

Page 43-40

Subsurface Soil Pesticides and PCBs Analytical Results St Sooster Quarry Ponds Draft Remedial Investigation Report

Peace-Outs-Outs-Outs-Outs-Outs-Outs-Outs-Outs	Station ID		FBQ 003	FBQ 009	PRO 040		
type         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/2003         10/20/200         10/20/200         10/20/200         10/20/200	Sample ID		FBQSO-003-0006-SO	FBOSO-009-0018 co	000000000000000000000000000000000000000	FBQ 051	FBQ 060
type         1.73         1.020/LOUS         1.032003         1.08/EDDOS           Unils         Composite	Date Collected		10/20/2003	00-0100-000-000	FBGSO-019-0038-SO	FBQSO-051-0102-SO	FBQSO-060-0120-SO
Pipe         Composite         Com	Depth (ft)		1.3	10/20/2003	10/13/2003	10/6/2003	10/13/2003
Units         Composite         Composite           Light         2U         2.1U         2U         1.9U           Light         2U	Sample Type			1-3	1-3	1-3'	1-3'
Higks         2U         2.1U         2U         1.9U           Ligkg         2U         2.1U         2U         1.9U           Ligkg         2U         2.1U         2U         1.9U           Ligkg         2U         2.1U         2U         1.9U           Jugkg         2U         2.1U         2U         1.9U           Ligkg         2U         2.1U         2U         1.9U           Lil         1gKg         2U         2.1U         2U         1.9U           Lil         2U         2.1U         2U         1.9U           Lil         2U         2.1U         2U         1.9U           Loc (Lindane)         1gKg         2U </td <td>Analyte</td> <td>Units</td> <td>Composite</td> <td>Composite</td> <td>Composite</td> <td>Composite</td> <td>Composite</td>	Analyte	Units	Composite	Composite	Composite	Composite	Composite
Higheory	4.4-DDD						
Highed   2.10   2.10   2.0   1.90     Highed   2.0   2.10   2.0   1.90     Highed   3.90   42.0   40.0   3.90     Highed   3.90   42.0   40.0     Highed   3.90   42.0   42.0     Highed   3.90   42.0   42.0     Highed   3.90   42.0   42.0     Highed   3.90   42.0   42.0     Highed   3.90	44.DDE	hg/kg	20	2.10	20	1.90	211
Lighkg         2.1         2.1         2.0         1.90           1         Lighkg         2.0         2.1         2.0         1.90      <	4,4-DDE	µg/kg	20	2.10	ZU	1011	02
Higher   Higher   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,900   1,	4,4-UUI	µg/kg	2U	2.10	2U	101	20
C         Light         2U         2.1U         2.0         1.9U           radane         Light         2U         2.1U         2U         1.9U           Light         2U         2.1U         2U         1.9U           Light         39U         42U         40U         39U           Light         2U         2.1U         2U         1.9U           Lichidane         Light         2U         2.1U         2U	Aldrin	µg/kg	20	2.10	2110	08.1	20
pugkg         2U         2.1U         2U         1.9U           11         pakg         2U         2.1U         2U         1.9U           11         pakg         2U         2.1U         2U         1.9U           11         pakg         2U         2.1U         2U         1.9U           sulfate         pakg         2U         2.1U         2U         1.9U           sulfate         pakg         2U         2.1U         2U         1.9U           cl (Lindane)         pakg         2U         2.1U         2U         1.9U           cl (Linda	Alpha-BHC	µg/kg	2U	2.10	02	1.90	20
lighted         2U         2.11U         2U         1.9U           lighted         2U         2.11U         2U         1.9U           lighted         2U         42U         40U         39U         1.9U           lill         lighted         2U         2.1U         2U         1.9U           lill         lighted         2U         2.1U         2U         1.9U           solidate         lighted         2U         2.1U         2U         1.9U           shyle         2U         2.1U         2U         1.9U         1.9U           none         lighted         2U         2.1U         2U         1.9U           none         lighted         2U         2.1U         2U         1.9U           none         lighted         2U         2.1U         2U         1.9U           cone         lighted         2U         2.1U         2U         1.9U           lor         lighted         2U         2.1U         2U         1.9U           lor         lighted         2U         2.1U         2U         1.9U           lighted         2U         2.1U         2U         1.9U	Alpha-Chlordane	µg/kg	2U	2.111	202	1.90	2U
1986   1987   1987   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988	Beta-BHC	ua/ka	211	24.10	70	1.90	20
1976   230   420   400   390   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190   190	Chlordane	na/ka	2011	2.10	20	1.9U	20
1976   1976   2.10   2.10   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90	Jella-RHC	0 0	080	420	40N	390	390
1	Dieldrin	hg/kg	70	2.10	20	1.9U	211
1   Hg/kg   2.0   2.10   2.0   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90   1.90	Indomiter 1	µg/kg	20	2.10	20	1.9U	116
1   10   10   10   10   10   10   10	- Indosulian I	µg/kg	20	2.1U	20	1011	0.7
Sulfate         µg/kg         2U         2.1U         2U         1.9U           ehyde         µg/kg         2U         2.1U         2U         1.9U           one         µg/kg         2U         2.1U         2U         1.9U           Hordane         µg/kg         2U         2.1U         2U         1.9U           Hordane         µg/kg         2U         2.1U         2U         1.9U           Lepoxide         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           pg/kg         2U         2.1U         2U         1.9U           pg/kg         39U         42U         40U         39U           pg/kg         39U         42U         40U         39U <td>Indosultan II</td> <td>µg/kg</td> <td>ZU Z</td> <td>2.10</td> <td>20</td> <td>1011</td> <td>0.7</td>	Indosultan II	µg/kg	ZU Z	2.10	20	1011	0.7
Hyde         Lyg/kg         2U         2.1U         2U         1.9U           one         Hg/kg         2U         2.1U         2U         1.9U           Hordane         Hg/kg         2U         2.1U         2U         1.9U           Hordane         Hg/kg         2U         2.1U         2U         1.9U           Hordane         Hg/kg         2U         2.1U         2U         1.9U           Lor         Hg/kg         2U         2.1U         2U         1.9U           Lor         Hg/kg         39U         42U         40U         39U           Hg/kg         39U         42U         40U         39U	endosulfan Sulfate	µg/kg	2U	2.10	211	1,00	707
ehyde         µg/kg         2U         2.1U         2U         1.9U           nore         µg/kg         2U         2.1U         2U         1.9U           Hordane         µg/kg         2U         2.1U         2U         1.9U           Hordane         µg/kg         2U         2.1U         2U         1.9U           Lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         39U         42U         40U         39U         39U           µg/kg         39U         42U         40U         39U         39U         39U         39U         42U         40U         39U	-ndrin	µg/kg	20	2.10	116	0.30	20
pg/kg         2U         2.1U         2U         1.9U           4C (Lindane)         µg/kg         2U         2.1U         2U         1.9U           hg/kg         2U         2.1U         2U         1.9U           hg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         39U         42U         40U         39U           hg/kg         39U         42U         40U         39U         39U         39U           hg/kg         39U         42U         40U         39U         39U         39U	Indrin Aldehyde	µg/kg	2U	2.411	011	08.1	2U
HC (Lindane)         µg/kg         2U         2U         1.9U           Hordane         µg/kg         2U         2.1U         2U         1.9U           Hordane         µg/kg         2U         2.1U         2U         1.9U           Epoxide         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         39U         42U         40U         39U           µg/kg         39U         42U         40U         39U         39U	Endrin Ketone	µg/kg	20	2,111	707	1.90	20
Leboxide         µg/kg         2U         2.1U         2U         1.9U           Epoxide         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         39U         42U         40U         39U	Samma-BHC (Lindane)	ua/ka	211	2.10	20	1.90	20
Epoxide         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         39U         42U         40U         39U	Samma-Chlordane	III/ka	0.3	2.10	20	1.9U	20
Epoxide         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         2U         2.1U         2U         1.9U           µg/kg         39U         42U         40U         39U         39U	leptachlor	10//60	112	2.10	20	1.9U	20
lor         µg/kg         2U         2.1U         2U         1.9U           lor         µg/kg         39U         42U         40U         39U	leptachlor Fpoxide	10/kg	0.7	2.10	SU	1.9U	20
Hg/kg         39U         42U         40U         39U	1ethoxychlor	מיואם ביו	0.7	2.10	ZU	1.9U	20
μg/kg         39U         42U         40U         39U	CP 4046	PB/Rg	nz nz	2.10	20	1.90	20
µg/kg         39U         42U         40U         39U	CD-1016	hg/kg	390	42N	400	390	3011
µg/kg         39U         42U         40U         39U	CD-1221	µg/kg	390	42N	400	390	3911
µg/kg         39U         42U         40U         39U	CD-1242	µg/kg	390	42N	40U	391)	3011
µg/kg         39U         42U         40U         39U           µg/kg         39U         42U         40U         39U           µg/kg         39U         42U         40U         39U	CB-1248	µg/kg	390	42N	400	390	3011
µg/kg         39U         42U         40U         39U           µg/kg         39U         42U         40U         39U	CB-1254	µg/kg	390	42N	40N	3911	2000
lg/kg 39U 42H	CB-1260	µg/kg	390	42N	40N	39(1	2011
	oxaphene	µg/kg	390	4211	IIUV		290

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Contract of the last

Subsurface Soil Pesticides and PCBs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 079	FBQ 083	FBQ 086
Sample ID		FBQSO-079-0158-SO	FBQSO-083-0166-SO	FBQSO-086-0172-SO
Date Collected		11/12/2003	11/13/2003	11/17/2003
Depth (ft)		1-3'	1-3'	1-3'
Sample Type		Composite	Composite	Composite
Analyte	Units			
4,4-DDD	µg/kg	2.10	1.9U	20
4,4-DDE	µg/kg	2.10	1.9U	2U
4,4-DDT	µg/kg	2.10	1.9U	2U
Aldrin	µg/kg	2.10	1.9U	20
Alpha-BHC	µg/kg	2.10	1.9U	20
Alpha-Chlordane	µg/kg	2.10	1.9U	20
Beta-BHC	µg/kg	2.10	1.90	20
Chlordane	µg/kg	42U	390	40N
Delta-BHC	µg/kg	2.10	1.9U	2U
Dieldrin	µg/kg	2.10	1.9U	2U
Endosulfan I	µg/kg	2.10	1.9U	2U
Endosulfan II	µg/kg	2.10	1.9U	2U
Endosulfan Sulfate	µg/kg	2.10	1.9U	20
Endrin	µg/kg	2.10	1.90	2U
Endrin Aldehyde	µg/kg	2.10	1.9U	20
Endrin Ketone	ug/kg	2.10	1.90	2U
Gamma-BHC (Lindane)	µg/kg	2.10	1.9U	20
Gamma-Chlordane	µg/kg	2.10	1.9U	20
Heptachlor	µg/kg	2.10	1.9U	20
Heptachlor Epoxide	µg/kg	2.10	1.9U	20
Methoxychlor	µg/kg	2.10	1.9U	20
PCB-1016	ug/kg		390	40N
PCB-1221	µg/kg		390	40N
PCB-1242	µg/kg	42N	390	40N
PCB-1248	µg/kg	42N	390	40N
PCB-1254	µg/kg		390	40N
PCB-1260	µg/kg	42N	390	40N
Tovanhene	ua/ka	42N	39U	40N

Page #3-412

Subsurface Soil SVOCs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

		100003	000000			
Sample ID		18	600 000	FBQ 019	FBQ 051	FBO DED
Date Collected		70/20/200	FBQSO-009-0018-SO	FBQSO-019-0038-SO	FBQSO-051-0102-SO	FROSO-060 0420 CO
Denth (#)		10/20/2003	10/20/2003	10/13/2003	10/6/2002	08-0210-000
Charles (10)		1-3'	1.3	Č T	10/0/2003	10/13/2003
Sample Type		Grab	de la constant de la	1-3	1-3'	1-3'
Analyte	Units		Glab	Grab	Grab	Grab
di-n-Octyl Phthalate	µg/kg	390U	11007			
Fluoranthene	рд/ка	39011	4200	4000	3900	3900
Fluorene	µg/kg	3900	4200	400N	3900	3900
Hexachlorobenzene	µg/kg	39011	4200	4000	3900	3900
Hexachlorobutadiene	ua/ka	39011	4200	4000	3900	3900
Hexachlorocyclopentadie ug/kg	ua/ka	34011	4200	400U	3900	390U
Hexachloroethane	na/ka	39011	4200	400U	390U	3901
Indeno(1,2,3-c,d)Pyrene		39011	4200	400U	3900	3900
Isophorone		3900	4200	400N	3900	390U
Naphthalene	11a/kg	1000	4200	400N	3900	39011
Nitrobenzene	המואה	2900	420U	4000	39011	0000
Nitrobonzene	µg/kg	3900	420N	4000	30011	3900
n Nitrocali n	µg/kg	100	1001	813	3900	3900
II-INITIOSOGI-n-Propylamir µg/kg	µg/kg	3900	420U	40011	0001	1000
n-Introsodiphenylamine	µg/kg	3900	420U	JOOL	3900	3900
Pentachlorophenol	µg/kg	780U	83011	0004	3900	390U
Phenanthrene	µg/kg	3900	7000	8000	7800	790U
Phenol	µg/kg	3901	42011	4000	3900	3900
Pyrene	ug/ka	39011	4200	4000	390U	390U
	00	0000	4200	400U	30011	

Subsurface Soil SVOCs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 079	FBQ 083	FBQ 086
Sample ID		FBQSO-079-0158-SO	FBQSO-083-0166-SO	FBQSO-086-0172-SO
Date Collected		11/12/2003	11/13/2003	11/17/2003
Depth (ft)		1-3'	1-3'	1-3'
Sample Type		Grab	Grab	Grab
	Units			
1.1- Biphenyl	µg/kg	420U	390U	400N
-Chloroprop	ug/kg	420U	3900	400U
	ug/kg	420U	390U	400U
2 4 6-Trichlorophenol	ua/ka	420U	3900	400U
2 4-Dichlorophenol	ua/ka	420U	3900	400U
2 4-Dimethylphenol	ua/ka	420U	390U	400U
2.4-Dinitrophenol	ug/kg	850U	780U	800N
2 4-Dinitrotoluene	ua/ka	420U	3900	400U
2 4-Dinitrotoluene	ua/ka	1000	100U	100U
2 6-Dinitrotoluene	ug/kg	420U	3900	400U
2.6-Dinitrotoluene	ug/kg	1000	100U	100N
2-Chloronaphthalene	ua/ka	420U	3900	400N
2-Chloronhenol	ua/ka	420U	3900	400N
2-Methylnaphthalene	ua/ka		3900	400N
2-methylphenol	uq/ka	420N	3900	400N
2-Nitroaniline	ua/ka	420U	390U	400N
2-Nitrophenol	ua/ka		3900	400N
3 3-Dichlorobenzidine	ua/ka	850U	780U	8000
3-Nitroaniline	ua/ka	420N	3900	400U
4 6-dinitro-2-methyl pher			780U	N008
4-Bromonhenvl-nhenvlet	_	420U	3900	400N
4 obloro 3 methylnhenol			3900	400N
4-Cilloto-o-lifetingipion	_		3900	400U
4-Chlorophenyl Phenyl F			3900	400U
t-cillolopholipit		420U	3900	400N

Page A3-44

subsurface Soil SVOCs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

		FBQ 079	FBQ 083	FRO DRG
Sample ID		FBQSO-079-0158-SO	FBQSO-083-0166-SO	FROSO-086 0472 SO
Date Collected		11/12/2003	11/13/2003	44.44.70000
Depth (ft)		1-3	4 21	11/1//2003
Sample Type		o desp	2-1	1-3'
	Units	0000	Grab	Grab
4-Nitroaniline	рд/ка	420U	30011	10007
4-Nitrophenol	µg/kg	850U	78011	4000
Acenaphthene	µg/kg	420U	39011	8000
Acenaphthylene	µg/kg	. 420U	39011	4000
Acetophenone	µg/kg	420U	39011	4000
Anthracene	µg/kg	420U	39011	4000
Atrazine	µg/kg	420U	30011	4000
Benzaldehyde	ug/kg	4200	2001	4000
Benzo(a)anthracene	µg/kg	420U	30011	4000
	µg/kg	420U	3901	4000
hene	ua/ka	42011	0000	4000
	ua/ka	42011	3900	400N
1	10 /kg	0021	3800	400U
+	Pg/kg	4200	3900	400U
	µg/kg	420U	3900	400N
-	µg/kg	420U	3900	40011
	µg/kg	420U	3900	40011
exyl) phthala	µg/kg	420U	3900	4001
m	µg/kg	420U	390U	4001
Carbazole	µg/kg	420U	3900	40011
	µg/kg	420U	3900	4001
Dibenz(a,h)Anthracene	µg/kg	420U	390U	40011
Dibenzofuran	µg/kg	420U	39011	40011
Diethyl Phthalate	µg/kg	420U	39011	4000
Dimethyl Phthalate	µg/kg	420U	3900	4000
di-n-Butvl Phthalate	na/ha	11007		000+

Page 13-45

Subsurface Soil SVOCs Analytical Results Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

Station ID		FBQ 079	FBQ 083	FBQ 086
Sample ID		FBQSO-079-0158-SO	FBQSO-083-0166-SO	FBQSO-086-0172-SO
Date Collected		11/12/2003	11/13/2003	11/17/2003
Depth (ft)		1-3'	1-3'	1-3'
Sample Type		Grab	Grab	Grab
	Units			
di-n-Octyl Phthalate	µg/kg	420U	3900	400U
	µg/kg	420U	3900	400U
Fluorene	µg/kg	420U	3900	400U
Hexachlorobenzene	µg/kg	420U	3900	400U
Hexachlorobutadiene	µg/kg	420U	3900	400U
Hexachlorocyclopentadie	100	420U	3900	400N
Hexachloroethane		420U	3900	400U
Indeno(1,2,3-c,d)Pyrene		420U	3900	400U
Isophorone		420N	3900	400U
Naphthalene	ug/kg	420U	3900	400U
Nitrobenzene	µg/kg	420U	3900	400U
Nitrobenzene	µg/kg	35JB	100U	100N
n-Nitrosodi-n-Propylamir	1	420U	390U	400N
n-Nitrosodiphenylamine	ug/kg	420U	3900	400N
Pentachlorophenol	-	850U	780U	8000
Phenanthrene	µg/kg	420U	3900	400N
Phenol	ug/kg	420U	3900	400N
Cocke	11a/kg	420U	3900	400N

Page 43-46

Subsurface Soil VOCs Analytical REsults Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

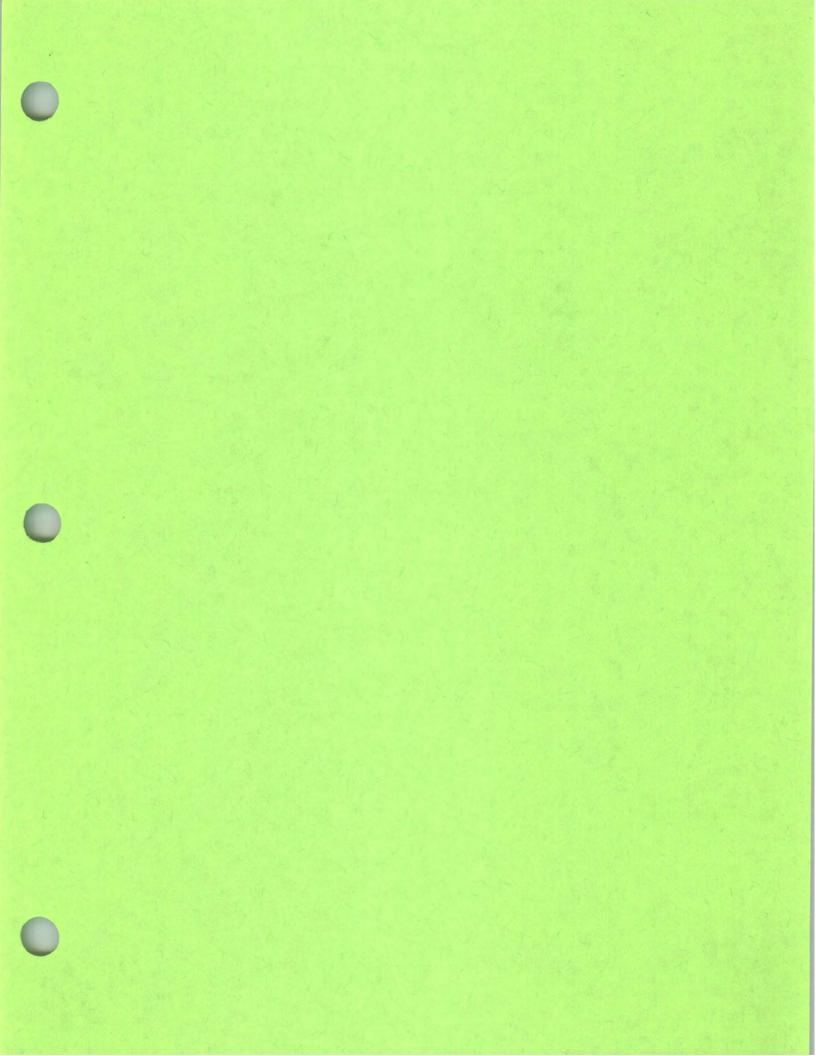
Station ID		FBO 079	EBO 083	()
Sample ID		EBOCO 070 04E0 DO	000	FBC 086
Date Collected		44140/0000	FBUSO-083-0166-SO	FBQSO-086-0172-SO
Don'th (#)		11/12/2003	11/13/2003	11/17/2003
Copies (iii)		1-3.	1-3'	1-3,
Sample Type		Grab	Grab	Grah
Analyte	Units			
1,1,1-Trichloroethane	µg/kg	6.5U	5.8U	116.9
1,1,2,2-Tetrachloroethane	µg/kg	6.50	5811	0.20
1,1,2-Trichloroethane	µg/kg	6.5U	5.8U	6.20
1,1-Dichloroethane	µg/kg	6.5U	5.81	6.211
1,1-Dichloroethene	µg/kg	6.50	5.8U	6.211
1,2,4-Trichlorobenzene	µg/kg	6.5U	5.8U	6.211
1,2-Dibromo-3-Chloropropan	µg/kg	6.5U	5.811	0.2.0
1,2-Dichlorobenzene	µg/kg	6.5U	5.81	6.20
1,2-Dichloroethane	µg/kg	6.5U	5.817	6.211
1,2-Dichloropropane	µg/kg	6.5U	5.81	0.20
1,3-Dichlorobenzene	pg/kg	6.5U	5811	0.20
1,4-Dichlorobenzene	µg/kg	6.5U	5.8U	6.21
2-Butanone	µg/kg	130	120	0.2.0
2-Hexanone	µg/kg	130	1211	0.40
4-Methyl-2-Pentanone	µg/kg	13U	12U	121
Acetone	µg/kg	13U	138	12 IB
Benzene	µg/kg	6.5U	5.81	12021
Bromochloromethane	µg/kg	A/N	N/A	0.20
Bromoform	µg/kg	6.5U	5.811	R 211
Bromomethane	µg/kg	13U	12U	1211
Carbon Disulfide	µg/kg	6.5U	16	3.11
Carbon Tetrachloride	µg/kg	6.50	5.8U	6.211
Chlorobenzene	µg/kg	6.5U	5.811	6.211
Chloroethane	µg/kg	130	1211	1211
Chloroform	µg/kg	6.5U	5.8U	6.211

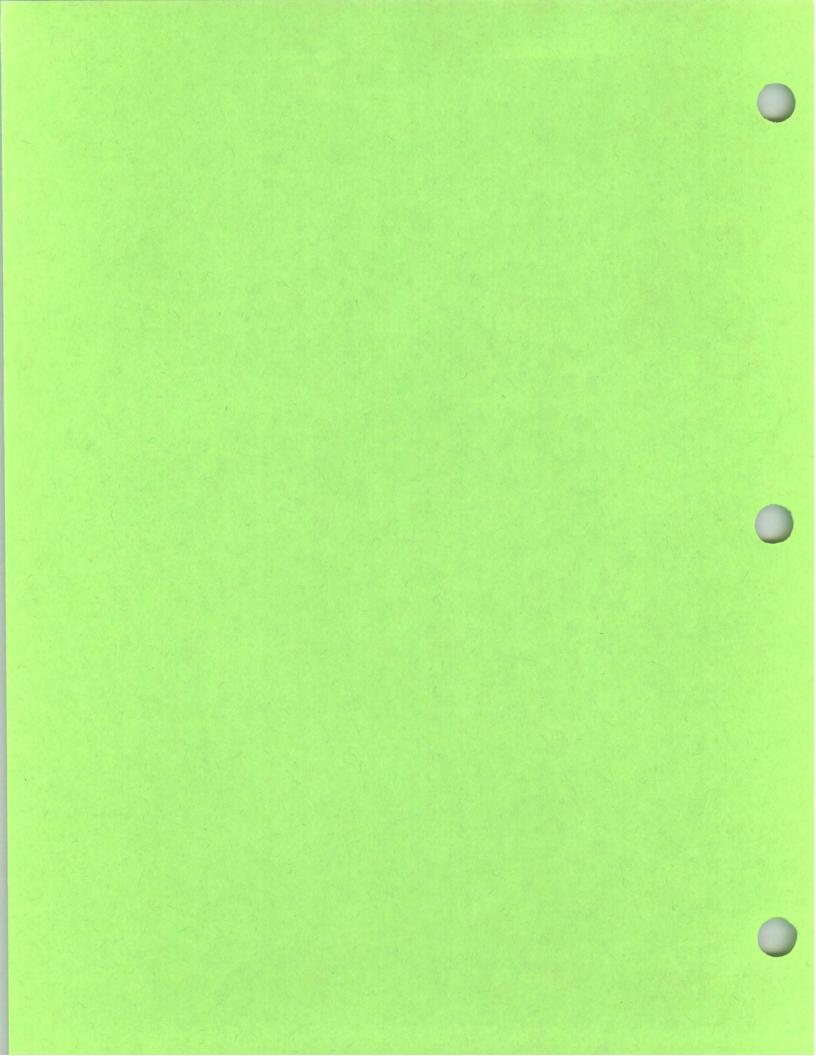
Page: 43-47

# Subsurface Soil VOCs Analytical REsults Summary Table Fuze and Booster Quarry Ponds Draft Remedial Investigation Report

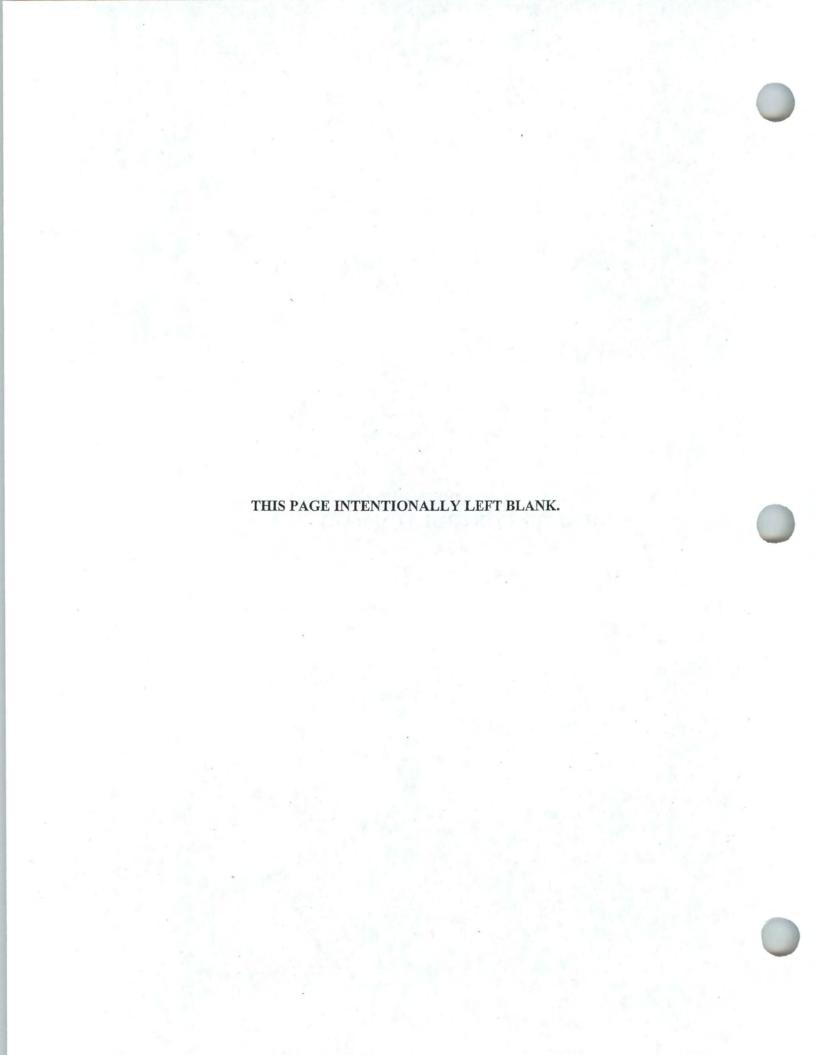
Station ID		FBQ 079	FBQ 083	FBQ 086
Sample ID		FBQSO-079-0158-SO	FBQSO-083-0166-SO	FBQSO-086-0172-SO
Date Collected		11/12/2003	11/13/2003	11/17/2003
Depth (ft)		1-3'	1-3'	1-3'
Sample Type		Grab	Grab	Grab
Analyte	Units			
Chloromethane	µg/kg	13U	12N	12U
cis-1,2-Dichloroethene	µg/kg	6.5U	5.8U	6.2U
cis-1,3-Dichloropropene	µg/kg	6.5U	5.8U	6.2U
Cyclohexane	µg/kg	6.5U	5.8U	6.2U
Dibromochloromethane	µg/kg	6.5U	5.8U	6.2U
Dichlorodifluoromethane	µg/kg	6.5U	5.8U	6.2U
Ethylbenzene	µg/kg	6.5U	5.8U	6.2U
Ethylene Dibromide	µg/kg	6.5U	5.8U	6.2U
Freon 113	µg/kg	6.5U	5.8U	6.2U
Isopropylbenzene	µg/kg	6.5U	5.8U	6.2U
m.p-Xylenes	µg/kg	6.5U	5.13	6.20
Methyl Acetate	µg/kg	6.5U	5.8U	6.2U
Methylcyclohexane	µg/kg	6.5U	5.8U	6.2U
Methylene Chloride	ug/kg	14B	7JB	9.2JB
o-Xylene	µg/kg	6.5U	23	6.2U
Styrene	µg/kg	6.5U	5.8U	6.2U
tert-butyl methyl ether	µg/kg	6.5U	5.8U	6.2U
Tetrachloroethylene	ug/kg	6.50	5.8U	6.2U
Toluene	µg/kg	6.5U	3.6J	6.2U
trans-1,2-dichloroethene	ug/kg	6.50	5.8U	6.2U
trans-1,3-dichloropropene	µg/kg	6.5U	5.8U	6.20
Trichloroethene	ug/kg	6.5U	5.8U	6.2U
Trichlorofluoromethane	ug/kg		5.8U	6.2U
Mand Oblorido	IIa/ka	130	120	12U

Page : A3-48





### APPENDIX A 4 QUALITY CONTROL SUMMARY REPORT



#### QUALITY CONTROL SUMMARY REPORT

#### TABLE OF CONTENTS

	ST OF TABLES	
	ST OF ATTACHMENT	
AC.	RONYMS	J-v
1.0	INTRODUCTION	J-1
2.0	FIELD DATA VERIFICATION	J-1
3.0	LABORATORY DATA VERIFICATION	J-2
	3.1 GENERAL FINDINGS	J-2
	3.2 PROJECT QUANTITATION LEVELS	J-2
	3.3 FIELD DUPLICATES	J-3
	3.4 SPLIT SAMPLES	J-4
4.0	VOLATILE ORGANIC COMPOUNDS	J-4
5.0	SEMIVOLATILE ORGANIC COMPOUNDS	J-7
6.0	PESTICIDES/POLYCHLORINATED BIPHENYLS	J-10
7.0	EXPLOSIVES AND PROPELLANTS SW8330	J-11
8.0	METALS AND MERCURY	J-12
9.0	GENERAL CHEMISTRY (IAAP NITROCELLULOSE, CYANIDE, SULFIDE,	
	FLASHPOINT, TOTAL ORGANIC CARBON, AND HEXAVALENT CHROMIUM)	J-13
10.0	QUALITY CONTROL PARAMETERS	J-13
	10.1 ACCURACY	
	10.2 PRECISION	J-14
	10.3 COMPLETENESS	
	10.4 REPRESENTATIVENESS	
	10.5 COMPARABILITY	J-15
	10.6 REJECTED DATA	
11.0	ELECTRONIC DATA DELIVERABLES	J-15
12.0	REFERENCES	J-15

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#### LIST OF TABLES

3-1	Non-Conforming Primary Chemicals of Potential Concern at RVAAP
4-1	Rejected Results for Volatile Organic Compounds
5-1	Rejected Results for Semivolatile Organic Compounds
6-1	Rejected Results for Pesticide/PCB Compounds
10-1	Summary of Rejected Results for All Methods

#### LIST OF ATTACHMENT

ATTACHMENT A PROJECT	QUANTITATION LIMIT GOALS AND ACHIEVED METHOD	
REPORTING LIMITS	At	tt A-1

#### ACRONYMS

EDD	electronic data deliverable
IS	internal standard
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
PCB	polychlorinated biphenyl
PQL	project quantitation level
QAPP	Quality Assurance Project Plan
QC	quality control
QCSR	Quality Control Summary Report
RPD	relative percent difference
RVAAP	Ravenna Army Ammunition Plant
SDG	Sample Delivery Group
SVOC	semivolatile organic compound
VOC	volatile organic compound
%R	percent recovery
%RSD	percent relative standard deviation

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#### 1.0 INTRODUCTION

This Quality Control Summary Report (QCSR) covers the field and laboratory work performed during sampling events at the Ravenna Army Ammunition Plant (RAAP) Fuze and Booster Quarry Landfill/Ponds conducted from October through December 2003, and additional samples collected in June and July of 2004. Soil, sediment, surface water, and groundwater were sampled for volatile organic compounds (VOCs) including perchlorate, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), explosive compounds including nitrocellulose, metals, miscellaneous chemical species such as hexavalent chromium, and total organic carbon. In addition, several samples were collected for toxicity characteristic leaching procedure and analyzed for VOCs, SVOCs, pesticides, herbicides, and hazardous characteristics including flashpoint, pH, and reactivity. Samples referenced in Tables 5-1 through 5-4 of the Work Plan and Sampling and Analysis Plan Addenda for the Phase I/Phase II Remedial Investigation of the Fuze Booster Quarry Landfill/Ponds at the Ravenna Army Ammunition Plant, Ravenna, Ohio (USACE 2002) were collected by SpecPro Incorporated field personnel. GPL Laboratories, 202 Perry Parkway, Gaithersburg, MD 20877, performed all analytical work.

Data verification and review of field and laboratory results described in this QCSR were conducted under the guidance provided by the facility-wide Quality Assurance Project Plan (QAPP) for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio (USACE 2001), and the Quality Assurance Project Plan Addendum for Phase I/Phase II Remedial Investigation of the Fuze Booster Quarry Landfill/Ponds (USACE 2003). Where required, the U. S. Army Corps of Engineers' Shell Document for Analytical Chemistry Requirements (USACE 1998) was used as a secondary reference. The topics covered include:

- the conformance of the participating laboratory to quality control (QC) procedures described in the referenced Quality Assurance Project Plans (QAPPs),
- · an evaluation of the quality of the data, and
- all rejected data.

#### 2.0 FIELD DATA VERIFICATION

Chain of custody records and sampling records were reviewed to ensure that the correct bottles and preservatives were utilized throughout sampling. Samples were preserved and held at the correct temperature from the time of collection through sample shipment, receipt in the laboratory, and until point of analysis. Appropriate field duplicates were collected on each matrix type and at the appropriate frequency to meet project requirements. Field QC samples were collected including trip blanks, field blanks, and equipment rinsate blanks. Unless addressed specifically in the summaries for each analytical method reviewed below, all field QC measures were within acceptance criteria and met project and method requirements.

#### 3.0 LABORATORY DATA VERIFICATION

Twenty-six sample delivery groups (SDGs) were submitted to the laboratory. A complete data package consisting of analytical, calibration, and QC information for each method within an SDG was supplied by the laboratory. All data packages were reviewed for each method for adherence to QAPP requirements as stated above. Completeness, correctness, consistency, and compliance were evaluated for all samples, which include all sample duplicate analysis and conformance to project reporting limits. In addition, 15% of the data was validated. During the validation process, calibration, calibration verification, blank contamination, recoveries of laboratory control samples (LCS), and matrix spike/matrix spike duplicate (MS/MSD) were evaluated. For organic analyses, instrument tuning, internal standard (IS) performance, and surrogate recoveries were also evaluated. For metals, interference checks, dilution tests, and post-digestion recoveries were also evaluated.

#### 3.1 GENERAL FINDINGS

Unless addressed specifically in the summaries for each analytical method reviewed below, preservation, sample custody logs, preparation, extraction and cleanup logs, analysis logs, sample identification, and holding times were within acceptance criteria and met method requirements. Calibration and QC parameters for all methods were found acceptable. All exceptions are discussed in the sections below.

High concentrations of metal analytes, hexavalent chromium, and mercury required occasional sample dilutions prior to analysis to maintain results within calibration range. Project quantitation levels (PQLs) were not adversely impacted by sample dilution.

Manual integration was performed for some analytes for VOCs, SVOCs, pesticides, and explosive compounds. The rationale provided in the case narratives based the need for manual integration on improper integration performed by the software. In most cases, the adjustments were made on low-concentration standards and QC samples where concentrations were near the limit of sensitivity. The laboratory submitted software-produced EICP chromatograms and corresponding manually integrated chromatograms. The adjustments were properly executed and consistent with the intent of the LCG guidance on manual integration.

#### 3.2 PROJECT QUANTITATION LEVELS

In general, the laboratory was able to achieve the PQLs specified in the QAPP. VOC analysis was typically performed using a 5-mL purging volume to obtain reporting limits of approximately 5  $\mu$ g/L for water. These levels met most LCG requirements; however, they did not achieve the PQL goals of the QAPP.

Method reporting limit (MRL) check standards were typically analyzed at the beginning of a sequence, but not consistently repeated either at the end of the sequence or every 12 hrs as required by the LCG for most analytical methods.

Prior to the beginning of the project, the laboratory was granted some PQL variances because of their inability to achieve QAPP-specified limits. In most cases, the laboratory reporting limits generally met LCG requirements. A comparison of the laboratory PQLs and the project-specific PQLs for performing baseline risk assessment for primary chemicals of potential concern at RVAAP is presented in Table 3-1. A comparison of the laboratory PQLs and the project-specific PQLs is presented in Appendix A.

Table 3-1. Non-Conforming Primary Chemicals of Potential Concern at RVAAP

	Soi	l (mg/kg)	Wa	iter (µg/L)
	GPL MRL	Baseline RA DL Requirements	GPL MRL	Baseline RA DL Requirements
Element		mg/kg		μg/L
2,4-DNT	NA	0.9	0.26	0.1
2.6-DNT	NA	0.9	0.26	0.1
TNT	NA	21	NA	3
RDX	NA	5.8	NA	0.8
HMX	NA	3900	NA	2,000
Nitrocellulose	NA	Best available	NA	Best available
Nitroglycerine	NA	Best available	NA	Best available
Nitroguanidine	NA	7,800	NA	4,000
Aluminum	NA	Best available	NA	Best available
Arsenic	2.0	0.4	20	0.1
Barium	NA	5,500	NA	2,000
Cadmium	NA	78	6.0	5.0
Chromium	NA	230	NA	100
Lead	NA	400	NA	15
Mercury	NA	23	NA	2.0
Selenium	NA	390	NA	50
Silver	NA	390	NA	200
Zinc	NA	24,000	NA	11,000
,3,5-TNB	NA	2,300	NA	1,000
,3-DNB	NA	7.8	NA	4.0
Vitrobenzene	NA	39	NA	20
-nitrotoluene	NA	780	NA	400
-nitrotoluene	NA	780	NA	400
-nitrotoluene	NA	780	NA	400
Manganese	NA	3,600	NA	2,000
PCBs	NA	0.3	1.1	0.04

DL = Detection limit.

GPL = GPL Laboratories, Inc.

MRL = Method reporting limit.

NA = GPL MRL met QAPP requirements.

RA = Remedial action.

RVAAP = Ravenna Army Ammunition Plant.

Overall, the laboratory met PQL requirements. The exceptions noted above are discussed under the respective method evaluations.

#### 3.3 FIELD DUPLICATES

Field duplicate samples were collected for each matrix under investigation and analyzed for all target analytes. Relative percent differences (RPDs) were calculated where applicable and the results are presented for each method. The RPDs are not applicable where one of the analytical results was nondetect or is estimated below the level of quantitation. This event is indicated by an asterisk (\*) in the table. Where the RPD exceeded QAPP-acceptance criteria, 30% for waters or 50% for soils and sediments, the word "Fail" qualifies the listed RPD. Positive results in the primary and field duplicate have been qualified estimated (J). This estimated value implies that more variability than acceptable may occur in subsequent re-sampling events.

#### 3.4 SPLIT SAMPLES

Field samples were divided between GPL and another laboratory to evaluate analytical quality. No evaluation of inter-laboratory precision was made because analytical data from the second laboratory was not provided.

#### 4.0 VOLATILE ORGANIC COMPOUNDS

Nine samples were submitted as field duplicates for volatile analysis and represented all matrix types sampled for this project. All compounds detected in one or both aliquots of the field duplicate have been summarized below. Most RPD values have been qualified with an (\*) representing undetectable or estimated below the quantitation limit in the other aliquot. All RPD values calculated for volatile organics meet the QAPP criteria.

FBQMW-167					
Chemical	-0308-GW	-0407-GW	RPD		
1,1,1-Trichloroethane	5.80	5.00 U	14.8 *		
1,1-Dichloroethene	4.20 J	5.00 U	17.4 *		
Acetone	5.60 JB	4.80 JB	15.4 *		
Methylene Chloride	6.60 JB	6.10 JB	7.87 *		

	FBQSD-130-		
Chemical	-0255-SD	-0389-SD	RPD
Acetone	16.00 JB	17.00 JB	6.1 *
Methylene Chloride	18.00 JB	16.00 JB	11.7 *

FBQSD-133					
Chemical	-0258-SD	-0394-SD	RPD		
2-Butanone	17.00 U	15.00 J	12.5 *		
Acetone	8.50 JB	40.00 B	129 *		
Methylene Chloride	11.00 JB	14.00 JB	24 *		
Toluene	7.30 J	79.00	166 *		

FBQSD-138					
Chemical	-0263-SD	-0393-SD	RPD		
Acetone	9.60 JB	17.0 U	55.6 *		
Methylene Chloride	11.00 JB	17.00 ЈВ	42.8 *		

FBQSD-140				
Chemical	-0265-SD	-0395-SD	RPD	
2-Butanone	13.00 JB	9.80 JB	28.1 *	
Acetone	36.00	32.00	11.8	
Methylene Chloride	18.00 JB	14.00 U	25.0 *	

FBQSO-086					
Chemical	-0172-SO	-0406-SO	RPD		
2-Butanone	5.40 J	12.00 U	75.9 *		
Acetone	12.00 JB	10.00 JB	18.2 *		
Carbon Disulfide	3.10 J	6.10 U	65.2 *		
Methylene Chloride	9.20 JB	16.00 JB	54.0 *		

FBQSS-084					
Chemical	-0167-SO	-0404-SO	RPD		
Acetone	10.00 JB	7.30 JB	31.2 *		
Methylene Chloride	6.50 JB	11.00 JB	51.4 *		
Toluene	3.90 J	5.8 U	39.2 *		

FBQSW-134				
Chemical	-0300-SW	-0391-SW	RPD	
2-Butanone	3.40 J	2.50 J	30.5 *	
Acetone	14.00 B	14.00 B	0 *	
Carbon Disulfide	1.70 J	5.0 U	98.5 *	
Methylene Chloride	6.20 JB	6.70 JB	7.7 *	
Toluene	16.00	17.00	6.1	

FBQSW-135				
Chemical	-0301-SW	-0392-SW	RPD	
Acetone	7.10 JB	4.90 JB	36.6 *	
Methylene Chloride	7.60 JB	5.70 JB	28.6 *	
Toluene	3.60 J	3.90 J	8.0 *	

In the review of laboratory QC criteria, calibrations were generally acceptable and followed method requirements. Instrument tuning met requirements. Where the percent relative standard deviation (%RSD) failed to meet the required 15% limit for an analyte, undetectable levels of these compounds were rejected (R) and positive results were qualified estimated (J). Table 4-1, Rejected Results for Volatile Compounds, lists specific sample numbers and analytes that were rejected.

Calibration verification was performed using a second source standard. When compounds had %RSD values that were greater than 20%, further evaluation of the data was performed. When positive bias existed in the %RSD, associated samples with undetectable levels of the compounds were not qualified. However, a positive bias associated with a positive result was qualified estimated (J). When a negative bias was present in the %RSD, positive values were qualified estimated (J) and nondetected values were estimated at the reporting limit (UJ). No %RSD values were seen in excess of 40%.

Table 4-1. Rejected Results for Volatile Organic Compounds

SDG	Sample IDs	Compound	% RSD	Type	Date
311136	FBQ-MW-168-0310-GW FBQ-MW-172-0318-GW FBQ-MW-172-0408-GW FBQ-MW-175-0324-GW Trip Blank	Bromomethane Methylene Chloride Acetone 2-Butanone trans-1,3-Dichloropropene	17 23.6 32.7 16 21.8	ICAL	11/10/03
311076	FBQ-MW-171-0316-GW FBQ-MW-170-0314-GW Trip Blank FBQ-SO-079-0158-SO FBQ-SS-079-0157-SO FBQ-SS-098-0195-SO	2-Hexanone Bromoform 1,2-Dibromo-3-chloropropane 1,2,4-Trichlorobenzene Freon-113 Cyclohexane	15.4 20.8 21.8 23.6 19.8 19.7		
311113	FBQ-MW-167-0308-GW FBQ-MW-167-0407-GW FBQ-MW-169-0312-GW FBQ-MW-174-0322-GW FBQ-SO-086-0172-SO FBQ-SO-086-0406-SO Trip Blank	Methyl Acetate	21.2		
310082	FBQ-SS-019-0037-SO FBQ-SS-019-0038-SO FBQ-SS-060-0119-SO FBQ-SS-060-0120-SO FBQ-SS-017-0033-SO FBQ-SS-045-0089-SO FBQTB-0379	Chloromethane Bromomethane Methylene Chloride	17 17.2 15.2	ICAL	10/7/03
	FBQ-SS-017-0033-SO-RE FBQ-SS-045-0089-SO-RE	Methylene Chloride Acetone 2-Hexanone	17.2 27.7 23.3	ICAL	10/21/03
311095	FBQ-SS-083-0165-SO FBQ-SS-083-0166-SO FBQ-SS-084-0404-SO FBQ-SS-084-0167-SO FBQ-TB-0405	1,1-Dichloroethene Acetone trans-1,3-Dichloropropene Bromoform Methyl Acetate	23.6 32.7 21.8 20.8 21.2	ICAL	11/10/03

%RSD = Percent relative standard deviation.

SDG = Sample Delivery Group.

Surrogate recovery exceeded acceptable limits of 50 to 150% for the analysis of several samples in various SDGs. In most cases, samples were reanalyzed within the holding time with similar results. Since all recoveries were between 10 and 50%, positive values for all volatiles in these samples have been qualified estimated (J) and all nondetect values have been qualified estimated at the reporting limit (UJ). Samples affected by low surrogate recovery include: FBQSS-019-0037-SO, FBQSS-019-0038-SO, FBQSS-017-0033-SO, FBQSS-045-0089-SO, FBQ-SO-098-0195-SO, FBQ-SO-079-0158-SO, FBQ-SO-079-0157-SO, FBQ-SO-086-0172-SO, and FBQ-SO-086-0406-SO.

IS area counts were acceptable for all samples evaluated during validation.

Method blanks were contaminated above one-half the MRL with acetone, methylene chloride, and/or 2-butanone. Trip blanks contained acetone and methylene chloride also. Equipment rinse blanks also contained carbon disulfide in addition to methylene chloride and acetone. Sample results have been

qualified "B" for common laboratory contaminants less than ten times the amount in the blank and less than five times the amount in the blank for other contaminants according to the LCG criterion.

LCS recoveries were generally acceptable. Elevated LCS/LCS duplicate (LCSD) recoveries were seen in several SDGs. Positive values for toluene were qualified estimated (J) in SDG 311095; in all other cases, elevated LCS/LCSD percent recoveries were associated with undetectable compounds in the associated samples. Low recovery of methyl acetate was reported in SDG 311136. All samples in this analytical batch had undetectable levels of this compound, and have been previously qualified (R) due to calibration issues.

MS/MSD analysis was performed at an appropriate frequency by the laboratory. In general, MS/MSD percent recoveries for samples associated with this project were acceptable. When batch QC was utilized by the laboratory, more compounds were reported out of control for MS/MSD criteria. Project samples were not qualified based on batch QC samples not collected from this project. For soil and sediment samples, MS/MSD recoveries for chloromethane, methylene chloride, carbon disulfide, 4-methyl-2-pentanone, and 2-hexanone were slightly out of control limits. For aqueous samples, MS/MSD recoveries for acetone and methyl acetate were slightly outside of control limits. There was no significant impact on data usability.

#### 5.0 SEMIVOLATILE ORGANIC COMPOUNDS

Nine samples were submitted as field duplicates for semivolatile analysis and represented all matrix types sampled for this project. All compounds detected in one or both aliquots of the field duplicate have been summarized below. Three field duplicates had undetectable levels of all SVOC compounds in both aliquots. Most RPD values have been qualified with an (\*) representing undetectable or estimated below the quantitation limit in the other aliquot. All RPD values calculated for semivolatile organics meet the QAPP criteria.

FBQMW-167					
Chemical	-0308-GW	-0407-GW	RPD		
bis(2-Ethylhexyl) phthalate	2.30 JB	2.60 J	12.2 *		
Caprolactam	46.00	36.00	24:4		

FBQSD-130			
Chemical	-0255-SD	-0389-SD	RPD
Benzo(a)pyrene	100.00 J	82.00 J	19.8 *
Benzo(b)fluoranthene	160.00 J	120.00 J	28.6 *
bis(2-Ethylhexyl) phthalate	880.00 U	93.00 J	162 *
Chrysene	110.00 J	89.00 J	21.1 *
Fluoranthene	170.00 J	160.00 J	6.06 *
Pyrene	200.00 J	800.00 U	120 *

FBQSD-133			
Chemical	-0258-SD	-0394-SD	RPD
4-Methylphenol	510.00 J	440.00 J	14.7 *
bis(2-Ethylhexyl) phthalate	110.00 JB	72.00 JB	41.7 *

FBQSD-138			
Chemical	-0263-SD	-0393-SD	RPD
Benzo(a)anthracene	74.00 J	560.00 U	153 *
Benzo(a)pyrene	72.00 J	60.00 J	18.2 *
Benzo(b)fluoranthene	120.00 J	96.00 J	22.2 *
Chrysene	81.00 J	67.00 J	18.9 *
Fluoranthene	180.00 J	140.00 J	25.0 *
Phenanthrene	97.00 J	95.00 J	2.1 *
Pyrene	130.00 J	560.00 U	124 *

FBQSW-134			
Chemical	-0300-SW	-0391-SW	RPD
4-Methylphenol	170.00	22.00 J	154 *
bis(2-Ethylhexyl) phthalate	2.80 JB	2.50 JB	11.3 *
Phenol	120.00	110.00	8.7

FBQSW-135			
Chemical	-0301-SW	-0392-SW	RPD
bis(2-Ethylhexyl) phthalate	1,40 J	2.00JB	35.3 *

Calibration and calibration verifications were generally acceptable and followed method requirements. Instrument tuning and IS performance met requirements except where noted below.

In the review of laboratory QC criteria, calibrations and calibration verifications were generally acceptable and followed method requirements. Instrument tuning and IS performance met requirements. Where the %RSD failed to meet the required 15% limit for an analyte, undetectable levels of these compounds were rejected (R) and positive results were qualified estimated (J). Table 5-1, Rejected Results for semivolatile Compounds, lists specific sample numbers and analytes that were rejected.

The laboratory has recently started running a low level MRL standard at least at the beginning of each analytical sequence. Recovery is expected between 70 and 130%. For recoveries between 50 and 70%, all positive values have been qualified (J) and all nondetected compounds (UJ). Rejected data for semivolatile compounds are listed in Table 5-1 where %RSD was less than 50%. Continuing calibration verification was also used to qualify data with %RSD values greater than 20%. Compounds with a negative bias were qualified (J) to positive values and (R) to undetected compounds.

ISs were acceptable for all samples validated.

Method blanks were contaminated above one-half the MRL with bis(2-ethyl hexyl)phthalate. Sample results have been qualified (B) for this common laboratory contaminant less than ten times the amount in the blank according to the LCG criterion.

Table 5-1. Rejected Results for Semivolatile Organic Compounds

SDG	Sample IDs	Compound	% RSD	Type	Date
311136	FBQ-MW-168-0310-GW	Benzadehyde	74.5	ICAL	12/22/03
	FBQ-MW-172-0318-GW	Phenol	16.3	0.7771	35.000
	FBQ-MW-172-0408-GW	n-Nitroso-di-n-propylamine	15.7		1
	FBQ-MW-175-0324-GW	Naphthalene	16.9		
	FBQ-MW-175-0324-GW-DL	4-Chloroaniline	18.4		
311113	FBQ-MW-167-0308-GW	Hexachlorocyclopentadiene	19.6		
10000	FBQ-MW-167-0407-GW	1,1-Biphenyl	15.9		
	FBQ-MW-169-0312-GW	Acenaphthene	23.1		
	FBQ-MW-174-0322-GW	2,4-Dinitrophenol	18.6		
	FBQ-SO-086-0172-SO	Dibenzofuran	15.2		
	FBQ-SO-086-0406-SO	Fluorene	16		
	Trip Blank	4,6-Dinitro-2-methylphenol	15.8		
	The Diana	n-Nitrosodiphenylamine	19.4		
		Atrazine	76.8		
		Phenanthrene			
		Anthracene	22.5		
		Carbazole	23.5		
	10		23.6		
		di-n-Butylphthalate	25		
		Fluoranthene	21.8		
		Pyrene	19.2		Action 1
2100000	EDO GO ALO ADOS GO	3,3-Dichlorobenzidine	34.4	****	
3100082	FBQ-SS-019-0038-SO	Benzadehyde	67.7	ICAL	10/17/03
	FBQ-SS-060-0119-SO	2,4-Dinitrophenol	26.8		
	FBQ-SS-060-0120-SO	4,6-Dinitro-2-methylphenol	15.6		1
	FBQ-SS-017-0033-SO FBQ-SS-045-0089-SO	3,3-Dichlorobenzidine	15.4		
		Hexachlorocyclopentadiene	31.7	MRL	
		4-Nitrophenol	32.2		
		n-Nitrosodimethylamine	48.2		
		di-n-Octylphthalate	-30.8		
		Caprolactam	-37.2	CCV	
		3-Nitroaniline	-24.5		
		2,4-Dinitrotoluene	-20.5		
	_	4-Nitroaniline	-31.5		
		di-n-Butylphthalate	-24.0		
311076	FBQ-MW-171-0316-GW	Benzaldehyde	57.6	ICAL	12/3/03
	FBQ-MW-170-0314-GW	Acenaphthylene	18.5		357/35
	The state of the s	2,4-dinitrophenol	20.5		
		Atrazine	42		
		Phenanthrene	18.9		
		Carbazole	17.7		
		di-n-Butylphthalate	18.3		
		Fluoranthene	18.6		
		3,3-Dichlorobenzidine	23.3		
		4-Chloroaniline	-26.1	CCV	
		4-Nitroaniline	-34.7	CCV	
		4-Nitrophenol	0%		
		Pentachlorophenol	6%		
		1 chiachiorophenor	0.70		

Table 5-1. Rejected Results for Semivolatile Organic Compounds (continued)

SDG	Sample IDs	Compound	% RSD	Type	Date
311095	FBQ-SS-083-0165-SO FBQ-SS-083-0166-SO FBQ-SS-084-0404-SO FBQ-SS-084-0167-SO FBQ-SO-079-0158-SO FBQ-SO-079-0157-SO	Benzadehyde Bis(2-chloroethyl)ether Acenaphthylene 2,4-Dinitrophenol	72.5 21.8 16.7 19.3	ICAL	12/23/03
	FBQ-SS-098-0195-SO	Hexachlorobutadiene din-n-Octylphthalate	-23.3 -24.4	CCV	N
311103	FBQ-SS-TCLP	Pyridine Hexachlorobutadiene	22.2 17	ICAL	12/1/03

%RSD = Percent relative standard deviation.

SDG = Sample Delivery Group.

Low LCS/LCSD percent recoveries were reported in SDG 311076 for 2-chlorophenol, 4-nitrophenol, pentachlorophenol, and phenol. Results for 4-nitrophenol and pentachlorophenol have been rejected (R) due to recovery less than 30%. All other compounds with low LCS percent recoveries have been qualified estimated (J/UJ). Low LCS recovery was reported in SDG 311095 for 2-chlorophenol, 4-nitrophenol, 4-chloro-3-methylphenol, pentachlorophenol, phenol, and n-nitrosodi-n-propylamine. All values of these compounds have been qualified estimated (J/UJ) due to these slight exceedances.

MS/MSD recoveries were within acceptance criteria.

### 6.0 PESTICIDES/POLYCHLORINATED BIPHENYLS

Nine samples were submitted as field duplicates for pesticide and PCB analysis and represented all matrix types sampled for this project. All compounds detected in one or both aliquots of the field duplicate have been summarized below. Six field duplicates had undetectable levels of all pesticide/PCB compounds in both aliquots. Most RPD values have been qualified with an (\*) representing undetectable or estimated below the quantitation limit in the other aliquot. All RPD values calculated for pesticides and PCBs met the QAPP criteria.

FBQSD-133					
Chemical	al -0394-SD -02		RPD		
Methoxychlor	1.10 J	2.80 U	87.2 *		

FBQSD-138					
Chemical	-0393-SD	-0263-SD	RPD		
Methoxychlor	0.94 J	2.5 U	90.7 *		

	FBQSD-1	40	
Chemical	-0265-SD	-0395-SD	RPD
4,4-DDE	0.79 J	0.57 J	32.3 *

Calibration and calibration verifications were acceptable and followed method requirements.

Low LCS percent recovery (%R) was reported for delta-BHC in SDGs 311136, 311076, and 311113. The laboratory attributed this problem to a standard problem. However, because of the recovery less than 30%, all sample data in this analytical batch have been rejected (R) for delta-BHC in these associated SDGs. Table 6-1, Rejected Results for Pesticide/PCB Compounds, lists specific sample numbers and analytes that were rejected.

Table 6-1. Rejected Results for Pesticide/PCB Compounds

SDG	Sample Number	Analyte	Analysis
311136	FBQ-MW-168-0310-GW FBQ-MW-172-0318-GW FBQ-MW-172-0408-GW FBQ-MW-175-0324-GW	Delta-BHC	LCS
311076	FBQ-MW-171-0316-GW FBQ-MW-170-0314-GW	Delta-BHC	LCS
311113	FBQ-MW-167-0308-GW FBQ-MW-167-0407-GW FBQ-MW-169-0312-GW FBQ-MW-174-0322-GW	Delta-BHC	LCS

PCB = Polychlorinated biphenyl.

SDG = Sample Delivery Group.

The method blank in SDG 311095 had low level contamination of 4,4-DDT; aldrin; dieldrin; endrin; endrin ketone; gamma-BHC; and heptachlor. The laboratory isolated this contamination to syringe contamination. Only one sample showed low level contamination of similar compounds at levels within five times the value found in the blank. These compounds have been qualified found in blank (B) in this sample.

MS/MSD recoveries were acceptable. Surrogate recoveries were generally acceptable.

With the exceptions noted above, the data are considered to be technically sound and usable.

### 7.0 EXPLOSIVES AND PROPELLANTS SW8330

Twenty-six samples were submitted as field duplicates for explosive analysis and represented all matrix types sampled for this project. All compounds detected in one or both aliquots of the field duplicate have been summarized below. Twenty-one field duplicates had undetectable levels of all explosive compounds in both aliquots. Most RPD values have been qualified with an (\*) representing undetectable or estimated below the quantitation limit in the other aliquot. All RPD values calculated for explosives met the QAPP criteria.

FBQSS-049					
Chemical	-0097-SO	-0378-SO	RPD		
2,4,6-Trinitrotoluene	82.00 J	120.00	37.6 *		
2-Amino-4,6-Dinitrotoluene	140.00	190.00	30.3		
4-Amino-2,6-Dinitrotoluene	110.00	140.00	24		

	FBQSS-075		
Chemical	-0149-SO	-0403-SO	RPD
Tetryl	170.00 J	200.00 U	16.2 *

	FBQSD-133	3	
Chemical	-0394-SD	-0258-SD	RPD
m-Nitrotoluene	81.00 J	200.00 U	84.7 *

	FBQSD-138	3	
Chemical	-0263-SD	-0393-SD	RPD
m-Nitrotoluene	78.00 J	200.00 U	85.6 *

FBQSW-134					
Chemical	-0300-SW	-0391-SW	RPD		
2-Amino-4,6-Dinitrotoluene	0.68 J	0.53 J	24.8 *		
4-Amino-2,6-Dinitrotoluene	20.00 J	18.00 J	10.5 *		

Calibration and calibration verifications were acceptable and followed method requirements. Associated calibration and method blanks were free of contamination.

Most LCS results met acceptable percent recoveries. In SDG 311082, low LCS %R was reported for tetryl. All samples had undetectable levels of tetryl and have been qualified rejected (R) due to recovery less than 30%. Also in SDG 311076, LCS/LCSD percent recoveries were outside of laboratory QC limits in the water analysis for 1,3,5-trinitrobenzene and tetryl. All associated samples had undetectable levels of these compounds, and results for these compounds were rejected (R) due to percent recoveries less than 30%. In the same SDG, LCS/LCSD percent recoveries were outside of laboratory QC limits in the soil analysis for 1,3,5-trinitrobenzene and tetryl and were rejected (R) due to percent recoveries less than 30%.

No surrogate results were reported for nitroguanidine. The laboratory stated that nitroguanidine was directly injected and there is typically no surrogate added when the direct injection method is used.

MS/MSD and LCS recoveries met the QAPP requirements.

With the exceptions noted above, the data are considered to be technically sound and usable.

### 8.0 METALS AND MERCURY

Twenty-six samples were submitted as field duplicates for metals analysis and represented all matrix types sampled for this project. All compounds detected in one or both aliquots of the field duplicate have been summarized below. Most RPD values have been qualified with an (\*) representing undetectable or estimated below quantitation limit in the other aliquot. Most compounds where high RPD values have been calculated between duplicates are with sample concentrations within five times the standard reporting limit. No data were qualified with this low level variability. Most RPD values calculated for metals met the QAPP criteria.

Calibration and calibration verification performance were within acceptance criteria. Interference checks, dilution tests, and post-digestion recoveries were within acceptance criteria except where noted.

The preparation blank frequently contained calcium, chromium, copper, sodium, and occasionally other target analytes above the MRL. The initial calibration blank was free of contamination, while continuing calibration blanks contained aluminum, iron, lead, sodium, thallium, magnesium, and occasionally other target analytes. Results for these analytes should be qualified (B) where positive values are less than five times the blank value in accordance with the LCG.

LCS recoveries of all analytes were within the specified control limits.

MS/MSD recoveries frequently were outside of control limits for antimony, arsenic, copper, magnesium, and potassium. However, post-digestion spike recoveries were with acceptance limits.

With the exceptions noted above, the data are considered to be technically sound and usable.

### 9.0 GENERAL CHEMISTRY (IAAP NITROCELLULOSE, CYANIDE, SULFIDE, FLASHPOINT, TOTAL ORGANIC CARBON, AND HEXAVALENT CHROMIUM)

Calibrations for general chemistry methods were acceptable. Sulfide is a titrimetric method and data for the standardization of the titrant were provided. Subsequent continuing calibration verification standards confirmed that the analyses remained in control. Associated calibration and method blanks were free of contamination.

LCS recoveries for analytes were within the specified control limits. MS/MSD recoveries were within acceptance criteria.

Several sample dilutions were required due to the limited range of the analytical method performed for hexavalent chromium. Dilutions were required to bring hexavalent chromium levels to within the linear range of the instrument. Reported values accurately reflected target analyte concentrations in project samples.

The data are considered to be technically sound and usable.

### 10.0 QUALITY CONTROL PARAMETERS

### 10.1 ACCURACY

Accuracy is defined as the agreement of a measurement with an accepted reference or true value and was measured by the %R of each analyte in the LCSs analyzed with each sample batch. Any rejection of analytical results based on non-conformant LCS recoveries is discussed under each method in previous sections of this report. The overall level of accuracy is considered to be acceptable.

### 10.2 PRECISION

Precision is defined as the agreement between a set of replicate measurements without consideration or knowledge of the true value. Precision was evaluated based on MS/MSD and field duplicate results where available. Any rejection of analytical results based on non-conformant MS/MSD RPDs are discussed under each method in previous sections of this report. Field duplicate samples were also analyzed and RPDs were calculated where applicable. The overall level of precision is considered to be acceptable.

### 10.3 COMPLETENESS

Completeness is the quantitative measure of the amount of data obtained from a measurement process compared with the amount expected to be obtained under the conditions of measurement. Unusable analytical data are those results reported by the laboratory but rejected during the data validation process. Completeness for all analytical fractions is outlined below. Table 10-1 summarizes the overall rejected results for all methods. Soil VOCs had higher than 10% rejections. The overall percentage of acceptable results was 96.8%, meeting the project completeness goal of 90%.

Table 10-1. Summary of Rejected Results for All Methods

Media	Analysis Group	Rejected Results	Total Results	Percent Rejected
Sediment	Metals	0	1,012	0%
	Volatile Organics	0	2,156	0%
	Semivolatile Organics	0	2,860	0%
	Pesticides/PCBs	0	1,276	0%
	Explosives	0	748	0%
	General Chemistry	0	99	0%
	Subtotal	0	8,151	0%
Soil	Metals	8	3,933	0.20%
747 774	Volatile Organics	279	1,066	26.2%
	Semivolatile Organics	114	1,495	7.62%
	Pesticides/PCBs	0	645	0%
	Explosives	44	2,606	1.69%
	General Chemistry	0	22	0%
	Subtotal	445	9,767	4.56%
Surface Water,	Metals	0	805	0%
Groundwater,	Volatile Organics	157	2,548	6.16%
and Quality	Semivolatile Organics	203	2,275	8.92%
Control	Pesticides/PCBs	10	1,015	0.98%
	Explosives	4	595	0.67%
	General Chemistry	0	46	0%
	Subtotal	374	7,284	5.13%
Project Totals		818	25,202	3.24%

PCB = Polychlorinated biphenyl.

### 10.4 REPRESENTATIVENESS

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness was evaluated by comparing the results of the field duplicate pairs and conducting sampling in accordance with the work plan, QAPP, and relevant standard operating procedures. Results for all analytes satisfied the field duplicate evaluation criteria and all sampling/analysis protocols were followed.

### 10.5 COMPARABILITY

Comparability expresses the confidence with which one data set can be compared to another. Comparability for this project could not be evaluated because of the absence of any previous data.

### 10.6 REJECTED DATA

Rejected data eliminate the actual result or data points for these compounds in the affected samples. Therefore, the data cannot be used to definitively state that these compounds are not present in these samples. If these compounds were suspected to be present in the samples, or were considered a critical contaminant of concern, re-sampling and re-analysis may be necessary to validate the concentration reported to the standards required by the data quality guidelines.

### 11.0 ELECTRONIC DATA DELIVERABLES

The electronic data deliverables (EDDs) were reviewed for completeness and the following observations were made. Overall the EDDs were acceptable with the following exceptions.

- Calibration data are not included in the EDDs. However, all the data packages are presented in electronic format (PDF) as well as hard copies. Calibration and QC data are available in both CD-ROM and hard copy formats.
- The VOC and SVOC LCS analyzed with SDG 208002 contained only a short analyte list reported in the EDD, well under the target analyte list as required by the QAPP Addendum. However, the results for the whole target analyte list were reported in the hardcopy data package and CD-ROM.
- Inconsistent reporting of compound names has been corrected to reflect consistent reporting requirements in the EDD.

### 12.0 REFERENCES

This report was written by Valerie Mariola.

- USACE (U. S. Army Corps of Engineers) 1998. Shell Document for Analytical Chemistry Requirements.
- USACE 2001. Quality Assurance Project Plan (QAPP) for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio, March.
- USACE 2002. Work Plan and Sampling and Analysis Plan Addenda for the Phase I/Phase II RI at the Fuze and Booster Quarry Landfill/Ponds at the Ravenna Army Ammunition Plant, Ravenna, Ohio (SAP Addendum).
- USACE 2003. Quality Assurance Project Plan Addendum for Phase I/Phase II Remedial Investigation of the Fuze Booster Quarry Landfill/Ponds, October.

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## ATTACHMENT A PROJECT QUANTITATION LIMIT GOALS AND ACHIEVED METHOD REPORTING LIMITS

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Table A-1. Project Quantitation Limit Goals and Achieved Method Reporting Limits

	V	ater	Soil/S	ediment
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Parameters/Methods	(µg/L)	(µg/L)	(µg/kg)	(µg/kg)
	VOCs SW 84		APB B/	(PB-11B)
1,1,1-Trichloroethane	1	5.0	5	5
1,1,2,2-Tetrachloroethane	1	5.0	5	5
1,1,2-Trichloroethane	1	5.0	5	5
1.1-Dichloroethane	1	5.0	5	5
1,1-Dichloroethene	1	5.0	5	5
1,2-Dibromomethane	1	5.0	5	5
1,2-Dichloroethane	1	5.0	5	5
1,2-Dichloroethene (total)	1	5.0	5	5
1,2-Dichloropropane	1 1	5.0	5	5
2-Butanone	10	10	20	10
2-Hexanone	10	10	20	10
4-Methyl-2-pentanone	10	10	20	10
Acetone	10	10	20	10
Benzene	1	5.0	5	5
Bromochloromethane	1	5.0	5	5
Bromodichloromethane	1	5.0	5	5
Bromoform	1	5.0	5	5
Bromomethane	1	5.0	5	10
Carbon Disulfide	1	5.0	5	5
Carbon Tetrachloride	1	5.0	5	5
Chlorobenzene	1	5.0	5	5
Chloroethane	1	5.0	5	10
Chloroform	1	5.0	5	5
Chloromethane	1	5.0	5	10
cis-1,3-Dichloropropene	1	5.0	5	5
Dibromochloromethane	1	5.0	5	5
Ethylbenzene	1	5.0	5	5
Methylene Chloride	1	5.0	5	10
	1	5.0	5	5
Styrene Fetrachloroethene	1	5.0	5	5
Toluene	1	5.0	5	5
rans-1,3-Dichloropropene	VOCs SW 840		3	5
Trichloroethene	1	5.0	5	5
Vinyl Chloride	1	5.0	5	10
Xylenes (total)	2	15	10	15
Lytones (total)	SVOCs SW 84		10	13
,2,4-Trichlorobenzene	10	11	330	330
,2-Dichlorobenzene	10	11	330	330
,3-Dichlorobenzene	10	11	330	330
.4-Dichlorobenzene	10	11	330	330
.4,5-Trichlorophenol	25	22	330	330
.4,6-Trichlorophenol	10	11	330	330
.4-Dichlorophenol	10	11	330	330
.4-Dimethylphenol	10	11	330	330

Table A-1. Project Quantitation Limit Goals and Achieved Method Reporting Limits (continued)

AT .	W	ater	Soil/S	ediment
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Parameters/Methods	(µg/L)	(µg/L)	(µg/kg)	(µg/kg)
2,4-Dinitrophenol	25	22	800	660
2,4-Dinitrotoluene	10	11	330	330
2,6-Dinitrotoluene	10	11	330	330
2-Chloronaphthalene	10	11	330	330
2-Chlorophenol	10	11	330	330
2-Methylnaphthalene	10	11	330	330
2-Methylphenol	10	11	330	330
2-Nitroaniline	25	11	800	330
2-Nitrophenol	10	11	330	330
3,3'-Dichlorobenzidine	25	22	330	660
3-Nitroaniline	25	11	800	330
4,6-Dinitro-2-methylphenol	25	22	800	660
4-Bromophenylphenylether	10	11	330	330
4-Chloro-3-methylphenol	10	11	330	330
4-Chloroaniline	10	11	330	330
4-Chlorophenyl-phenyl ether	10	11	330	330
3 & 4-Methylphenol	10	11	330	660
4-Nitroaniline	25	11	. 800	330
4-Nitrophenol	25	22	800	660
Acenaphthene	10	11	50	330
	SVOCs SW 8	46-8270C		
Acenaphthylene	10	11	50	330
Anthracene	10	11	50	330
Benzo(a)anthracene	10	11	50	330
Benzo(a)pyrene	10	11	50	330
Benzo(b)fluoranthene	10	11	50	330
Benzo(ghi)perylene	10	11	50	330
Benzo(k)fluoranthene	10	11	50	330
Benzoic Acid	25	22	800	660
Benzyl alcohol	10	11	330	330
2,2'-oxybis(1-Chloropropane)	10	11	330	330
ois(2-Chloroethoxy) methane	10	11	330	330
ois(2-Chloroethyl) ether	10	11	330	330
ois(2-Ethylhexyl)phthalate	10	11	330	330
Butylbenzylphthalate	10	11	330	330
Carbazole	10	11	50	330
Chrysene	10	11	50	330
Di-n-butylphthalate	10	11	330	330
Di-n-octylphthalate	10	11	330	330
Dibenzo(a,h)anthracene	10	11	50	330
Dibenzofuran	10	11	330	330
Diethylphthalate	10	11	330	330
Dimethylphthalate	10	11	330	330
luoranthene	10	11	50	330
luorene	. 10	11	50	330

Table A-1. Project Quantitation Limit Goals and Achieved Method Reporting Limits (continued)

	V	ater	Soil/S	Sediment
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Parameters/Methods	(µg/L)	(µg/L)	(µg/kg)	(µg/kg)
Hexachlorobenzene	10	11	330	330
Hexachlorobutadiene	10	11	330	330
Hexachloroethane	10	11	330	330
Hexacholorocyclopentadiene	10	11	330	330
Indeno(1,2,3-cd)pyrene	10	11	50	330
Isophorone	10	11	330	330
N-Nitroso-di-n-dipropylamine	10	11	330	330
N-Nitrosodiphenylamine	10	11	330	330
	SVOCs SW 84	46-8270C		
Naphthalene	10	11	50	330
Nitrobenzene	10	11	330	330
Pentachlorophenol	25	22	. 330	660
Phenanthrene	10	11	50	330
Phenol	10	11	330	330
Pyrene	10	11	50	330
	Pesticides SW	846-8081		
4,4-DDD	0.05	0.05	1.7	1.7
4.4-DDE	0.05	0.05	1.7	1.7
4.4-DDT	0.05	0.05	1.7	1.7
Aldrin	0.05	0.05	1.7	1.7
alpha-BHC	0.05	0.05	1.7	1.7
alpha-Chlordane	0.05	0.05	1.7	1.7
beta-BHC	0.05	0.05	1.7	1.7
Chlordane	0.05	1.0	1.7	33
delta-BHC	0.05	0.05	1.7	1.7
Dieldrin	0.05	0.05	1.7	1.7
Endosulfan I	0.05	0.05	1.7	1.7
Endosulfan II	0.05	0.05	1.7	1.7
Endosulfan Sulfate	0.05	0.05	1.7	1.7
Endrin	0.05	0.05	1.7	1.7
Endrin aldehyde	0.05	0.05	1.7	1.7
Endrin Ketone	0.05	0.05	1.7	1.7
gamma-BHC (Lindane)	0.05	0.05	1.7	1.7
gamma-Chlordane	0.05	0.05	1.7	1.7
Heptachlor	0.05	0.05	1.7	1.7
leptachlor Epoxide	0.05	0.05	1.7	1.7
Methoxychlor	0.1	0.05	1.7	1.7
Toxaphene	2.0	1.0	170	33
	PCB SW 846		270	23
Arochlor-1016	0.5	1.0	33	33
Arochlor-1221	0.5	1.0	33	33
	PCB SW 846		-	42
Aroclor-1232	0.5	1.0	33	33
Aroclor-1242	0.5	1.0	33	33
aroclor-1248	0.5	1.0	33	33
aroclor-1254	0.5	1.0	33	33

Table A-1. Project Quantitation Limit Goals and Achieved Method Reporting Limits (continued)

	V	Vater	Soil/S	Sediment
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Parameters/Methods	(µg/L)	(μg/L)	(µg/kg)	(µg/kg)
Aroclor-1260	0.5	1.0	33	33
	Explosive Co SW 846			
HMX (Octahydro-1,3,5,7-				0.0
Tetranitro-1,3,5,7-tetrazocine)	0.5	0.52	1.0	0.2
RDX (cyclonite) Hexahydro-	0.5	0.52	1.0	0.2
1,3,5-trinitro-1,3,5-triazine	0.5	0.52		
1.3,5-Trinitrobenzene	0.2	0.26	0.25	0.1
1,3-Dinitrobenzene	0.2	0.26	0.25	0.1
Tetryl	0.2	0.52	1.0	0.2
Nitrobenzene	0.2	0.26	0.25	0.1
2,4,6-Trinitrotoluene	0.2	0.26	0.25	0.1
2,4-Dinitrotoluene	0.1	0.26	0.25	0.1
2,6-Dinitrotoluene	0.1	0.26	0.25	0.1
2-Amino-4,6-dinitrotoluene	0.2	0.26	0.25	0.1
4-Amino-2,6-dinitrotoluene	0.2	0.26	0.25	0.1
o-Nitrotoluene	0.2	0.52	0.25	0.2
m-Nitrotoluene	0.2	0.52	0.25	0.2
p-Nitrotoluene	0.2	0.52	0.25	0.2
p-ivitrototuene	Additional Explosi		0.23	0.2
NT'. 1:	3.0	26	3	10
Nitroglycerin	20	10	0.25	0.13
Nitroquanidine		700	5	39
Nitrocellulose	500		3	39
	Meta SW 846-6010B/			
Aluminum	100	200	10	20
Antimony	5	20	.05	2.0
Arsenic	5	20	0.5	2.0
Barium	10	5.0	1	0.5
Beryllium	1	2.0	0.1	0.2
Berymum	Meta	ls	0.1	0.2
	SW 846-601			
Cadmium	1	6.0	0.1	0.6
Calcium	100	1000	10	100
Chromium	5	5.0	0.5	0.5
Cobalt	5	5.0	0.5	0.5
Copper	5	10	0.5	1.0
Iron	100	150	10	15
Lead	3	10	0.3	1.0
Magnesium	100	250	. 10	25
Manganese	10	5.0	1	0.5
Mercury (CVAA)			0.1	0.02
SW846-7470A/7471A	0.2	0.2	0.1	0.03
Nickel	10	10	1	1.0
Potassium	200	250	20	25
Selenium	5	20	0.5	2.0
Silver	5	3.0	0.5	0.3

Table A-1. Project Quantitation Limit Goals and Achieved Method Reporting Limits (continued)

	V	ater	Soil/S	Sediment
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Parameters/Methods	(µg/L)	(µg/L)	(µg/kg)	(µg/kg)
Sodium	200	2500	20	250
Thallium	2	30	0.2	3.0
Vanadium	10	10	1	1.0
Zinc	10	20	1	2.0
	General Ch	emistry		
Nitrate/Nitrite Nitrogen E353.2	0.1	0.02	NL	NA
Sulfide E376.2	1.0	2.5	NL	80
Total Cyanide SW846 9014T	0.01	0.005	0.5	0.25
Hexavalent Chromium SW846 7196A	NL	0.05	NL	0.4
Total Organic Carbon SW846 9060A	1.0	1.0	10.0	100

PCB = Polychlorinated biphenyl.

SVOC = Semivolatile organic compound.

VOC = Volatile organic compound.

NL = Project quantitation level not listed for this analyte in the Facility-wide Quality Assurance Project Plan.

NA = No analysis for this compound.

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8	
10	
11	
12	
13	
14	
15	APPENDIX B
16	HUMAN HEALTH RISK CHARACTERIZATION
17	
18	
19	
20	
21	
22	
23	



# APPENDIX B COMPUTATIONS FOR HUMAN HEALTH RISK ASSESSMENT

Appendix Table B-1. COPC Screening for Shallow Surface Soil (0-1 ft bgs) at 40mm Firing Range

Appendix Table B-2. COPC Screening for Deep Surface Soil (0-3 ft bgs) at 40mm Firing Range

Appendix Table B-3. COPC Screening for Subsurface Soil (1-3 ft bgs) at 40mm Firing Range

Appendix Table B-4. Chemical-specific Exposure Parameters for 40 mm Range COPCs

Appendix Table B-5. Non-carcinogenic Reference Doses for 40 mm Range COPCs

Appendix Table B-6. Cancer Slope Factors for 40 mm Range COPCs

Appendix Table B-7. 40 mm Range Deep Surface Soil Carcinogenic Risks - Direct Contact

Appendix Table B-8. 40 mm Range Deep Surface Soil Non-carcinogenic Hazards - Direct Contact

Appendix Table B-9. 40 mm Range Shallow Surface Soil Carcinogenic Risks - Direct Contact

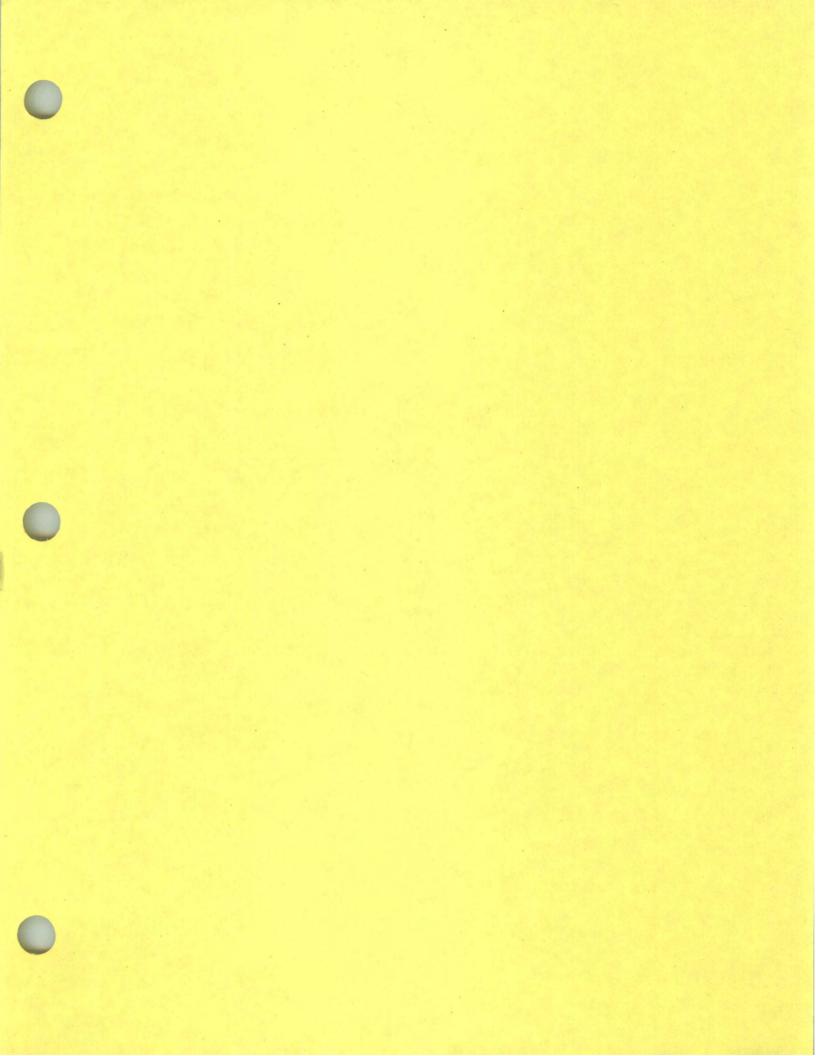
Appendix Table B-10. 40 mm Range Shallow Surface Soil Non-carcinogenic Hazards - Direct Contact

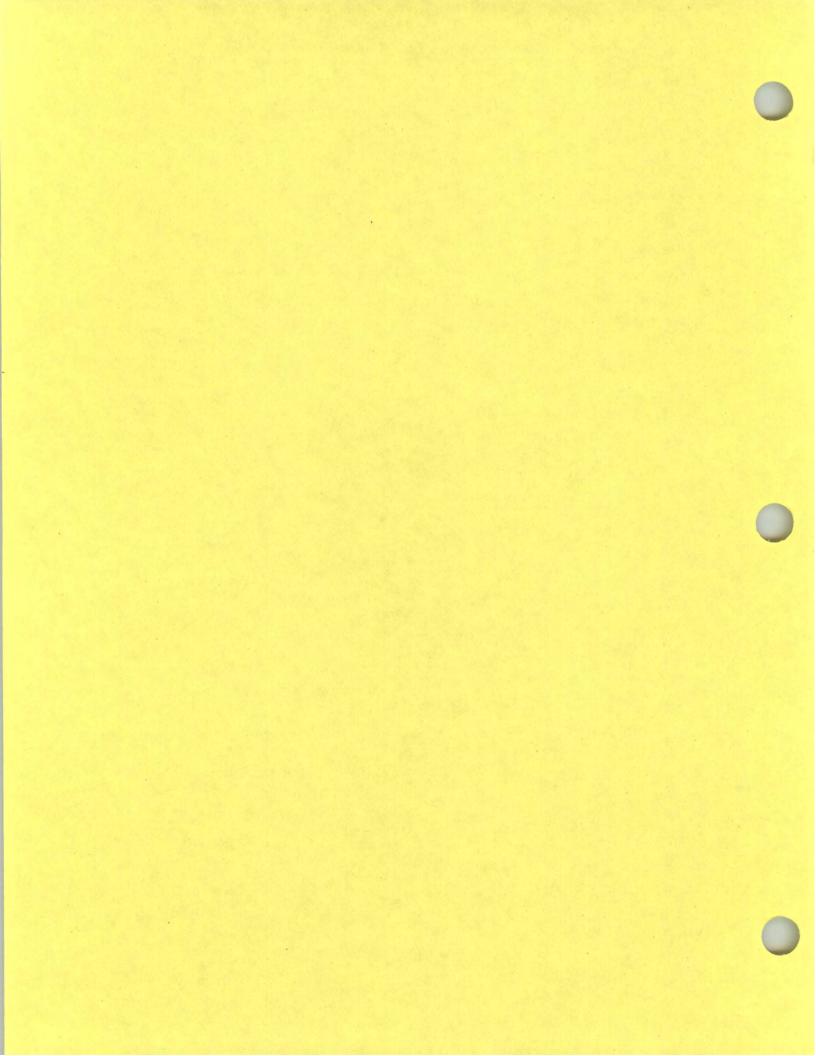
Appendix Table B-11. 40 mm Range Subsurface Soil Carcinogenic Risks - Direct Contact

Appendix Table B-12. 40 mm Range Subsurface Soil Non-carcinogenic Hazards - Direct Contact

Appendix Table B-13. 40 mm Range Shallow Surface Soil Carcinogenic Risks - Ingestion of Foodstuffs

Appendix Table B-14. 40 mm Range Shallow Surface Soil Non-carcinogenic Hazards - Ingestion of Foodstuffs





Appendix Table B-1, COPC Screening for Shallow Surface Soil (0-1 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetect Results*	t Results*	Detect Results <sup>b</sup>	Results					MDC	Region 9	MDC		
Analyte	Number	of Detection	Min DL	Max DL	Min	Max	Avg	JON %56	3043	Bkgd	exceeds	Residential	Exceeds		
Metals							Mesult	or Mean	EFC	Criteria	Bkgd?	PRG	PRG?	COPC?	COPC? Justification
Aluminum	7429905	40/40 (100%)	AD	AD	3470	21000	11100	13400	2000	COME.					
Antimony	7440360	0/40 (0%)	0.18	0.52	CN	ND	0.157	0 157	(x) (x)	00//1	Yes	7600 (nc)	Yes	Yes	MDC > Bkgd & PRG
Arsenic	7440382	40/40 (100%)	AD	AD	53	300	11.4	0.107	0.107 (0)	0.96	ND	3.1 (nc)	No	No	Not detected
Barium	7440393	40/40 (100%)	AD	AD	010	144	11.4	12.5	12.5 (L)	15.4	Yes	0.39 (ca)	Yes	Yes	MDC > Bkgd & PRG
Beryllium	7440417	36/36 (100%)	An An	4	21.9	144	8.00	76.8	76.8 (L)	88.4	Yes	540 (nc)	No	No	MDC < PRG
Cadmium	7440439	20/40 (506/)	0100	ADOU	24.0	- 0	0.66	0.704	0.704 (L)	0.88	Yes	.15 (nc)	No	No	MDC < PRG
Calcium	2010111	(2006) 04/04	0,010	0.074	0.057	0.87	0.129	0.178	0.178 (x)	0	Yes	3.7 (nc)	No	No	MDC < PRG
Chromina	7440/02	40/40 (100%)	AD	AD	153	9250	1150	1620	1620 (X)	15800	No	None	None	No	December Medical
- 1	14404/3	40/40 (100%)	AD	AD	7.5	429	26.5	43.9	43.9 (X)	17.4	Yes	22 (ne)	Vac	Vac	MDC - Died - pp.
Cohalt	18540299	0/4 (0%)	2.9	5.9	ND	ND	1.9	2.73	2.73 (0)	N.A.	N.A.	22 (nc)	No.	SIN	MDC > Bugg & PRG
Conner	1440484	40/40 (100%)	AD	AD	4.4	13	8.83	9.46	9.46 (N)	10.4	Yes	140 (nc)	No	No	MDC - DDC
- Control	7440208	40/40 (100%)	AD	AD	9	9.89	17.3	20.2	20.2 (L)	17.7	Yes	310 (nc)	No	No	MDC - ppc
HOU	7439896	40/40 (100%)	AD	AD	15200	34700	23400	24600	24600 (1.)	23100	Vac	JANN A.	Van		The state of the s
read	7439921	40/40 (100%)	AD	AD	11.6	49.5	16.9	18.5	18.5 (X)	196	Vac	400 (nc)	ICS	No	Essential Nutrient
Magnesium	7439954	40/40 (100%)	AD	AD	575	4290	0160	2300	3300 000	0000	103	+00 (nc)	ON	No	MDC < PRG
Manganese	7439965	40/40 (100%)	AD	AD	204	1300	546	637	(N) (N)	3,450	Yes	None	None	No	Essential Nutrient
Mercury	7439976	0/40 (0%)	0.014	0.061	ND	CIN	0.0123	0.0136	0.0136 (0)	1430	No	180 (nc)	Yes	No	MDC < Bkgd
Nickel	7440020	40/40 (100%)	AD	AD	6.6	28.7	16.5	17.7	(0) 0510.0	0.030	QN	2.3 (nc)	No	No	Not detected
Potassium	7440097	40/40 (100%)	AD	AB	670	0100	1000	17.7	17.7 (N)	21.1	Yes	160 (nc)	No	No	MDC < PRG
Selenium	7782492	0/40 (082)	0.37	0.02	010	2010	1080	0/11	1170 (L)	927	Yes	None	None	No	Essential Nutrient
Silver	7440234	0/40 (0%)	0.000	0.73	ON COL	QN.	0.246	0.27	0.27 (0)	1.4	ND	39 (nc)	No	No	Not detected
Sodium	7440000	0/40 (0%)	0.039	0.17	ON	QN	0.0329	0.0367	0.0367 (0)	0	ND	39 (nc)	No	No	Not detected
Thelling	7440235	36/40 (90%)	47.7	52.3	30.4	118	99	72.1	72.1 (N)	123	No	None	None	N.	Trees, 1 M
Vanadium	7440280	6/40 (15%)	0.36	1.8	3	2.6	0.611	0.804	0.804 (D)	0	Yes	0.52 (nc)	Vac	Vac	MDC - Died a pro
Zinc	7790667	40/40 (100%)	AD	AD	9.3	34.1	20.7	22.7	22.7 (x)	31.1	Yes	7.8 (nc)	Vec	Vac	MDC > Digd & PKG
Organics-Explosives	7440000	40/40 (100%)	AD	AD	44.2	114	9.09	63.9	(x) 63.9	61.8	Yes	2300 (nc)	No	No	MDC < PRG
3.5-Trinitrohenzene	00354	0/30 0000													
.3-Dinitrobenzene	05966	0/40 (0%)	0.1	1.0	ON	QN S	0.05	0.05	0.05 (0)	NA	NA	180 (nc)	No	No	Not detected
2,4,6-Trinitrotoluene	118967	1/40 /2 5843	100		UND	ON	0.03	0.05	0.05 (0)	NA	NA	0.61 (nc)	No	No	Not detected
2,4-Dinitrotoluene	121142	1/40 (2.5%)	0 1	100	0.000	0.11	0.0515	0.054	0.054 (D)	NA	NA	3.1 (nc)	No	No	MDC < PRG
2,6-Dinitrotoluene	606303	0/40 (005)	100		0,030	0.090	0.0312	0.0531	0.0531 (D)	NA	NA	0.72 (ca)	No	No	MDC < PRG
2-Amino-4,6-dinitrotoluene	35572782	0/40 (0%)	0.1		UNI GIN	ON SE	0.05	0.05	0.05 (0)	NA	NA	0.72 (ca)	No	No	Not detected
2-Nitrotoluene	88722	0/40 (0%)	0.0	1.0	UND	ON S	0.05	0.05	0.05 (0)	NA	NA	None	None	No	Not detected
3-Nitrotoluene	99081	1/40 (2.50)	200	7.0	ND O	ND.	0.1	0.1	0.1 (0)	NA	NA	0.88 (ca)	No	No	Not detected
4-Amino-2 6-dinitrotoluene	19406510	0/40 (2.378)	5.0	7.0	0.1	0.1	0.1	0.1	0.1 (D)	NA	NA	73 (nc)	No	No	MDC < PRG
4-Nitrotoluene	00000	0/40 (050)	1.0	0.1	ON.	QN	0.05	0.05	0.05 (0)	NA	NA	None	None	No	Not detected
HMX	2601410	1/40 (070)	700	7.0	ON	ON	0.1	0.1	0.1 (0)	NA	NA	12 (ca)	No	No	Not detected
Nirrobenzene	08052	4/40 (2.3%)	2.0	0.2	0.28	0.28	0.105	0.112	0.112 (D)	NA	NA	310 (nc)	No	No	MDC < PRG
Nitrocellulose	9004700	A/4 (100s)	0,037	0.1	0.033	0.066	0.0483	0.0506	0.0506 (D)	NA	NA	2.0 (nc)	No	No	MDC < PRG
Nitroglycerin	55630	0/4 (086)	101	200	207	40	43	65	64 (N)	NA	NA	None	None	Yes	No bkgd or PRG
		farm'	1	10	IND	ND	0	2	5 (0)	NA	NA	35 (ca)	No	No	Not detected

Appendix Table B-1. COPC Screening for Shallow Surface Soil (0-1 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetec	Nondetect Resultsa	Detect Results <sup>b</sup>	esults					MDC	Region 9	MDC		
Analyte	CAS	of Detection	Min DL	Max DL	Min	Max	Avg	95% UCL of Mean	EPC	Bkgd Criteria <sup>d</sup>	exceeds Bkgd?	Residential PRG <sup>e</sup>	Exceeds PRG?	COPC?	Justification
Nitroguanidine	556887	0/4 (0%)	0.13	0.13	ND	ND	0.065	0.065	0.065 (0)	NA		610 (nc)	No	No	
RDX	121824	0/40 (0%)	0.2	0.2	QN	ND	0.1	0.1	0.1 (0)	NA	NA	4.4 (ca)	No	No	Not detected
Tetryl	479458	1/30 (3.3%)	0.2	0.2	0.17	0.17	0.102	0.106	0.106 (D)	NA	NA	61 (nc)	No	No	MDC < PRG
Organics-Pesticide/PCB						1					1				
4,4'-DDD	72548	0/4 (0%)	0.002	0.0024	ON	ND	0.00105	0.00117	0.00117 (0)	NA	NA	2.4 (ca)	No	No	Not detected
4,4'-DDE	72559	1/4 (25%)	0.002	0.0024	33	0.00033	0.000883	0.00133	0.00033 (D)	NA	NA	1.7 (ca)	No	No	MDC < PRG
4,4'-DDT	50293	0/4 (0%)	0.002	0.0024	ON	ND	0.0011	0.00124	0.0012 (0)	NA	NA	1.7 (ca)	No	No	Not detected
Aldrin	309002	1/4 (25%)	0.002	0.0024	0.0012	0.0012	0.0011	0.00124	0.0012 (D)	NA	NA	0.03 (ca)	No	No	MDC < PRG
Chlordane	57749	0/4 (0%)	0.039	0.047	ND	ND	0.021	0.023	0.023 (0)	NA	NA	1.6 (ca)	No	No	Not detected
Dieldrin	60571	0/4 (0%)	0.002	0.0024	ND	ND	0.00106	0.00117	0.00117 (0)	NA	NA	0.03 (ca)	No	No	Not detected
Endosulfan I	959988	0/4 (0%)	0.002	0.0024	ND		0.00105	0.00117	0.00117 (0)	NA	NA	37 (nc)	No	No	Not detected
Endosulfan II	33213659	0/4 (0%)	0.002	0.0024	ND		0.00105	0.00117	0.00117 (0)	NA	NA	37 (nc)	No	No	Not detected
Endosulfan sulfate	1031078	0/4 (0%)	0.002	0.0024	ND		0.00105	0.00117	0.00117 (0)	NA	NA	37 (nc)	No	No	Not detected
Endrin	72208	0/4 (0%)	0.002				0.00113	0.0013	0.0013 (0)	NA	NA	1.8 (nc)	No	No	Not detected
Endrin aldehyde	7421934	1/4 (25%)	0.002	0.0024	0.00085	0.00085	0.00101	0.00118	0.00085 (D)	NA	NA	1.8 (nc)	No	No	MDC < PRG
Endrin ketone	53494705	1/4 (25%)	0.002		0.00034	0.00034	0.000885	0.00133	0.00034 (D)	NA	NA	1.8 (nc)	No	No	MDC < PRG
Heptachlor	76448	1/4 (25%)	0.002	0.0024	6	6/	0.000998	0.00119	(a) 67000.0	NA	NA	0.11 (ca)	No	No	MDC < PRG
Heptachlor epoxide	1024573	0/4 (0%)	0.002	0.0024	ND	ND	0.00105	0.00117	0.00117 (0)	NA	NA	0.05 (ca)	No	No	Not detected
Lindane	58899	1/4 (25%)	0.002	0.0024	0.00003	0.00093	0.00103	0.00117	0.00093 (D)	NA	NA	0.44 (ca)	No	No	MDC < PRG
Methoxychlor	72435	0/4 (0%)	0.002	0.0024	ND	ND	0.00105		0.00117 (0)	NA	NA	31 (nc)	No	No	Not detected
PCB-1016	12674112	0/4 (0%)	0.039	0.047	ND	ND	0.021	0.023	0.023 (0)	NA	NA	0.39 (nc)	No	No	Not detected
PCB-1221	11104282	0/4 (0%)	0.039	0.047	ND	ND	0.021	0.023	0.023 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1232	11141165	0/4 (0%)	0.039	0.047	ND	ND	0.021	0.023	0.023 (0)	NA.	NA	0.11 (nc)	No	No	Not detected
PCB-1242	53469219	0/4 (0%)	0.039	0.047	ND	ND	0.021	0.023	0.023 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1248	12672296	0/4 (0%)	0.039	0.047	ND	ND	0.021	0.023	0.023 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1254	11097691	0/4 (0%)	0.039	0.047	QN	N	0.021	0.023	0.023 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1260	11096825	0/4 (0%)	0.039	0.047	ND	N	0.021	0.023	0.023 (0)	NA	NA	0.11 (nc)	No	No	Not detected
Toxaphene	8001352	0/4 (0%)	0.039	0.047	ON	ND	0.021	0.023	0.023 (0)	NA	NA	0.44 (ca)	No	No	Not detected
alpha-BHC	319846	0/4 (0%)	0.002	0.0024	ND	QN	0.00105		0.00117 (0)	NA	NA	0.09 (ca)	No	No	Not detected
alpha-Chlordane	5103719	0/4 (0%)	0.002	0.0024	QN	ND	0.00105		0.00117 (0)	NA	NA	1.6 (ca)	No	No	Not detected
beta-BHC	319857	0/4 (0%)	0.002	0.0024	ND	ON.	0.00105	1	0.00117 (0)	NA	NA	0.32 (ca)	No	No	Not detected
delta-BHC	319868	0/4 (0%)	0.002	0.0024	ND	N N	0.00105		0.00117 (0)	NA	NA	None	None	No	Not detected
gamma-Chlordane	5103742	0/4 (0%)	0.002	0.0024	ND	ND	0.00105	0.00117	0.00117 (0)	NA	NA	1.6 (ca)	No	No	Not detected
Organics-Semivolatile															
1,1-Biphenyl	92524	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	300 (nc)	No	No	Not detected
2,4,5-Trichlorophenol	95954	0/4 (0%)	0.39	0.47	ND	ON	0.21	0.23	0.23 (0)	NA	NA	610 (nc)	No	No	Not detected
2,4,6-Trichlorophenol	88062	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	0.61 (nc)	No	No	Not detected
2,4-Dichlorophenol	120832	0/4 (0%)	0.39	0.47	ND	QN	0.21	0.23	0.23 (0)	NA	NA	18 (nc)	No	No	Not detected
2,4-Dimethylphenol	105679	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	120 (nc)	No	No	Not detected
2-Chloronaphthalene	91587	0/4 (0%)	0.39	0.47	ND	ON	0.21	0.23	0.23 (0)	NA	NA	490 (nc)	No	No	Not detected
2-Chlorophenol	05579	0.14	000	17.											



Appendix Table B-1. COPC Screening for Shallow Surface Soil (0-1 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetect Results	t Results <sup>a</sup>	Detect Results <sup>b</sup>	esults					MDC	Region 9	MINC		
Analyte	Number	of Detection	Min DL	Max DL	Min	Max	Avg	95% UCL of Mean	EPC	Bkgd Criteria <sup>d</sup>	exceeds Brad?	Residential	Exceeds	0000	
2-Methyl-4,6-dinitrophenol	534521	0/4 (0%)	0.78	0.94	ND	ND	0.419	0.46	0.46 (0)	NA	N.A	OW.	LINGS	COPC	COPC? Justification
z-Memyinaphihalene	91576	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	MA	MA	U.D.I (nc)	ON	No	Not detected
7-Methylphenol	95487	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.03	0.23 (0)	NA	INA	5.0 (nc)	No	No	Not detected
2-Nitrobenzenamine	88744	0/4 (0%)	0.39	0.47	CIN	CN.	0.21	0.33	(0) 57 (0)	INA	NA	310 (nc)	No	No	Not detected
2-Nitrophenol	88755	0/4 (0%)	0.39	0.47	CN	N CN	10.0	0.20	0.23 (0)	NA	NA	18 (nc)	No	No	Not detected
3-Nitrobenzenamine	99092	0/4 (0%)	0.39	0.47	ND	N CEN	140	0.23	0.23 (0)	NA	NA	None	None	No	Not detected
4-Bromophenyl phenyl ether	101553	0/4 (0%)	0.39	0.47	N. C.N.	ND	15.0	0.23	0.23 (0)	NA	NA	1,8 (nc)	No	No	Not detected
4-Chloro-3-methylphenol	59507	0/4 (095)	010	0.47	NIN	ON CIN	17.0	0.23	0.23 (0)	NA	NA	None	None	No	Not detected
4-Chlorobenzenamine	106478	0/4 (002)	0.20	14.0	UND.	ON.	0.21	0.23	0.23 (0)	NA	NA	None	None	No	Not detected
4-Chlorophenyl phenyl ether	7005723	0/4 (004)	0.00	0.47	ND.	ON!	0.21	0.23	0.23 (0)	NA	NA	24 (nc)	No	No	Not detected
4-Methylphenol	106445	0/4 (002)	0.00	0.47	ON	ND	0.21	0.23	0.23 (0)	NA	NA	None	None	No	Not detected
4-Nitrobenzenamine	100016	0/4 (060)	60.0	0.47	ON!	ND	0.21	0.23	0,23 (0)	NA	NA	31 (ne)	No	No	Not detected
4-Nitrophenol	10001	0/4 (070)	0.39	0.47	ND	QN	0.21	0.23	0.23 (0)	NA	NA	18 (nc)	No	N	Not detected
Acenaphthene	63330	0/4 (078)	0.78	0.94	QN	QN	0.419	0.46	0.46 (0)	NA	NA	None	None	No	Not detected
Acetophenone	03353	0/4 (0%)	0.39	0.47	QN	ND	0.21	0.23	0.23 (0)	NA	AN	370 (ne)	No	Ma	Not detected
Anthracene	70006	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	VA	None	Mann	ON	not detected
Afrasina	120127	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	SUCCE	TAONE	ON:	Not detected
Zillic Zillic	1912249	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.73 (0)	VA	NA	22 (nc)	NO	ON.	Not detected
Denz(a)antmacene	56553	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	VA	NA	2.2 (ca)	No	No	Not detected
Benzo(a)pyrene	50328	0/4 (0%)	0.39	0.47	CN.	UN	0.31	0000	(0) 00:0	200	INA	0.02 (ca)	No	No	Not detected
Benzo(b)fluoranthene	205992	0/4 (0%)	0.39	0.47	2 2	QN CN	0.21	0.23	0.23 (0)	NA	NA	0.06 (ca)	No	Nog	Not detected
Benzo(ghi)perylene	191242	0/4 (0%)	0.39	0.47	N CN	N. O.N.	0.21	57.0	0.23 (0)	NA	NA	0.62 (ca)	No	No	Not detected
Benzo(k)fluoranthene	207089	0/4 (0%)	0.30	0.47	NID OIL	ON.	17.0	0.23	0.23 (0)	NA	NA	None	None	No	Not detected
Bis(2-chloroethoxy)methane	1119111	0/4 /08:1	000	1,0	UNI GNI	UND	0.21	0.23	0.23 (0)	NA	NA	6.2 (ca)	No	No	Not detected
Bis(2-chloroisopronyl) ether	108601	0/4 (070)	650	0.47	ON.	Q	0.21	0.23	0.23 (0)	NA	NA	None	None	No	Not detected
Bis(2-ethylbexyl)nhthalata	117017	(1/4 (1/2))	0.39	0.47	QN	ND	0.21	0.23	0.23 (0)	NA	NA	29 (ca)	No	Mo	Mot detected
Butyl henzyl nhtholote	110/11	1/4 (25%)	0.39	0.47	0.15	0.15	0.196	0.238	0.15 (D)	NA	NA	35 (ca)	No	Mo	Nerson defected
Caprolactam	1005001	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	1200 (ac)	No	IND	MINESPRE
Carbazola	103002	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	AN	3100 (ne)	Ma	N.C.	Not detected
Chryspa	84/09	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA.	24 (ca)	Mo	ONI	Not detected
Dien huntel absheleste	610817	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	(82) (-2)	Ma	INO	Not detected
outy) pumanate	84/47	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	(2) (2)	ONI	INO	Not detected
Dibenz(a,h)anthracene	53703	0/4 (0%)	0.39	0.47	ND	QN	0.21	0.03	0.32 (6)	****	110	010 (nc)	INO	No	Not detected
Dibenzofuran	132649	0/4 (0%)	0.39	0.47	GN	S	0.21	25.0	0.23 (0)	WA	NA	0.06 (ca)	No	Noe	Not detected
Diethyl phthalate	84662	1/4 (25%)	0.39	0.47	5.6	2.6	1 56	4 73	4 77 (0)	NA	NA	15 (nc)	No	No	Not detected
Dimethyl phthalate	131113	0/4 (0%)	0.39	0.47	ND.	ND	0.31	4.73	4.73 (D)	NA	NA	4900 (nc)	No	No	MDC < PRG
Fluoranthene	206440	0/4 (0%)	0.39	0.47	QN.		15.0	0.23	0.23 (0)	NA	NA	61000 (nc)	No	No	Not detected
Fluorene	86737	0/4 (0%)	0.39	0.47	N.	N CN	15.0	0.23	0.23 (0)	NA	NA	230 (nc)	No	No	Not detected
Hexachlorobenzene	118741	0/4 (082)	N 3G	21.14	TAN .	N.	0.21	0.23	0.23 (0)	NA	NA	270 (nc)	No	No	Not detected
Hexachlorocyclopentadiene	77474	0/4 (0%)	0.39	0.47	QN	QN !	0.21	0.23	0.23 (0)	NA	NA	0.30 (ca)	No	Nog	Not detected
Hexachloroethane	1022	0/4 (026)	0.30	0.47	ON	QN	0.21	0,23	0.23 (0)	NA	NA	37 (nc)	No	No	Not detected
Indeno(1,2,3-cd)pyrene	193395	0/4 (095)	0.09	0.47	ON	ND	0.21	0.23	0.23 (0)	NA	NA	6.1 (nc)	No	No	Not detected
7.7	Araben.	U.T. IUVai	0.37	11.02.7	No. of the last							1	20.1	21.	TOTAL TOTAL

Appendix Table B-1. COPC Screening for Shallow Surface Soil (0-1 ft bgs) at 40mm Firing Range (All units are mg/kg)

	CAS	Frequency	Nondetec	Nondetect Results*	Detect R	ect Results <sup>b</sup>	Ava	1011 % 50		Bkgd	MDC	Region 9	MDC		
Analyte	Number	Detection	Min DL	Max DL	Min	Max	Result	of Mean	EPC	Criteriad	Bkgd?	PRG*	PRG?	COPC?	Justification
Isophorone	78591	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	510 (ca)	No	No	Not detected
N-Nitroso-di-n-propylamine	621647	0/4 (0%)	0.39	0.47	ON	ND	0.21	0.23	0.23 (0)	NA	NA	0.07 (ca)	No	Nog	Not detected
N-Nitrosodiphenylamine	86306	0/4 (0%)	0.39	0.47	N	ON	0.21	0.23	0.23 (0)	NA	NA	99 (ca)	No	No	Not detected
Naphthalene	91203	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	5.6 (nc)	No	No	Not detected
Pentachlorophenol	87865	0/4 (0%)	0.78	0.94	ND	ND	0.419	0.46	0.46 (0)	NA	NA	3.0 (ca)	No	No	Not detected
Phenanthrene	85018	0/4 (0%)	0.39	0.47	ND	ON	0.21	0.23	0.23 (0)	NA	NA	None	None	No	Not detected
Phenol	108952	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	1800 (nc)	No	No	Not detected
Pyrene	129000	0/4 (0%)	0.39	0.47	ND	ND	0.21	0.23	0.23 (0)	NA	NA	230 (nc)	No	No	Not detected
Organics-Volatile															
1,1-Trichloroethane	71556	1/4 (25%)	0.0059	0.0069	0.013	0.013	0.00561	0.0114	0.0114 (0)	NA	NA	200 (nc)	No	No	MDC < PRG
1,2,2-Tetrachloroethane	79345	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.41 (ca)	No	No	Not detected
,1,2-Trichloro- ,2,2-trifluoroethane	76131	0/2 (0%)	0.0059	0.0069	QN	ND	0.003	0.00332	0.00305 (0)	NA	NA	2100 (nc)	No	No	Not detected
,1,2-Trichloroethane	79005	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.73 (ca)	No	No	Not detected
,1-Dichloroethane	75343	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	51 (nc)	No	No	Not detected
,1-Dichloroethene	75354	1/3 (33%)	0.0059	6900'0	0.0074	0.0074	0.00463	0.00869	0.0074 (D)	NA	NA	12 (nc)	No	No	MDC < PRG
,2,4-Trichlorobenzene	120821	0/2 (0%)	0.0059	0.0069	ND	ND	0.003	0.00332	0.00305 (0)	NA	NA	6.2 (nc)	No	No	Not detected
,2-Dibromo-3-chloropropane	96128	0/2 (0%)	0.0059	6900'0	ND	ND	0.003	0.00332	0.00305 (0)	NA	NA	0.21 (nc)	No	No	Not detected
,2-Dibromoethane	106934	0/4 (0%)	0.0059	6900'0	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.03 (ca)	No	No	Not detected
,2-Dichlorobenzene	95501	0/4 (0%)	0.0059	6900.0	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	110 (nc)	No	No	Not detected
,2-Dichloroethane	107062	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.28 (ca)	No	No	Not detected
,2-Dichloropropane	78875	0/4 (0%)	0.0059	6900'0	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.34 (ca)	No	No	Not detected
,2-Dimethylbenzene	95476	0/4 (0%)	0.0059	6900'0	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	None	None	No	Not detected
,3-Dichlorobenzene	541731	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	53 (nc)	No	No	Not detected
1,4-Dichlorobenzene	106467	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	3.4 (ca)	No	No	Not detected
2-Butanone	78933	0/2 (0%)	0.012	0.014	ND	ND	900.0	900'0	0.006 (0)	NA	NA	2200 (nc)	No	No	Not detected
2-Hexanone		0/2 (0%)	0.012	0.014	ND	ND	900.0	900.0	0.006 (0)	NA	NA	None	None	No	Not detected
2-Methoxy-2-methylpropane		0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	17 (ca)	No	No	Not detected
4-Methyl-2-pentanone		0/4 (0%)	0.012	0.014	ND	ND	0.00625	0.00684	0.00684 (0)	NA	NA	530 (nc)	No	No	Not detected
Acetone	67641	0/2 (0%)	9900'0	0.015	ND	ND	0.00445	0.00698	0.00485 (0)	NA	NA	1400 (nc)	No	No	Not detected
Benzene	71432	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.64 (ca)	No	No	Not detected
Bromodichloromethane	75274	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.82 (ca)	No	No	Not detected
Bromomethane	74839	0/2 (0%)	0.012	0.014	ND	ND	900.0	900.0	0.006 (0)	NA	NA	0.39 (nc)	No	No	Not detected
Carbon disulfide	75150	0/4 (0%)	0.0059	6900'0	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	36 (nc)	No	No	Not detected
Carbon tetrachloride	56235	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.22 (nc)	No	No	Not detected
Chlorobenzene	108907	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	15 (nc)	No	No	Not detected
Chloroethane	75003	0/4 (0%)	0.012	0.014	N N	ND	0.00625	0.00684	0.00684 (0)	NA	NA	3.0 (ca)	No	No	Not detected
Chloroform	67663	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	0.22 (ca)	No	No	Not detected
Chloromethane	74873	0/4 (0%)	0.012	0.014	ND	ND	0.00625	0.00684	0.00684 (0)	NA	NA	4.7 (nc)	No	No	Not detected
Cumene	98828	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0.00339 (0)	NA	NA	16 (nc)	No	No	Not detected
Cyclobergue	110037	0,0	0000												



Appendix Table B-1, COPC Screening for Shallow Surface Soil (0-1 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetec	Nondetect Results <sup>a</sup>	Detect 1	Detect Results <sup>b</sup>									
Analyte	Number	of Detection	Min DL	Min DL Max DL	Min	Max	Avg	95% UCI		Bkgd	MDC	Region 9	MDC		
Dibromochloromethane	124481	0/4 (0%)	0.0059	0.0069	UN	GN	0.00313	of Mean		Criteria	Bkgd?	PRG	PRG?	COPC?	COPC? Justification
achiorodiffuoromethane	75718	0/4 (0%)	0.0059	0.0069	S	N.	0.00313	95500.0		NA	NA	1.1 (ca)	No	No	Not detected
Einylbenzene M + P Vylene	100414	0/4 (0%)	0.0059	0.0069	ND	QN	0.00313	0.00339	0.00339 (0)	NA	NA	9,4 (nc)	No	No	Not detected
Methylevelehemen	136777612	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.0033	1	NA.	NA	190 (nc)	No	No	Not detected
Methologogia	108872	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00230	1	NA	NA	27 (nc)	No	No	Not detected
Styrene Chionde	75092	0/2 (0%)	0.0085	0.012	ND	ND	0 000	0.006	0.00339 (0)	NA	NA	260 (nc)	No	No	Not detected
Patrachlorouthous	100425	0/4 (0%)	0.0059	6900.0	ND	QN	0.00313	0.00330	0.00230 (0)	NA	NA	9.1 (ca)	No	No	Not detected
oluene	127184	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00230	0.00339 (0)	NA	NA	440 (no)	No	No	Not detected
Line	108883	1/4 (25%)	0.0059	0.0069	0.002	0 000	0.00286	0.00350	0.00339 (0)	NA	NA	0.48 (ca)	No	No	Not detected
richloroemene	79016	0/4 (0%)	0.0059	0.0069	ND	QN	0.00313	0.00330	0.002 (D)	NA	NA	(pu) 99	No	No	MDC < PRG
inclinitoring omethane	75694	0/4 (0%)	0.0059	0.0069	ND	ND	0.00313	0.00339	0,00339 (0)	NA	NA	0.05 (ca)	No	No	Not detected
vinyi chionde	75014	0/4 (0%)	0.012	0.014	ND	QN	509000	0.00584	0.00539 (0)	NA	NA	39 (nc)	No	No	Not detected
cis-1,z-Dienloroethene	156592	0/4 (0%)	0.0059	0.0069	ON	GN	0.00313	0.00000	0.00220	NA	NA	0.08 (ca)	No	No	Not detected
trans 1 2 Distriction	10061015	0/4 (0%)	0.0059	0.0069	ND	QN	0.00313	0.00000	0.00339 (0)	NA.	NA	4.3 (nc)	No	No	Not detected
dans-1,Dicmoroethene	156605	0/4 (0%)	0.0059	0.0069	ND	QN	0.00313	0.00330	0.00339 (0)	NA	NA	0.78 (ca)	No	No	Not detected
							240000	0.00333	0.00349 (6)	VV	ATA.				

Minimum and maximum detection limit (DL) shown for nondetect results.

<sup>b</sup>Minimum and maximum detected concentration shown for detect results.

Exposure point concentration (EPC) is lesser of 95% upper conficence level (UCL.) or maxaximum detected concentration (MDC) as appropriate based on data distribution (shown in parentheses). Data distribution codes: D - Distribution not determined due to less than 50% frequency of detection, 95% UCL calculated using Student's t-statistic.

L - Distribution is lognormal. 95% UCL calculated using Land's H method.

N - Distribution is normal, 95% UCL calculated using Student's t-statistic.

O - The analyte was not detected. 95% UCL calculated using Student's t-statistic.

X - Distribution is nonparametric. 95% UCL calculated using Student's t-statistic.

Background criteria for RVAAP from USACE 2001. Final Phase II Remedial Investigation Report for the Winklapeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio. \*Residential soil preliminary remediation goal (PRG) from Region 9 corresponding to risk of 1.0E-06 for carcinogenic endpoint (ca) or hazard index of 0.1 for noncarcinogenic endpoint (nc).

Analyte is not a COPC because it was not detected in soil at the 40mm Range; however, because the maximum detection limit exceeds the Region 9 PRG this chemical is included in the risk characterization. Essential nutrients are not retained as COPCs because the MDC would result in an intake less than the recommended daily intake (RDI).

MDC - maximum detected concentration. EPC - exposure point concentration.

CAS - chemical abstract service.

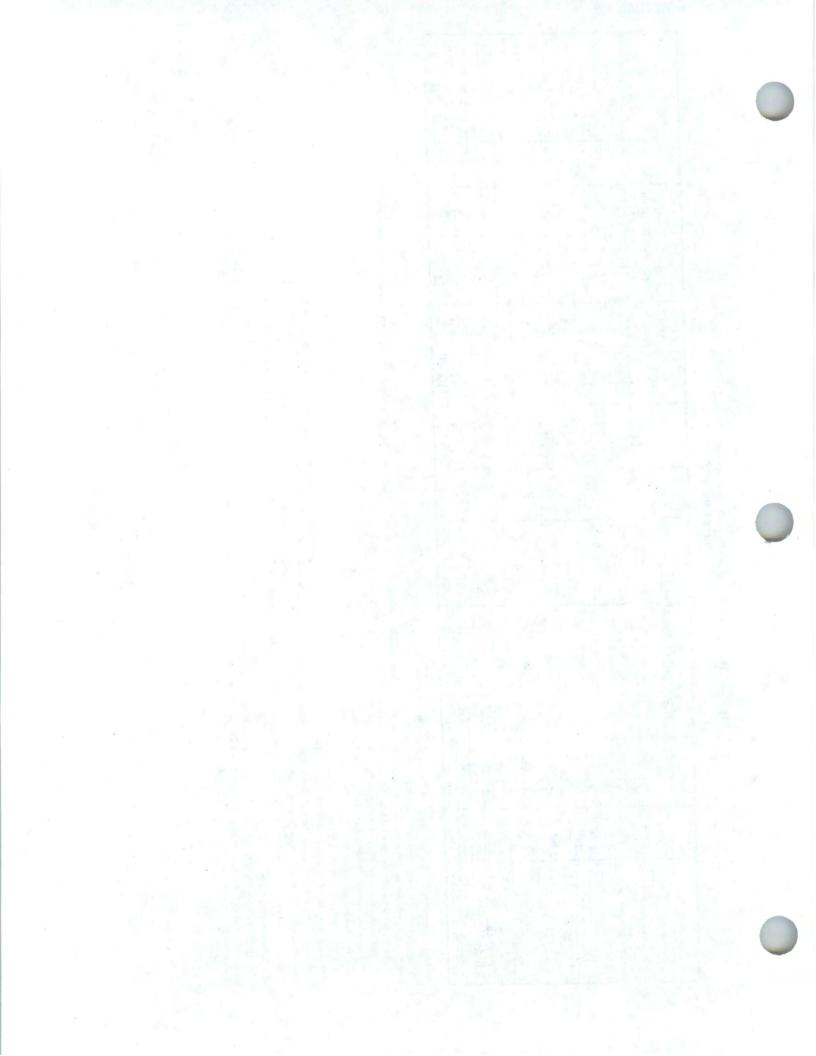
COPC - chemical of potential concern.

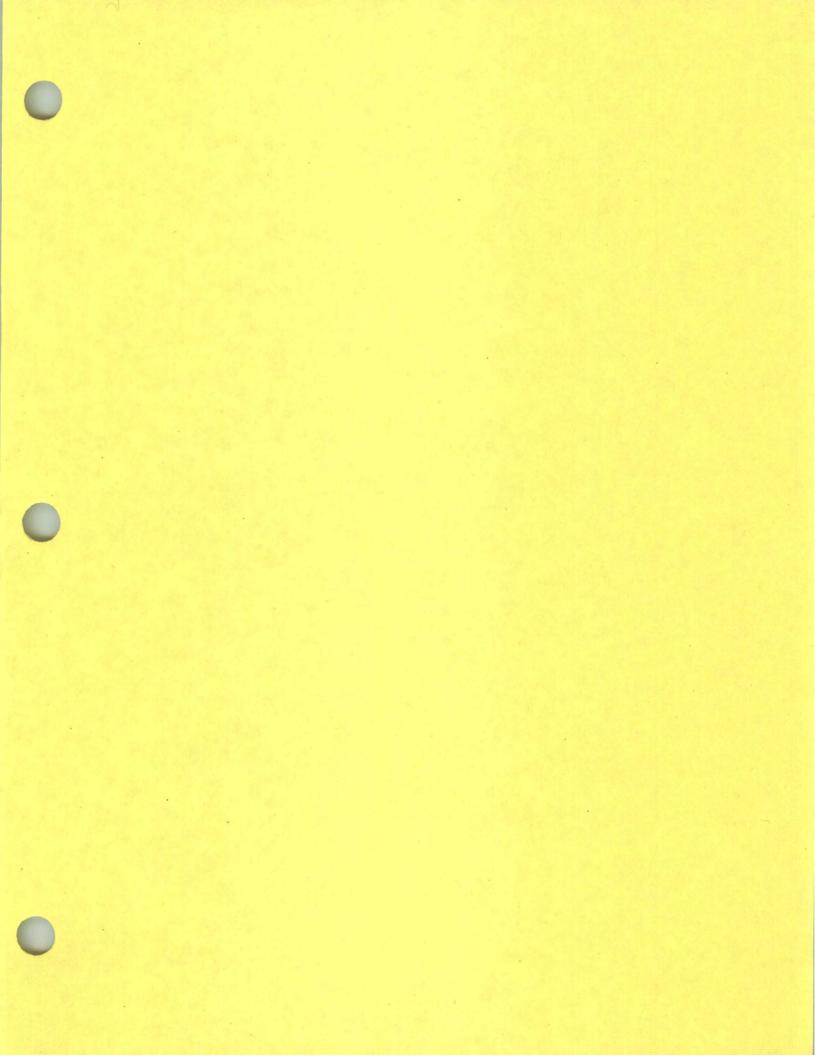
DL - detection limit.

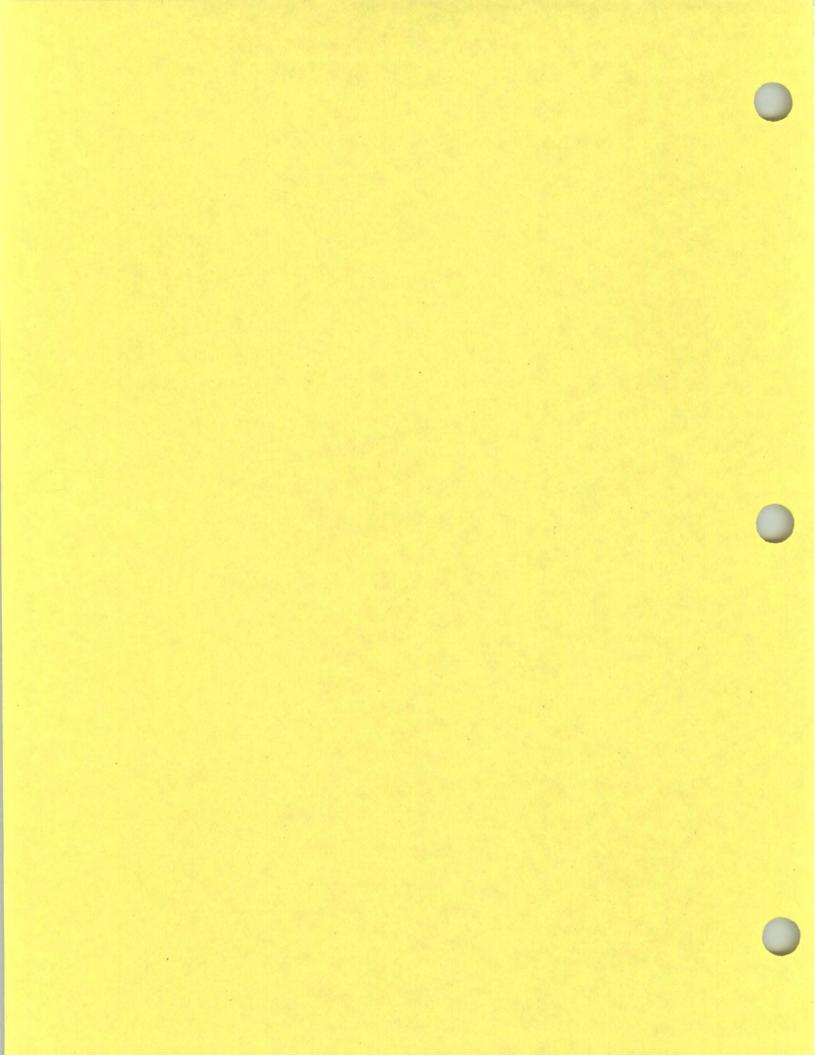
ND - All results are nondetect.

None - no PRG available. NA - not applicable, background criteria are only used to screen naturally occuring inorganics.

PRG - preliminary remediation goal. UCL - upper confidence limit.

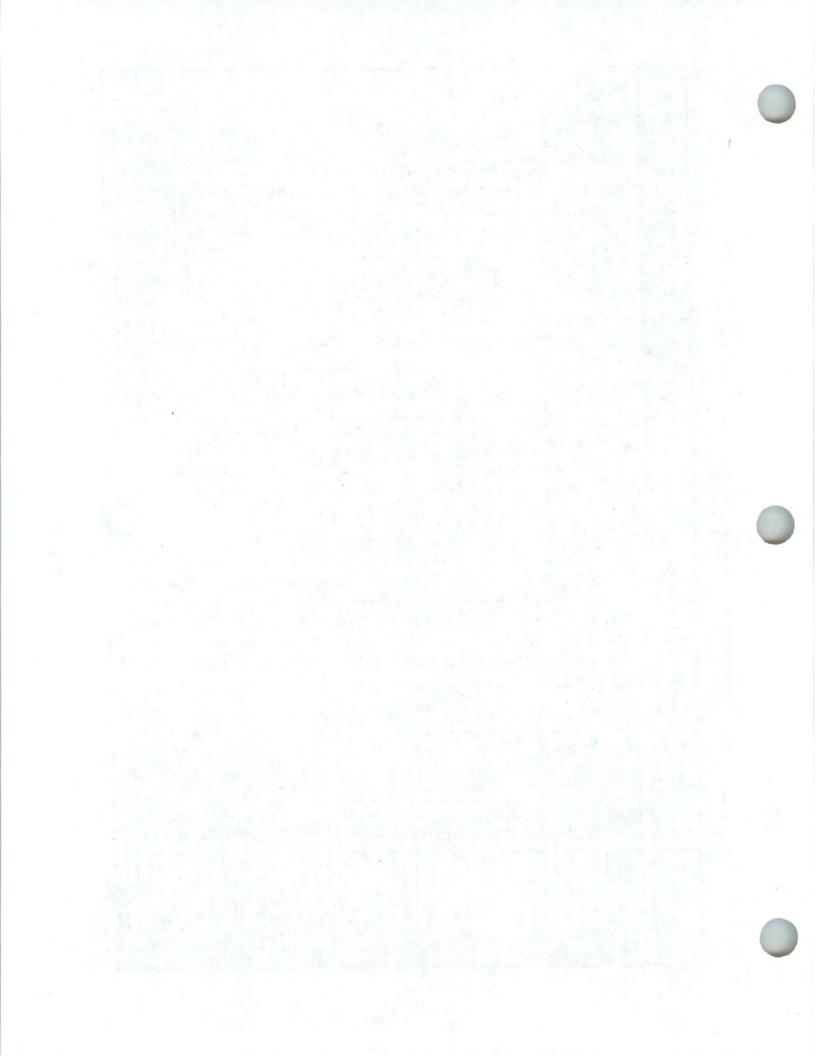






Appendix Table B-2. COPC Screening for Deep Surface Soil (0-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

Analyte	CAS	Jo	Nondetec	Nondetect Results"	Detect	Detect Results <sup>b</sup>					MDC	Region 9	MDC		
VI PTS IS	Number	Detection	Min DL	Max DL	Min	Max	Avg	95% UCL of Mean	EPC	Bkgd	Exceeds	Residential	Exceeds	_	
Aluminum										CHICAGO	ридис	FRG	PRG?	COPC	COPC? Justification
Antimony	7429905	(%001) 99/99	AD	AD	3470	21000	11700	12600	12600 /v/	17700		0031			
Arcenic	7440360	(%0) 99/0	0.18	0.52	ND	QN	0.156	0.164	0 164 (0)	0.06	res	/600 (nc)	Yes	Yes	MDC > Bkgd & PRG
ocuro	/440382	(%001) 99/99	AD	AD	5.7	30.3	13.0	15	15 (4)	0.50	ON	3.1 (пс)	ND	No	Not detected
Балит	7440393	(100%)	AD	AD	219	144	643	21.3	(T) (T)	15.4	Yes	0,39 (ca)	Yes	Yes	MDC > Bkgd & PRG
Beryllium	7440417	59/59 (1009%)	AD	AD	0.37	1.3	0.570	(1.3	71.3 (L)	4.00	Yes	540 (nc)	No	No	MDC < PRG
Cadmium	7440439	23/66 (35%)	0.016	0.074	0.057	7.00	6/000	0.719	0.719 (L)	0.88	Yes	15 (nc)	No	No	MDC < PRG
Calcium	7440702	66/66 (1000)	2	1000	0.037	0.87	0,0889	0.121	0.121 (D)	0	Yes	3.7 (nc)	No	No	MDC < PRG
Chromium total	TANDANY	00/00 (10078)	AD.	AD	144	9250	931	1220	1220 (X)	15800	No	None	Klasse	1	2
Chromium bearsulant	107404/3	00/00 (100%)	AD	AD	7.5	429	23.1	33.6	13 6 (X)	17.4	Ver	anoni de	None	No	Essential Nutrient
Cohole	18540299	(%0) L/0	2.7	6.3	ND	ND	1.94	2.5	75 100	4774	res	(nn) 77	Yes	Yes	MDC > Bkgd & PRG
dil	7440484	(%001) 99/99	AD	AD	4.4	23.8	596	10.4	10.4 (0)	0	ON:	22 (nc)	ND	No	Not detected
copper	7440508	(%001) 99/99	AD	AD	9	989	10	31	21 200	10.4	Yes	140 (nc)	No	No	MDC < PRG
Iroa	7439896	(%001) 99/99	AD	AD	12200	25000	a trans	17	71 (X)	17.7	Yes	310 (nc)	No	No	MDC < PRG
Lead	7439921	66/66 (100%)	AD	AP.	00000	00600	24/00	75/00	25700 (N)	23100	Yes	2300 (nc)	Yes	No	Fesential Nutriant
Magnesium	7430054	KE/KE 110000	1	9	0.0	69.3	91	17.2	17.2 (x)	26.1	Yes	400 (nc)	No	No	MDC < PRG
Manganese	7430065	66/66 (100%)	AD	AD	575	4700	2400	2590	2590 (N)	3030	Yes	None	Mona	37.0	The state of the s
Mercury	7430076	00/00 (100%)	AD	AD	152	1300	462	512	512 (L)	1450	No	180 /***	AVOUS VALLE	ONE	Essential Nutrient
Nickel	7440000	0/00 (0%)	0.013	0.061	QQ	QN	0.011	6	0.0119 (0)	0.036	ND CIN	7.3 (110)	153	No	MDC < Bkgrd
	0700447	00/00 (100%)	AD	AD	9.2	38.5	18.8	20.1	20.1 (L)	21.1	Voc	150 (10)	IND	INO	Not detected
Fotassium	7440097	(%001) 99/99	AD	AD	578	2400	1170	1750	1350 035	200	67.4	100 (00)	INO	No	MDC < PRG
Scientiff	7782492	(%0) 99/0	0.22	0.93	UN	CN	0.333	100	12.00 (L)	176	res	None	None	No	Essential Nutrient
Silver	7440224	(%0) 99/0	0.037	0.17	QN	CN	0.0300	1	0.24 (0)	4.1	QN	39 (nc)	ND	No	Not detected
Sodium	7440235	62/66 (94%)	47.7	53.2	30.4	900	2000	+	0.0333 (0)	0	ND	39 (nc)	ND	No	Not detected
Thallium	7440280	12/66 (18%)	0.31	1.8	1.0	997	71.9	79	79 (X)	123	Yes	None	None	No	Essential Nutrient
Vanadium	7440622	66/66 (100%)	AD	CV.	000	0.7	0.009	0.838	0.838 (D)	0	Yes	0.52 (nc)	Yes	Yes	MDC > Read & DDC
Zinc	7440666	66/66 (100%)	AD	400	2.6	34.1	717	22.5	22.5 (N)	31.1	Yes	7.8 (ac)	Yes	Yes	MDC > Rhod & pp.c
Organics-Explosives			The state of the s	AD.	7.67	114	60.5	67.9	62.9 (x)	61.8	Yes	2300 (nc)	No	No	MDC < PRG
,3,5-Trinitrobenzene	99354	0/53 (0%)	0.1	0.1	MIN	MIN	000								
,3-Dinitrobenzene	99650	(%0) 99/0	0.1	0.1	NIN CIN	N. O.N.	0.03	0.03	0.05 (0)	NA	NA	180 (nc)	ND	No	Not detected
2,4,6-Trinitrotoluene	118967	1/66 (1.5%)	0.1	0.1	110	0.11	0.030	+	0.05 (0)	NA	NA	0,61 (nc)	ND	No	Not detected
2,4-Dinitrotoluene	121142	1/66 (1.5%)	0.1	0.1	9000	0.006	0.0203	+	0.0524 (D)	NA	NA	3.1 (nc)	No	No	MDC < PRG
2,6-Dinitrotoluene	606202	(%0) 99/0	0.1	0.1	CN	ND	0.000		(D) 6150.0	NA	NA	0.72 (ca)	No	No	MDC < PRG
2-Amino-4,6-dinitrotoluene	35572782	(%0) 99/0	0.1	0.1	CZ	CIN CIN	0.00	0.00	0.03 (0)	NA.	NA	0.72 (ca)	ND	No	Not detected
2-Nitrotoluene	88722	(%0) 99/0	0.2	0.2	CIN	NB	0.00	0.03	(0) 50.0	NA	NA	None	ND	No	Not detected
3-Nitrotoluene	99081	2/66 (3.0%)	0.2	0.2	860 0	10	1.0	0.1	0.1 (0)	NA	NA	0.88 (ca)	ND	No	Not detected
4-Amino-2,6-dinitrotoluene	19406510	0/66 (0%)	0.1	0.1	UN	LIN	0.00	100	0.1 (D)	NA	NA	73 (nc)	No	No	MDC < PRG
4-Nitrotoluene	06666	0/66 (0%)	0.2	0.5	NO.	ND	0.03	0.03	0.05 (0)	NA	NA	None	ND	No	Not detected
HMX	2691410	1/66 (1.5%)	0.2	0.0	0.28	000	0.103	0.01	0.1 (0)	NA	NA	12 (ca)	QN	No	Not detected
Nitrobenzene	98953	7/66 (11%)	0.035	0.1	0.033	0.07	001.0	+	0.107 (D)	NA	NA	310 (nc)	No	No	MDC < PRG
Nitrocellulose	9004700	7/7 (100%)	AD	AD	200	6.07	413	+	0.0498 (D)	NA	NA	2 (nc)	No	No	MDC < PRG
Nitroglycerin	55630	(%0) L/0	10	101	MD	ND CIN	40	22.3	33.3 (N)	NA	NA	None	None	Yes	No bkgd or PRG
Nitroguanidine	556887	0/7 (0%)	0.13	0.13	N. C.	N. P.	2000	000	(0)	NA	NA	35 (ca)	ND	Na	Not detected
RDX	121824	0/66 (0%)	0.0	0.0	NIN NIN	MIN	0.003	0.003	0.065 (0)	NA	NA	610 (nc)	ND	No	Not detected
Tetryl	470460			210	CIVI	25			100						



Appendix Table B-2. COPC Screening for Deep Surface Soil (0-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

	CAS	Frequency	Nondete	Nondetect Results"	Detect	Detect Resultsh				,	MDC	Region 9	MDC		
Analyte	Number	Detection	Min DL	Max DL	Min	Max	Result	of Mann	5000	Bkgd	Exceeds	Residential	Exceeds		
4,4'-DDD	72548	(960) 2/0	0.0019	0.0024	ND	QN	0.00103	0.00100	0.6011.00	Criteria	Bkgd?	PRG	PRG?	COPC?	Justification
4,4-DDE	72559	1/ 7 (14%)	0.0019	0.0024	0.00033	0.00033	0.000933	0.00114	0.0003 /01	NA	INA	2.4 (ca)	ND	No	Not detected
4,4~DDI	50293	(%0) 2/0	0.0019	0.0024	ND	QN	0.00106	0.00113	0.0000	NA.	NA	1.7 (ca)	No	No	MDC < PRG
Aldrin	309002	1/7 (14%)	0.0019	0.0024	0.0012	0.0012	0.00106	0.00112	00011000	INA	NA.	1.7 (ca)	QN	No	Not detected
Chlordane	57749	(%0) 2/0	0.039	0.047	QN	CIN	90000	71000	0.0011 (D)	NA	NA	0.029 (ca)	No	No	MDC < PRG
Dieldrin	60571	(%0) L/0	0.0019	0.0074	UN	CIN CIN	0.0200	0.0217	0.0217 (0)	NA	NA	1.6 (ca)	ND	No	Not detected
Endosulfan I	959988	(%0) //0	0.0019	0.0074	div.	di.	0.00104	0.00109	0.0011 (0)	NA	NA	0.03 (ca)	ND	No	Not detected
Endosulfan II	33213659	(560) 2/0	0.0019	0.0024	UN NIN	ON.	0.00103	0.00109	0.0011 (0)	NA	NA	37 (nc)	ND	No	Not detected
Endosulfan sulfate	1031078	(360) 2/0	0.0010	0.0034	N. C.	ND STA	0.00103	0.00109	0.0011 (0)	NA	NA	37 (nc)	ND	No	Not detected
Endrin	72208	(360) 2/0	0.0010	0.0024	ND CITY	ON COL	0.00103	0.00109	0.0011 (0)	NA	NA	37 (nc)	QN	No	Not detected
Endrín aldehyde	7421934	1/7 (1495)	0.0010	0,0020	ON O	ND	0.00107	0.00117	0.0012 (0)	NA	NA	1,8 (nc)	ND	No	Not detected
Endrin ketone	53494705	1/7 (14%)	0.0010	42000	0.00083	0.000085	0.00101	0.00108	(a) 6000°0	NA	NA	1.8 (nc)	No	No	MDC < PRG
Heptachlor	76448	1/7 (14%)	0.000	0.0024	0.00034	0.00034	0.000934	0.00114	0.0003 (D)	NA	NA	I.8 (nc)	No	No	MDC < PRG
Heptachlor epoxide	1024573	0/7 (0%)	01000	0.0034	W.000/9	6/00000	0.000999	6010000	0.0008 (D)	NA	NA	0.11 (ca)	No	No	MDC < PRG
Lindane	58899	1/7 (14%)	0.0019	PC000	0 00003	COUNTY OF	0.00103	0.00109	0.0011 (0)	NA	NA	0.053 (ca)	ON	No	Not detected
Methoxychlor	72435	(%0) 4/0	0.0019	0.0004	CKUUU'U	260000	0.00102	0.00108	0.0009 (D)	NA	NA	0.44 (ca)	No	No	MDC < PRG
PCB-1016	12674112	0/7 (0%)	0.030	0.000	ON.	ND NE	0.00103	0.00109	0.0011 (0)	NA	NA	31 (nc)	ND	No	Not detected
PCB-1221	11104282	(5:0) (/0	0.010	0.047	N N	ON	0.0206	0.0217	0.0217 (0)	NA	NA	0.39 (nc)	S	No	Not detected
PCB-1232	11141165	(260) 2/0	0.030	0.047	ON!	ON.	0.0206	0.0217	0.0217 (0)	NA	NA	0.11 (nc)	ND	No	Not detected
PCB-1242	53469219	0/7 (095)	0.030	0.047	NO.	ON I	0.0206	0.0217	0.0217 (0)	NA	NA	0.11 (nc)	QN	No	Not detected
PCB-1248	12672296	0/7 (095)	0.033	0.047	N.	ON	0.0206	0.0217	0.0217 (0)	NA	NA	0.11 (nc)	QN	No	Not detected
PCB-1254	110976011	0/7 (001)	0000	0.047	QN	QN	0.0206	0.0217	0.0217 (0)	NA	NA	0.11 (nc)	QN	No	Not detected
PCB-1260	1100,0011	0/7 (030)	0.039	0.047	QN	QN	0.0206	0.0217	0.0217 (0)	NA	NA.	0.11 (nc)	QN.	Mo	Not detected
Toxanhene	8001353	0/7 (0%)	0.039	0.047	QN	ND	0.0206	0.0217	0.0217 (0)	NA	N. Y.	0 11 (ne)	N. CN	Ma	Not detected
alpha BHC	2001000	(%0) //0	0.039	0.047	ND	ND	0.0206	0.0217	0.0217 (0)	NA	AN	0.44 (20)	CIN CIN	ON.	Not detected
PERC	319846	(%0) 2/0	0.0019	0.0024	ON	ND	0.00103	0.00109	0.0011 (0)	NA	NA	0.44 (ca)	ON SE	No	Not detected
alpha-Cillordane	5103719	(%0) L/0	0.0019	0.0024	ND	ND	0.00103	0.00109	0.0011 /01	NA	NA	0.09 (ca)	ON	No	Not detected
Jela-Bric	319857	(%0) L/0	0.0019	0.0024	ND	ND	0.00103	0.00109	0.0011 701	NA	MA	1,0 (ca)	ND	No	Not detected
delta-BHC	319868	(%0) L/0	0.0019	0.0024	ND	ND	+	0.00109	0 0011 00	MA	NA.	U.32 (ca)	QN.	No	Not detected
gamma-Chlordane	5103742	(960) 2/0	0.0019	0.0024	QN		+	0.00109	0 0011 70	NA	NA	None	QN.	No	Not detected
Organics-Semivolatile						1	4.	2010010	101 1100	NA	NA	1.0 (ca)	ND	No	Not detected
l, I-Biphenyl	92524	(%0) L/0	0.39	0.47	QN	GN	0 206	0.317	10, 710,0	NIA	1111	-			
2,4,5-Inchlorophenol	95954	0/7 (0%)	0.39	0.47	ND	GN	0.206	0.317	0.217 (0)	NA	NA	300 (nc)	ND		Not detected
2.4.6-1 richlorophenol	88062	(%60) 2/0	0.39	0.47	ND	ND	0.206	0.217	0017 (0)	NA	NA	610 (nc)	Q	No	Not detected
2,4-Dichlorophenol	120832	(%) (/)	0.39	0,47	ND	QN	0.206	2100	0.217 (0)	NA	NA.	0.01 (nc)	QN	No	Not detected
2.4-Dimethylphenol	105679	(960) 2/0	0.39	0.47	ND	QN	0.206	0.017	0.217 (0)	NA	NA.	18 (nc)	QN	No	Not detected
2,4-Dinitrophenol	51285	0/1 (0%)	0.78	0.94	ND	QN	0.4		0.4 (0)	NA	NA	120 (00)	QN	No	Not detected
Z-Chloronaphthalene	91587	(%60) 2/0	0.39	0.47	ND	ND	0.206	0.217	0317 (0)	VIV	NA	12 (nc)	QN	No	Not detected
Z-Chlorophenol	95578	(%0) 2/0	0.39	0.47	QN	QN	0.206	0.217	0 217 (0)	NA	NA.	490 (nc)	ND	1	Not detected
2-Methyl-4,6-dinitrophenol	534521	(%0) 1/0	0.78	0.04	N.D.	1	0000	0.517	0.217 (0)	INA	NA	6.3 (nc)	QN	No	Not detected
2-Methylnaphthalene	91576	0/7 (092)	0.70	0.47	UNI.	ON SE	0.413	0.433	0.433 (0)	NA	NA	0.61 (nc)	ND	Nog	Not detected
2-Methylphenol	95487	0/7 (047)	0.00	14.0	ON SE	QN.	0.200	0.217	0.217 (0)	NA	NA	5.6 (nc)	ND		Not detected
2-Nitrobenzenamine	88744	0/7 (0/9)	65.0	14.0	ND.	Q	0.206	0.217	0.217 (0)	NA	NA	310 (nc)	ND		Not detected
2-Nitrophenol	88755	0/7 (0%)	0.39	0.47	QN	QN	0.206	0.217	0.217 (0)	NA	NA	18 (nc)	ND	T	Not detected
3.3-Dichlorohenzidine	01041	0/1 (0%)	0.39	0.47	ND ND	QN	0.206	0.217	0.217 (0)	NA	AN	None	GN	T	Not detected
3-Nitrohanzanamina	21241	0/1 (0%)	0.78	0.94	CZ	CIN	7 10							Ī	יאסו מכוכרוכת
	COMMO	N/7 /200	000	1	7	TAN.	0.4		0.4 (0)	NA	NA	1.1 (ca)	UN	T	Not detected

Appendix Table B-2. COPC Screening for Deep Surface Soil (0-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

	240	Frequency	Nondetec	Nondetect Results*	Detect Results <sup>b</sup>	esults		1311 /030		Rkad	MDC	Region 9	MDC		
Analyte	Number	Detection	Min DL	Max DL	Min	Max	Result	of Mean	EPC	Criteria	Exceeds Bkgd?	PRG	Exceeds PRG?	COPC?	Justification
4-Bromophenyl phenyl ether	101553	(%0) 2/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	None	ND	No	Not detected
4-Chloro-3-methylphenol	59507	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	None	ND	No	Not detected
4-Chlorobenzenamine	106478	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	24 (nc)	ND	No	Not detected
4-Chlorophenyl phenyl ether	7005723	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	None	ND	No	Not detected
4-Methylphenol	106445	(%0) L/0	0.39	0.47	ND	QN	0.206	0.217	0.217 (0)	NA	NA	31 (nc)	ND	No	Not detected
4-Nitrobenzenamine	100016	(%0) 2/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	18 (nc)	ND	No	Not detected
4-Nitrophenol	100027	(%0) L/0	0.78	0.94	ND	ND	0.413	0.433	0.433 (0)	NA	NA	None	ND	No	Not detected
Acenaphthene	83329	(%0) 2/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	370 (nc)	ND	No	Not detected
Acenaphthylene	208968	0/1 (0%)	0.39	0.47	ND	ND	0.2		0.2 (0)	NA	NA	None	ND	No	Not detected
Acetophenone	98862	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	None	ND	No	Not detected
Anthracene	120127	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	2200 (nc)	ND	No	Not detected
Atrazine	1912249	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	2.2 (ca)	ND	No	Not detected
Benz(a)anthracene	56553	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	0.62 (ca)	ND	No	Not detected
Benzaldehyde	100527	0/1 (0%)	0.39	0.47	ND	ND	0.2		0.2 (0)	NA	NA	610 (nc)	ND	No	Not detected
Benzo(a)pyrene	50328	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	0.062 (ca)	ND	Nog	Not detected
Benzo(b)fluoranthene	205992	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	0.62 (ca)	QN	No	Not detected
Benzo(ghi)perylene	191242	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	None	ND	No	Not detected
Benzo(k)fluoranthene	207089	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	6.2 (ca)	ND	No	Not detected
Bis(2-chloroethoxy)methane	111911	(%0) L/0	0.39	0.47	Q	ND	0.206	0.217	0.217 (0)	NA	NA	None	ND	No	Not detected
Bis(2-chloroethyl) ether	111444	0/1 (0%)	0.39	0.47	ND	ND	0.2		0.2 (0)	NA	NA	0.22 (ca)	ND	Nog	Not detected
Bis(2-chloroisopropyl) ether	108601	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	2.9 (ca)	ND	No	Not detected
Bis(2-ethylhexyl)phthalate	117817	1/7 (14%)	0.39	0.47	0.15	0.15	0.199	0.217	0.15 (D)	NA	NA	35 (ca)	No	No	MDC < PRG
Butyl benzyl phthalate	85687	(%0) //0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	1200 (nc)	N	No	Not detected
Caprolactam	105602	(%0) 4/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	3100 (nc)	ND	No	Not detected
Carbazole	86748	(%0) L/0	0.39	0.47	ND	QN	0.206	0.217	0.217 (0)	NA	NA	24 (ca)	ON	No	Not detected
Chrysene	218019	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	62 (ca)	ND	No	Not detected
Di-n-butyl phthalate	84742	(%0) L/0	0.39	0.47	R	ND	0.206	0.217	0.217 (0)	NA	NA	610 (nc)	ND	No	Not detected
Di-n-octylphthalate	117840	0/1 (0%)	0.39	0.47	QN	N N	0.2		0.2 (0)	NA	NA	240 (nc)	N	No	Not detected
Dibenz(a,h)anthracene	53703	(%0) L/0	0.39	0.47	QN	ND	0.206	0.217	0.217 (0)	NA	NA	0.062 (ca)	ND	Nog	Not detected
Dibenzofuran	132649	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	15 (nc)	ND	No	Not detected
Diethyl phthalate	84662	1/7 (14%)	0.39	0.47	5.6	5.6	716.0	2.47	2.47 (D)	NA	NA	4900 (nc)	No	No	MDC < PRG
Dimethyl phthalate	131113	(%0) L/0	0.39	0.47	QQ	QN	0,206	0.217	0.217 (0)	NA	NA	61000 (nc)	ND	No	Not detected
Fluoranthene	206440	(%0) L/0	0.39	0.47	ND	N	0.206	0.217	0.217 (0)	NA	NA	230 (nc)	ND	No	Not detected
Fluorene	86737	(%0) L/0	0.39	0.47	NO.	ND	0.206	0.217	0.217 (0)	NA	NA	270 (nc)	QN	No	Not detected
Hexachlorobenzene	118741	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	0.3 (ca)	ND	Nog	Not detected
Hexachlorobutadiene	87683	0/1 (0%)	0.39	0.47	ND	ND	0.2		0.2 (0)	NA	NA	1.8 (nc)	ND	No	Not detected
Hexachlorocyclopentadiene	77474	(%0) 2/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	37 (nc)	ND	No	Not detected
Hexachloroethane	67721	(%0) L/0	0.39	0.47	ND	QN	0.206	0.217	0.217 (0)	NA	NA	6.1 (nc)	ND	No	Not detected
Indeno(1,2,3-cd)pyrene	193395	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	0.62 (ca)	ND	No	Not detected
sophorone	78591	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	510 (ca)	ND	No	Not detected
N-Nitroso-di-n-propylamine	621647	(%0) (/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	0.069 (ca)	ND	Nog	Not detected
N-Nitrosodiphenylamine	86306	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	99 (ca)	ND	No	Not detected
Naphthalene	91203	(%0) L/0	0.39	0.47	ND	ND	0.206	0.217	0.217 (0)	NA	NA	5.6 (nc)	ND	No	Not detected
Dentachloronhenol	87865	(%0) (/0	0.78	000	CIN	CL.									



Appendix Table B-2. COPC Screening for Deep Surface Soil (0-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

	CAS	Frequency	Nondete	Nondetect Results"	-	Detect Results <sup>b</sup>					MDC	Region 9	MDC		
Analyte	Number	Detection	Min DL	Max DL	Min	Max	Avg	of Mean	FPC	Bkgd	Exceeds	Residential	Exceeds		
rhenanthrene	82018	0/7 (0%)	0.39	0.47	QN	CN	0.705	0.217	2000	Criteria	Bkgd?	PRG	PRG?	COPC?	COPC? Justification
Filenol	108952	0/7 (0%)	0.39	0.47	QN	ND	002.0	0.217	0.217 (0)	NA	NA	None	QN	No	Not detected
rytene	129000	(%60) 2/0	0.39	0.47	ND	NIN.	0000	0.217	0.217 (0)	NA	NA	1800 (nc)	ND	No	Not detected
Organics-Volatile					and a	CIVI	0.700	0.217	0.217 (0)	NA	NA	230 (nc)	QN	No	Not defected
, I, I-Trichloroethane	71556	1.7 (14%)	0.0058	0.0069	0.013	0.012	V 00.457	000000							non-new con-
1,1,2,2-Tetrachloroethane	79345	(%0) (/0	0.0058	0.0060	+	CLU.	0.00433	87/00'0	0.0073 (D)	NA	NA	200 (nc)	No	No	MDC - DDC
1,1,2-Trichloro-				20000	1	IND	0.00311	0.00325	0.0033 (0)	NA	NA	0.41 (ca)	Q.	No	Not detected
1,2,2-trifluoroethane	76131	0/3 (0%)	0.0058	0.0069	CN.	CN	400000	10000	1						ייטו חבוברובח
1,2-1 nchloroethane	79005	(%0) 2/0	0.0058	0.0069	2	ND	0.00211	1500.0	0.0031 (0)	NA	NA	2100 (ac)	ND	No	Not detected
.1-Dichloroethane	75343	(960) 2/0	0.0058	0.0069	ND	ON ALL	0.00311	0.00325	0.0033 (0)	NA	NA	0.73 (ca)	QN	Na	Not detected
, 1-Dichloroethene	75354	1/5 (20%)	0.0058	0.0000	N ANDA	ND	0.00311	0.00325	0.0033 (0)	NA	NA	51 (nc)	CN	No	Not detected
.2.4-Trichlorobenzene	120821	0/3 (085)	0.005	00000	4.00.4	0.0074	0.00405	0.00584	0.0058 (D)	NA	NA	12 (nc)	Z	Mo	Man detected
.2-Dibromo-3-chloropropane		0/3 (095)	0.000	60000	ND	NO.	0.00297	0.0031	0.0031 (0)	NA	NA	6.2 (ne)	CN	No	MUCSERG
,2-Dibromoethane		(0.0) 1/0	0.0050	0.0009	ON.	ON	0.00297	0.0031	0.0031 (0)	NA	NA	0.21 (nc)	QN.	DAT.	INOT detected
,2-Dichlorobenzene	95501	0/2 1000	0.0030	0.0009	ON	ND	0.00311	0.00325	0.0033 (0)	NA	AN	0.032 (00)	G N	ONI	Not detected
,2-Dichloroethane	107062	0/7 (0/8)	0.0038	0.0069	QN	QN	0.00311	0.00325	0.0033 (0)	NA	AN	110 /	dia.	NO	Not detected
1,2-Dichloropropane	78875	0/7 (078)	0.0038	0.0069	ND	QN	0.00311	0.00325	0.0033 (0)	NA	NA	0.30 (115)	ON.	ON.	Not detected
1,2-Dimethylbenzene	92720	177 (1976)	0.0058	69000	QN	ND	0.00311	0.00325	0.0033 (0)	A.Z.	NA	0.24 (52)	ON.	No.	Not detected
3-Dichlorobenzene	541721	1// (14%6)	0.0059	6900'0	0.002	0.002	0.00298	0.00332	0.002 (D)	NA.	MA	0,34 (ca)	ON	No	Not detected
.4-Dichlorobenzene	100160	0/1 (0%0)	0.0058	6900.0	ND	ND	0.00311	0.00325	0 0033 (0)	NA	VIV	Z (nc)	No	No	MDC < PRG
2-Butanone	100407	0/7 (0%)	0.0058	6900'0	ND	ND	0.00311	0.00325	0.0033 (0)	NA	INA	53 (nc)	Q	No	Not detected
2-Hexapone	501705	0/3 (0%)	0.012	0.014	QN	ND	0.006	9000	0.006 /01	NA	IN.	3.4 (ca)	ND	No	Not detected
2-Methoxy-7-mothylmonon	291/80	0/3 (0%)	0.012	0.014	ND	QN	900.0	9000	0 0000	NA	NA	2200 (nc)	QN	No.	Not detected
4-Methyl-2 pantage	1034044	0/7 (0%)	0.0058	0.0069	ND	ND	0.00311	0.00325	0 0033 (0)	NA	NA.	None	ND	No	Not detected
Acetone	108101	(%0) L/O	0.012	0.014	ND	ND	0.00621	+	0 0005 000	NA	NA	17 (ca)	QN	No	Not detected
Represent	67641	0/3 (0%)	9900'0	0.015	ND	ND	0.00513		0 0000	NA.	NA	530 (nc)	QN	No	Not detected
11 11	71432	(%0) (/0	0.0058	0.0069	ON	ND	0.00311	+	(0) 60000	NA	NA	1400 (nc)	ND	No	Not detected
bromodichloromethane	75274	(%0) L/0	0.0058	0.0069	ND	CN	0.00311	+	0.0033 (0)	NA	NA	0.64 (ca)	ND		Not detected
Diomomethane	74839	0/3 (0%)	0.012	0.014	ON	UN	0.006	+	0.0033 (0)	NA	NA	0.82 (ca)	ND		Not detected
Carbon distunde	75150	2/7 (29%)	0.0059	6900.0	0.0031	0.016	0.00498	1	0.000 (0)	NA	NA	0.39 (nc)	ND		Not detected
Carbon terrachionde	56235	0/2 (0%)	0.0058	6900.0	CN	CN	0.00311	+	(0) 0000	NA.	NA	36 (ac)	No	No	MDC < PRG
Choropenzene	108907	(960) 2/0	0.0058	6900.0	ND	QN	0.00311	+	0.0033 (0)	NA	NA	0,22 (nc)	ND	No	Not detected
Culoioculane	75003	(960) 2/0	0.012	0.014	QN	UN	0.00671	+	0.0035 (0)	NA	NA	15 (nc)	ND	No	Not detected
Chlorent	67663	(%0) (/0	0.0058	0.0069	QN	QN	0.00311	+	0.0003 (0)	NA.	NA	3 (ca)	ND	No	Not detected
Curonomeniane	74873	(%0) L/0	0.012	0.014	QN	ND	10,000,0	+	0.0053 (0)	NA	NA	0.22 (ca)	ND	No	Not detected
Cullelle	98828	(%0) 2/0	0.0058	690000	QN	CN	0.00311	+	0.0003 (0)	NA	NA	4.7 (nc)	ND	No	Not detected
Cyclohexane	110827	0/3 (0%)	0.0058	0.0069	QN	CN	0.0000	+	0.0033 (0)	NA	NA	16 (ac)	ND		Not detected
Moromorphane	124481	(%0) 2/0	0.0058	6900.0	QN	UN	0.00211	1.	0.0031 (0)	NA	NA	140 sat	ND		Not detected
Dichlorodifluoromethane	75718	(960) 6/0	0.0058	6900'0	GN	CN	0.00311	+	0.0033 (0)	NA	NA	I.1 (ca)	ND	No	Not detected
	100414	0/7 (0%)	0.0058	0.0069	UN	QN.	110000	+	0.0033 (0)	NA	NA	9.4 (nc)	ND	No	Not detected
	136777612	1/7 (14%)	0.0059	69000	0.0051	0.0051	0.00347	+	0.0033 (0)	NA	NA	190 (nc)	ND		Not detected
Methylcyclohexane	108872	(%0) 2/0	0.0058	0 00069	ND	NIN	24500.0	+	0.004 (D)	NA	NA	27 (nc)	No		MDC < PRG
Methylene chloride	75092	0/3 (0%)	0.007	0.014	NP	NE	0.00311	+	0.0033 (0)	NA	NA	260 (nc)	QN		Not detected
Styrene	100425	0/7 (094)	0.0058	0 0000	N.D.	DN	110000	+	0.006 (0)	NA	NA	9.1 (ca)	QN	No	Not detected
Tetrachloroethene	127184	(%0) 2/0	0.0058	0 0000	N. O. W.	ND NE	0.00311	-	0.0033 (0)	NA	NA	440 (nc)	QN		Not detected
Toluene	108883	2/7 (29%)	0.0059	0 0000	Chi	1	0.00311	-	0.0033 (0)	NA	NA	0.48 (ca)	ND	T	Mos de la
				Contract of	(1)(1)(1)	71000	0 00200	A MARKET				(400)	717	Ī	Deller Deller

# Appendix Table B-2. COPC Screening for Deep Surface Soil (0-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetect Results	Results"	Detect Results <sup>b</sup>	kesults <sup>b</sup>		1011 /020		Bload	MDC	Residential	MDC		
Analyte	CAS	of Detection	Min DL	Max DL	Min	Max	Result	of Mean	EPC	Criteria	Bkgd?	PRG	PRG?	COPC? J	Justification
Trichloroethene	79016	(%0) 2/0	0.0058	6900.0	QN	ND	0.00311	0.00325	0.0033 (0)	NA	NA	0.053 (ca)	ND	No	Not detected
Trichlorofluoromethane	75694	(%0) 2/0	0.0058	6900.0	ND	ND	0.00311	0.00325	0.0033 (0)	NA	NA	39 (nc)	ND	No	Not detected
Vinyl chloride	75014	(%0) 4/0	0.012	0.014	ND	QN	0.00621	0.0065	0.0065 (0)	NA	NA	0.079 (ca)	ND	No	Not detected
cis-1.2-Dichloroethene	156592	(%0) 2/0	0.0058	6900'0	ND	ND	0.00311	0.00325	0.0033 (0)	NA	NA	4.3 (nc)	ND	No	Not detected
cis-1 3-Dichloropropene	10061015	(%0) 2/0	0.0058	6900.0	ND	ND	0.00311	0.00325	0.0033 (0)	NA	NA	0.78 (ca)	ND	No	Not detected
trans-1,2-Dichloroethene	156605	(%0) L/0	0.0058	6900.0	ND	ND	0.00311	0.00325	0.0033 (0)	NA	NA	6.9 (nc)	ND	No	Not detected

Minimum and maximum detection limit (DL) shown for nondetect results.

<sup>b</sup>Minimum and maximum detected concentration shown for detect results.

Exposure point concentration (EPC) is lesser of 95% upper conficence level (UCL) or maxaximum detected concentration (MDC) as appropriate based on data distribution (shown in parentheses). Data distribution codes:

D - Distribution not determined due to less than 50% frequency of detection. 95% UCL calculated using Student's t-statistic.

L - Distribution is lognormal. 95% UCL calculated using Land's H method

N - Distribution is normal. 95% UCL calculated using Student's t-statistic.

O - The analyte was not detected. 95% UCL calculated using Student's t-statistic.

X - Distribution is nonparametric. 95% UCL calculated using Student's t-statistic.

Background criteria for RVAAP from USACE 2001. Final Phase II Remedial Investigation Report for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Residential soil preliminary remediation goal (PRG) from Region 9 corresponding to risk of 1.0E-06 for carcinogenic endpoint (ca) or hazard index of 0.1 for noncarcinogenic endpoint (nc).

Essential nutrients are not retained as COPCs because the MDC would result in an intake less than the recommended daily intake (RDI).

\*Analyte is not a COPC because it was not detected in soil at the 40mm Range, however, because the maximum detection limit exceeds the Region 9 PRG this chemical is included in the risk characterization.

AD - All results are detects.

EPC - exposure point concentration.

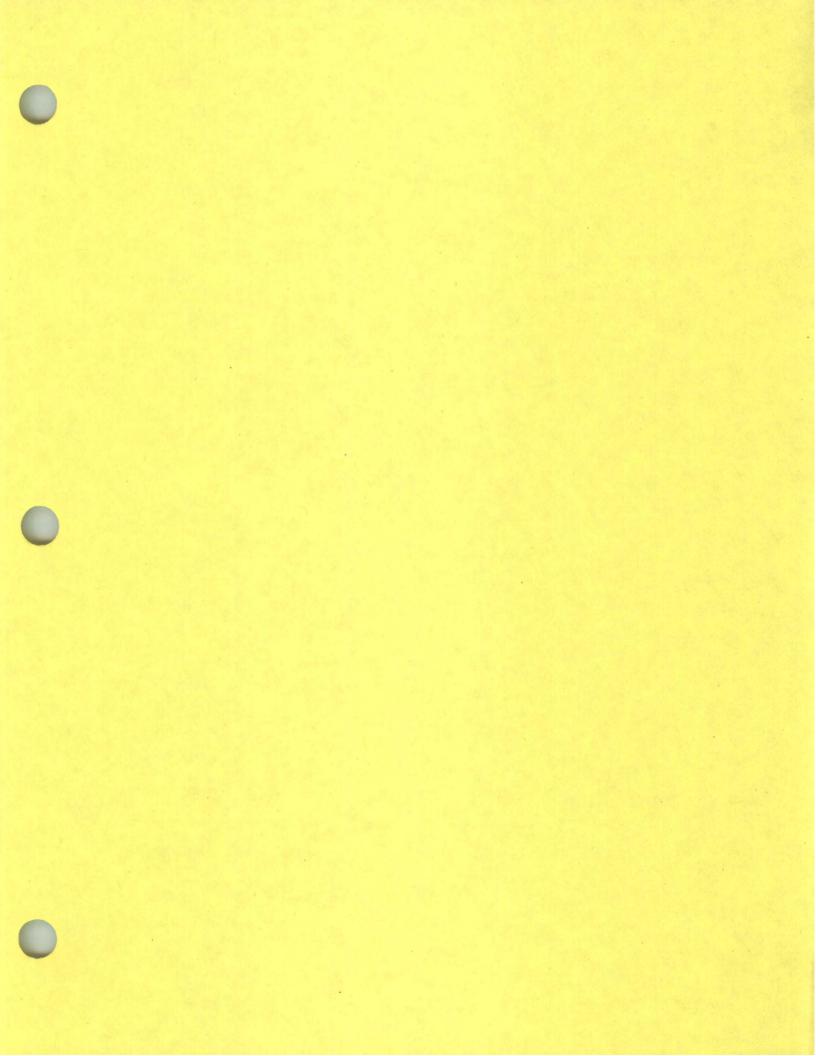
MDC - maximum detected concentration. COPC - chemical of potential concern. CAS - chemical abstract service.

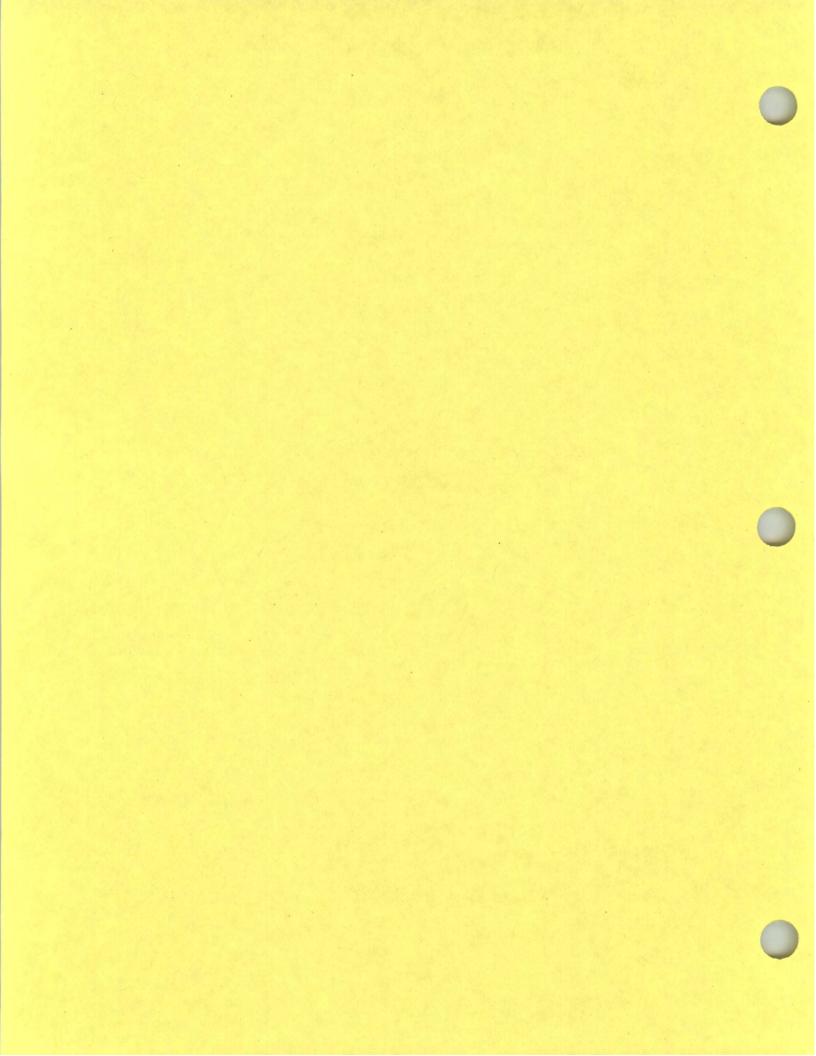
DL - detection limit.

NA - not applicable, background criteria are only used to screen naturally occuring inorganics.

ND - All results are nondetect.

PRG - preliminary remediation goal. UCL - upper confidence limit. None - no PRG available.





Page 1 of 5

Appendix Table B-3. COPC Screening for Subsurface Soil (1-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondeter	Nondetect Results*	Detect Results <sup>b</sup>	esults <sup>b</sup>									
Analyte	CAS	Of	Min DE	Max DI	Min	Mas	Avg	95% UCL		Bkgd	MDC	Region 9	MDC		
Metals		Detection	-	MAYDE	IMIII	MAX	Result	of Mean	EPC	Criteria	Bkgd?	PRG*	PRG?	COPC?	COPC? Justification
Aluminum	7429905	26/26 (10095)	AD	AD	10600	6950	13500	14600							
Antimony	7440360	0/26 (0%)	0.18	0.45	MIN	OCON NEW	17000	13600	13600 (N)	19500	Yes	7600 (nc)	Yes	Yes	MDC > Bkod & PRG
Arsenic	7440382	26/26 (100%)	AD	AD	202	N.O	0.134	0.166	0.166 (0)	96.0	No	3.1 (nc)	No	No	Not detected
Bariun	7440393	26/26 (100%)	AD	AD AD	101	30.5	(7)	19	(N) 6I	19.8	Yes	0.39 (ca)	Yes	Yes	MDC > Bkgd & PRG
Beryllium	7440417	23/23 (100%)	AD	CA A	171	20.0	79	7.1	71 (L)	124	No	540 (nc)	No	No	MDC < Bkgd
Cadmium	7440439	3/26 (12%)	9100	0.061	2.7	0.32	607.0	0.796	0.796 (L)	0.88	Yes	15 (nc)	No	No	MDC < PRG
Calcium	7440702	76/76 (1000)	40.0	100.0	77.0	0.077	0.0279	0.0424	0.0424 (D)	0	Yes	3.7 (nc)	No	No	MDC < PRG
Chromium	7440473	26/26 (100%)	AD	AD	1570	144	589	774	774 (L)	35500	No	None	None	No	Feentis Mutrices
Chromium, hexavalent	18540299	0/3 (002)	AD 2.7	AD	27.7	5.01	17.9	19.2	19,2 (L)	27.2	Yes	22 (nc)	Yes	Yes	MDC > Read & pp.C.
Cobalt	7440484	26/26 (100%)	AD.	6.9	ND	QN.	1.98	3.69	3,15 (0)	0	ND	22 (nc)	No	No	Not detected
Copper	7440508	26/26 (100%)	AD	AN	22.6	4.0	10.9	12.5	12.5 (L)	23.2	Yes	140 (nc)	No	No	MDC < PRG
Iron	7410806	36736 (10020)	000	AD	36.3	9.4	21.6	23.2	23.2 (x)	32,3	Yes	310 (nc)	No	No	MDC < PRG
Lead	7439921	26/26 (100%)	AD	AD	36900	13300	26800	28400	28400 (x)	35200	Yes	2300 (nc)	Yes	No	Freential Musical
Magnesium	7420054	100000000000000000000000000000000000000	AD.	AD	36.1	8.7	14.7	16.3	16.3 (x)	19.1	Yes	400 (nc)	No	No	MDC < PRG
Manganese	7430065	26/26 (100%)	AD	AD	4700	1430	2770	3120	3120 (L)	8790	No	None	None	No	The state of the s
Mercury	7439976	0/26 (20078)	AD	AD	840	+	333	_	375 (L)	3030	No	180 (nc)	Vec	No	MANO DE LA
Nickel	7440020	76/76 (10002)	0.013	0.023	ON	+	90600.0	00	0.00948 (0)	0.044	No	2.3 (nc)	No	No	Not detected
Potassium	7440007	16/06/15/19/19/19	an a	AD	28.2	10.2	22.2	24.7	24.7 (1.)	60.7	No	160 (nc)	No	No	MDC < Blod
Selenium	7783403	(%001) 07/07	AD	AD	2400	692	1310	1440	1440 (L)	3350	No	None	None	No	Larrie 131
Silver	7440714	0/20 (0%)	77.0	69.0	Q	ND	0.188	0.21	0.21 (0)	1.5	No.	30 /001	Min	INO	Essential Nutrient
Sodium	4770447	0,70 (0%)	0.037	0.079	QN	QN	0.0277	0.0297	0.0297 (0)	0	GN	30 (110)	MA	NO	Not detected
Dhallion	7440235	26/26 (100%)	AD	AD	288	46.3	18	96.4	96 d rvv	145		7. (mc)	OKT	INO	Not detected
muni	7440280	6/26 (23%)	0.31	6.0	2.8	1.9	0.759	1.08	1 08 (m)	247	1 05	None	None	No	Essential Nutrient
Vanadium	7440622	26/26 (100%)	AD	AD	34	13.1	22	21.6	73.6 (1)	16.0	Yes	0.52 (nc)	Yes	Yes	MDC > Bkgd & PRG
zuic	7440666	26/26 (100%)	AD	AD	77.4	29.2	5 09	64.1	(N) 0.52	37.0	No	7.8 (nc)	Yes	No	MDC < Bkgd
Organics-Explosives							200	7.1.7	04.1 (N)	93.3	No	2300 (nc)	No	No	MDC < Bkgd
3 District	99354	0/23 (0%)	0.1	0.1	ND	ND	0.05	0.05	10/ 50 0	MA	11.1	200			
2 d 6. Trinitotoluana	05966	0/26 (0%)	0.1	0.1	ND	ND	0.05	0.05	0.05 (0)	NA	MA	180 (nc)	No.	No.	Not detected
2.4-Dinitrotoluene	11890/	0/26 (0%)	0.1	0.1	ND	ND	0.05	0.05	0.05 (0)	NA	NA	3.1 (ac)	No.	No	Not detected
2,6-Dinitrotoluene	241121	0/26 (0%)	0.1	0.1	QN	QN	0.05	0.05	0.05 (0)	NA	NA	0.72 (cn)	No.	No.	Not detected
2-Amino-4,6-dinitrotoluene	35573783	0/26 (0%)	1.0	0.1	QN	ND	0.05	0.05	0.05 (0)	NA	NA	0.72 (ca)	No	T	Not detected
2-Nitrotoluene	88722	0/26 (020)	0.0	0.1	ON	Q !	0.05	0.05	0.05 (0)	NA	NA	None	None	T	Not detected
3-Nitrotoluene	18066	1/26 (3.9)	0.0	2.0	O VOD	+	0.1	0.1	0.1 (0)	NA	NA	0.88 (ca)	No		Not detected
4-Amino-2,6-dinitrotoluene	19406510	0/26 (0%)	0.1	1	ND	ND ON	6660.0	0.0	0.098 (D)	NA	NA	73 (nc)	No		MDC < PRG
4-Nitrotoluene	06666	0/26 (0%)	0.2	2	N CN	N.D.	0.00	0.00	0.05 (0)	NA	NA	None	None		Not detected
HMX	2691410	0/26 (0%)	0.2	2	CN	UN	0.1	0.1	0.1 (0)	NA.	NA	12 (ca)	No		Not detected
Nitrobenzene	98953	3/26 (12%)	0.035		0.07	+	0.0473	0.050.0	0.1 (0)	NA.	NA	310 (nc)	No		Not detected
Nitrocellulose	9004700	3/3 (100%)	AD	AD	59	+	43	20.000	(U) 0000.0	NA	NA	2 (nc)	No	No	MDC < PRG
Nitroglycerin	55630	0/3 (098)	10	10	ND	GN	2 4	6.21	(N)	NA	NA	None	None		No bkgd or PRG
Nitroguanidine	556887	0/3 (0%)	0.13	0.13	ND	QN	5900	0.065	(0) 6	NA	NA	35 (ca)	No	No	Not detected
KUA Teted	121824	0/26 (0%)	0.2	0.2	QN	-	0.1	0.00	0.003 (0)	NA.	NA	610 (nc)	No		Not detected
							***		(0) 1.0	AN	V V	1001	Min	Ī	

Appendix Table B-3. COPC Screening for Subsurface Soil (1-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetec	Nondetect Results"	Detect Results <sup>b</sup>	esults					MDC	Region 9	MDC		
Analyte	CAS	of Detection	Min DL	Max DL	Min	Max	Avg	95% UCL of Mean	EPC	Bkgd Criteria <sup>d</sup>	-	Residential PRG <sup>e</sup>	Exceeds PRG?	COPC?	COPC? Justification
Organics-Pesticide/PCB														N	
4,4'-DDD	72548	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	2.4 (ca)	No	No	Not detected
4,4'-DDE	72559	0/3 (0%)	0.0019	0.0021	ND	QN	0.001	0.00108	0.00105 (0)	NA	NA	1.7 (ca)	No	No.	Not detected
4,4'-DDT	50293	0/3 (0%)	0.0019	0.0021	ND	QN	0.001	0.00108	0.00105 (0)	NA	NA	1.7 (ca)	No	No	Not detected
Aldrin	309002	0/3 (0%)	0.0019	0.0021	ND	N	0.001	0.00108	0.00105 (0)	NA	NA	0.029 (ca)	No	No	Not detected
Chlordane	57749	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	1.6 (ca)	No	No	Not detected
Dieldrin	60571	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	0.03 (ca)	No	No	Not detected
Endosulfan I	886656	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	37 (nc)	No	No	Not detected
Endosulfan II	33213659	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	37 (nc)	No	No	Not detected
Endosulfan sulfate	1031078	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	37 (nc)	No	No	Not detected
Endrin	72208	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	1.8 (nc)	No	No	Not detected
Endrin aldehyde	7421934	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	I.8 (nc)	No	No	Not detected
Endrin ketone	53494705	0/3 (0%)	0.0019	0.0021	ND	ND	0.001		0.00105 (0)	NA	NA	1.8 (nc)	No	No	Not detected
Heptachlor	76448	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	0.11 (ca)	No	No	Not detected
Heptachlor epoxide	1024573	0/3 (0%)	0.0019	0.0021	ND	ND	0.001		0.00105 (0)	NA	NA	0.053 (ca)	No	No	Not detected
Lindane	58899	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	0.44 (ca)	No	No	Not detected
Methoxychlor	72435	0/3 (0%)	0.0019	0.0021	ND	ND	0.001		0.00105 (0)	NA	NA	31 (nc)	No	No	Not detected
PCB-1016	12674112	0/3 (0%)	0.039	0.042	ND	QN	0.0202	0.0215	0.021 (0)	NA	NA	0.39 (nc)	No	No	Not detected
PCB-1221	11104282	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1232	11141165	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1242	53469219	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1248	12672296	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1254	11097691	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	0.11 (nc)	No	No	Not detected
PCB-1260	11096825	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	0.11 (nc)	No	No	Not detected
Toxaphene	8001352	0/3 (0%)	0.039	0.042	ND	ND	0.0202	0.0215	0.021 (0)	NA	NA	0.44 (ca)	No	No	Not detected
alpha-BHC	319846	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	0.09 (ca)	No	No	Not detected
alpha-Chlordane	5103719	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	1.6 (ca)	No	No	Not detected
beta-BHC	319857	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	0.32 (ca)	No	No	Not detected
delta-BHC	319868	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	None	None	No	Not detected
gamma-Chlordane	5103742	0/3 (0%)	0.0019	0.0021	ND	ND	0.001	0.00108	0.00105 (0)	NA	NA	1.6 (ca)	No	No	Not detected
Organics-Semivolatile															
,1-Biphenyl	92524	0/3 (0%)	0.39	0.42	Q.	QN	0.202	0.215	0.21 (0)	NA	NA	300 (nc)	No	oN.	Not detected
2,4,5-Trichlorophenol	95954	0/3 (0%)	0.39	0.42	ON SE	NO	0.202	0.215	0.21 (0)	NA	NA	010 (nc)	No	No	Not detected
2,4,6-1 richlorophenol	79088	0/3 (0%)	0.39	24.0	N N	N.	0.202	0.215	0.21 (0)	NA	MAN	10 (10)	No	No	Not detected
Z,4-Dienioropaenoi	100032	0/3 (0%)	0.00	0.42	S S	NA CENT	0.202	0.215	0.21 (0)	NA	NA	120 (nc)	No	No	Not detected
2,4-Dinitrophenol	51785	0/1 (0%)	0 78	0.85	2	GN	0.4	200	0.4 (0)	NA	NA	12 (nc)	No	No	Not detected
2-Chloronanhthalene	91587	0/3 (0%)	0.39	0.42	N.	QN	0.202	0.215	0.21 (0)	AN	NA	490 (nc)	No	No	Not detected
2-Chlorophenol	95578	0/3 (0%)	0.39	0.42	S	QN	0.202	0.215	0.21 (0)	NA	NA	6.3 (nc)	No	No	Not detected
2-Methyl-4 6-dinitrophenol	534521	0/3 (0%)	0.78	0.85	ND	ND	0.405	0.435	0.425 (0)	NA	NA	0.61 (nc)	No	Nog	Not detected
2-Methylnaphthalene	91576	0/3 (0%)	0.39	0.42	QN	QN	0.202	0.215	0.21 (0)		NA	5.6 (nc)	No	No	Not detected
2-Methylphenol	95487	0/3 (0%)	0.39	0.42	ND	ND	0.202	0.215	0.21 (0)		NA	310 (nc)	No	No	Not detected
2-Nitrobenzenamine	88744	0/3 (0%)	0.39	0.42	QN	QN	0.202	0.215	0.21 (0)		NA	18 (nc)	No	No	Not detected
2-Nitronhenol	99400	0/2 /00/1	0 30	07.0	e.							-			





Page 3 of 5

Appendix Table B-3. COPC Screening for Subsurface Soil (1-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetect I	t Results	Detect Results <sup>b</sup>	esults <sup>b</sup>									
Analyte	CAS	of Detection	Min DL	Max DL	Min	Max	Avg	35% UCL		Bkgd	MDC	Region 9	MDC		
3'-Dichlorobenzidine	91941	(%0) 1/0	0.78	0.85	ND	MIN	Result	of Mean	EPC	Criteria	Bkgd?	PRG	PRG?	COPC?	Justification
3-Nitrobenzenamine	99092	0/3 (0%)	0.39	0.42	ND	ND ON	6.00	4180	0.4 (0)	NA	NA	1.1 (ca)	No	No	Not detected
4-Bromophenyl phenyl ether	101553	0/3 (0%)	0.39	0.47	ND	C C	207.0	0.213	0.21 (0)	NA	NA	1.8 (nc)	No	No	Not detected
4-Chloro-3-methylphenol	59507	0/3 (0%)	0.39	0.42	S	ND	207.0	0.215	0.21 (0)	NA	NA	None	None	No	Not detected
4-Chlorobenzenamine	106478	0/3 (0%)	0.39	0.42	CN.	ND	207.0	0.215	0.21 (0)	NA	NA	None	None	No	Not detected
4-Chlorophenyl phenyl ether	7005723	0/3 (0%)	0.39	0.42	CN	ON CA	207.0	0.215	0.21 (0)	NA	NA	24 (nc)	No	No	Not detected
4-Methylphenol	106445	0/3 (0%)	0.39	0.42	QN	9 5	0.202	0.215	0.21 (0)	NA	NA	None	None	No	Not detected
4-Nitrobenzenamine	100016	0/3 (0%)	0.39	0.42	2	ON ON	707.0	0.215	0.21 (0)	NA	NA	31 (nc)	No	No	Not detected
4-Nitrophenol	100027	0/3 (0%)	0.78	0.85	ND ON	N. O. N.	7070	0.215	0.21 (0)	NA	NA	18 (nc)	No	No	Not detected
Acenaphthene	83329	0/3 (0%)	0.39	0.43	ON ON	ON CIN	0.405	0.435	0.425 (0)	NA	NA	None	None	No	Not detected
Acenaphthylene	208968	0/1 (0%)	0.30	24.0	UND UND	ON SE	0.207	0.215	0.21 (0)	NA	NA	370 (nc)	No	Na	Not detected
Acetophenone	98862	0/3 (0%)	0.39	0.42	N CIN	ND	2.0		0.2 (0)	NA	NA	None	None	No	Not detected
Anthracene	120127	0/3 (0%)	0.30	0.43	NIN NIN	UND.	0.202	0.215	0.21 (0)	NA	NA	None	None	No	Not detected
Atrazine	1912249	0/3 (0%)	0.30	24.0	ND NE	ON S	0.202	0.215	0.21 (0)	NA	NA	2200 (nc)	No.		Not detected
Benz(a)anthracene	56553	0/3 (0%)	0.70	24.0	ON	Q.	0.202	0.215	0.21 (0)	NA	NA	2.2 (cn)	No	T	Delicated and
Benzaldehyde	100527	0/1 (0%)	0.30	747	ON S	QN.	0.202	0.215	0.21 (0)	NA	NA	0.62 (ca)	No	Ma	Not detected
Benzo(a)pyrene	50230	012 220	66.0	75.0	ND	ND	0.2		0.2 (0)	NA	NA	(510 (pc)	o N		Not detected
Benzo(b)fluoranthene	2005000	0/3 (0%)	0.39	0.42	ND	ND	0.202	0.215	0.21 (0)	MA	NI.N	10000	011		Not defected
Benzo(ghi)perylene	101747	0/3 (0%)	0.39	0.42	ND	QN	0.202	0.215	0.21 (0)	NA	NIA	0.002 (ca)	No		Not detected
Benzo(k) fluoranthana	7677600	0/3 (0%)	0.39	0.42	ND	ND	0.202	0.215	021 (0)	NA	NA	0.62 (ca)	No		Not detected
Bis(2-chloroethow)methous	50/08	0/3 (0%)	0.39	0.42	ND		0.202	0.215	0.21 (0)	NA	NA	None	None		Not detected
and the market	1119111	0/3 (0%)	0.39	0.42	ND	H	0.202	0.215	0.21 (0)	NA.	NA	6.2 (ca)	No	No	Not detected
bis(2-chloroethyl) ether	111444	0/1 (0%)	0.39	0.42	UN	+	0.0		0.21 (0)	NA	NA	None	None	No	Not detected
Dis(2-chlorotsopropyl) ether	108601	0/3 (0%)	0.39	0.42	CN	+	2.0	2360	0.2 (0)	NA	NA	0.22 (ca)	No	No®	Not detected
Dis(2-ethythexy1)phthalate	117817	0/3 (0%)	0.39	0.42	N.	+	202.0	0.213	0.21 (0)	NA	NA	2.9 (ca)	No		Not detected
Butyl benzyl phthalate	85687	0/3 (0%)	0.39	0.42	N CN	25	707.0	0.215	0.21 (0)	NA	NA	35 (ca)	No		Not detected
Caprolactam	105602	0/3 (0%)	0.39	0.42	200	+	707.0	0.215	0.21 (0)	NA	NA	1200 (nc)	No		Not detected
Carbazole	86748	0/3 (0%)	0.39	0.42	S	N CN	202.0	0.213	0.21 (0)	NA	NA	3100 (nc)	No		Not detected
Cillysene	218019	0/3 (0%)	0.39	0.42	ND	+	0 202	0.215	0.21 (0)	NA	NA	24 (ca)	No	No	Not detected
Oi-n-butyl phthalate	84742	0/3 (096)	0.39	0.42	ND	ND	0.202	0.212	0.21 (0)	NA	NA	62 (ca)	No		Not detected
Di-u-octylphthalate	117840	0/1 (0%)	0.39	0.42	QN	+	0.202	0.213	0.21 (0)	NA	NA	610 (nc)	No	No	Not detected
Dibenz(a,h)anthracene	53703	0/3 (0%)	0.39	0.42	N.	+	2000		0.2 (0)	NA	NA	240 (nc)	No		Not detected
Dibenzofuran	132649	0/3 (0%)	0.39	0.42	N CN	+	207.0	0.215	0.21 (0)	NA	NA	0.062 (ca)	No	Nos	Not detected
Dimerkal puthalate	84662	0/3 (0%)	0.39	0.42	ND	QN	0 202	0.213	0.21 (0)	NA	NA	15 (nc)	No	No	Not detected
Fluoranthana	131113	0/3 (0%)	0.39	0.42	ND	+	0.202	0.215	0.21 (0)	NA.	N.A	4900 (nc)	No		Not detected
Fliorena	200440	0/3 (0%)	0.39	0.42	ND	-	0.202	0.215	0.21 (0)	MA	N.A	61000 (nc)	No		Not detected
Havarhornham	90/3/	0/3 (0%)	0.39	0.42	ND		0.202	0.215	0.21 (0)	NA	NA	230 (nc)	No	1	Not detected
Horogenzene	118741	0/3 (0%)	0.39	0.42			0 202	0.215	0.31 (0)		000	Z/U (nc)	No	1	Not detected
Hevachloracudonalia	87683	0/1 (096)	0.39	0.42	QN	ND	0.2	0.610	02 /0/	NA	NA	0.3 (ca)	No		Not detected
Hazachlassad	77474	0/3 (0%)	0.39	0.42	-	+	0.202	2100	031 (0)	VV.	NA	I.8 (nc)	No	No	Not detected
more mane	67721	0/3 (0%)	0.39	0.42	-	+	0.202	0.215	0.21 (0)	NA	NA	37 (nc)	No	No N	Not detected
ndeno(1,2,3-cd)pyrene	193395	0/3 (0%)	0.39	0.42	+	+	0.202	0.213	0.21 (0)	NA.	NA	6.1 (nc)	No	No	Not detected
sophotone	78591	0/3 (0%)	0.39	0.42	-	+	0.000	0.213	0.21 (0)	NA	NA	0.62 (ca)	No	No	Not detected
N-Nitroso-di-n-propylamine	621647	0/3 10041	0.20	20, 10	+	+	0.202	0.213	0.21 (0)	NA	NA	510 (ca)	No		Not detected

Appendix Table B-3. COPC Screening for Subsurface Soil (1-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetec	Nondetect Results*	Detect Results <sup>b</sup>	Results					MDC	Region 9	MDC		
Analyte	CAS	of Detection	Min DL	Max DL	Min	Max	Avg Result	95% UCL of Mean	EPC	Bkgd Criteria <sup>d</sup>	exceeds Bkgd?	Residential PRG <sup>e</sup>	Exceeds PRG?	COPC?	Justification
N-Nitrosodiphenvlamine	86306	0/3 (0%)	0.39	0.42	ND	QN	0.202	0.215	0.21 (0)	NA	NA	99 (ca)	No	No	Not detected
Naphthalene	91203	0/3 (0%)	0.39	0,42	ON	ND	0.202	0.215	0.21 (0)	NA	NA	5.6 (nc)	No	No	Not detected
Pentachlorophenol	87865	0/3 (0%)	0.78	0.85	QN	ND	0.405	0.435	0.425 (0)	NA	NA	3 (ca)	No	No	Not detected
Phenanthrene	85018	0/3 (0%)	0.39	0.42	UN	ND	0.202	0.215	0.21 (0)	NA	NA	None	None	No	Not detected
Phenol	108952	0/3 (0%)	0.39	0.42	ND	ND	0.202	0.215	0.21 (0)	NA	NA	1800 (nc)	No	No	Not detected
Pyrene	129000	0/3 (0%)	0.39	0.42	ND	ND	0.202	0.215	0.21 (0)	NA	NA	230 (nc)	No	No	Not detected
Organics-Volatile								- 1					1		
1,1-Trichloroethane	71556	0/3 (0%)	0.0058	0.0065	ND	ND	0.00308		0.00325 (0)	NA	NA	200 (nc)	No	No	Not detected
1,2,2-Tetrachloroethane	79345	0/3 (0%)	0.0058	0.0065	Q	QQ.	0.00308	0.00338	0.00325 (0)	NA	NA	0.41 (ca)	No	No	Not detected
,1,2-1 richloro- ,2,2-trifluoroethane	76131	0/1 (0%)	0.0058	0.0065	ND	ND	0.0029		0.0029 (0)	NA	NA	2100 (nc)	No	No	Not detected
1.2-Trichloroethane	79005	0/3 (0%)	0.0058	0.0065	ND	ND	0.00308	0.00338	0.00325 (0)	NA	NA	0.73 (ca)	No	No	Not detected
1-Dichloroethane	75343	0/3 (0%)	0.0058	0.0065	ND	ND	0.00308	0.00338	0.00325 (0)	NA	NA	51 (nc)	No	No	Not detected
,1-Dichloroethene	75354	0/2 (0%)	0.0058	0.0065	ND	N	0.00318	0.00365	0.00325 (0)	NA	NA	12 (nc)	No	No	Not detected
,2,4-Trichlorobenzene	120821	0/1 (0%)	0.0058	0.0065	ND	QN	0.0029		0.0029 (0)	NA	NA	6.2 (nc)	No	No.	Not detected
,2-Dibromo-3-chloropropane	96128	0/1 (0%)	0.0058	0.0065	ND	ND	0.0029		0.0029 (0)	NA	NA	0.21 (nc)	No	No	Not detected
,2-Dibromoethane	106934	0/3 (0%)	0.0058	0.0065	ND ND	ND	0.00308	0.00338	0.00325 (0)	NA	NA	0.032 (ca)	oN :	oN.	Not detected
,2-Dichlorobenzene	95501	0/3 (0%)	0.0058	0.0065	Q.	ND	0.00308	0.00338	0.00325 (0)	NA	NA	110 (nc)	No.	No.	Not detected
,2-Dichloroethane	107062	0/3 (0%)	0.0058	0.0065	ON!	NO.	0.00308	0.00338	0.00325 (0)	NA	NA	0.28 (ca)	INO	ON	Not detected
,2-Dichloropropane	78875	0/3 (0%)	0.0058	0.0065	QN	QN	0.00308	0.00338	0.00325 (0)	NA	NA	0.34 (ca)	No.	No.	MDC < PRG
2-Dimethylbenzene	924/0	1/3 (33%)	0.0002	0.0000	200.0	200.0	0.00200	0.00333	0.002 (D)	VAN	NA	53 (nc)	No	N. S.	Not detected
3-Dichlorobenzene	106467	0/3 (0%)	0.0038	0.0005	2 5	S CN	0.00308	0.00338	0.00325 (0)	NA	NA	3.4 (ca)	No	No.	Not detected
1,4-Diemolobenzene	78011	(0/0) (1/0	0.012	0.013	S	E S	900 0	+	0.006 (0)	NA	NA	2200 (nc)	No	No	Not detected
2. Hevenone	591786	0/1 (0%)	0.012	0.013	QN	QN	0.006		0.006 (0)	NA	NA	None	None	No	Not detected
2-Methoxy-7-methylpropape	1634044	0/3 (0%)	0.0058	0.0065	QN	QN	0.00308	0.00338	0.00325 (0)	NA	NA	17 (ca)	No	No	Not detected
4-Methyl-2-nentanone	108101	0/3 (0%)	0.012	0.013	QN	R	0.00617	-	0.0065 (0)	NA	NA	530 (nc)	No	No	Not detected
Acetone	67641	0/1 (0%)	0.012	0.013	ON	ND	0.0065		0.0065 (0)	NA	NA	1400 (nc)	No	No	Not detected
Benzene	71432	0/3 (0%)	0.0058	0.0065	ND	ND	0.00308		0.00325 (0)	NA	NA	0.64 (ca)	No	No	Not detected
Bromodichloromethane	75274	0/3 (0%)	0.0058	0.0065	ND	ND	0.00308	0.00338	0.00325 (0)	NA	NA	0.82 (ca)	No	No	Not detected
Bromomethane	74839	0/1 (0%)	0.012	0.013	ND	ND	900'0	-	0.006 (0)	NA	NA	0.39 (nc)	No.	o <sub>N</sub>	Not detected
Carbon disulfide	75150	2/3 (67%)	0.0065	0.0065	0.016	0.0031	0.00745	+	0.016 (X)	NA	NA	36 (nc)	No.	No.	MDC < PRG
Carbon tetrachloride	56235	0/3 (0%)	0.0058	0.0065	2	ND	0.00308	+	0.00325 (0)	NA	NA	0.22 (nc)	oN.	oN.	Not detected
Chlorobenzene	108907	0/3 (0%)	0.0058	0.0065	QN	QN	0.00308	0.00338	0.00325 (0)	NA	NA V	13 (nc)	No.	No No	Not detected
Chloroethane	75003	0/3 (0%)	210.0	0.013	N. S.	N C	0.00017	+	0.0003 (0)	NA	NA	0.22 (ca)	No.	N N	Not detected
Chloroform	0/003	0/3 (0%)	0.0038	0,000	N CN	N CE	0.00000	+	0 0065 000	NA	NAN	47 (nc)	No	No	Not detected
Chloromethane	00636	0/3 (0%)	0.0058	0.0065	2 5	C N	0.00308	+	0.00325 (0)	NA	NA	16 (nc)	No	No	Not detected
Curlohevane	110827	0/1 (0%)	0.0058	0.0065	S	2	0.0029	+	0.0029 (0)	NA	NA	140 sat	No	No	Not detected
Dibromochloromethane	124481	0/3 (0%)	0.0058	0.0065	QN	QN	0.00308	0.00338	0.00325 (0)	NA	NA	1.1 (ca)	No	No	Not detected
Dichlorodiffuoromethane	75718	0/3 (0%)	0.0058	-	QN	ND	0.00308	0.00338	0.00325 (0)	NA	NA	9.4 (nc)	No	No	Not detected
Ethylbenzene	100414	0/3 (0%)	0.0058	-	ND	ND	0.00308	0.00338	0.00325 (0)	NA	NA	190 (nc)	No	No	Not detected
M + P Xylene	136777612	1/3 (33%)	0.0062		0.0051	0.0051			0.0051 (D)		NA	27 (nc)	-	No	MDC < PRG
Methylcyclohexane	108872	0/3 (0%)	0.0058		R	ND	0.00308	0.00338	0.00325 (0)		NA	260 (nc)	No	No	Not detected
11. 11. 12.	-						0.0000	+			1		-		





## Appendix Table B-3. COPC Screening for Subsurface Soil (1-3 ft bgs) at 40mm Firing Range (All units are mg/kg)

		Frequency	Nondetect Results*	t Results"	Detect Results	esults									
Analyte	CAS	of Detection	Min DL	Max DL	Min	Max	Avg	JON %56	3002	Bkgd	MDC	Region 9	MDC		
Styrene	100425	0/3 (038)	0.0058	0.0065	CN	NIN O	0 00200	OFFICAL O	CEFC	Criteria	Bkgd?	PRG	PRG?	COPC?	Justification
etrachloroethene	127184	0/3 (0%)	0.0058	0.0065	N.D.	+	000000	0.00338	0.00325 (0)	NA	NA	440 (nc)	No	No	Not detected
oluene	108883	1/3 (33%)	0.0062	0.0065	0 0036	+	00308	0.00338	0.00325 (0)	NA	NA	0.48 (ca)	No	S. S.	Not detected
Trichloroethene	91062	0/3 (0%)	0.0058	0.0005	0.0030 ATA	0	0.00332	0.00375	0.0036 (D)	NA	NA	(nc) 99	No	Na	MEN - DBC
l'richlorofluoromethane	75694	0/3 (0%)	0.0058	0,000	TAN MIN	1	0.00308	0.00338	0.00325 (0)	NA	NA	0.053 (ca)	No	No	Mot detect
Vinyl chloride	75014	0/3 (0%)	0.000	0.0003	N UN	ON CAN	0.00308	0.00338	0.00325 (0)	NA	NA	39 (nc)	No	No	Not datasted
cis-1,2-Dichloroethene	156592	0/3 (0%)	0.0058	0.0065	CN CN	+	7.0000.0	0.00665	0.0065 (0)	NA	NA	0.079 (ca)	No	No	Not detected
cts-1,3-Dichloropropene	10061015	(360) (00)	0.0058	59000	ND	1	7.00308	0,00338	0.00325 (0)	NA	NA	4.3 (nc)	No	No	Not detected
rans-1,2-Dichloroethene	156605	0/3 (0%)	0.0058	0.0065	ND	+	0.00308	0.00338	0.00325 (0)	NA	NA	0.78 (ca)	No	No	Not detected
					717	+	0.00308	0.00338	0.00325 (0)	NA	NA	60 (me)	Mo	NT-	100000000000000000000000000000000000000

"Minimum and maximum detection limit (DL) shown for nondetect results.

<sup>b</sup>Minimum and maximum detected concentration shown for detect results.

Exposure point concentration (EPC) is lesser of 95% upper conficence level (UCL) or maxaximum detected concentration (MDC) as appropriate based on data distribution (shown in parentheses). Data distribution codes: D - Distribution not determined due to less than 50% frequency of detection, 95% UCL calculated using Student's t-statistic.

L - Distribution is lognormal 95% UCL calculated using Land's H method.

N - Distribution is normal 95% UCL calculated using Student's t-statistic.

O - The analyte was not detected. 95% UCL calculated using Student's t-statistic.

X - Distribution is nonparametric. 95% UCL calculated using Student's t-statistic.

<sup>4</sup>Background criteria for RVAAP from USACE 2001. Final Phase 11 Remedial Investigation Report for the Winkleperk Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Residential soil preliminary remediation goal (PRG) from Region 9 corresponding to risk of 1.0E-06 for carcinogenic endpoint (ca) or hazard index of 0.1 for noncarcinogenic endpoint (nc).

Essential nutrients are not retained as COPCs because the MDC would result in an intake less than the recommended daily intake (RDI).

\*Analyte is not a COPC because it was not detected in soil at the 40mm Range, however, because the maximum detection limit exceeds the Region 9 PRG this chemical is included in the risk characterization

CAS - chemical abstract service.

COPC - chemical of potential concern.

DL - detection limit

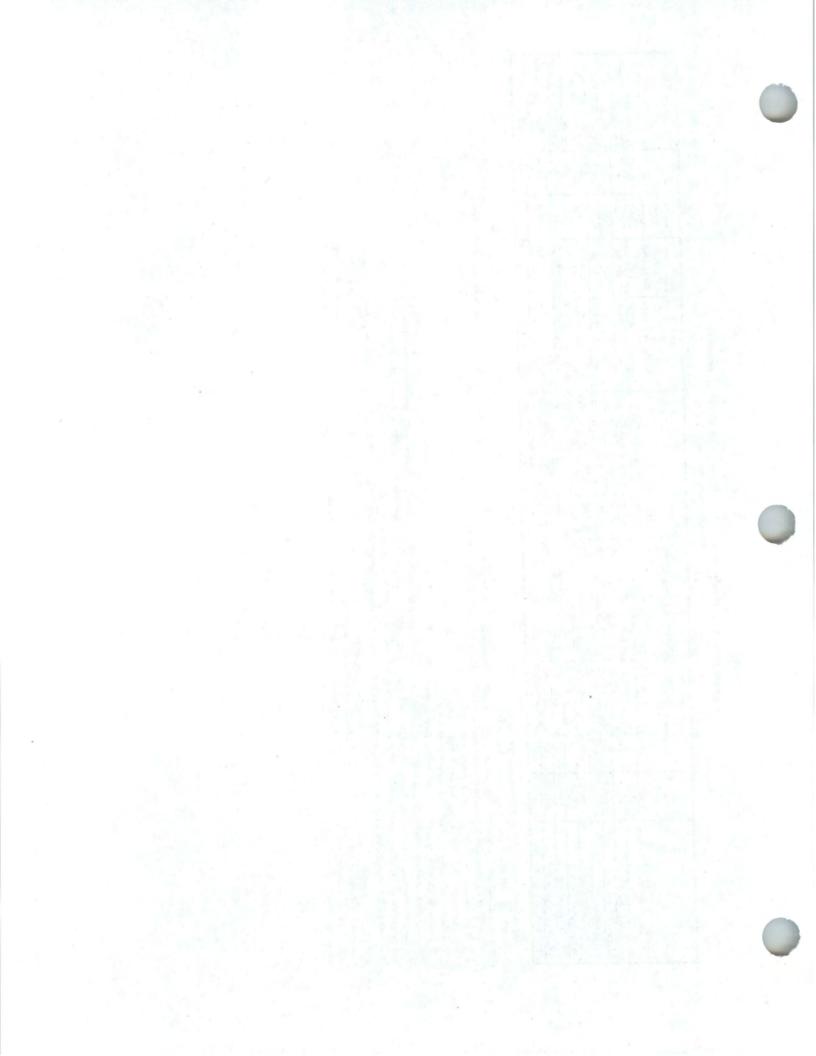
BPC - exposure point concentration.

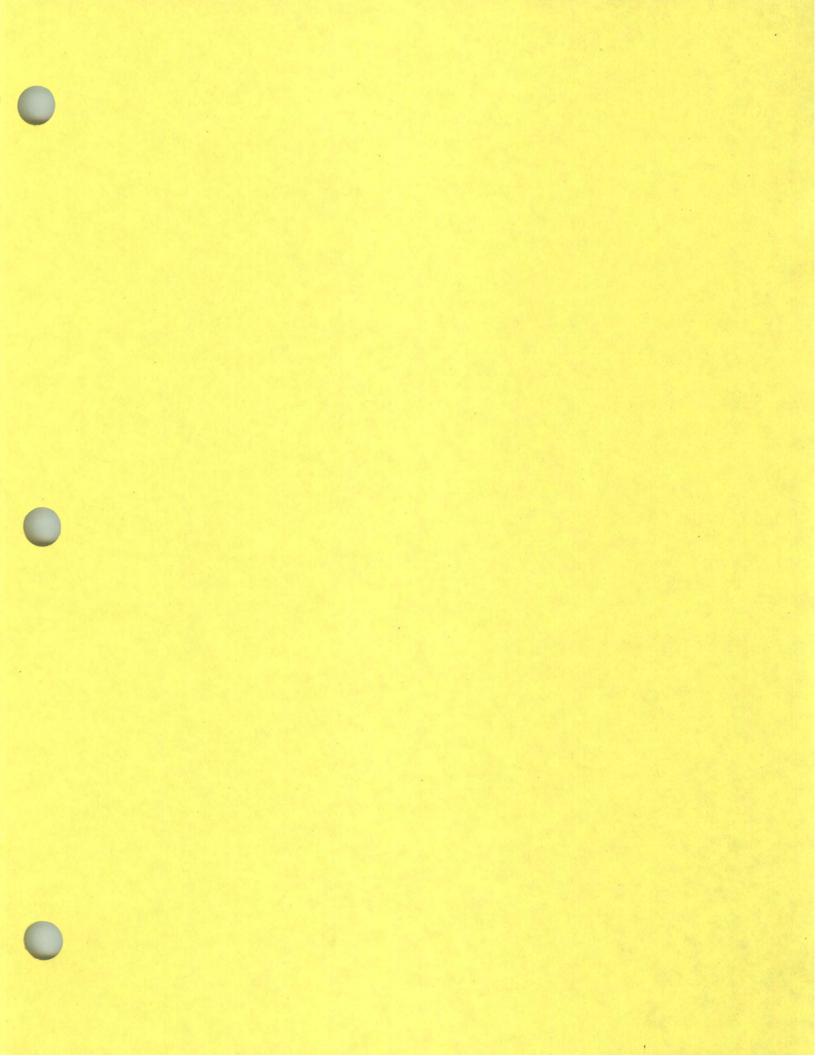
MDC - maximum detected concentration.

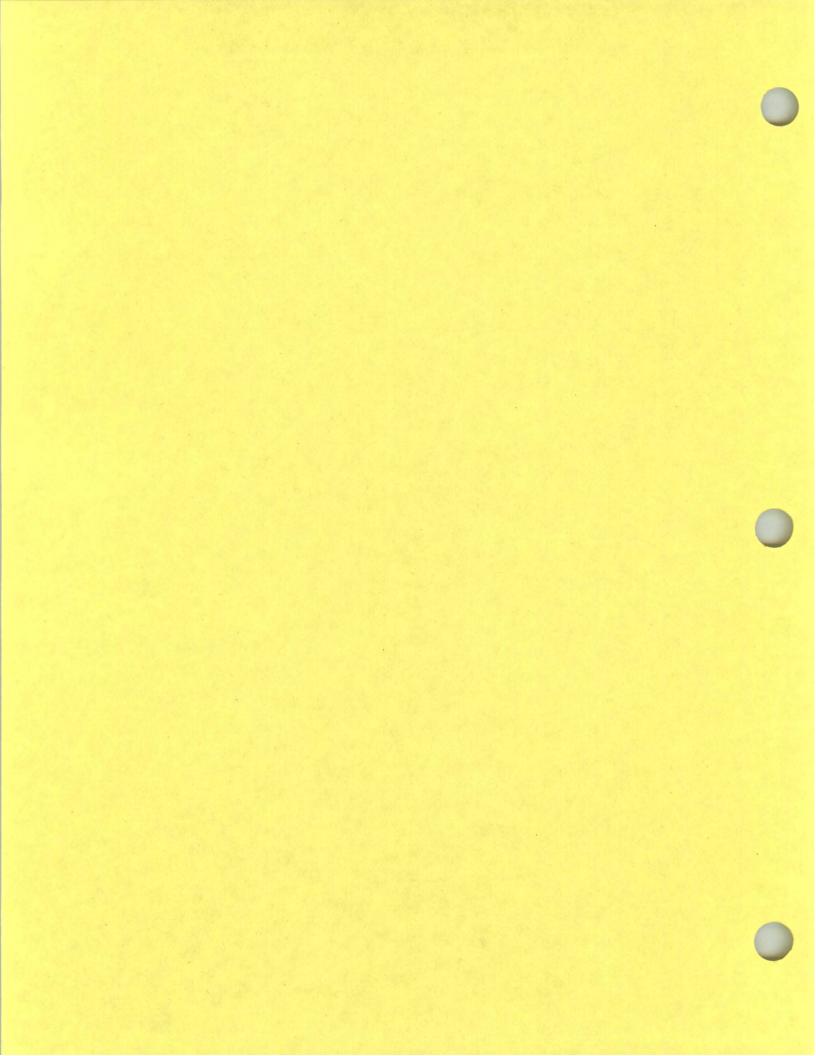
NA - not applicable, background criteria are only used to screen naturally occuring inorganics. ND - All results are nondetect

None - no PRG available.

PRG - preliminary remediation goal. UCL - upper confidence limit.







Appendix Table B-4. Chemical-specific Exposure Parameters for 40 mm Range COPCs

DRAFT

	Dermal Absorption	Volatilization	Soil-to-Plant l	Soil-to-Plant Uptake Factor	Beef Transfer	Will Transfer
COPC	Factor" (unitless)	Factor <sup>b</sup> (m <sup>3</sup> /kg)	Dry Weight (davs/kg)	Wet Weight	Coefficient	Coefficient
Inorganics		ò	(9)	(uays/kg)	(kg/kg)	(kg/kg)
Aluminum	1 0F-03					
Arsenic	20 00 00	:	4.0E-03	1.0E-03	1.5E-03	2 0E.04
Chromium (as Chromium III)	3.0E-02	1	4.0E-02	1.0E-02	2.0E-03	6 OE OE
Challium (as Thollium - 1	1.0E-03	1	4.0E-02	1 0F-04	0.000	0.0E-03
indicate (as 1 namen carbonate)	1.0E-03	1	4 0F-03	1 00 00	7.0E-03	1.0E-05
Vanadium	1 0F-03		CO TOTA	1.UE-U3	4.0E-02	2.0E-03
Organics	70 75.	:	5.5E-03	1.4E-03	2.5E-03	2.0E-05
2-Methyl-4,6-dinitrophenol	1 0E-01					
Benzo(a)pyrene	1,35,01		1.0E+00	2.1E-01	1.3E-05	4 OE OK
Bis(2-chloroethyl) ether	1.3E-01	1	1.1E-02	2.2E-03	3.1F-02	0 OE 02
lihenz(a blanthussess	1.0E-01	4.0E+04	6.7E+00	1.4F+00	S OE 07	2.75-03
order (a, ii) an in racene	1.3E-01	***	A 2E 02	00.000	3.0E-07	1.6E-07
Hexachlorobenzene	1.0E-01		בטישניד	8.8E-04	1.6E-01	5.0E-02
N-Nitroso-di-n-propylamine	1.08-01		3.4E-02	6.5E-03	5.0E-03	1.6F-03
	1,02,01	1	5.9E+00	1.2E+00	63500	

<sup>a</sup> Chemical-specific absorption factor values from EPA Region V (EPA, 2000). When chemical-specific values are not available the following default values are used for soil and

SVOCs = 0.1, VOCs = 0.01, inorganics = 0.001 per USEPA Region 4 Supplemental Guidance to RAGS.

<sup>b</sup> Volatilization factors (VFs) calculated using the 1996 EPA Soil Screening Guidance Methodology, using site-specific parameter values for Cleveland, Ohio. Only used for soil

c Parameter used to evaluate food pathways.

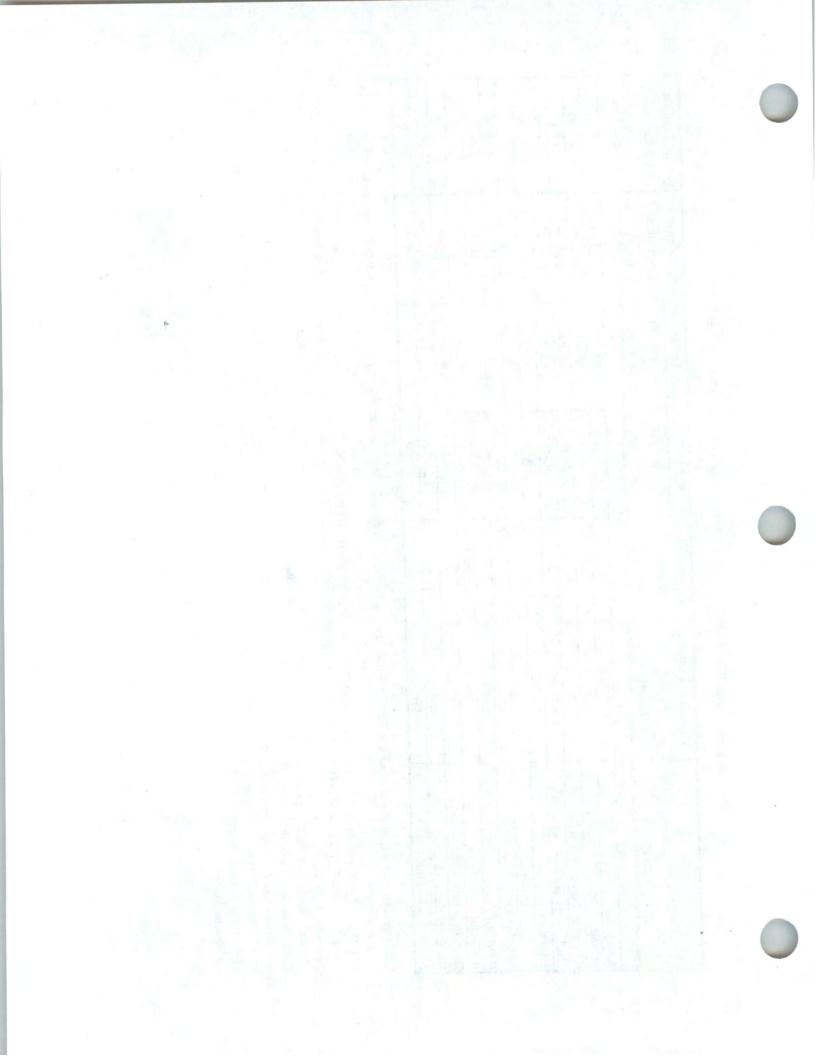
COPC = Chemical of potential concern.

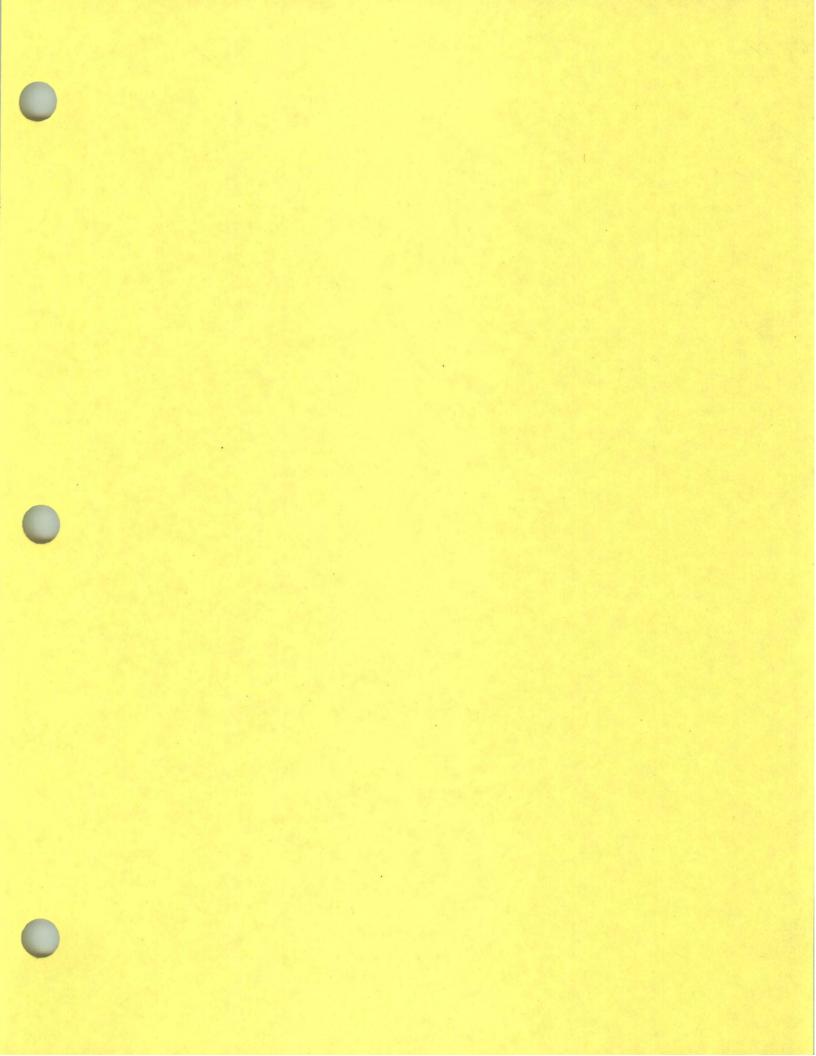
RAGS = Risk Assessment Guidance for Superfund.

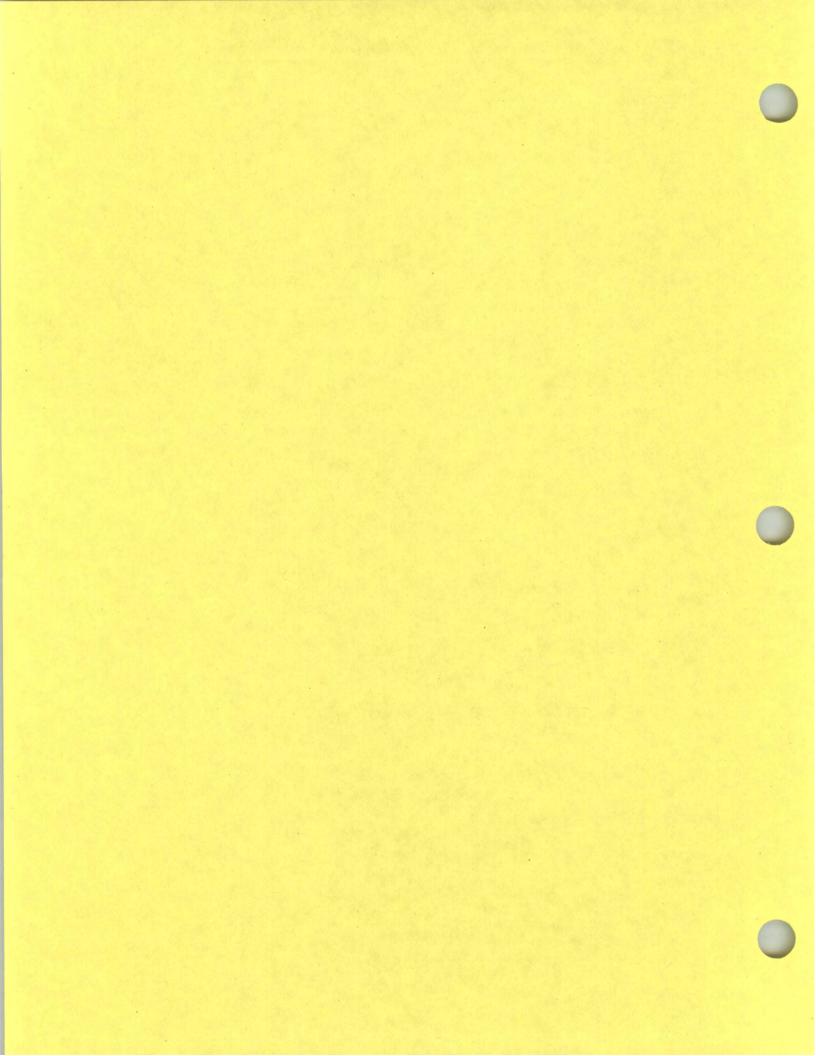
SVOC = Semivolatile organic compound.

VOC = Volatile organic compound.

-- = No value available.







Appendix Table B-5. Non-carcinogenic Reference Doses for 40 mm Range COPCs

	Oral							
COPC	Chronic RFD Confidence (mg/kg-day) Level	Confidence Level	% GI absorption"	Dermal Chronic RfD (mg/kg-day)	Inhalation Chronic RfD (mg/kg-day)	RfD Basis (vehicle)	Critical Effect	Uncertainty/ Modifying
Aliminum								racior
	1.0E+00	NA	1	1.0E+00	1.4E-03	NA	NA	(0) UF=10
Arsenic	3.0E-04	Medium (O)	56'0	3.0E-04	1	Oral, oral- water	Hyperpigmentation and keritosis and possible vascular complication	e milion
Chromium (as Chromium III)	1.5E+00	Low (O)	0.013	2.0E-02	1	rat	Reduced lives/sel	(O) UF=3
Thallium	8.0E-05	Low (O)	-	100			Nervous system, lungs. (O) MF=1	(O) MF=100
		(2)	-	8.0E-05	1	Oral	heart, liver, and kidneys	(O) UF=3000
Vanadium Organics	7.0E-03	NA	0.026	1.8E-04	4	Inhalation	(I) respiratory system	(O) MF=1 (O) UF=100
2-Methyl-4,6-dinitrophenol	1.0E-04	NA	1	1.0E-04		Oral	Increased basal metabolic	
Hexachlorobenzene	8.0E-04	NA	1	8.0E-04	1		Liver. kidneys and thursid MA	NA
							חומולווו החות והלוווו	

<sup>&</sup>lt;sup>a</sup> % GI absorption values from EPA 2000.

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<sup>(</sup>O) indicates oral, (I) indicates inhalation.

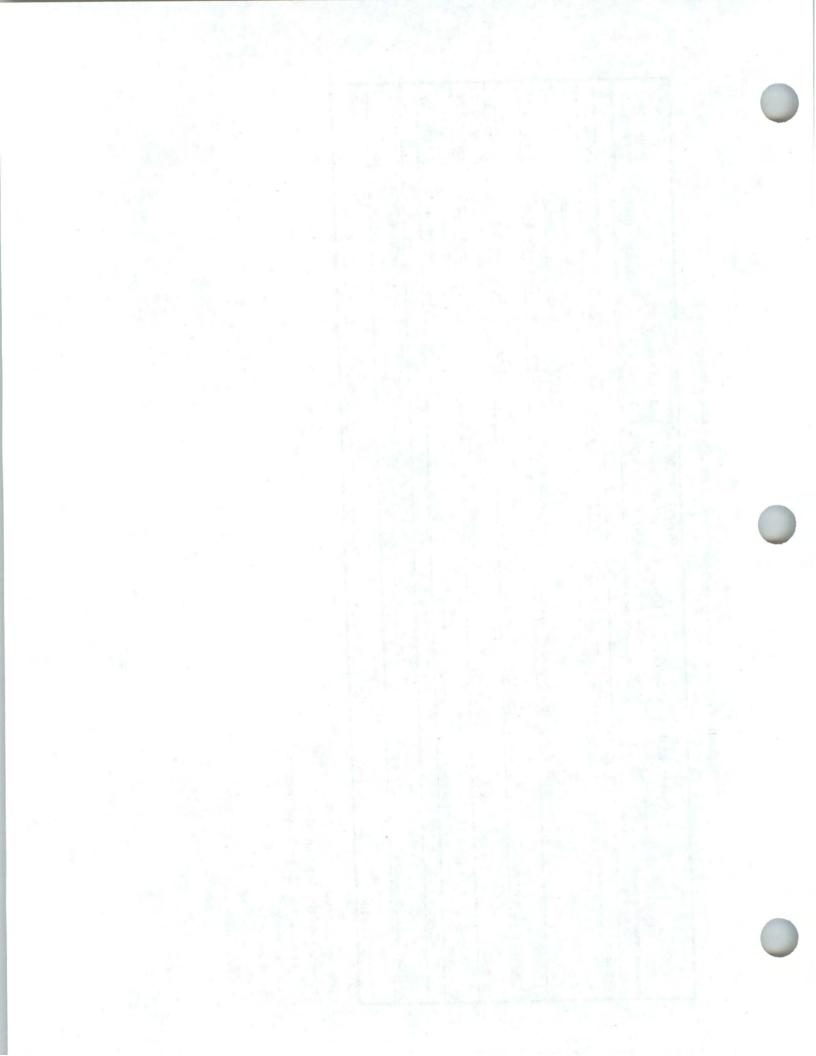
MF = Modifying factor (the default modifying factor is 1).

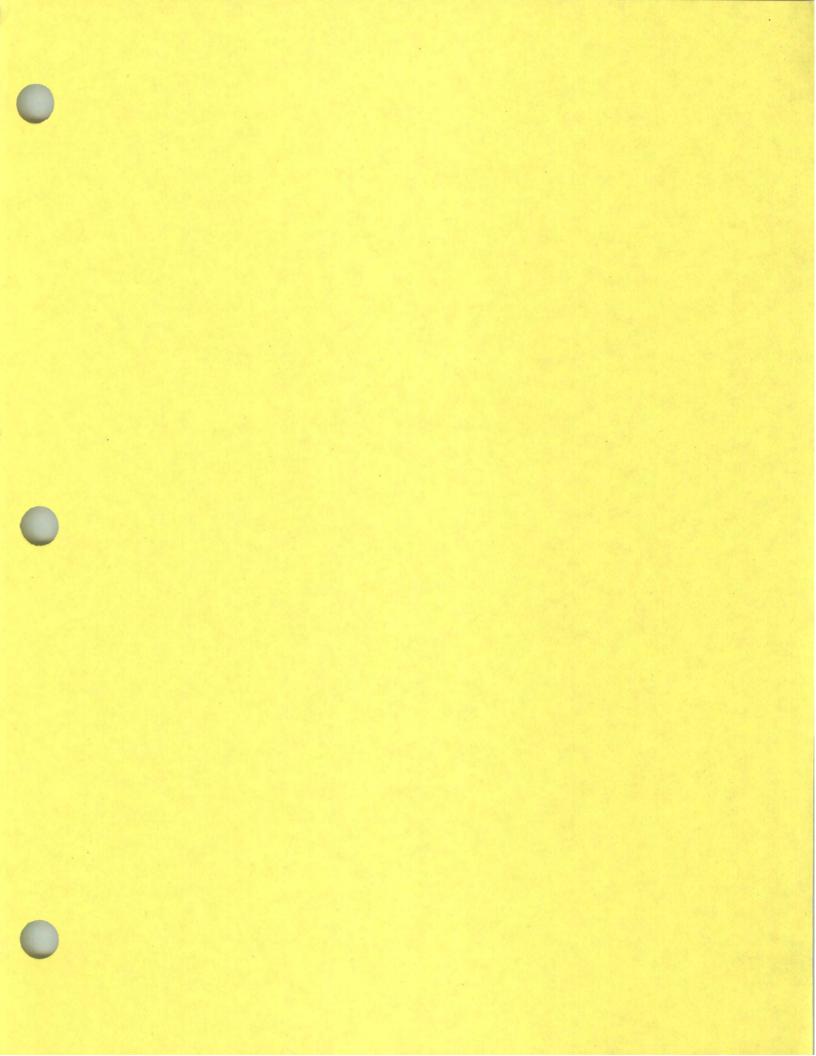
NA = Not available.

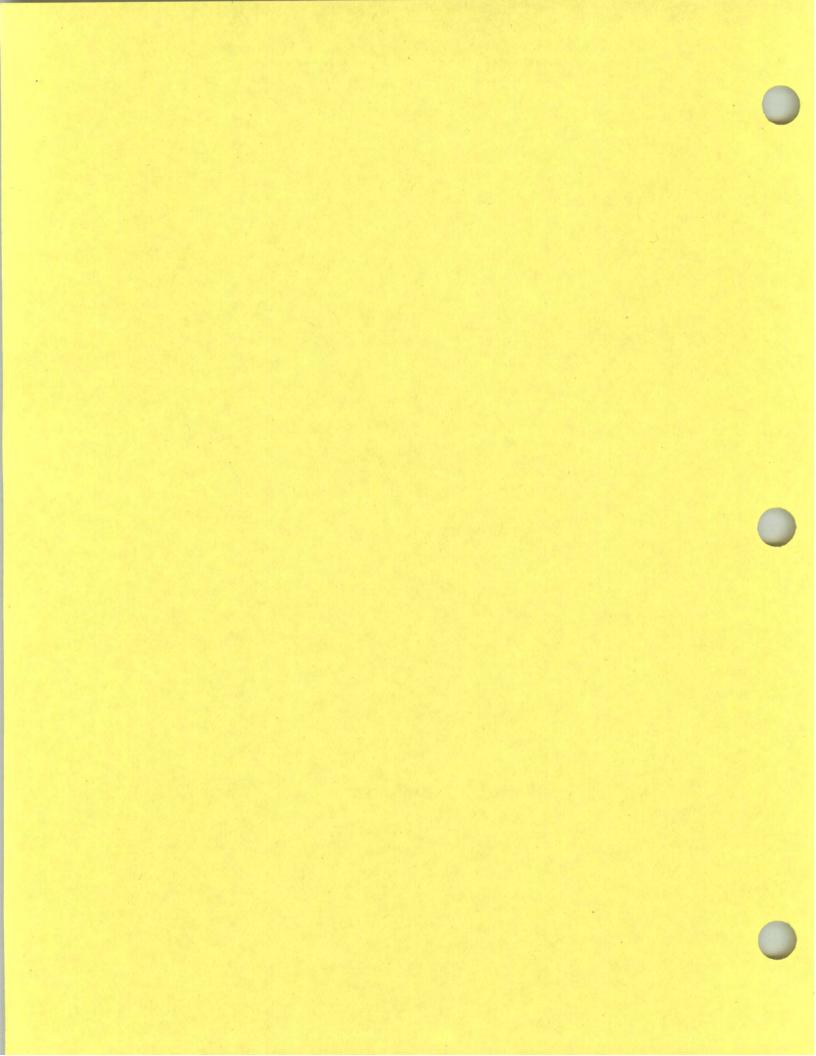
RfD = Reference dose.

UF = Uncertainty factor.

<sup>-- =</sup> No value available.







Appendix Table B-6. Cancer Slope Factors for 40 mm Range COPCs

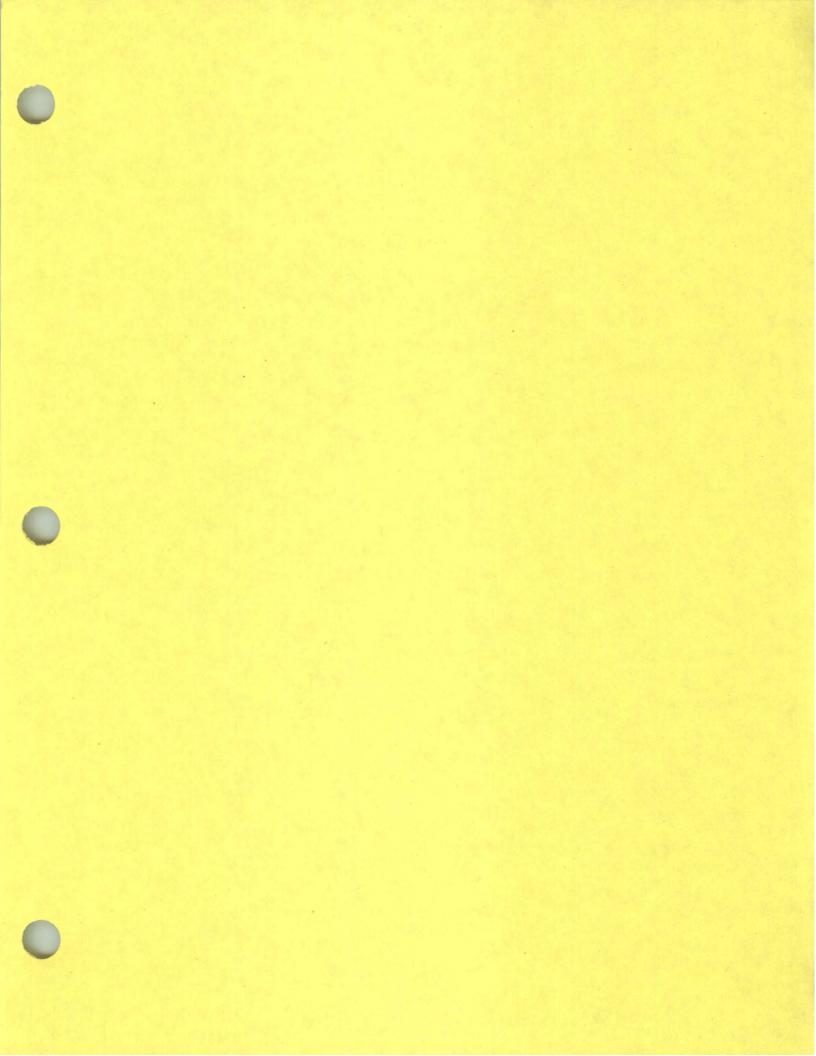
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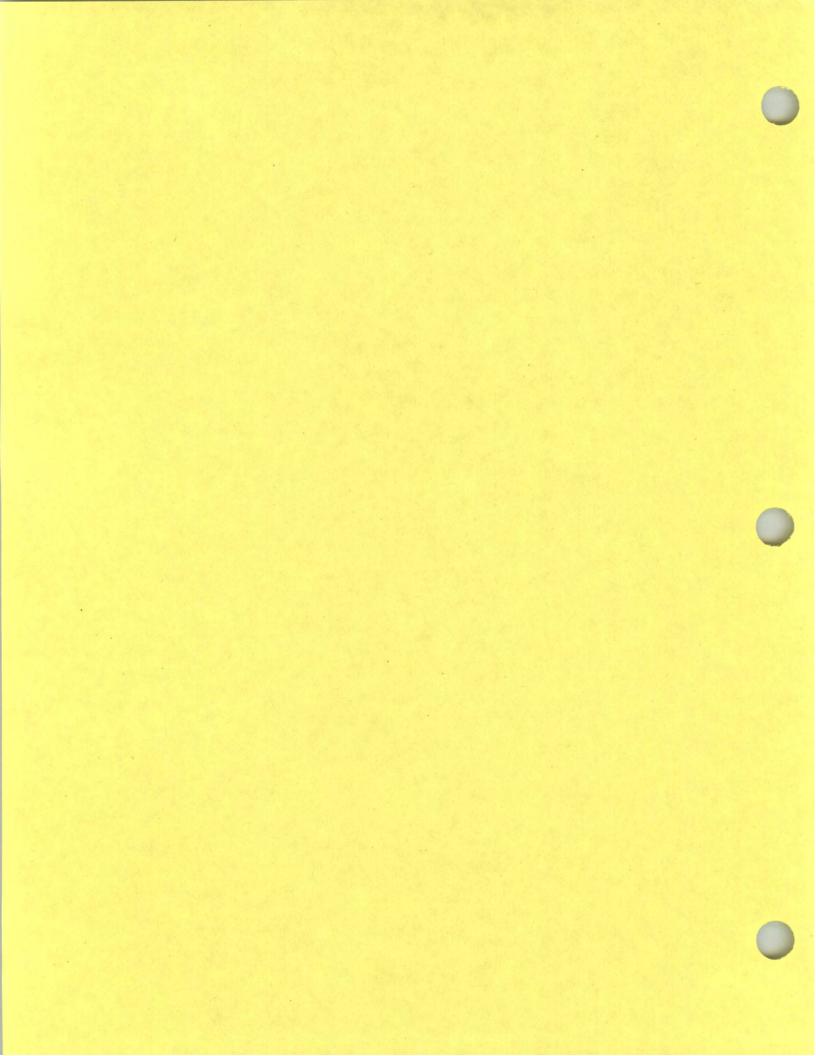
COPC         (mg/kg-day) <sup>-1</sup> absorption <sup>a</sup> (mg/kg-day) <sup>-1</sup> (mg/kg-day) <sup>-1</sup> (mg/kg-day) <sup>-1</sup> (mg/kg-day) <sup>-1</sup> Class TEF         Type of Cancer           Arsenic         Organics         1.5E+00         0.95         1.5E+01         A Respiratory system tumors           Benzo(a)pyrene         7.3E+00         0.58         7.3E+00         3.1E+00         B2         1 stomach, nasal cavity, larynx, tracheak, and pharnyx           Dibenz(a,h)anthracene         7.3E+00         0.58         7.3E+00         1.2E+00         B2         NA           Hexachlorobenzene         1.6E+00         1         1.6E+00         1.6E+00         1.6E+00         1.6E+00           N-Nitroso-di-n-propylamine         7.0E+00         1         7.0E+00         -         B2         Liver, kidneys, and thyroid		Oral Slope		Dermal Slope	Inhalation			
mics         1.5E+00         0.95         1.5E+00         1.5E+01         A           nics         7.3E+00         0.95         1.5E+00         1.5E+01         A           1) ether         1.1E+00         1         1.1E+00         B2           acene         7.3E+00         0.58         7.3E+00         B2           ne         1.6E+00         1         1.6E+00         B2           ropylamine         7.0E+00         1         7.0E+00         B2           ropylamine         7.0E+00         1         7.0E+00         B2	COPC	Factor (mg/kg-day) <sup>-1</sup>	% GI absorption <sup>a</sup>	Factor (mg/kg-day) <sup>-1</sup>	Slope Factor (mg/kg-dav) <sup>-1</sup>		TRE	E
nics         1.5E+00         0.95         1.5E+00         1.5E+01         A           pether         7.3E+00         0.58         7.3E+00         3.1E+00         B2           acene         7.3E+00         0.58         7.3E+00         3.1E+00         B2           ne         1.6E+00         1         1.6E+00         1.6E+00         B2           ropylamine         7.0E+00         1         7.0E+00         B2	Inorganics				6 0 0	- 11		Type of Cancer
nics         7.3E+00         0.58         7.3E+00         3.1E+00         B2           acene         7.3E+00         0.58         7.3E+00         B2           acene         7.3E+00         0.58         7.3E+00         B2           ane         1.6E+00         1.6E+00         1.6E+00         B2           ropylamine         7.0E+00         1         7.0E+00         B2	rsenic	1.5E+00	0.95	1 5E+00	1 50.01			
1) ether         7.3E+00         0.58         7.3E+00         3.1E+00         B2           acene         7.3E+00         1         1.1E+00         1.2E+00         B2           acene         7.3E+00         0.58         7.3E+00         3.1E+00         B2           ne         1.6E+00         1         1.6E+00         1.6E+00         B2           ropylamine         7.0E+00         1         7.0E+00         -         B2	Organics			ON SECT	1.3E+01	A	Resp	iratory system tumors
I) ether         1.1E+00         0.58         7.3E+00         3.1E+00         B2           acene         7.3E+00         0.58         7.3E+00         3.1E+00         B2           ane         1.6E+00         1         1.6E+00         B2           ropylamine         7.0E+00         1         7.0E+00         B2	enzo(a)byrene	20,775	3					
1.1E+00         1         1.1E+00         1.2E+00         B2           7.3E+00         0.58         7.3E+00         3.1E+00         B2           1.6E+00         1         1.6E+00         B2           7.0E+00         1         7.0E+00          B2	2	1.3E+00	0.58	7.3E+00	3 1E+00		-	
7.3E+00     0.58     7.3E+00     1.2E+00     B2       1.6E+00     1     1.6E+00     1.6E+00     B2       7.0E+00     1     7.0E+00      B2	is(2-chloroethyl) ether	1.1E+00	-	1 1171,00	00.77.	- 1	1 Stom	ach, nasal cavity, larynx, tracheak, and pharnvx
7.3E+00         0.58         7.3E+00         3.1E+00         B2         1           1.6E+00         1         1.6E+00         1.6E+00         B2            7.0E+00         1         7.0E+00          B2	ibenz(a.h)anthracene	730.00	- 4	1.1E+00	1,2E+00		NA	
1.6E+00         1         1.6E+00         1.6E+00         B2            7.0E+00         1         7.0E+00          B2	(a)tr)	7.3E+00	0.58	7.3E+00	3.1E+00	B2	1 Imm	The state of the s
7.0E+00 1 7.0E+00 B2	exacilioropenzene	1.6E+00	-	1 6E+00	1 65.00	200	T THIRTH	modepressive effects (mouse)
7.0E+00 B2	-Nitroso-di-n-propylamine	7.0F+00	-	00.00.0	1.0E+00	P7	Liver	, kidneys, and thyroid
		00.700	1	7.0E+00	1	B2	Liver	, nose, and stomach (animals)

<sup>a</sup> % GI absorption values from EPA 2000.

TEF = Toxicity Equivalency Factor is based on the relative potency of each carcinogenic polycyclic aromatic hydrocarbon (PAH) relative to that of benzo(a)pyrene.







Appendix Table B-7. 40 mm Range Deep Surface Soil Carcinogenic Risks - Direct Contact

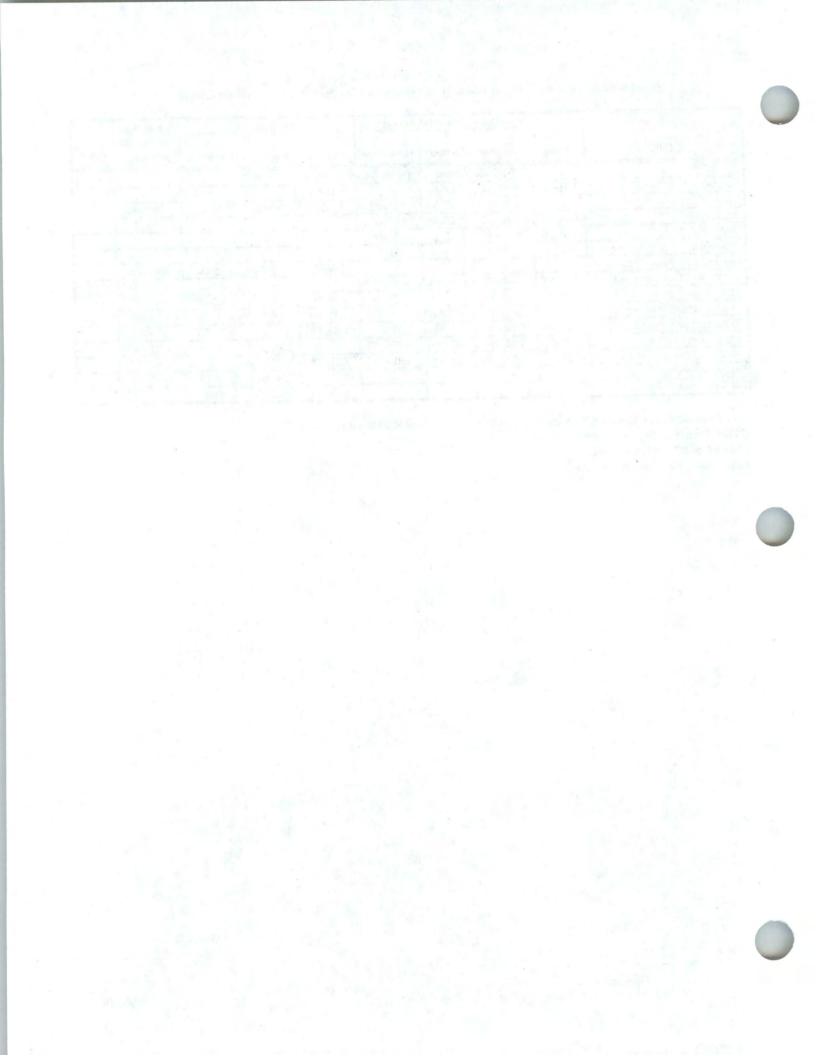
	TING	Daily	Intake (m	ig/kg-d)		Risk		Total Risk	
СОРС	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	across all pathways	COC
		Nationa	Guard - ]	Vational Gua	rd Trainee		y votor a ciry	(Constitution)	
Aluminum	1.3E+04	6.9E-04	6.8E-06	1.8E-04		1			
Arsenic	1.5E+01	8.2E-07	2.4E-07	2.2E-07	1.2E-06	3.6E-07	3.3E-06	4.05.07	T)
Chromium	3.4E+01	1.8E-06	1.8E-08	4.9E-07	1,22,00	J.0E-07	3.3E-00	4.9E-06	R
Thallium	8.4E-01	4.6E-08	4.5E-10	1.2E-08					
Vanadium	2.3E+01	1.2E-06	1.2E-08	3.3E-07					
Inorganics Pathway Total			1122 00	5.52-07	1.2E-06	3.6E-07	2.25.06	105.04	
2-Methyl-4,6-dinitrophenol	4.3E-01	2.4E-08	2.3E-08	6.3E-09	1.2E-00	3.0E-U/	3.3E-06	4.9E-06	
Benzo(a)pyrene	2.2E-01	1.2E-08	1.5E-08	3.2E-09	8.6E-08	1.15.05	0.05.00		
Bis(2-chloroethyl) ether	2.0E-01	1.1E-08	1.1E-08	2.9E-09	1.2E-08	1.1E-07	9.8E-09	2.1E-07	
Dibenz(a,h)anthracene	2.2E-01	1.2E-08	1.5E-08	3.2E-09		1.2E-08	3.4E-09	2.7E-08	
Hexachlorobenzene	2.2E-01	1.2E-08	1.2E-08		8.6E-08	1.1E-07	9.8E-09	2.1E-07	
N-Nitroso-di-n-propylamine	2.2E-01	1.2E-08		3.2E-09	1.9E-08	1.9E-08	5.1E-09	4.3E-08	
Organics Pathway Total	2.213-01	1.2E-08	1.2E-08	3.2E-09	8.3E-08	8.2E-08		1.6E-07	
Pathway Total - Chemicals					2.9E-07	3.3E-07	2.8E-08	6.5E-07	
animay I olai - Chemicals					1.5E-06	7.0E-07	3.3E-06	5.5E-06	

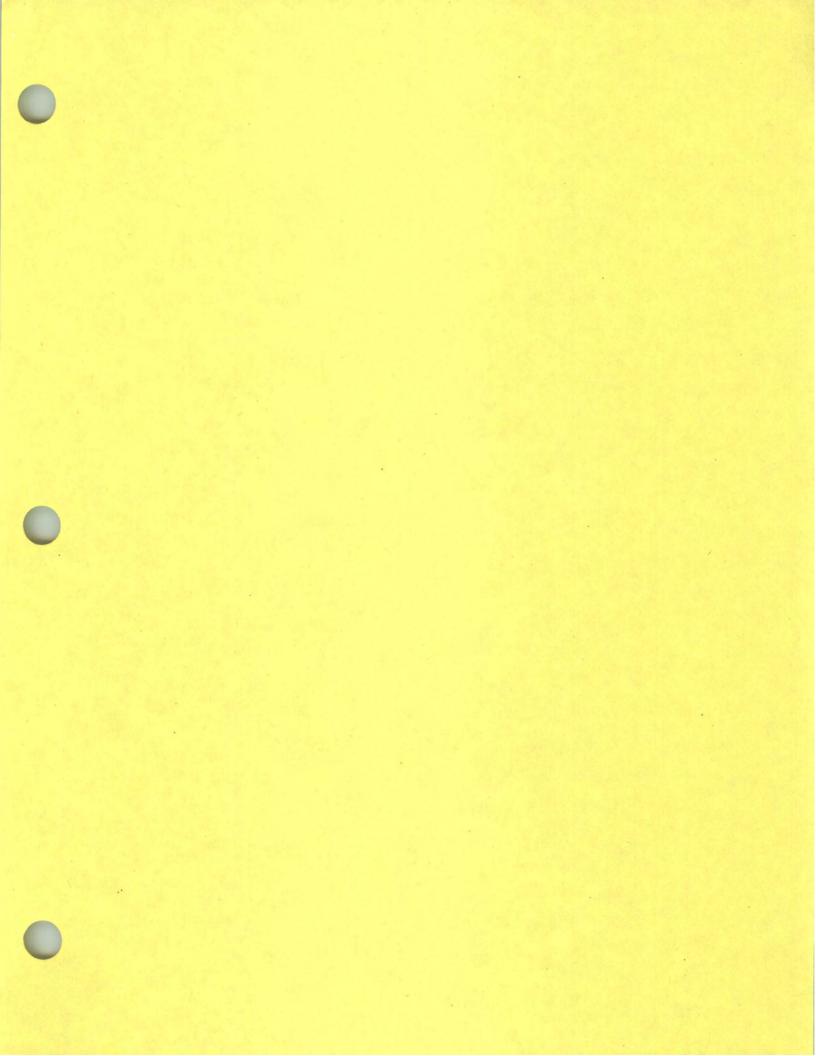
<sup>&</sup>quot; COPCs are identified as chemicals of concern (COCs) if the total ILCR across all pathways is > 1E-06 (R).

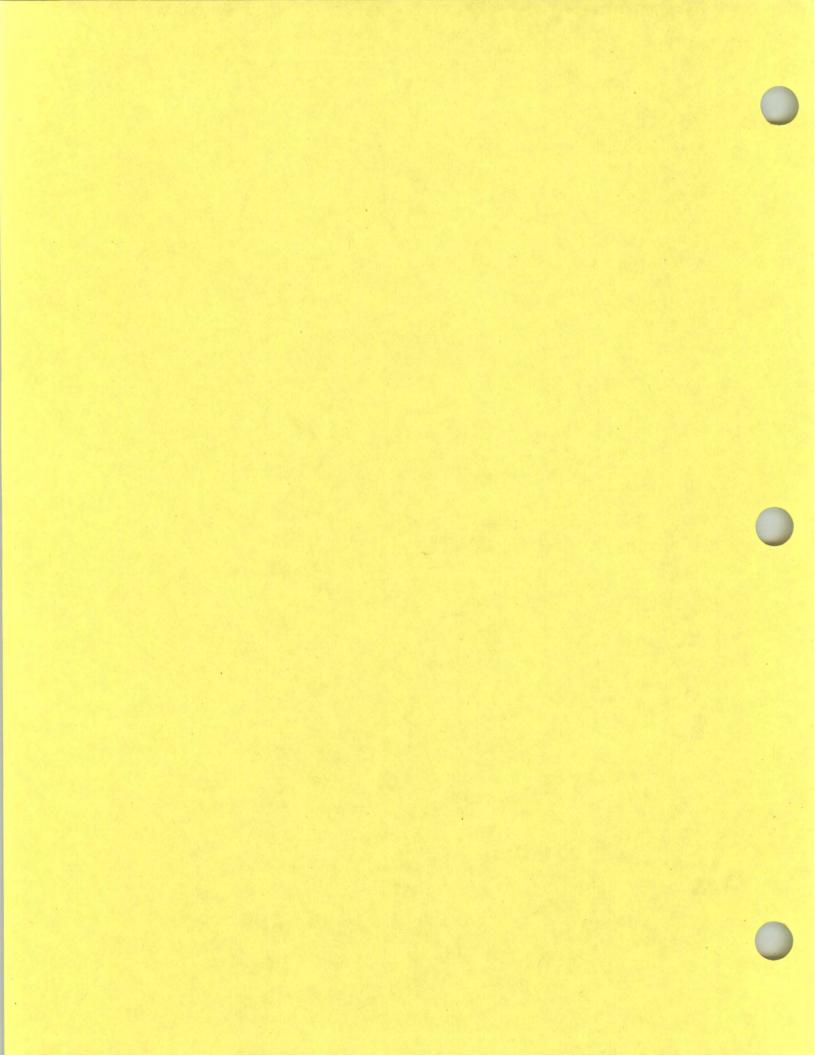
COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

ILCR = Incremental Lifetime Cancer Risk.







Appendix Table B-8. 40 mm Range Deep Surface Soil Non-carcinogenic Hazards - Direct Contact

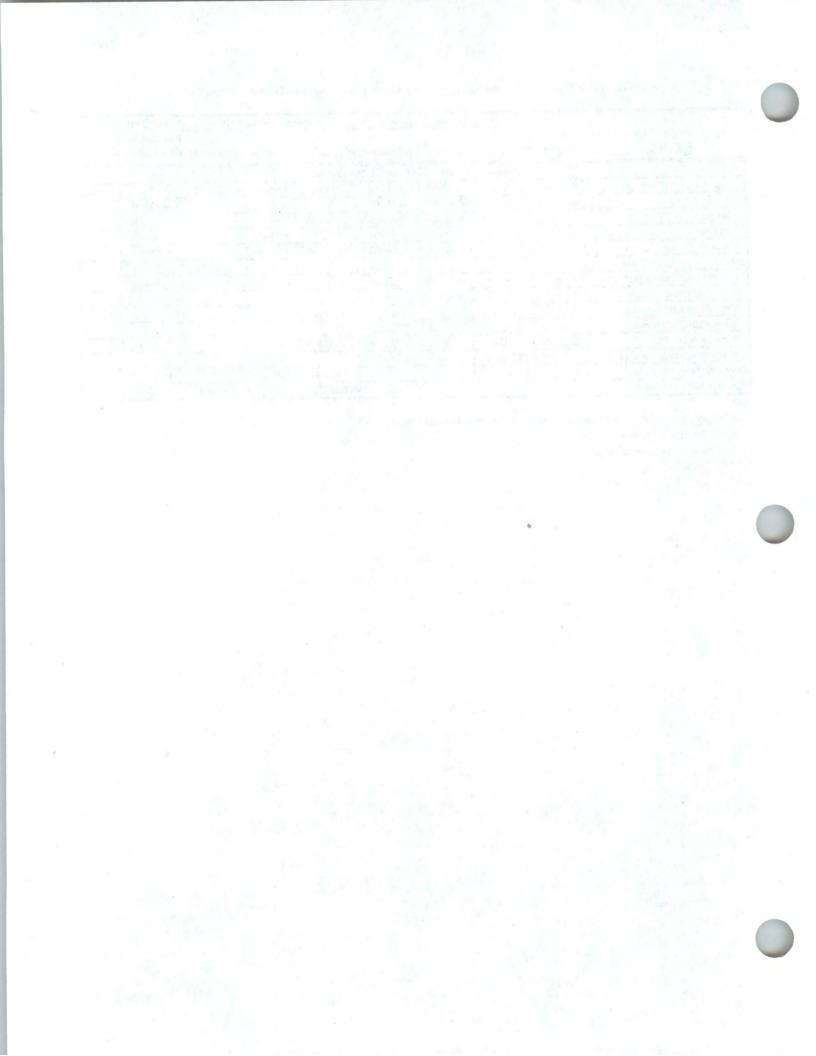
		Daily	Intake (m	g/kg-d)	Haza	rd Quotie	nt (HQ)	Total HI	
COPC	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	across all pathways	COC
		National	Guard - N	ational Guar	d Trainee				
Aluminum	1.3E+04	1.9E-03	1.9E-05	5.1E-04	1.9E-03	1.9E-05	3.6E-01	3.6E-01	
Arsenic	1.5E+01	2.3E-06	6.8E-07	6.1E-07	7.6E-03	2.3E-03	DIOL 01	9.9E-03	
Chromium	3.4E+01	5.1E-06	5.1E-08	1.4E-06	3.4E-06	2.6E-06		6.0E-06	
Thallium	8.4E-01	1.3E-07	1.3E-09	3.4E-08	1.6E-03	1.6E-05		1.6E-03	
Vanadium	2.3E+01	3.4E-06	3.4E-08	9.1E-07	4.9E-04	1.9E-04		6.8E-04	
Inorganics Pathway Total					1.2E-02	2.5E-03	3.6E-01	3.7E-01	
2-Methyl-4,6-dinitrophenol	4.3E-01	6:6E-08	6.5E-08	1.8E-08	6.6E-04	6.5E-04	5.02.01	1.3E-03	
Benzo(a)pyrene	2.2E-01	3.3E-08	4.3E-08	8.8E-09		0.025 0.1		1.515-05	
Bis(2-chloroethyl) ether	2.0E-01	3.1E-08	3.0E-08	8.1E-09					
Dibenz(a,h)anthracene	2.2E-01	3.3E-08	4.3E-08	8.8E-09					
Hexachlorobenzene	2.2E-01	3.3E-08	3.3E-08	8.8E-09	4.1E-05	4.1E-05		8.2E-05	-
N-Nitroso-di-n-propylamine	2.2E-01	3.3E-08	3.3E-08	8.8E-09		111111111111111111111111111111111111111		6.21-03	
Organics Pathway Total					7.0E-04	7.0E-04		1.4E-03	
Pathway Total - Chemicals			- 1		1.2E-02	3.2E-03	3.6E-01	3.7E-01	

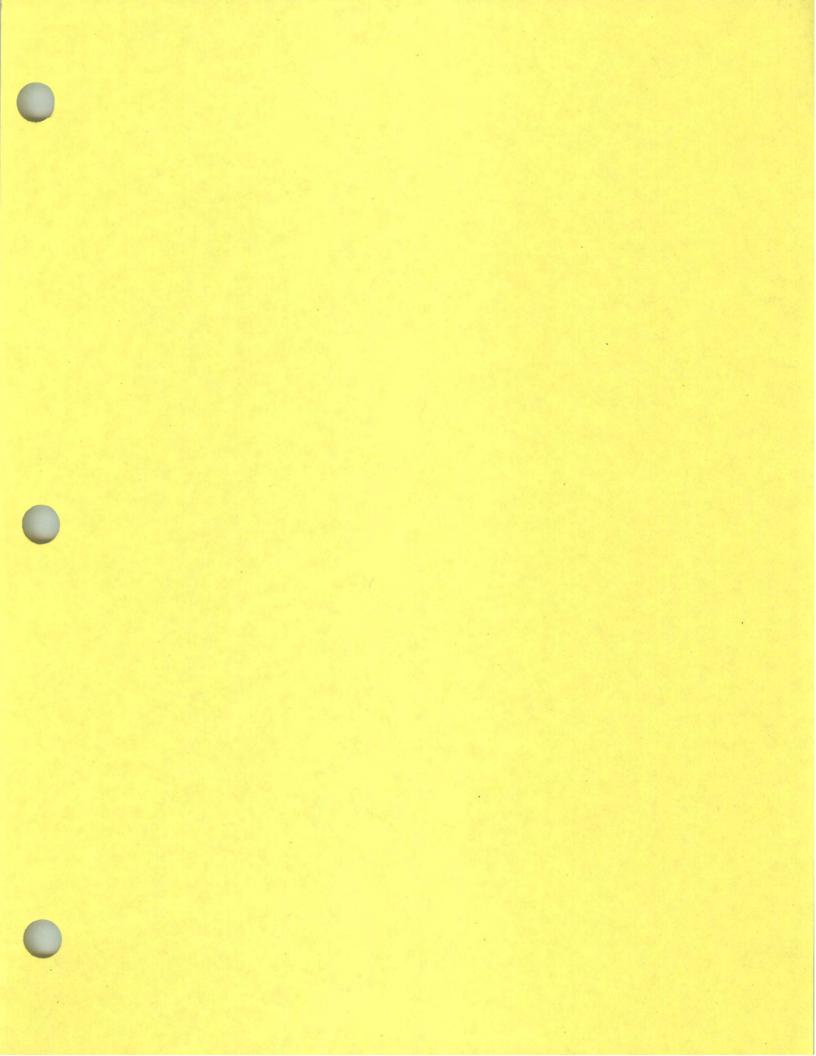
 $<sup>^{\</sup>alpha}$  COPCs are identified as chemicals of concern (COCs) if the total HI across all pathways is > 1 (H).

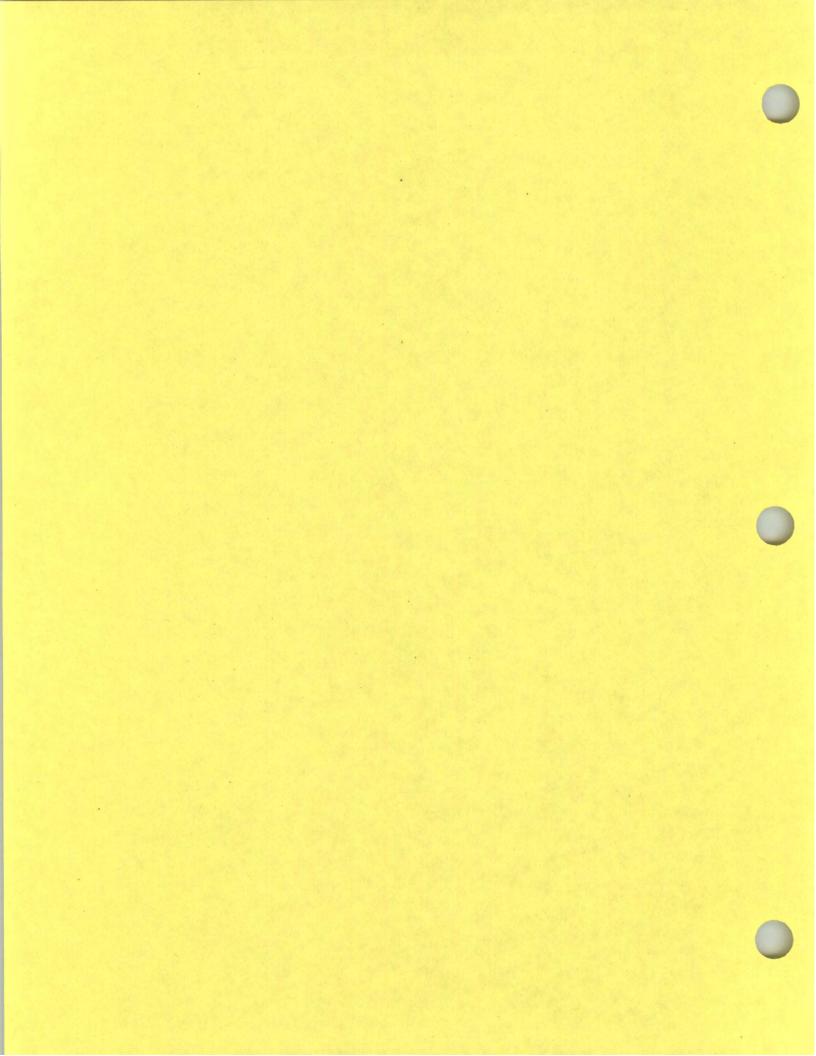
COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

HI = Hazard Index.







Appendix Table B-9. 40 mm Range Shallow Surface Soil Carcinogenic Risks - Direct Contact

		Dai	ly Intake (n	ng/kg-d)		Risk		Total Risk	
COPC	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	across all pathways	COC
Mai	ntained Indu	strial/Man	iged Recrea	tional - Secu	rity Guard	Maintenan			
Aluminum	1.2E+04	1.8E-04	1.0E-04	3.9E-08	T T T T T T T T T T T T T T T T T T T		LE WOIKE		
Arsenic	1.3E+01	1.8E-07			2.7E-07	4.5E-06	5.9E-10	4.8E-06	D
Chromium	4.4E+01	6.4E-07	3.5E-07		Ziii Dii	1.515-00	3.9E-10	4.65-00	R
Thallium	8.0E-01	1.2E-08	6.5E-09	2.5E-12					
Vanadium	2.3E+01	3.3E-07	1.8E-07	7.2E-11					
Inorganics Pathway Total					2.7E-07	4.5E-06	5.9E-10	4.8E-06	
2-Methyl-4,6-dinitrophenol	4.6E-01	6.7E-09	3.7E-07	1.5E-12		1.02.00	5.515-10	4.815-00	
Benzo(a)pyrene	2.3E-01	3.3E-09	2.4E-07	7.3E-13	2.4E-08	1.8E-06	2.2E-12	1.8E-06	R
Dibenz(a,h)anthracene	2.3E-01	3.3E-09	2.4E-07	7.3E-13	2.4E-08	1.8E-06	2.2E-12	1.8E-06	R
Hexachlorobenzene	2.3E-01	3.3E-09	1.9E-07	7.3E-13	5.4E-09	3.0E-07	1.2E-12	3.0E-07	N
N-Nitroso-di-n-propylamine	2.3E-01	3.3E-09	1.9E-07	7.3E-13	2.3E-08	1.3E-06	THE TE	1.3E-06	R
Organics Pathway Total			1 1		7.8E-08	5.1E-06	5.7E-12	5.2E-06	I
Pathway Total - Chemicals			J===="1		3.5E-07	9.7E-06	6.0E-10	1.0E-05	
		Open R	esidential -	Resident Far		1 2 4 2 5 5	0.02 10	1.01.03	
Aluminum	1.2E+04	7.3E-03	1.7E-04	1.6E-06					
Arsenic	1.3E+01	7.3E-06	5.0E-06	1.6E-09	1.1E-05	7.5E-06	2.4E-08	1.9E-05	R
Chromium	4.4E+01	2.6E-05	5.9E-07	5.6E-09			2.12.00	1.72-03	K
Thallium	8.0E-01	4.7E-07	1.1E-08	1.0E-10					
Vanadium	2.3E+01	1.3E-05	3.0E-07	2.9E-09					
Inorganics Pathway Total					1.1E-05	7.5E-06	2.4E-08	1.9E-05	
2-Methyl-4,6-dinitrophenol	4.6E-01	2.7E-07	6.2E-07	5.8E-11			2,12,00	1.52-03	-
Benzo(a)pyrene	2.3E-01	1.4E-07	4.0E-07	2.9E-11	9.9E-07	2.9E-06	9.1E-11	3.9E-06	R
Dibenz(a,h)anthracene	2.3E-01	1.4E-07	4.0E-07	2.9E-11	9.9E-07	2.9E-06	9.1E-11	3.9E-06	R
Hexachlorobenzene	2.3E-01	1.4E-07	3.1E-07	2.9E-11	2.2E-07	4.9E-07	4.7E-11	7.1E-07	10
N-Nitroso-di-n-propylamine	2.3E-01	1.4E-07	3.1E-07	2.9E-11	9.5E-07	2.2E-06		3.1E-06	R
Organics Pathway Total					3.1E-06	8.5E-06	2.3E-10	1.2E-05	10
athway Total - Chemicals					1.4E-05	1.6E-05	2.4E-08	3.0E-05	
			sidential - I	Resident Farn	ner Child				
Aluminum	1.2E+04	1.4E-02	3.0E-05	7.4E-07					
Arsenic	1.3E+01	1.4E-05	9.0E-07	7.4E-10	2.1E-05	1.4E-06	1.1E-08	2.2E-05	R
Chromium	4.4E+01	4.8E-05	1.1E-07	2.6E-09					
Thallium	8.0E-01	8.8E-07	1.9E-09	4.8E-11			_		
Vanadium	2.3E+01	2.5E-05	5.5E-08	1.3E-09					
norganics Pathway Total					2.1E-05	1.4E-06	1.1E-08	2.2E-05	
2-Methyl-4,6-dinitrophenol	4.6E-01	5.0E-07	1.1E-07	2.7E-11					
Benzo(a)pyrene	2.3E-01	2.5E-07	7.2E-08	1.4E-11	1.8E-06	5.3E-07	4.2E-11	2.4E-06	R
Dibenz(a,h)anthracene	2.3E-01	2.5E-07	7.2E-08	1.4E-11	1.8E-06	5.3E-07	4.2E-11	2.4E-06	R
Hexachlorobenzene	2.3E-01	2.5E-07	5.5E-08	1.4E-11	4.0E-07	8.9E-08	2.2E-11	4.9E-07	
N-Nitroso-di-n-propylamine	2.3E-01	2.5E-07	5.5E-08	1.4E-11	1.8E-06	3.9E-07		2.2E-06	R
rganics Pathway Total					5.8E-06	1.5E-06	1.1E-10	7.4E-06	
athway Total - Chemicals					2.6E-05	2.9E-06	1.1E-08	2.9E-05	
T. action as				al - Hunter					
Aluminum	1.2E+04		6.5E-07	2.3E-09		- 1			
Arsenic			2.0E-08		1.6E-08	2.9E-08	3.4E-11	4.5E-08	
Chromium				8.0E-12		1.41			
hallium 'anadium				1.5E-13					
	2.3E+01	1.9E-08	1.2E-09	4.1E-12					
Organics Pathway Total	1000				1.6E-08	2.9E-08	3.4E-11	4.5E-08	
-Methyl-4,6-dinitrophenol				8.4E-14					
enzo(a)pyrene	2.3E-01	1.9E-10	1.6E-09	4.2E-14	1.4E-09	1.1E-08	1.3E-13	1.3E-08	

Page 1 of 2 10/03/2005

## Appendix Table B-9. 40 mm Range Shallow Surface Soil Carcinogenic Risks - Direct Contact

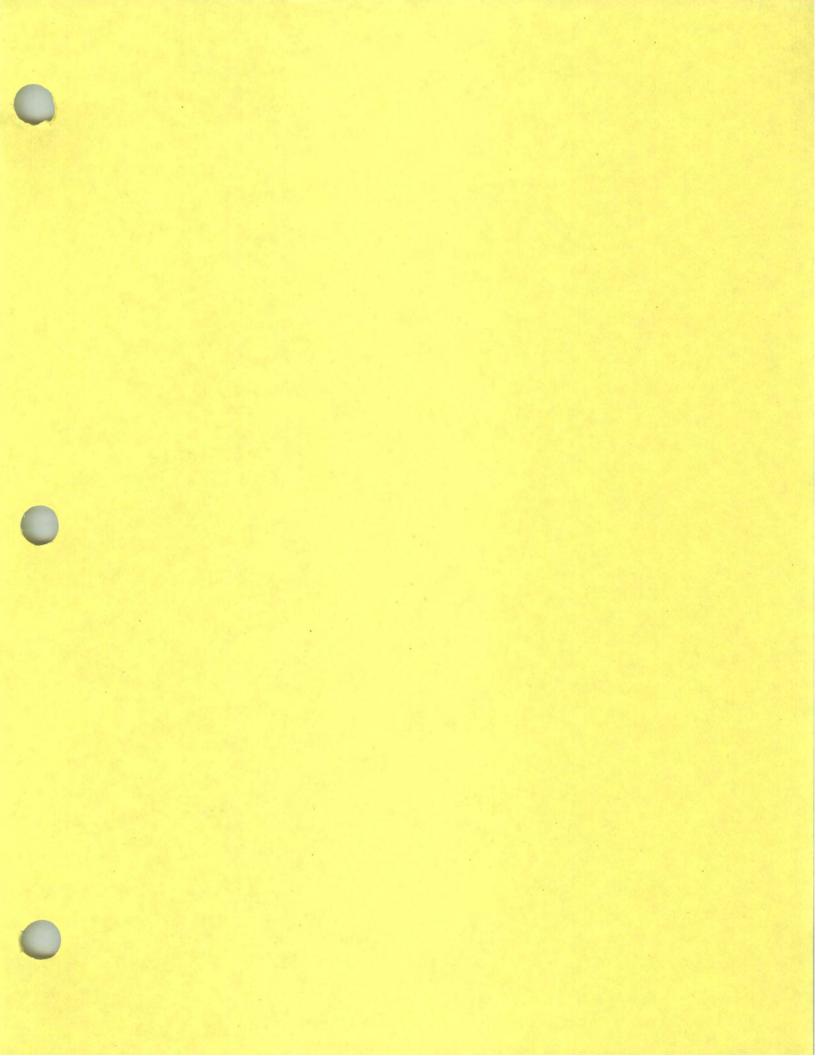
		Daily	Intake (m	g/kg-d)		Risk	1000	Total Risk	
COPC	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	across all pathways	COCa
Dibenz(a,h)anthracene	2.3E-01	1.9E-10	1.6E-09	4.2E-14	1.4E-09	1.1E-08	1.3E-13	1.3E-08	
Hexachlorobenzene	2.3E-01	1.9E-10	1.2E-09	4.2E-14	3.1E-10	1.9E-09	6.7E-14	2.2E-09	
N-Nitroso-di-n-propylamine	2.3E-01	1.9E-10	1.2E-09	4.2E-14	1.4E-09	8.4E-09		9.8E-09	
Organics Pathway Total	2.515-01	1.71	1.22 07		4.5E-09	3.3E-08	3.3E-13	3.8E-08	
Pathway Total - Chemicals			7		2.0E-08	6.3E-08	3.4E-11	8.3E-08	

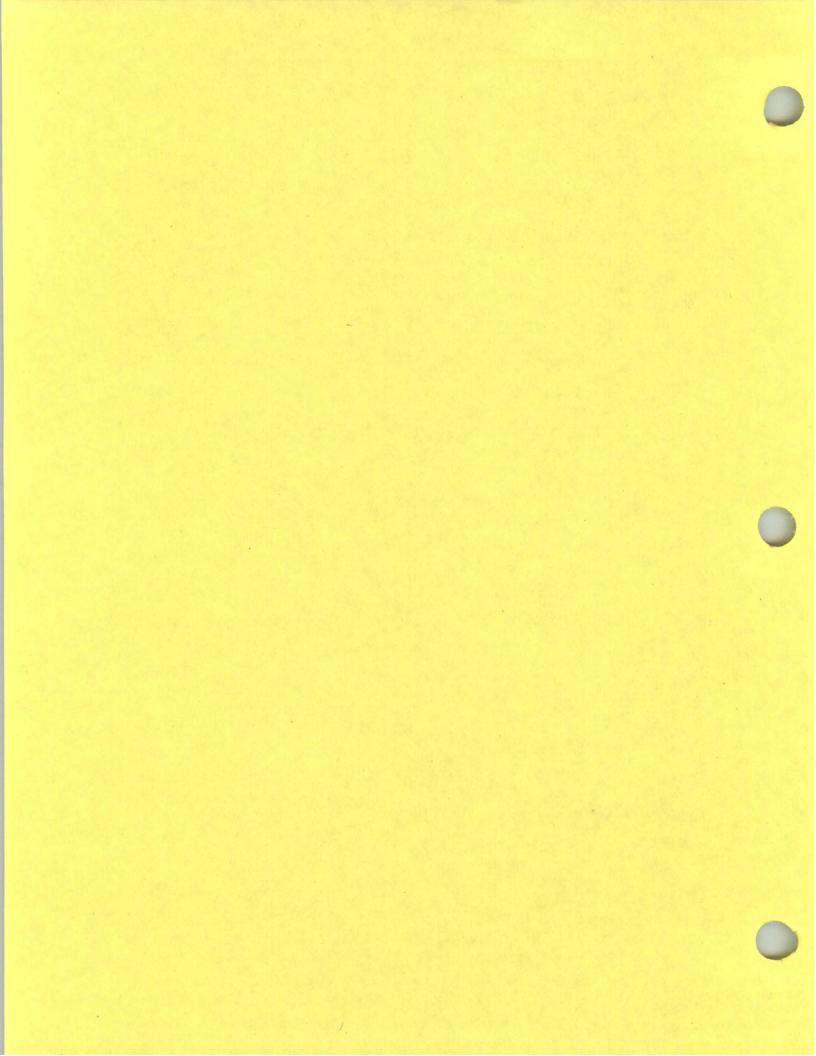
<sup>&</sup>lt;sup>a</sup> COPCs are identified as chemicals of concern (COCs) if the total ILCR across all pathways is > 1E-06 (R).

COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

ILCR = Incremental Lifetime Cancer Risk.





Appendix Table B-10. 40 mm Range Shallow Surface Soil Non-carcinogenic Hazards - Direct Contact

СОРС	EPC (mg/kg)	Daily Intake (mg/kg-d)			Hazard Quotient (HQ)			Total HI	
		Ingestion	Dermal	Inhalation				across all	COC
Maii	ntained Indus	trial/Mana	ged Recrea	tional - Secu				patatings	COC
Atummum	1.2E+04	5.1E-04	2.8E-04	1.1E-07	5.1E-04			I e cr or	-
Arsenic	1.3E+01	5.1E-07			1.7E-03			8.6E-04	
Chromium	4.4E+01	1.8E-06	9.9E-07		1.2E-06			3.0E-02	
Thallium	8.0E-01	3.3E-08	1.8E-08	7.1E-12	4.1E-04			5.2E-05	
Vanadium	2.3E+01	9.3E-07	5.1E-07	2.0E-10	1.3E-04			6.4E-04	
Inorganics Pathway Total					2.7E-03		7.7E-05	3.0E-03 3.4E-02	
2-Methyl-4,6-dinitrophenol	4.6E-01	1.9E-08	1.0E-06	4.1E-12	1.9E-04	1.0E-02	7.7E-03	1.1E-02	
Benzo(a)pyrene	2.3E-01	9.4E-09	6.8E-07	2.0E-12	1,725 01	1.0L-02		1.1E-02	
Dibenz(a,h)anthracene	2.3E-01	9.4E-09	6.8E-07	2.0E-12		-			-
Hexachlorobenzene	2.3E-01	9.4E-09	5.2E-07	2.0E-12	1.2E-05	6.5E-04		6.6E-04	_
N-Nitroso-di-n-propylamine	2.3E-01	9.4E-09	5.2E-07	2.0E-12	1120 00	0.52.04		0.0E-04	
Organics Pathway Total	7 7				2.0E-04	1.1E-02		1.1E-02	
Pathway Total - Chemicals					2.9E-03	4.3E-02	7.7E-05	4.6E-02	
		Open Res	sidential - I	Resident Far	mer Adult	1.515-02	1.712-03	4.0E-0Z	
Aluminum	1.2E+04	1.7E-02	3.9E-04	3.7E-06	1.7E-02	3.9E-04	2.6E-03	2.0E-02	
Arsenic	1.3E+01	1.7E-05	1.2E-05	3.7E-09	5.7E-02	3.9E-02	2.015-05	9.6E-02	
Chromium	4.4E+01	6.0E-05	1.4E-06	1.3E-08	4.0E-05	7.0E-05		1.1E-04	-
Thallium	8.0E-01	1.1E-06	2.5E-08	2.4E-10	1.4E-02	3.1E-04		1.1E-04 1.4E-02	
Vanadium	2.3E+01	3.1E-05	7.1E-07	6.7E-09	4.4E-03	3.9E-03		8.3E-03	_
Inorganics Pathway Total					9.2E-02	4.4E-02	2.6E-03	1.4E-01	
2-Methyl-4,6-dinitrophenol	4.6E-01	6.3E-07	1.4E-06	1.4E-10	6.3E-03	1.4E-02	2.015-03	2.1E-02	_
Benzo(a)pyrene	2.3E-01	3.2E-07	9.3E-07	6.8E-11	0.020 00	1.12 02		2.1E-02	
Dibenz(a,h)anthracene	2.3E-01	3.2E-07	9.3E-07	6.8E-11					
Hexachlorobenzene	2.3E-01	3.2E-07	7.2E-07	6.8E-11	3.9E-04	9.0E-04	1	1.3E-03	_
N-Nitroso-di-n-propylamine	2.3E-01	3.2E-07	7.2E-07	6.8E-11	4,02,03	2.02.04		1.515-03	_
Organics Pathway Total					6.7E-03	1.5E-02		2.2E-02	
Pathway Total - Chemicals					9.9E-02	5.9E-02	2.6E-03	1.6E-01	-
		Open Resi	dential - Re	esident Farn	er Child	0.02	2.02 03	1.0E-01	
Aluminum	1.2E+04	1.6E-01	3.5E-04	8.6E-06	1.6E-01	3.5E-04	6.0E-03	1.6E-01	
Arsenic	1.3E+01	1.6E-04	1.1E-05	8.7E-09	5.3E-01	3.5E-02	0.015-03	5.7E-01	
Chromium	4.4E+01	5.6E-04	1.2E-06	3.0E-08	3.7E-04	6.3E-05		4.4E-04	
Thallium	8.0E-01	1.0E-05	2.3E-08	5.6E-10	1.3E-01	2.8E-04		1.3E-01	
Vanadium	2.3E+01	2.9E-04	6.4E-07	1.6E-08	4.1E-02	3.5E-03		4.5E-02	-
norganics Pathway Total					8.6E-01	3.9E-02	6.0E-03	9.1E-01	-
2-Methyl-4,6-dinitrophenol	4.6E-01	5.9E-06	1.3E-06	3.2E-10	5.9E-02	1.3E-02	0.0L-03	7.2E-02	
Benzo(a)pyrene	2.3E-01		8.4E-07	1.6E-10		1.52 02		7.2E-02	_
Dibenz(a,h)anthracene	2.3E-01		8.4E-07	1.6E-10					_
Hexachlorobenzene	2.3E-01		6.5E-07	1.6E-10	3.7E-03	8.1E-04		4.5E-03	_
N-Nitroso-di-n-propylamine	2.3E-01		6.5E-07	1.6E-10	5.712 05	0.11.704		4.3E-03	_
rganics Pathway Total					6.2E-02	1.4E-02		7.6E-02	-
athway Total - Chemicals					9.2E-01	5.3E-02	6.0E-03	9.8E-01	
	X	R	ecreationa	l - Hunter			5102 00	J.0L-01	
Aluminum	1.2E+04			5.3E-09	2.4E-05	1.5E-06	3.7E-06	2.9E-05	-
arsenic	1.3E+01			5.3E-12		1.5E-04	D.1115-00	2.3E-04	
Chromium		8.6E-08		1.9E-11		2.7E-07		3.3E-07	-
hallium	8.0E-01					1.2E-06		2.1E-05	-
anadium	2.3E+01					1.5E-05		2.2E-05	
organics Pathway Total						1.7E-04		3.1E-04	
-Methyl-4,6-dinitrophenol		9.0E-10 5	5.6E-09			5.6E-05		6.5E-05	
enzo(a)pyrene	2.3E-01 4	1.5E-10 3		9.7E-14				0.02.00	-

Page 1 of 2

## Appendix Table B-10. 40 mm Range Shallow Surface Soil Non-carcinogenic Hazards - Direct Contact

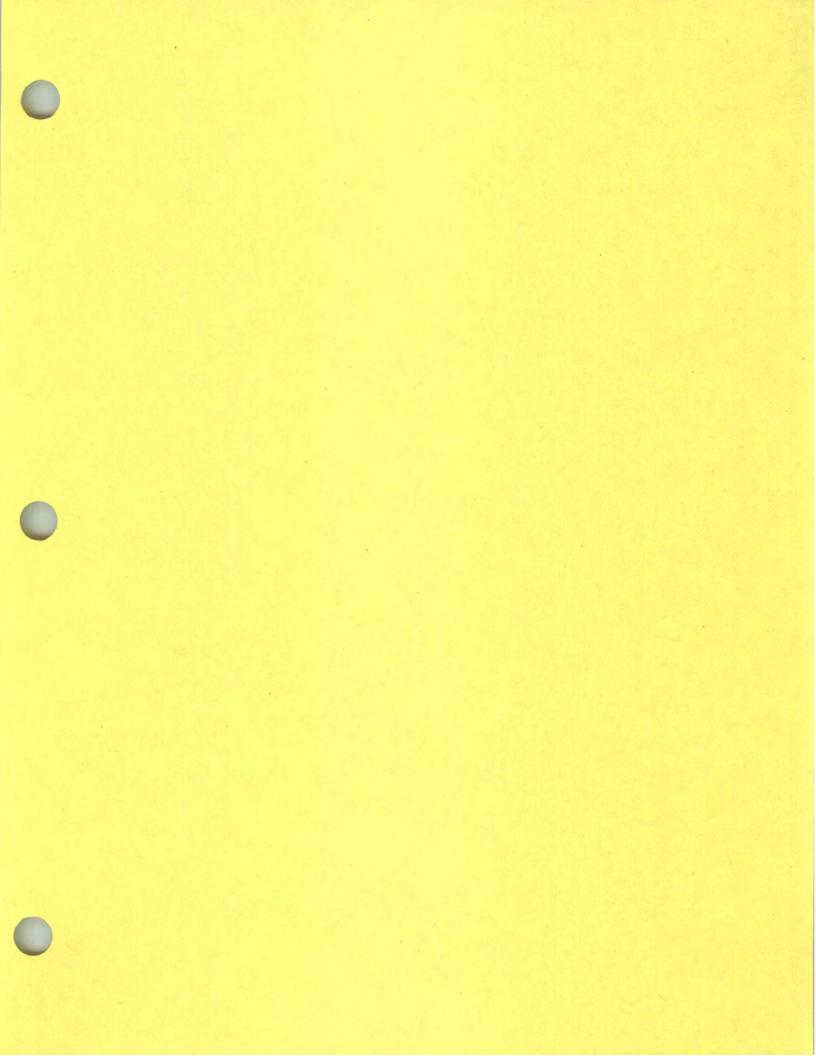
COPC	EPC (mg/kg)	Daily Intake (mg/kg-d)			Hazard Quotient (HQ)			Total HI	
		Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	across all pathways	COCa
Dibenz(a,h)anthracene	2.3E-01	4.5E-10	3.7E-09	9.7E-14	2757				
Hexachlorobenzene	2.3E-01	4.5E-10	2.8E-09	9.7E-14	5.6E-07	3.5E-06		4.1E-06	
N-Nitroso-di-n-propylamine	2.3E-01	4.5E-10	2.8E-09	9.7E-14					
	2.51-01	1.02 10	2102		9.6E-06	6.0E-05		6.9E-05	
Organics Pathway Total		-		7. 2. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7.	1.4E-04	2.3E-04	3.7E-06	3.8E-04	157
Pathway Total - Chemicals					1.4L-04	Z.UL O.			

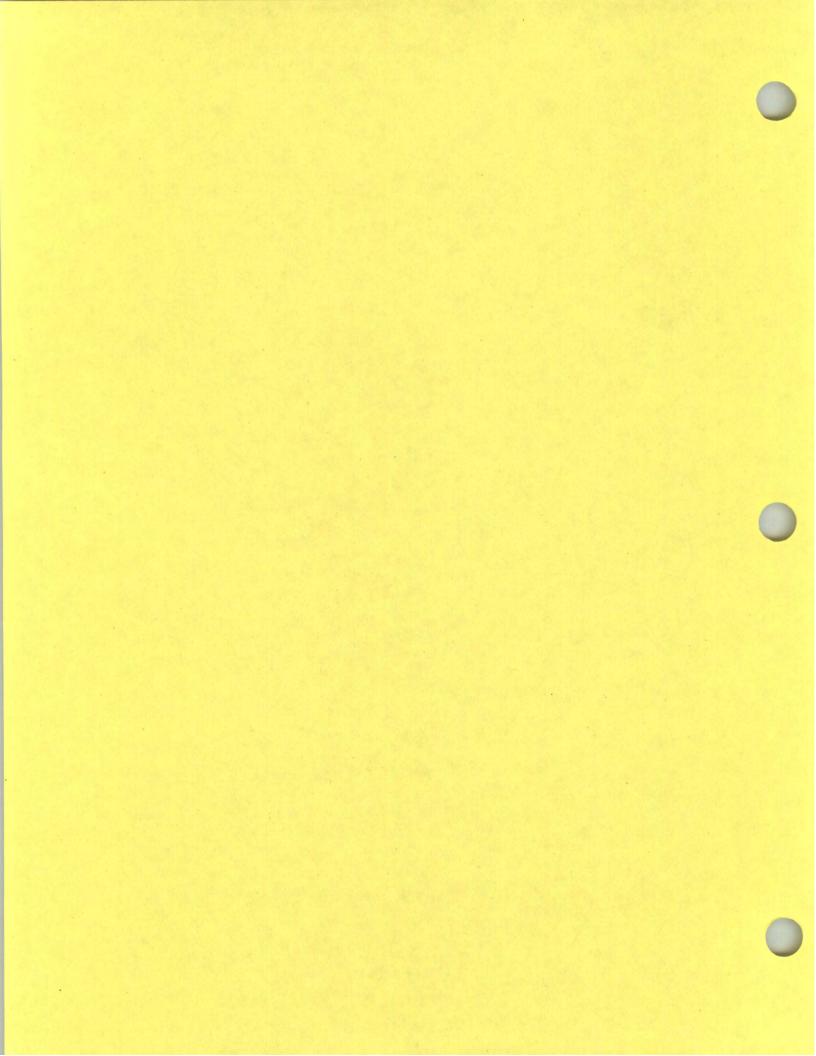
 $<sup>^</sup>a$  COPCs are identified as chemicals of concern (COCs) if the total HI across all pathways is > 1 (H).

COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

HI = Hazard Index.





Appendix Table B-11. 40 mm Range Subsurface Soil Carcinogenic Risks - Direct Contact

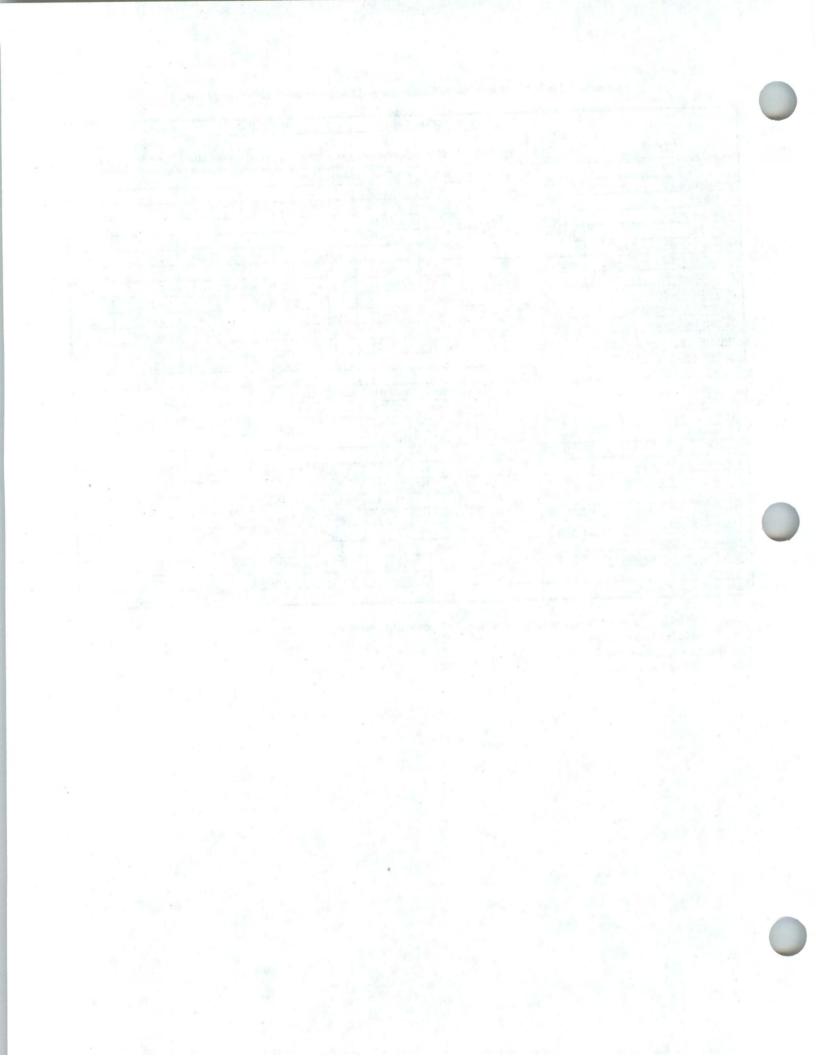
		Dai	ly Intake (n	ng/kg-d)		Risk		Total Risk	
COPC	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion		Inhalation	across all pathways	coc
		Open 1	Residential -	Resident Fo	rmer Adult		1.00	Factority	COC
Aluminum	1.4E+04	8.0E-03	1.8E-04	1.7E-06		1			
Arsenic	1.9E+01	1.1E-05	7.6E-06	2.4E-09	1.7E-05	1.1E-05	2 (7 00	0.00	
Chromium	1.9E+01	1.1E-05	2.6E-07	2.4E-09	1.72-05	1.1E-03	3.6E-08	2.8E-05	R
Thallium	1.1E+00	6.3E-07	1.4E-08	1.4E-10		-			
Inorganics Pathway Total			1	1.1210	1.7E-05	1.10.05	2 07 00		1
2-Methyl-4,6-dinitrophenol	4.3E-01	2.5E-07	5.7E-07	5.4E-11	1.7E-03	1.1E-05	3.6E-08	2.8E-05	
Benzo(a)pyrene	2.1E-01	1.2E-07	3.7E-07	2.7E-11	9.0E-07	2 70 00	0.05		
Bis(2-chloroethyl) ether	2.0E-01	1.2E-07	2.7E-07	2.5E-11		2.7E-06	8.3E-11	3.6E-06	R
Dibenz(a,h)anthracene	2.1E-01	1.2E-07	3.7E-07	2.7E-11	1.3E-07	2.9E-07	2.9E-11	4.2E-07	
Hexachlorobenzene	2.1E-01	1.2E-07	2.8E-07	2.7E-11 2.7E-11	9.0E-07	2.7E-06	8.3E-11	3.6E-06	R
N-Nitroso-di-n-propylamine	2.1E-01	1.2E-07	2.8E-07		2.0E-07	4.5E-07	4.3E-11	6.5E-07	
Organics Pathway Total	1.12 01	1.20-07	2.0E-07	2.7E-11	8.6E-07	2.0E-06		2.8E-06	R
Pathway Total - Chemicals					3.0E-06	8.0E-06	2.4E-10	1.1E-05	
		Onen De	pidantial 1	D 1	2.0E-05	1.9E-05	3.7E-08	3.9E-05	
Aluminum	1.4E+04	1.5E-02	3.3E-05	Resident Far	mer Child				
Arsenic	1.9E+01	2.1E-05	1.4E-06	8.1E-07	0.450.00				
Chromium	1.9E+01	2.1E-05	4.6E-08	1.1E-09	3.1E-05	2.1E-06	1.7E-08	3.3E-05	R
Thallium	1.1E+00	1.2E-06	2.6E-09	1.1E-09					
norganics Pathway Total	1.12.00	1.2D-00	2.0E-09	6.4E-11					
2-Methyl-4,6-dinitrophenol	4.3E-01	4.7E-07	1.00.00	0.00	3.1E-05	2.1E-06	1.7E-08	3.3E-05	
Benzo(a)pyrene	2.1E-01	2.3E-07	1.0E-07	2.5E-11					
Bis(2-chloroethyl) ether	2.0E-01	2.2E-07	6.6E-08	1.2E-11	1.7E-06	4.8E-07	3.9E-11	2.2E-06	R
Dibenz(a,h)anthracene	2.1E-01		4.8E-08	1.2E-11	2.4E-07	5.3E-08	1.4E-11	2.9E-07	
Hexachlorobenzene	2.1E-01	2.3E-07	6.6E-08	1.2E-11	1.7E-06	4.8E-07	3.9E-11	2.2E-06	R
N-Nitroso-di-n-propylamine			5.1E-08	1.2E-11		8.1E-08	2.0E-11	4.5E-07	
rganics Pathway Total	2.1E-01	2.3E-07	5.1E-08	1.2E-11		3.5E-07		2.0E-06	R
thway Total - Chemicals						1.4E-06	1.1E-10	7.0E-06	
Total - Chemicals					3.7E-05	3.5E-06	1.7E-08	4.0E-05	

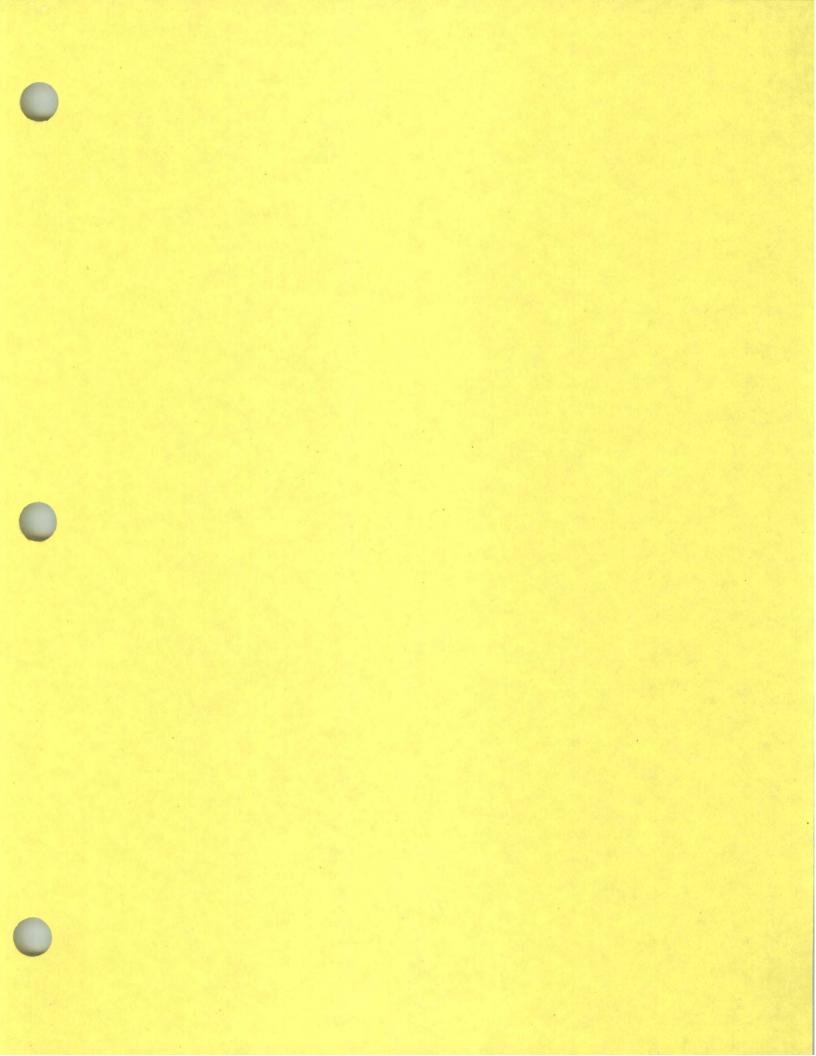
COPCs are identified as chemicals of concern (COCs) if the total ILCR across all pathways is > 1E-06 (R).

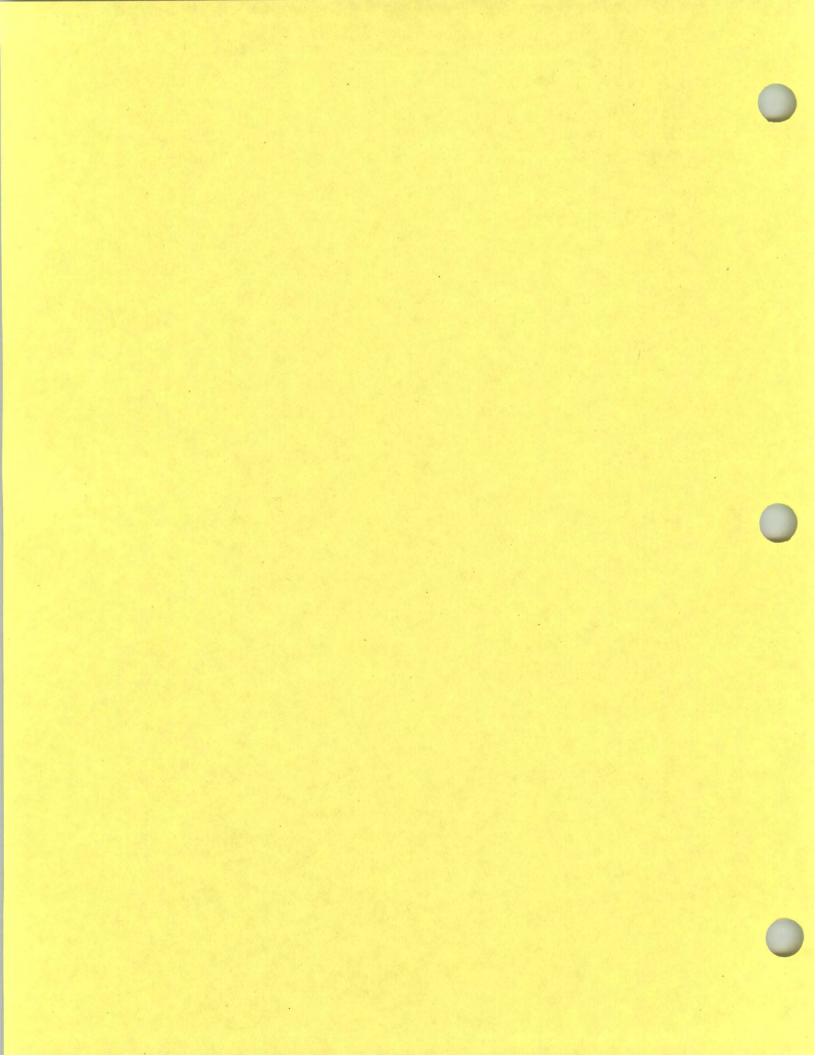
COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

ILCR = Incremental Lifetime Cancer Risk.







Appendix Table B-12. 40 mm Range Subsurface Soil Non-carcinogenic Hazards - Direct Contact

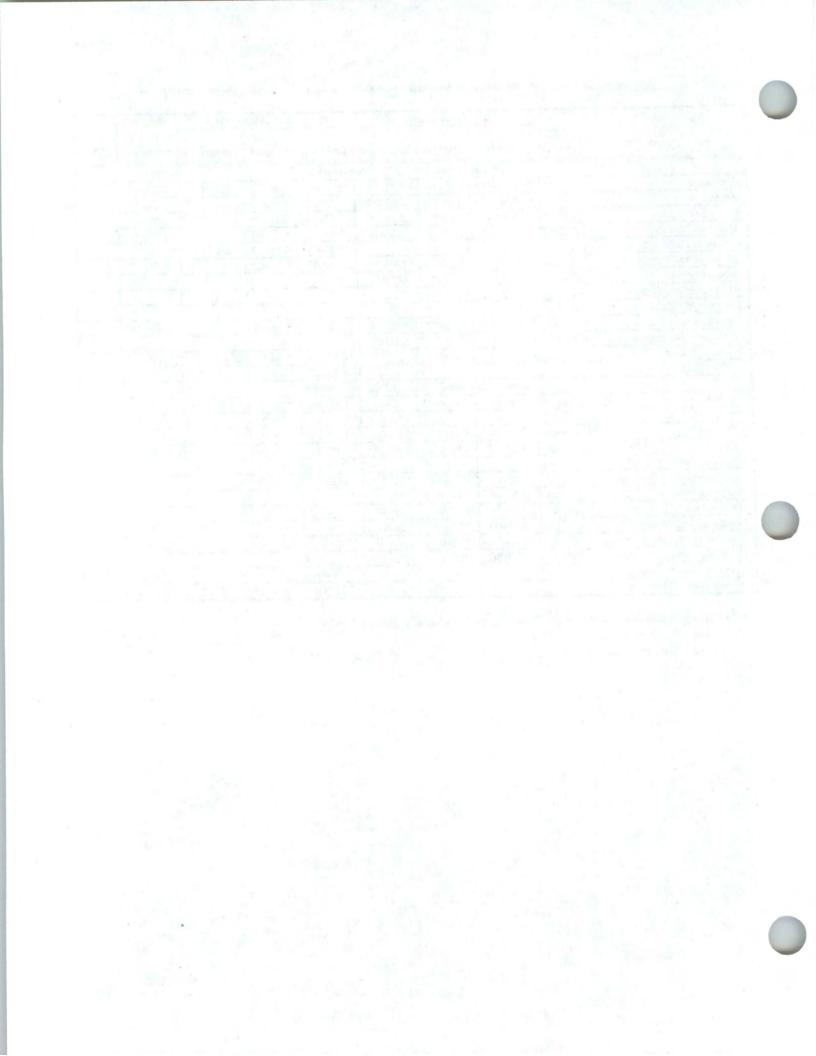
		Dail	y Intake (n	ig/kg-d)	Haz	ard Quotie	nt (HQ)	Total HI	
COPC	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion		Inhalation	across all pathways	COC
		Open Re	sidential -	Resident Far	mer Adult				
Aluminum	1.4E+04	1.9E-02	4.2E-04	4.0E-06	1.9E-02	4.2E-04	2.8E-03	2.2E-02	
Arsenic	1,9E+01	2.6E-05	1.8E-05	5.6E-09	8.7E-02	5.9E-02	2.02 05	1.5E-01	
Chromium	1.9E+01	2.6E-05	6.0E-07	5.7E-09	1.8E-05	3.1E-05		4.8E-05	
Thallium	1.1E+00	1.5E-06	3.4E-08	3.2E-10	1.8E-02	4.2E-04		1.9E-02	
Inorganics Pathway Total					1.2E-01	6.0E-02	2.8E-03	1.9E-01	
2-Methyl-4,6-dinitrophenol	4.3E-01	5.8E-07	1.3E-06	1.3E-10	5.8E-03	1.3E-02	2.01-03	1.9E-02	
Benzo(a)pyrene	2.1E-01	2.9E-07	8.5E-07	6.2E-11	0.02 00	1.51.02		1.915-02	
Bis(2-chloroethyl) ether	2.0E-01	2.7E-07	6.2E-07	5.9E-11			7		
Dibenz(a,h)anthracene	2.1E-01	2.9E-07	8.5E-07	6.2E-11					
Hexachlorobenzene	2.1E-01	2.9E-07	6.6E-07	6.2E-11	3.6E-04	8.2E-04		1.2E-03	
N-Nitroso-di-n-propylamine	2.1E-01	2.9E-07	6.6E-07	6.2E-11	5.02-04	0.2L-04		1.2E-03	
Organics Pathway Total				0.22	6.2E-03	1.4E-02		2.0E-02	
Pathway Total - Chemicals					1.3E-01	7.4E-02	2.8E-03	2.1E-01	
		Open Res	idential - R	esident Farn		7.4LF-02	2.6E-03	2.1E-01	
Aluminum	1.4E+04	1.7E-01	3.8E-04	9.4E-06	1.7E-01	3.8E-04	6.6E-03	1.8E-01	
Arsenic	1.9E+01	2.4E-04	1.6E-05	1.3E-08	8.1E-01	5.3E-02	0.0E-03		
Chromium	1.9E+01	2.5E-04	5.4E-07	1.3E-08	1.6E-04	2.8E-05		8.6E-01 1.9E-04	
Thallium	1.1E+00	1.4E-05	3.0E-08	7.5E-10	1.7E-01	3.8E-04	-	1.7E-01	
Inorganics Pathway Total		3,100,00	5.02.00	7.3L-10	1.2E+00	5.4E-02	6.6E-03		
2-Methyl-4,6-dinitrophenol	4.3E-01	5.4E-06	1.2E-06	2.9E-10	5.4E-02	1.2E-02	0.0E-03	1.2E+00	
Benzo(a)pyrene	2.1E-01	2.7E-06	7.7E-07	1.5E-10	J.4L-02	1.2E-02	-	6.6E-02	
Bis(2-chloroethyl) ether	2.0E-01	2.6E-06	5.6E-07	1.4E-10					_
Dibenz(a,h)anthracene	2.1E-01	2.7E-06	7.7E-07	1.5E-10			-		
Hexachlorobenzene	2.1E-01		5.9E-07	1.5E-10	3.4E-03	7.4E-04		4.15.02	_
N-Nitroso-di-n-propylamine	2.1E-01		5.9E-07	1.5E-10	J.4E-03	7.4E-04		4.1E-03	
Organics Pathway Total	- IL UI	4.715-00	2.915-07	1.3E-10	5.8E-02	1 20 02		7.07.00	
athway Total - Chemicals						1.3E-02	( CT 02	7.0E-02	
, commodia					1.2E+00	6.7E-02	6.6E-03	1.3E+00	

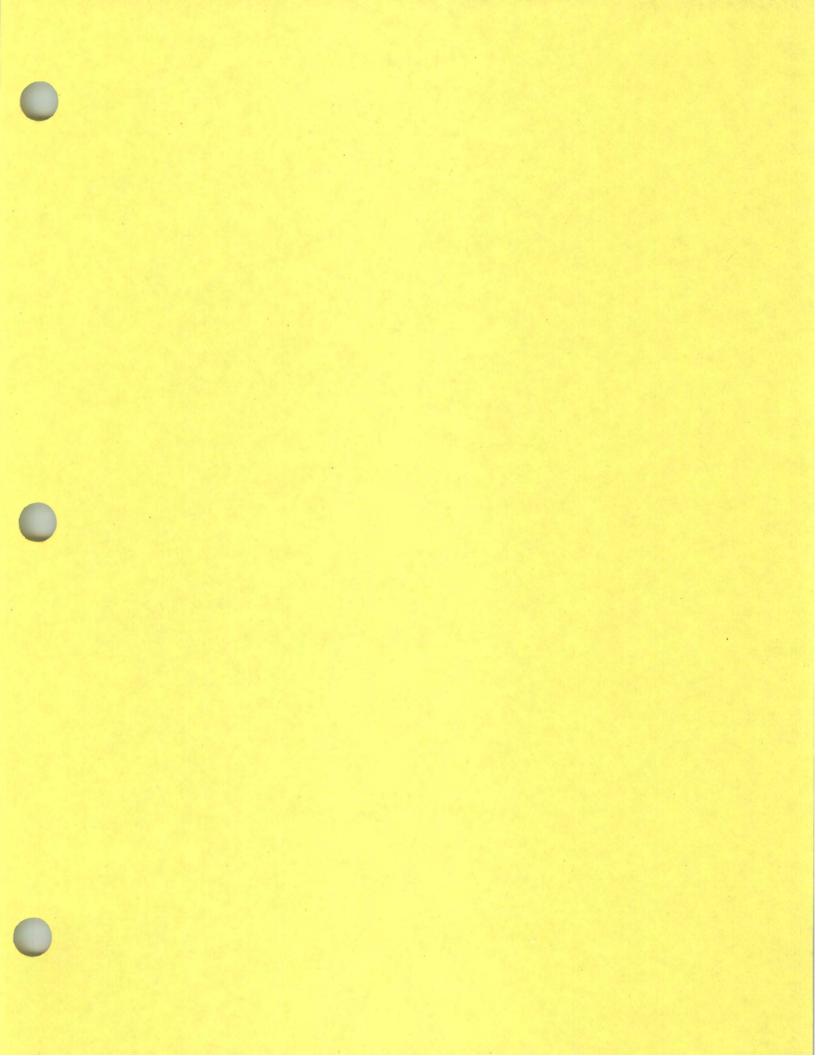
<sup>&</sup>quot; COPCs are identified as chemicals of concern (COCs) if the total HI across all pathways is > 1 (H).

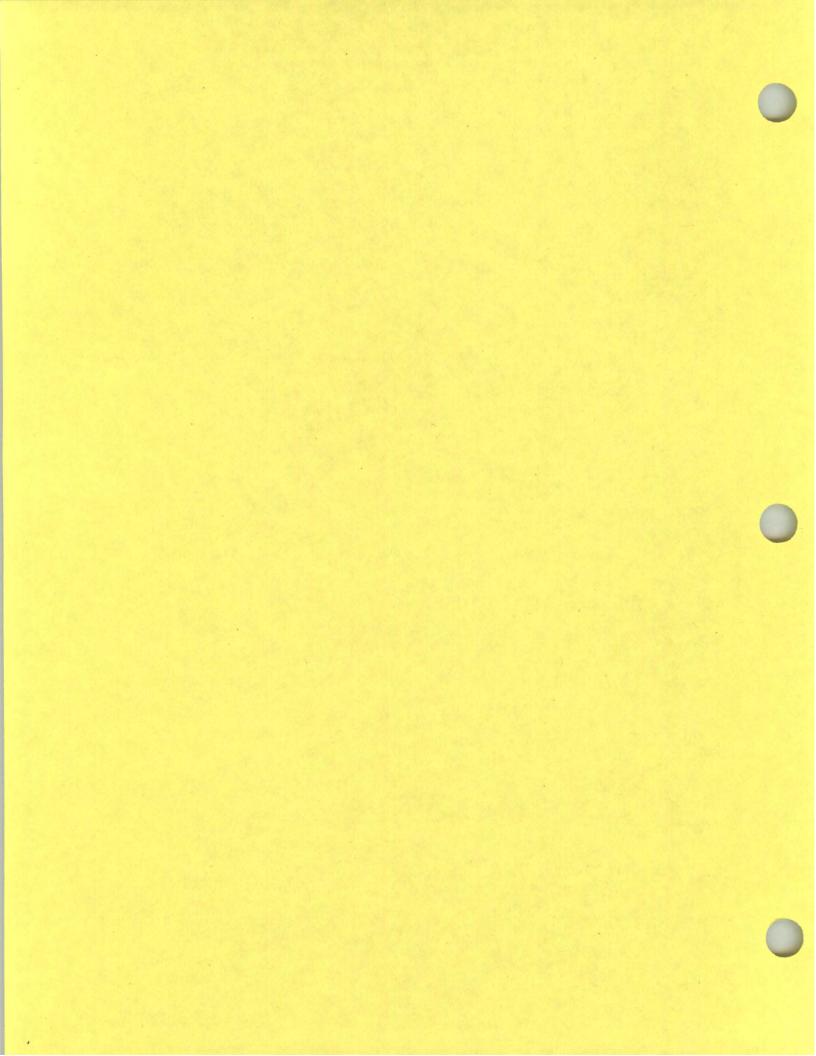
COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

HI = Hazard Index.







Appendix Table B-13. 40 mm Range Shallow Surface Soil Carcinogenic Risks - Ingestion of Foodstuffs

	1220		Daily In	ntake (mg/kg-	(d)	11		Risk		Total Risk	
COPC	EPC (mg/kg)	Milk	Beef	Vegetables	Venison	Milk	Beef	Vegetables	Venison	across all pathways	COC
			Open .	Residential -	Resident F	armer Ac	lult				
Aluminum	1.2E+04	1.6E-02	1.3E-02		6.9E-08						
Arsenic	1.3E+01	5.3E-06	1.9E-05	1.7E-03	9.2E-10	8.0E-06	2.9E-05	2.5E-03	1.4E-09	2.5E-03	R
Chromium	4.4E+01	3.1E-06	3.1E-04	5,6E-03	1.5E-08		Tange of	2,52-05	1.415.07	2,31,503	K
Thallium	8.0E-01	1.0E-05	2.3E-05	1.0E-04	1.2E-10	_					
Vanadium	2.3E+01		4.1E-05	2.9E-03	2.9E-10	_					
Inorganics Pathway Total	100 5 -					_	2.9E-05	2.5E-03	1.4E-09	2.5E-03	
2-Methyl-4,6-dinitrophenol	4.6E-01	4.5E-08	1.5E-08	1.1E-04	1.1E-12	0.02 00	LOL US	2.01-05	1.41.409	2.312-03	
Benzo(a)pyrene	2.3E-01	-	5.2E-06	3.0E-05	1.5E-11	1.1F-04	3.8E-05	2.2E-04	1.1E-10	3.6E-04	R
Dibenz(a,h)anthracene	2.3E-01	7.4E-05	2.6E-05	2.9E-05	2.9E-11	-	1.9E-04	2.1E-04	2.2E-10	9.5E-04	R
Hexachlorobenzene	2.3E-01	-	8.8E-07	3.0E-05	6.8E-12	-	1.4E-06	4.8E-05	1.1E-11	5.4E-05	R
N-Nitroso-di-n-propylamine	2.3E-01	5.2E-09	1.6E-09	1.6E-04	1.6E-13	-	1.1E-08	1.2E-03	1.1E-11	1.2E-03	R
Organics Pathway Total				7102 01	1.02 15	-	2.3E-04	1.6E-03	3.3E-10	2.5E-03	K
Pathway Total							2.6E-04	4.1E-03	1.7E-09	5.0E-03	
			Open R	esidential - R	esident Fo			4.1E-03	1./E-09	3.UE-03	
Aluminum	1.2E+04	2.5E-02		1.5E+00	6.4E-08	The can				1	_
Arsenic	1.3E+01	8.3E-06	1.8E-05	1.5E-03	8.6E-10	1.2F-05	2.7E-05	2.3E-03	1.3E-09	2.4E-03	D
Chromium	4.4E+01	4.9E-06		5.2E-03	1.4E-08	1.21-03	2.7L-03	2.3E=03	1.3E-09	2,40-03	R
Thallium	8.0E-01	1.6E-05		9.6E-05	1.1E-10						_
Vanadium	2,3E+01	4.6E-06		2.7E-03	2.7E-10						
Inorganics Pathway Total				2.72.00	2.72 10	1.2E-05	2.7E-05	2.3E-03	1.3E-09	2.4E-03	
2-Methyl-4,6-dinitrophenol	4.6E-01	7.0E-08	1.4E-08	9.9E-05	1.0E-12	1.25-02	2.7L-03	2.3E-03	1.3E-09	Z.4E-03	
Benzo(a)pyrene		2.3E-05		2.8E-05	1.4E-11	1.7E-04	2 5E 05	2.0E-04	9.9E-11	4.15.04	T)
Dibenz(a,h)anthracene		1.2E-04		2.7E-05		8.4E-04		2.0E-04		4.1E-04	R
Hexachlorobenzene		4.0E-06		2.8E-05		6.4E-06		4.5E-05	2.0E-10	1.2E-03	R
N-Nitroso-di-n-propylamine		8.1E-09		1.5E-04		5.7E-08			1.0E-11	5.3E-05	R
Organics Pathway Total				3.52.04		1.0E-03		1.1E-03	1.0E-12	1.1E-03	R
athway Total						1.0E-03		1.5E-03 3.8E-03	3.1E-10 1.6E-09	2.8E-03 5.1E-03	

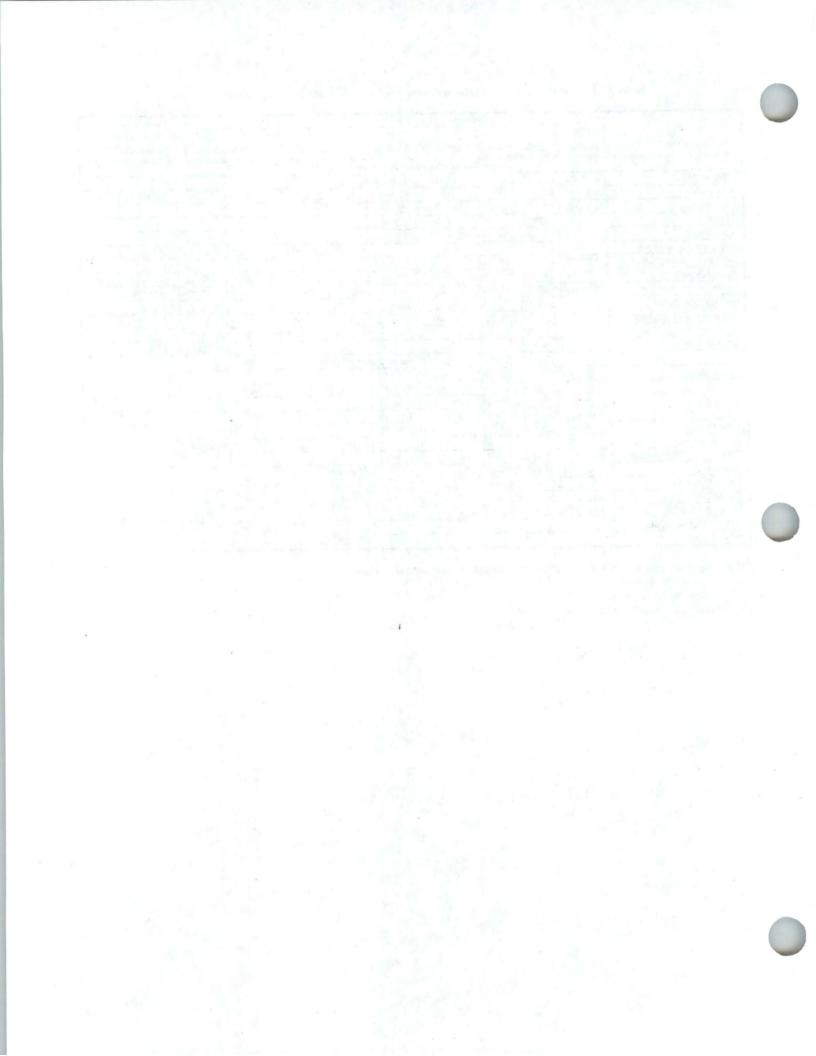
<sup>&</sup>quot; COPCs are identified as chemicals of concern (COCs) if the total ILCR across all pathways is > 1E-06 (R).

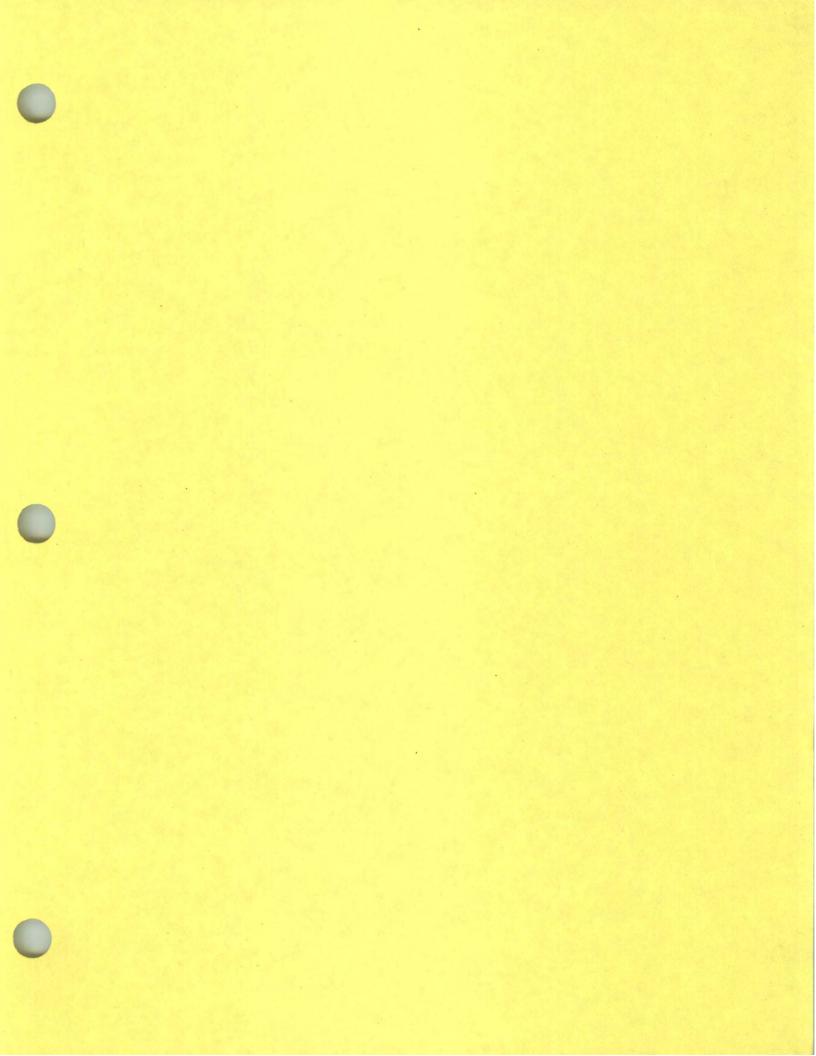
Page I of 1 10/03/2005

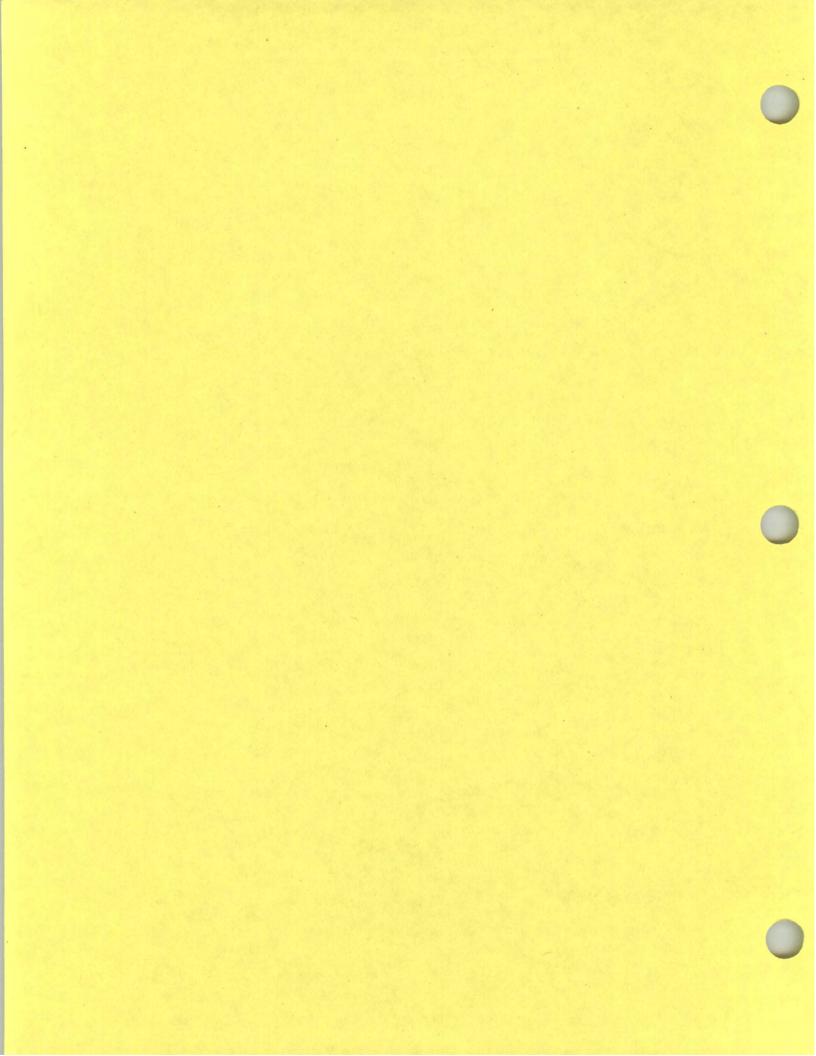
COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

ILCR = Incremental Lifetime Cancer Risk.







Appendix Table B-14. 40 mm Range Shallow Surface Soil Non-carcinogenic Hazards - Ingestion of Foodstuffs

	222.2		Daily In	itake (mg/kg-	-d)		Hazard	Quotient (HC	2)	Total HI	
COPC	EPC (mg/kg)	Milk	Beef	Vegetables	Venison	Milk	Beef	Vegetables	Venison	across all pathways	coc
			Open	Residential -	Resident F	armer Ad	ult				
Aluminum	1.2E+04	3.7E-02	3.1E-02	3.7E+00	1.6E-07	3.7E-02		3.7E+00	1.6E-07	3.8E+00	Н
Arsenic	1.3E+01	1.2E-05	4.5E-05	3.9E-03	2.2E-09	4.1E-02		1.3E+01	7.2E-06	1.3E+01	H
Chromium	4.4E+01	7.3E-06	7.2E-04	1.3E-02	3.4E-08	4.8E-06		8.7E-03	2.3E-08	9.2E-03	- 41
Thallium	8.0E-01	2.4E-05	5.3E-05	2.4E-04	2.8E-10	3.0E-01	6.7E-01	3.0E+00	3.5E-06	4.0E+00	Н
Vanadium	2.3E+01	6.9E-06	9.5E-05	6.8E-03	6.7E-10	9.8E-04	1.4E-02	9.7E-01	9.6E-08	9.8E-01	- 11
Inorganics Pathway Total						3.8E-01	8.6E-01	2.1E+01	1.1E-05	2.2E+01	Н
2-Methyl-4,6-dinitrophenol	4.6E-01	1.0E-07	3.4E-08	2.5E-04	2.6E-12	1.0E-03	3.4E-04	2.5E+00	2.6E-08	2	Н
Benzo(a)pyrene	2.3E-01	3.5E-05	1.2E-05	6.9E-05	3.4E-11	7.02 00	5.12.01	2.52.00	2.0L-06	- 4	- 11
Dibenz(a,h)anthracene	2.3E-01	1.7E-04	6.1E-05	6.9E-05	6.9E-11						-
Hexachlorobenzene	2.3E-01	6.0E-06	2.0E-06	7.0E-05	1.6E-11	7.5E-03	2.6E-03	8.8E-02	2.0E-08	9.8E-02	
N-Nitroso-di-n-propylamine	2.3E-01	-	3.7E-09	3.8E-04	3.7E-13	7.52 05	2.015-05	0.BL-02	2,0E-08	7.6E-UZ	
Organics Pathway Total					5.72 15	8.5E-03	2.9E-03	2.6E+00	4.6E-08	2.6E+00	Н
Pathway Total					-	3.9E-01	8.7E-01	2.3E+01	1.1E-05	2.4E+01	H
			Open B	Residential - H	esident Fa			2,31,101	1.115-03	2.415701	п
Aluminum	1.2E+04	2.9E-01	1.4E-01	1.7E+01	7.5E-07	2.9E-01	1.4E-01	1.7E+01	7.5E-07	1.8E+01 T	Н
Arsenic	1.3E+01	9.7E-05		1.8E-02	1.0E-08	3.2E-01	7.0E-01	6.0E+01	3.4E-05	6.1E+01	Н
Chromium	4.4E+01	5.7E-05		6.1E-02	1.6E-07		2.2E-03	4.1E-02	1.1E-07	4.3E-02	n
Thallium	8.0E-01	1.9E-04		1.1E-03	1.3E-09	2.4E+00		1.4E+01	1.6E-05	1.9E+01	Н
Vanadium	2.3E+01	5.3E-05		3.2E-02	3.1E-09		6.3E-02	4.5E+00	4.5E-07	4.6E+00	H
norganics Pathway Total				5.45 02	5.12 07	3.0E+00		9.6E+01	5.1E-05	1.0E+02	Н
2-Methyl-4,6-dinitrophenol	4.6E-01	8.2E-07	1.6E-07	1.2E-03	1.2E-11		1.6E-03	1.2E+01	1.2E-07	1.0E+02 1.2E+01	Н
Benzo(a)pyrene	2.3E-01	2.7E-04	-	3.2E-04	1.6E-10	0.225	1.015-05	1.25.01	1.2E-07	1.25701	п
Dibenz(a,h)anthracene	2.3E-01	1.3E-03		3.2E-04	3.2E-10						-
Hexachlorobenzene		4.7E-05		3.3E-04		5.8E-02	1.2E-02	4.1E-01	9.3E-08	4.8E-01	
N-Nitroso-di-n-propylamine			1.7E-08	1.8E-03	1.7E-12	2.012-02	1,215-02	4.1E-U1	7.3E-U8	4.8E-U1	
Prganics Pathway Total	-10.00	2.12 00	2.72.00	3.02.03		6.6E-02	1.4E-02	1.2E+01	2.1E-07	1.2E+01	7.7
athway Total						3.0E+00		1.1E+02	5.1E-05	1.1E+01	H

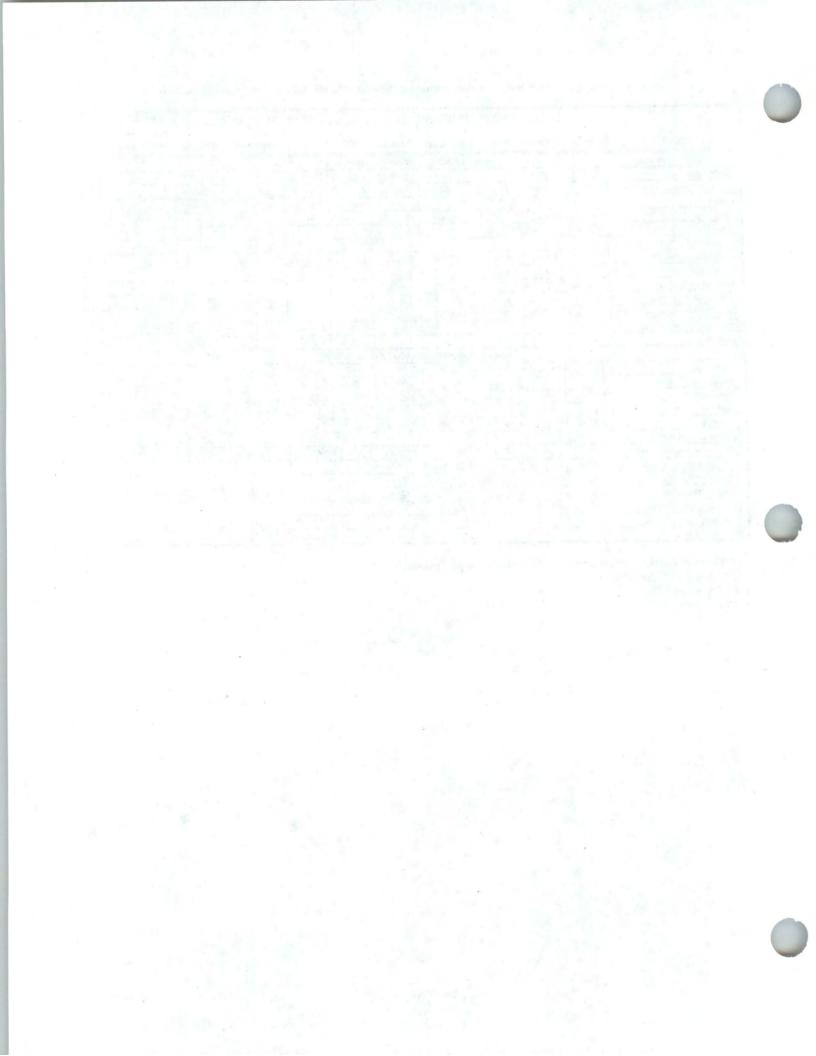
 $<sup>^{</sup>a}$  COPCs are identified as chemicals of concern (COCs) if the total HI across all pathways is > 1 (H).

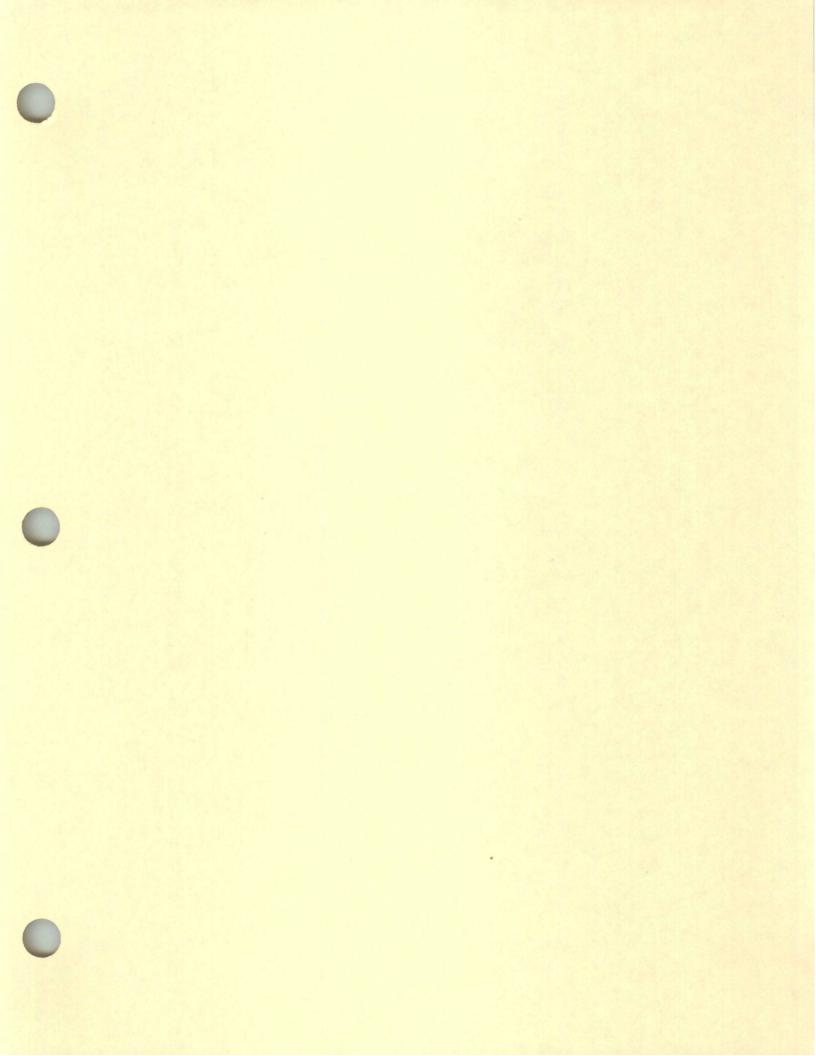
Page 1 of 1 10/03/2005

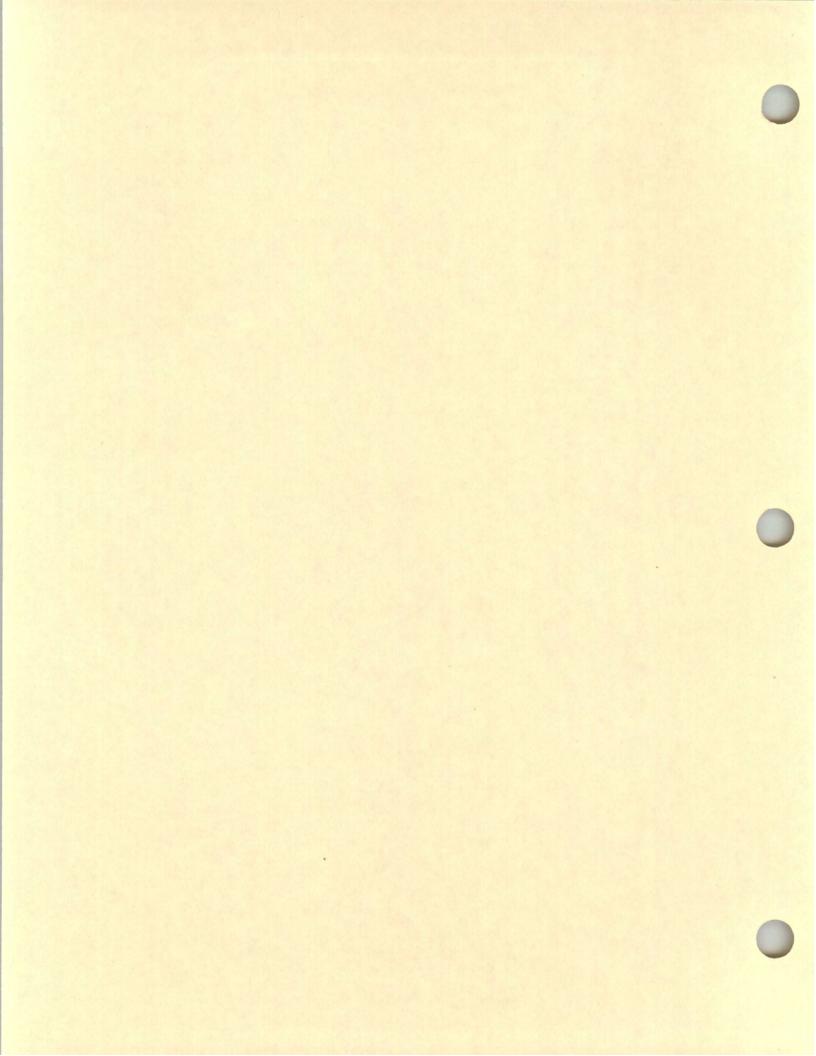
COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

HI = Hazard Index.

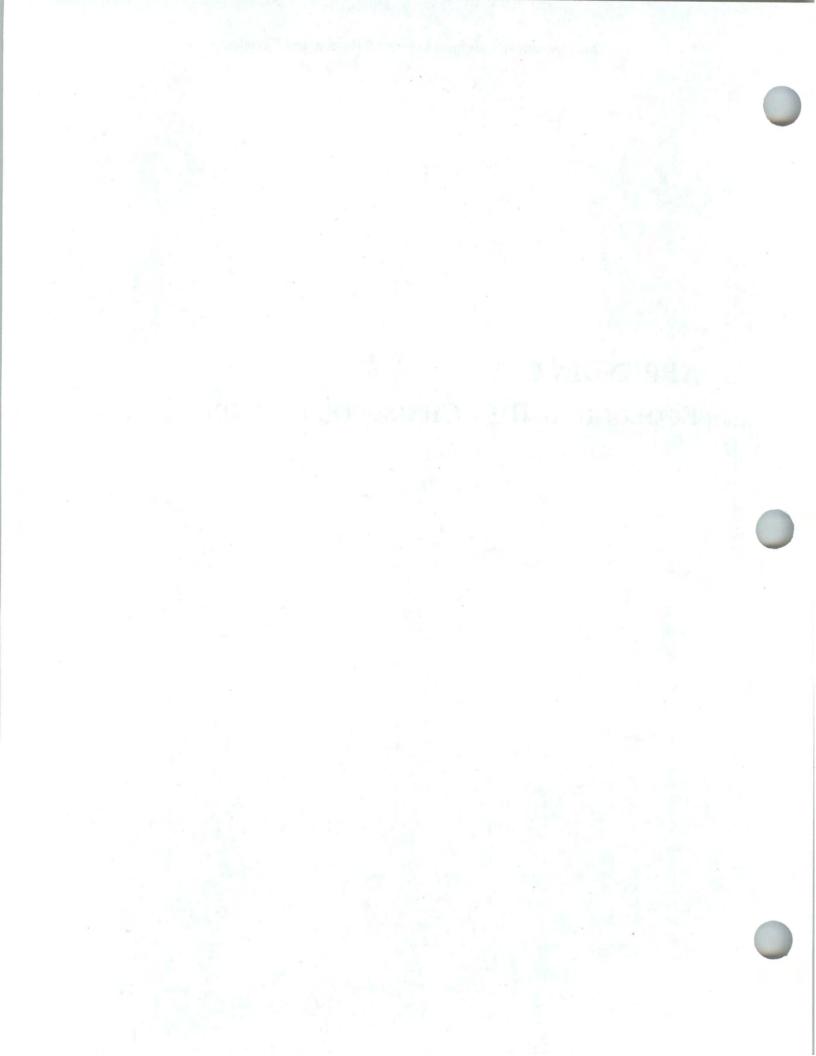






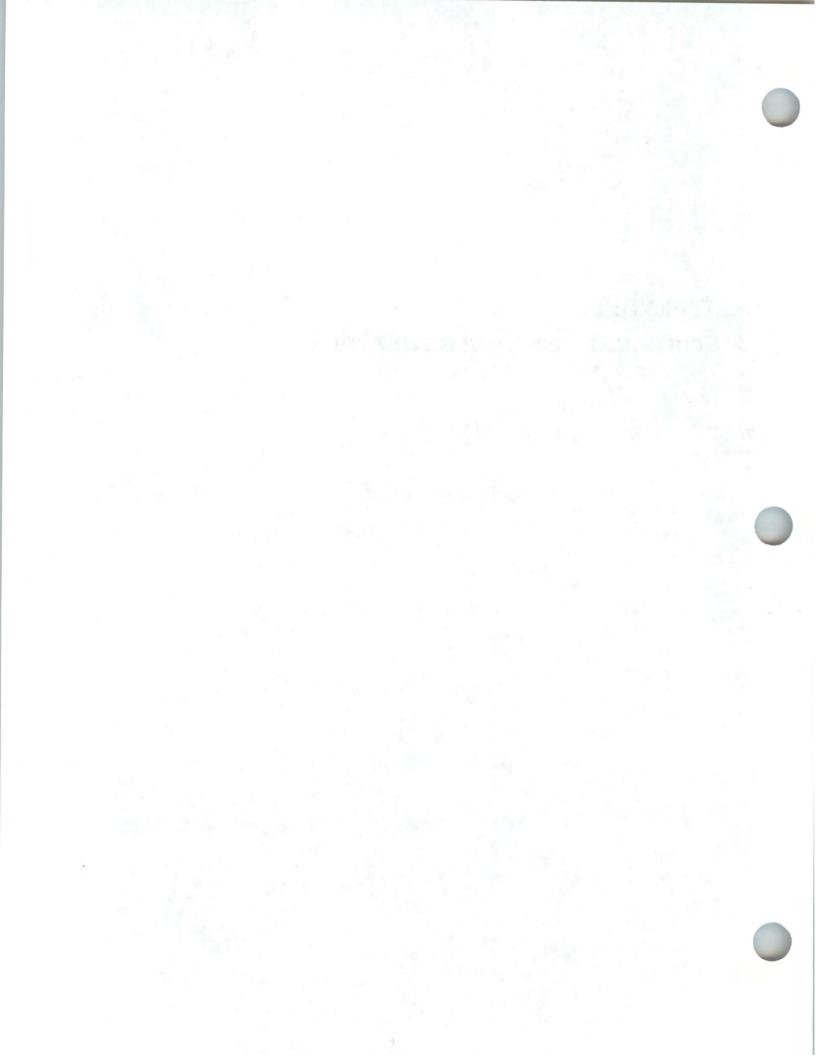
## Draft Document - Subject to Internal Review and Revision

1	
2 3 4 5	
4	
5	
6	
7	
8	
10	
11	
12	
13	
14	
15	APPENDIX C
16	ECOLOGICAL RISK CHARACTERIZATION
17	
18	
19	
20	
21	
22	
23	



## APPENDIX C

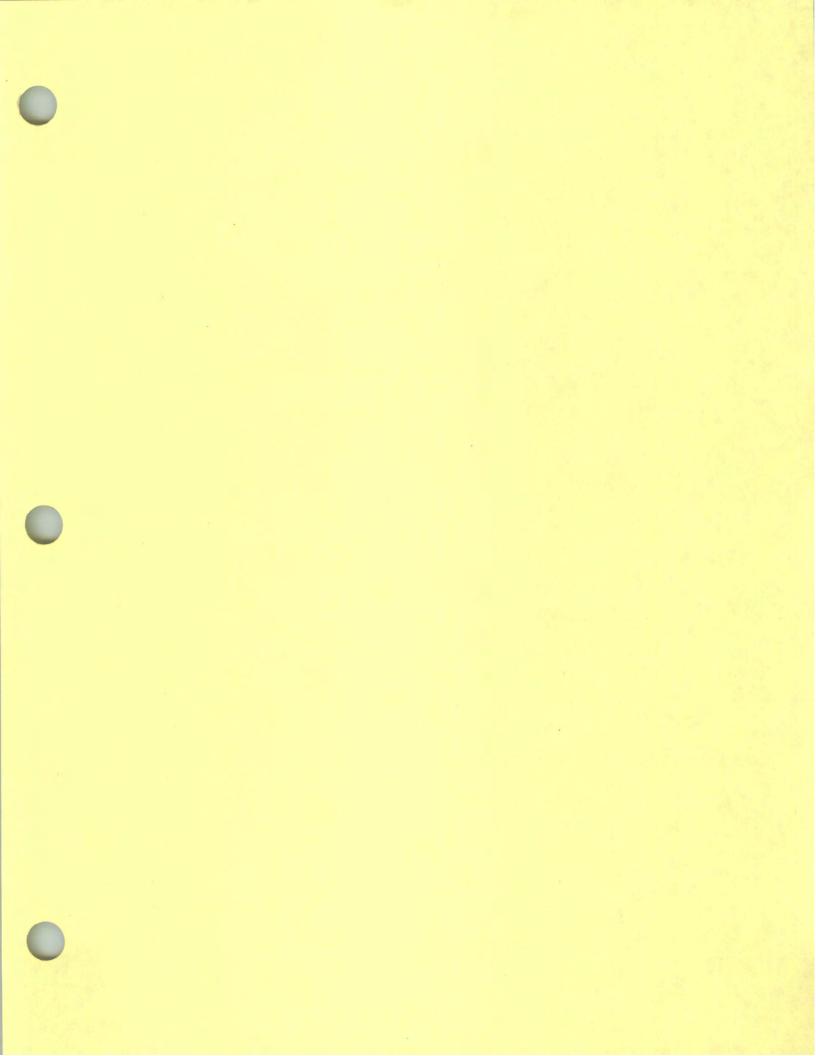
## ECOLOGICAL RISK CHARACTERIZATION

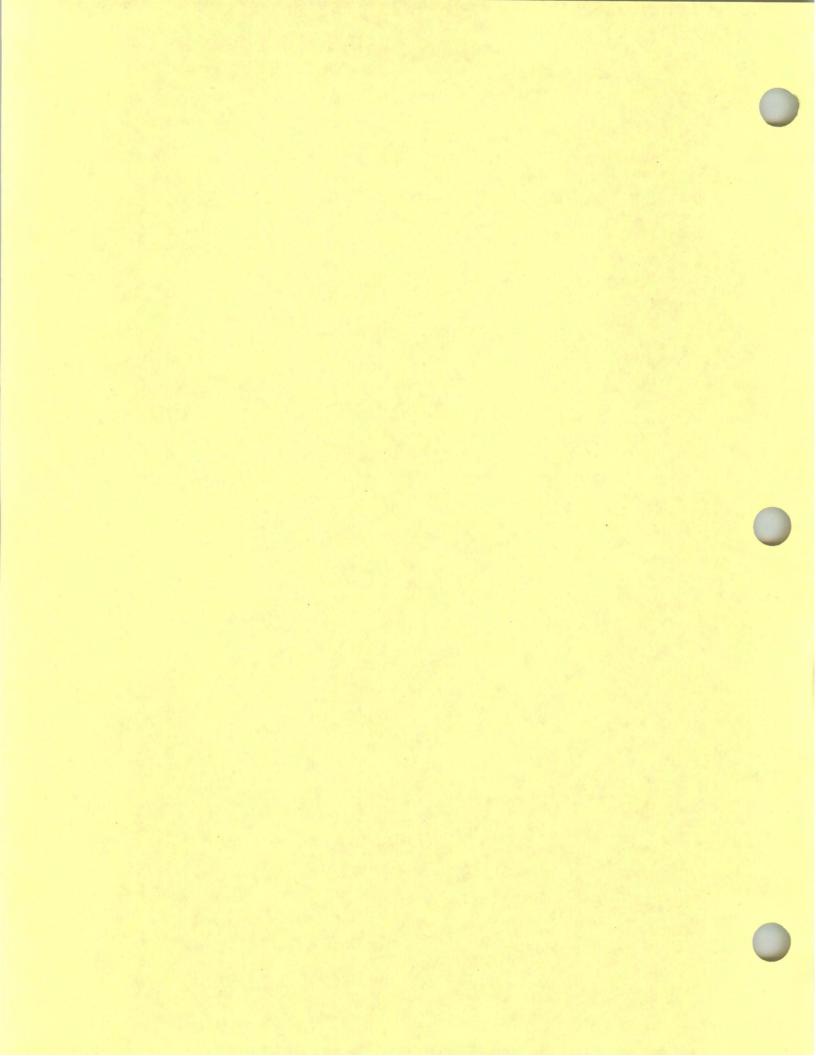


List of Appendix C Table numbers and brief descriptions of content for the 40 mm Range Soil Ecological Risk Screening, Ravenna, Ohio

Table No.	Description	
C- 1	Log Kow	
C- 2	Soil ESVs	
C- 3	Shallow Surface Soil (0-1 ft) ESV screen	181
C- 4	Subsurface Soil (1-3 ft) ESV screen	
C- 5	Deep Surface Soil (0-3 ft) ESV screen	
C- 6	Cottontail parameters	
C- 7	Shrew parameters	
C- 8	Red fox parameters	
C- 9	Red-tailed hawk parameters	
C- 10	SPv, SPr, BAFi, Ba	
C- 11	AUFs-terrestrial	
C- 12	Ingestion Rates	
C- 13	TRVs plants	
C- 14	TRVs soil inverts	
C- 15	Mammal TRV Derivation	
C- 16	Mammal TRVs (NOAELs)	
C- 17	Bird TRV Derivation	
C- 18	Bird TRVs (NOAELs)	1.0
C- 19	Shallow Surface Soil (0-1 ft) plant and EW HQs	plant and EW HQs
C- 20	Shallow Surface Soil (0-1 ft) Cottontail HQs	Cottontail HQs
C- 21	Shallow Surface Soil (0-1 ft) shrew HQs	shrew HQs
C- 22	Shallow Surface Soil (0-1 ft) fox HQs	fox HQs
C- 23	Shallow Surface Soil (0-1 ft) Hawk HQs	Hawk HQ
C- 24	Subsurface Soil (1-3 ft) plant and EW HQs	plants and worms HQs
C- 25	Subsurface Soil (1-3 ft) Cottontail HQs	Cottontail HQs
C- 26	Subsurface Soil (1-3 ft) shrew HQs	shrew HQs
C- 27	Subsurface Soil (1-3 ft) fox HQs	fox HQs
C- 28	Subsurface Soil (1-3 ft) Hawk HQs	Hawk HQ
C- 29	Deep Surface Soil (0-3 ft) plant and EW HQs	plants and worms HQs
C- 30	Deep Surface Soil (0-3 ft) Cottontail HQs	Cottontail HQs
C- 31	Deep Surface Soil (0-3 ft) shrew HQs	shrew HQs
C- 32	Deep Surface Soil (0-3 ft) fox HQs	fox HQs
C- 33	Deep Surface Soil (0-3 ft) Hawk HQs	Hawk HQ







Appendix Table C-1. Bioaccumulation Factors and Log Octanol-Water Partition Coefficients (Kows) For Analytes at 40 mm Range, Ravenna, Ohio

Chemical	CAS Registry Number	Log Kow' (L/kg)	Source	BAF MAX	Source
Muminum		NA	NA NA	0.075	HAZWRAP (1994)
Ammonia		NA	NA NA	1	default value
		NA	NA NA	0.05	HAZWRAP (1994)
Antimony		NA	NA.	0.1	HAZWRAP (1994)
Arsenic		NA	NA.	0.0075	HAZWRAP (1994)
larium		NA	NA NA	0.05	HAZWRAP (1994)
Seryllium			NA NA	1	default value
Soron	1	NA	NA NA	11	HAZWRAP (1994)
Cadmium		NA	NA NA	1	default value
Calcium		NA	NA NA	1	default value
hloride		NA		0.28	HAZWRAP (1994)
Chromium		NA	NA.		
Chromium, hexavalent		NA	NA NA	0.28	HAZWRAP (1994)
Cobalt		NA	NA NA	1	HAZWRAP (1994)
Copper		NA	NA NA	0.5	HAZWRAP (1994)
yanide		NA	NA.	0	HAZWRAP (1994)
luoride		NA	NA NA	- 1	default value
ron		NA	NA.	1	default value
ead		NA	NA.	2	HAZWRAP (1994)
Magnesium		NA	NA NA	1	default value
Manganese		NA	NA.	0.02	HAZWRAP (1994)
Mercury		NA	NA.	13	HAZWRAP (1994)
Molybdenum		NA.	NA NA	1	default value
Nickel		NA	NA NA	0.3	HAZWRAP (1994)
Vitrate		NA	NA NA	1	default value
		NA	NA NA	1	default value
Phosphorus		NA.	NA NA	1	default value
otassium		NA.	NA NA	0.76	HAZWRAP (1994)
Selenium			NA NA	1	default value
Silicon		NA.	NA NA	0.15	HAZWRAP (1994)
Silver		NA.		1	default value
Sodium	1	NA	NA NA	i	default value
Sulfide		NA	NA	1	default value
Thallium		NA	NA.		
Vanadium		NA.	NA	0.13	HAZWRAP (1994)
Zinc		NA.	NA NA	5	HAZWRAP (1994)
,1,1-Trichloroethane	71-55-6	2.48	EPA 1995a in Jones, et al 1996	NA	NA
1,2,2-Tetrachloroethane	79-34-5	2.39	EPA 1995a in Jones, et al 1996	NA	NA
,1,2,2-Tetrachloroethylene	127-18-4	2.67	EPA 1995e in Sample, et al 1996	NA	NA
.1.2-Trichloroethane	79-00-5	2.17	EPA 1995	NA	NA
,1'-Biphenyl	92-52-4	4.09	Schwarzenbach, et al 1993	NA	NA
,1-Dichloroethane	75-34-3	4.00	EPA 1995a in Jones, et al 1996	NA	NA
,1-Dichloroethene	75-35-4	2,13	EPA 1995a in Jones, et al 1996	NA.	NA
,1-Dichloroethylene	75-35-4	5,00	EPA 1995e in Sample, et al 1996	NA	NA
.2,2-Trichloro-1,1,2-trifluoroe	76-13-1	3.16	Hansch and Leo 1985 in Syracuse 1996	NA	NA
,2,3,4-Tetrachlorobenzene	634-66-2	4.55	Swarzenbch, et al 1993	NA.	NA
.2.3-Trichlorobenzene	87-61-6	4.05	Sangster 1994 in Syracuse 1996	NA.	NA
2,3-Trichloropropane	96-18-4	1.98	Russom, et al 1996	NA	NA
,2,4,5-Tetrachlorobenzene	95-94-3	4.64	Hansch and Leo 1985 in Syracuse 1996	NA	NA
1,2,4-Trichlorobenzene	120-82-1	4.02	EPA 1995d	NA	NA.
1,2,4-Trimethyl benzene	95-63-6	3.63	Hansch, et al 1995 in Syracuse 1996	NA	NA
	96-12-8	2.96	Chem Inspect Test Inst 1992 in Syracuse 1996	NA	NA
2-Dibromo-3-Chloropropane	193-39-5	6.92	EPA (1994b)	NA.	NA
ndeno(1,2,3-cd)pyrene	76-14-2	2.82	Hansch and Leo 1985 in Syracuse 1996	NA	NA.
,2-Dichloro-1,1,2,2-tetrafluor	10000	3.38	EPA 1995d	NA	NA.
,2-Dichlorobenzene	95-50-1		EPA 1995d EPA 1995a in Jones, et al 1996	NA	NA.
1,2-Dichloroethane	107-06-2	1.47			NA.
1,2-Dichloroethene	540-59-0	1.86	EPA 1995a in Jones, et al 1996	NA	

Appendix Table C-1. Bioaccumulation Factors and Log Octanol-Water Partition Coefficients (Kows) For Analytes at 40 mm Range, Ravenna, Ohio

Chemical	CAS Registry Number	Log Kow' (L/kg)	Source	BAF MAX	Source
1,2-Dimethylbenzene	95-47-6	3.12	Schwarzenbach, et al 1993	NA	NA
1,2-Diphenylhydrazine	122-66-7	2.94	Hansch and Leo 1985 in Syracuse 1996	NA	NA
1,3,5-Trinitrobenzene	99-35-4	1.18	Hansch and Leo 1985 in Syracuse 1996	NA	NA
1,3-Butadiene	106-99-0	1.99	Hansch and Leo 1985 in Syracuse 1996	NA	NA
1,3-Dichlorobenzene	541-73-1	3.43	EPA 1995a in Jones, et al 1996	NA	NA
1,3-Dichloropropene	542-75-6	2.00	EPA 1995a in Jones, et al 1996	NA	NA
1,3-Dinitrobenzene	99-65-0	1.49	Hansch and Leo 1985 in Syracuse 1996	NA	NA
1,4-Dichlorobenzene	95-50-1	3.42	EPA 1995a in Jones, et al 1996	NA	NA
1.4-Dinitrobenzene	100-25-4	1.46	Hansch and Leo 1985 in Syracuse 1996	NA	NA
1,4-Dioxane	123-91-1	-0.39	EPA 1995e in Sample, et al 1996	NA	NA
1,4-Naphthoquinone	130-15-4	1.71	Hansch, et al 1995 in Syracuse 1996	NA	NA
1-12'-Dimethybenz(a)anthracene	57-97-6	5.80	Hansch and Leo 1985 in Syracuse 1996	NA NA	NA
1-Hexanol					
HMX	111-27-3	2.03	Schwarzenbach, et al 1993	NA	NA
	2691-41-0	2.07	No Source	NA	NA
1-Methylnapthalene	90-12-0	3.87	Syracuse 1996 in Jones, et al 1996	NA	NA
I-Nitropropane	108-03-2	0.87	Hansch and Leo 1985 in Syracuse 1996	NA	NA
I-Octanol	111-87-5	2.84	Schwarzenbach, et al 1993	NA	NA
1-Pentanol	71-41-0	1.51	Syracuse 1996 in Jones, et al 1996	NA	NA
2,2'-oxybis(1-chloropropane)	108-60-1	2.48	Kawamoto, K and Urano, K 1989 in Syracuse 1996	NA	NA
2,3,4,5-Tetrachlorophenol	4901-51-3	4.21	Hansch and Leo 1985 in Syracuse 1996	NA	NA
2,3,4,6-Tetrachlorophenol	58-90-2	4.45	Russom, et al 1996 <sup>i</sup>	NA	NA
2,3,5,6-Tetrachloroaniline	3481-20-7	4.10	Russom, et al 1996	NA	NA
Nitrocellulose	9004-70-0		No Source	NA	NA
n-nitrosodiphenylamine	86-30-6	3.13	Hansch and Leo 1985 in Syracuse 1996	NA	NA
2,3,7,8-Tetrachloro-Dibenzodioxin	1746-01-6	6.53	EPA 1995e in Sample, et al 1996 <sup>f</sup>	NA	NA
Tetryl	479-45-8		No Source	NA	NA
2,4,5-Trichloroaniline	636-30-6	4.01	EPA 1995a in Jones, et al 1996	NA	NA
2,4,5-Trichlorophenoxyacetic acid	93-76-5	3,31	Hansch and Leo 1985 in Syracuse 1996	NA	NA
2.4.6-Trichlorophenol	88-06-2	3.69	Hansch and Leo 1985 in Syracuse 1996	NA	NA
2,4,6-Trinitrotoluene	118-96-7	1.60	Hansch and Leo 1985 in Syracuse 1996	NA	NA
	1000000			1,54,5	
2,4-D	94-75-7	2.81	EPA 1995c <sup>k</sup>	NA	NA
2,4-Dichloroaniline	554-00-7	2.78	Sangster 1994 in Syracuse 1996	NA	NA
2,4-Dichlorophenol	120-83-2	3.06	Russom, et al 1996	NA	NA
2,4-Dimethylphenol	105-67-9	2.35	Swarzenbch, et al 1993	NA.	NA
2,4-Dinitrophenol	51-28-5	1.54	Howard 1990	NA	NA
2,4-Dinitrotoluene	121-14-2		Howard 1990	NA	NA
2,6-Dichlorophenol	87-65-0	2.75	Hansch, et al 1995 in Syracuse 1996	NA	NA
2,6-Dinitrotoluene	606-20-2		Howard 1990	NA	NA
-Butanone	79-93-3		EPA 1995a in Jones et al 1996	NA	NA
2-Chloronaphthalene	91-58-7		Sangster 1994 in Syracuse 1996	NA	NA
-Chlorophenol	95-57-8	2.15	Howard 1990.	NA	NA
-Chloropropane	75-29-6	1.90	Hansch and Leo 1985 in Syracuse 1996	NA	NA
-Chlorotoluene	95-49-8	3.42	Hansch and Leo 1985 in Syracuse 1996	NA	NA
-Hexanone	591-78-6	1.38	EPA 1995a in Jones, et al 1996	NA	NA
-Methylnaphthalene	91-57-6	-1.90	SCDM 1993 in HAZWRAP 1994	NA	NA
-Methylnapthalene	91-57-6	3.86	Hansch and Leo 1985 in Syracuse 1996	NA	NA
-Methylphenol	95-48-7		EPA 1995a in Jones, et al 1996	NA	NA
-Naphthylamine	91-59-8		Hansch and Leo 1985 in Syracuse 1996	NA	NA
-Nitrophenol	88-75-5		Howard 1990	NA	NA
-Octanone	111-13-7		Syracuse 1996 in Jones, et al 1996	NA	NA
-Picoline	109-06-8	1.11	Russom, et al 1996	NA NA	NA
2-Propanol	67-63-0		Hansch and Leo 1985 in Syracuse 1996	NA NA	NA
-Propenoic acid	79-10-7		Hansch, et al 1995 in Syracuse 1996	NA NA	NA
		111111111111111111111111111111111111111		7.77	
,3'-Dichlorobenzidine	91-94-1		Howard 1990 <sup>j</sup>	NA	NA
,3'-Dimethoxybenzidine	119-90-4		Debnath, et al 1992 in Syracuse 1996	NA	NA
,3'-Dimethylbenziding	119-93-7	2.34	Hansch and Leo 1985 in Syracuse 1996	NA	NA

Appendix Table C-1. Bioaccumulation Factors and Log Octanol-Water Partition Coefficients (Kows) For Analytes at 40 mm Range, Ravenna, Ohio

Chemical	CAS Registry Number	Log Kow*	Source	BAF MAX	Source
.4-Dichloroaniline	95-76-1	2,69	Russom, et al 1996	NA	NA
4-Dichlorophenol	95-77-2	3.33	Hansch and Leo 1985 in Syracuse 1996	NA	NA
-Chloroaniline	108-42-9	1.88	Hansch and Leo 1985 in Syracuse 1996	NA	NA
-Chlorophenol	108-43-0	2.50	Howard 1990	NA	NA
-Nitroaniline	99-09-2	1.37	Hansch and Leo 1985 in Syracuse 1996	NA	NA
-Pentanone	96-22-0	0.99	Hansch and Leo 1985 in Syracuse 1996	NA	NA
,4-Methylenedianiline	101-77-9	1.59	Hansch and Leo 1985 in Syracuse 1996	NA	NA
6.6-Dinitro-2-methylphenol	534-52-1	2.12	Hansch and Leo 1985 in Syracuse 1996	NA	NA.
-Bromoaniline	106-40-1	2,26	Hansch and Leo 1985 in Syracuse 1996	NA	NA
l-Bromophenyl phenyl-ether	101-55-3	5.00	EPA 1995a in Jones et al 1996	NA	NA
	35421-08-0	3.10	Russom, et al 1996	NA.	NA
4-Chloro-3-methylphenol	106-47-8	1.83	Howard 1990	NA	NA
1-chloroaniline	106-48-9	2.39	Howard 1990.	NA	NA
4-Chlorophenol		4.08	Sangster 1994 in Syracuse 1996	NA.	NA
-Chlorophenyl-phenyl ether	7005-72-3		Hansch and Leo 1985 in Syracuse 1996	NA	NA
4-Chlorotoluene	106-43-4	3.33		NA	NA
4-Methyl 2-Pentanone	108-10-1	1.31	Syracuse 1996 in Jones, et al 1996	100	NA
-Methylphenol	106-44-5	1.90	SCDM 1993 in HAZWRAP 1994	NA NA	NA
-Nitroaniline	100-01-6	1.39	Hansch and Leo 1985 in Syracuse 1996	NA NA	NA NA
-Nitrophenol	100-02-7	1.91	Howard 1990	NA NA	
4-Nitroquinoline-1-oxide	56-57-5	1.09	Hansch and Leo 1985 in Syracuse 1996	NA	NA
1-Toluidine	106-49-0	1.39	Russom, et al 1996	NA	NA
5-Nitro-o-Toluidine	99-55-8	1.87	Hansch, et al 1995 in Syracuse 1996	NA	NA
Acenaphthene	83-32-9	3.92	EPA 1995a in Jones, et al 1996	NA	NA
Acenaphthylene	208-96-8	4.10	SCDM 1993 in HAZWRAP 1994	NA	NA
Acetone	67-64-1	-0.24	EPA 1995a in Jones, et al 1996	NA	NA
Acetonitrile	75-05-8	0.25	Howard 1990	NA	NA
Acetonitrile	75-05-8	-0.34	Hansch and Leo 1995 in Syracuse 1996.	NA	NA
Acrolein	107-02-8	-0.01	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Acrylamide	79-06-1	-0.67	Howard 1990	NA	NA
Aldicarb	116-06-3	1.13	EPA 1995c	NA	NA
Aldrin	309-00-2	6.50	EPA 1995e in Sample, et al 1996	NA	NA
	122-09-8	1.90	Hansch and Leo 1985 in Syracuse 1996	NA	NA
alpha, alpha-Dimethylphenethylamine	319-84-6	3.80	SCDM 1993 in HAZWRAP 1994	NA	NA
lpha-BHC		1.94	(estimated, Talmage et al. 1999)	NA	NA
2-Amino-4,6-dinitrotoluene	35572-78-2	2.00	No Source	NA NA	NA
4-Amino-2,6-dinitrotoluene	19406-51-0	0.00		NA	NA
Aniline	62-53-3	0,90	Howard 1990	NA.	NA
Anthracene	120-12-7	4,55	EPA 1995a in Jones, et al 1996		NA
Aroclor 1016	1264-11-2	5.60	ATSDR 1989 in Jones, et al 1996	NA.	
PCB-1016	1264-11-2	5,60	ATSDR 1989 in Jones, et al 1996	NA.	NA
Aroclor 1221	11104-28-2	4.70	ATSDR 1989 in Jones, et al 1996	NA	NA
PCB-1221	11104-28-2	4.70	ATSDR 1989 in Jones, et al 1996	NA	NA
Aroclor 1232	11141-16-5	5.10	ATSDR 1989 in Jones, et al 1996	NA	NA
PCB-1232	11141-16-5	5.10	ATSDR 1989 in Jones, et al 1996	NA	NA
Aroclor 1242	53469-21-9	5,60	ATSDR 1989 in Jones, et al 1996	NA NA	NA
PCB-1242	53469-21-9	5.60	ATSDR 1989 in Jones, et al 1996	NA.	NA
Arocior 1248	12672-29-6	6.20	ATSDR 1989 in Jones, et al 1996	NA	NA
PCB-1248	12672-29-6	6.20	ATSDR 1989 in Jones, et al 1996	NA	NA
Aroclor 1254	27323-18-E	6.50	ATSDR 1989 in Jones, et al 1996	NA.	NA
PCB-1254	27323-18-8	6.50	ATSDR 1989 in Jones, et al 1996	NA	NA
Aroclor 1260	11096-82-5	6.80	ATSDR 1989 in Jones, et al 1996	NA	NA
PCB-1260	11096-82-5	6.80	ATSDR 1989 in Jones, et al 1996	NA .	NA
	1912-24-9	2.75	EPA 1995c	NA	NA
Atrazine		3.82	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Azobenzene	103-33-3		Schwarzenbach, et al 1993	NA NA	NA
Benzaldehyde	100-52-7	1.48		NA.	NA
Benzene	71-43-2	2.13	EPA 1995a in Jones et al 1996	NA.	NA
Benzidine	92-87-5	1.66	EPA 1995a in Jones et al 1996		
Benzo(a)anthracene	56-55-3	5.70	EPA 1995a in Jones et al 1996	NA.	NA
Benzo(a)pyrene	50-32-8	6.11	EPA 1995a in Jones et al 1996	NA	NA
Benzo(b)fluoranthene	205-99-2	6.10	SCDM 1993 in HAZWRAP 1994	NA	NA
Benzo(e)pyrene	192-97-2	6.44	Devoogt, et al 1990 in Syracuse 1996	NA	NA
Benzo(g,h,i)perylene	191-24-2	6.60	SCDM 1993 in HAZWRAP 1994*	NA	NA
Benzo(k)fluoranthene	207-08-9	6.10	SCDM 1993 in HAZWRAP 1994	NA	NA.
	65-85-0	1.87	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Benzoic acid	100-51-6	1.11	EPA 1995a in Jones et al 1996	NA	NA
Benzyl alcohol	100-44-7	2.30	Hansch and Leo 1985 in Syracuse 1996	NA	NA.
Benzyl chloride		100000000000000000000000000000000000000	EPA 1995e in Sample, et al 1996	NA	NA
beta-BHC	319-85-7	3.81			
BHC-mixed isomers	-	5.89	EPA 1995e in Sample, et al 1996	NA NA	NA
Biphenyl	95-52-4	3.96	EPA 1995h in Jones et al 1996	NA	NA
bis(2-chloroethyl)ether	111-44-4	1.29	Howard 1990	NA	NA.
Bis(2-ethylhexyl)phthalate	117-81-7	7.60	Syracuse 1996 in Jones, et al 1996°	NA	NA

Appendix Table C-1. Bioaccumulation Factors and Log Octanol-Water Partition Coefficients (Kows) For Analytes at 40 mm Range, Ravenna, Ohio

Chemical	CAS Registry Number	Log Kow' (L/kg)	Source	BAF MAX	Source
Bromobenzene	108-86-1	2.99	Schwarzenbach, et al 1993	NA	NA
Bromodichloromethane	75-27-4	1.41	Syracuse 1996 in Jones, et al 1996	NA	NA
Butane	106-97-8	2.89	Schwarzenbach, et al 1993	NA	NA
Butylbenzylphthalate	85-68-7	4.84	EPA 1995a in Jones, et al 1996	NA	NA
Captan	133-06-2	2.35	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Carbaryl	65-25-2	2.36	Schwarzenbach, et al 1993	NA NA	NA
Carbazole					
	86-74-8	3.76	Hansch and Leo 1979 in HAZWRAP 1994	NA	NA
Carbofuran	1563-66-2	2.32	EPA 1995c	NA	NA
Carbon Disulfide	75-15-0	2.00	EPA1995a in Jones, et al 1996	NA.	NA
Carbon Tetrachloride	56-23-5	2.73	EPA 1995a in Jones, et al 1996	NA	NA
Chloracetamide	79-07-2	-0.53	Hansch and Leo 1985 in Syracuse 1996	NA.	NA
Chlordane	57-74-9	6.32	EPA 1995a in Jones, et al 1996	NA	NA
Chlordecone	143-50-0	5.30	EPA 1995e in Sample, et al 1996	NA	NA
Chlorobenzene	108-90-7	2.86	EPA 1995a in Jones, et al 1996	NA	NA
Chlorobenzilate	510-15-6	4.74	Chem Inspect Test Inst. 1992 in Syracuse 1996	NA	NA
Chlorodifluoromethane	75-45-6	1.08	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Chloroethane	75-00-3	1.43	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Chloroform	67-66-3	1.92	EPA 1995e in Sample, et al 1996	NA	NA
Chloromethane	74-87-3	0.91	Schwarzenbach, et al 1993	NA	NA.
Chloropropene	107-05-1	2.03	Howard 1990	NA NA	NA NA
	441,44				
Chrysene	218-01-9	5.70	SCDM 1993 in HAZWRAP 1994	NA	NA
Cis-1,3-Dichloropropene	10061-02-6	2.06	Tomlin 1994 in Syracuse 1996	NA	NA
Cumene	98-82-8	3.66	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Cyanogen	460-19-5	0.07	Hansch, et al 1995 in Syracuse 1996	NA	NA
Cyclohexanol	108-93-0	1.23	Schwarzenbach, et al 1993	NA	NA
Cyclohexanone	108-94-1	0.81	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Cyclopentane	287-92-3	3.00	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Dalapon	75-99-0	0.78	EPA 1995c	NA	NA
ODT	50-29-3	6.53	EPA 1995a in Jones, et al 1996	NA	NA
4'-DDT	50-29-3	6.53	EPA 1995a in Jones, et al 1996	NA	NA
Decane	124-18-5	5.01	EPA 1995a in Jones, et al 1996	NA	NA
lelta-BHC	319-86-8	4.10	SCDM 1993 in HAZWRAP 1994	NA	NA
Diallate		1015.0			
	2303-16-4	4.49	Ellington and Stancil 1988 in Syracuse 1996	NA	NA
Diazinon	333-41-5	3.70	EPA 1995a in Jones, et al 1996	NA	NA
Dibenzo(a,h)anthracene	53-70-3	6.50	SCDM 1993 in HAZWRAP 1994	NA	NA
Dibenzofuran	132-64-9	4.12	EPA 1995a in Jones, et al 1996	NA	NA
Dibromochloromethane	124-48-1	2.16	Sangster 1994 in Syracuse 1996	NA	NA
Dibromomethane	74-95-3	1.70	Martiska, A, Bekarek, V 1990 in Syracuse 1996	NA	NA
Dichlorodifluromethane	74-71-8	2.53	Swarzenbch, et al 1993	NA	NA
Dieldrin	60-57-1	5.37	EPA 1995a in Jones, et al 1996	NA	NA
Dienochlor	2227-17-0	3.50	British Crop Protection Council 1987 in ARS 1999	NA	NA
Diethyl Sulfide	352-93-2	1.95	Schwarzenbach, et al 1993	NA	NA
Diethylphthalate	84-66-2	2.50	EPA 1995a in Jones, et al 1996	NA	NA
Diisobutylphthalate	84-69-5	4.11	Schwarzenbach, et al 1993	NA	NA
Dimethoate	60-51-5		Hansch and Leo 1985 in Syracuse 1996	NA	NA
Dimethylphthalate	131-11-3	1.53	Schwarzenbach, et al 1993	NA NA	NA
Di-n-butylphthalate	84-74-2		EPA 1995a in Jones, et al 1996	NA	NA
Di-n-octylphthalate	117-84-0		Ellington and Floyd 1996 in Syracuse 1996	NA	NA
Dinoseb	88-85-7	3.56	Hansch, et al 1995 in Syracuse 1996	NA	NA
Dioxin	1746-01-6	6.80	EPA 1995d <sup>d</sup>	NA	NA
Diphenyl ether	101-84-8	4.21	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Piphenylamine	122-39-4		Russom, et al 1996	NA	NA
liquat	85-00-7		EPA 1995c	NA	NA
Disulfoton	298-04-4	2,44	Hansch and Leo 1985 in Syracuse 1996	NA	NA
biuron	330-54-1			NA NA	
ndosulfan			Dupon Cortporation Data 1989 in ARS 1999		NA
	115-29-7		EPA 1995a in Jones, et al 1996	NA	NA
ndosulfan sulfate	1031-07-8		Hansch, et al 1995 in Syracuse 1996	NA	NA
ndosulfan I	959-98-8		Hansch and Leo 1985 in Syracuse 1996	NA	NA
Endrin	72-20-8		EPA 1995a in Jones, et al 1996	NA	NA
indrin Aldehyde	7421-93-4	3.14	Arthur D. Little, Inc. 1981 in HAZWRAP 1994	NA	NA
pichlorohydrin	106-89-8		Deneer, et al 1988 in Syracuse 1996	NA	NA
thane	74-84-0	1.81	Schwarzenbach, et al 1993	NA	NA
thanol	64-17-5		EPA 1992b in Sample, et al 1996	NA	NA

Appendix Table C-1. Bioaccumulation Factors and Log Octanol-Water Partition Coefficients (Kows) For Analytes at 40 mm Range, Ravenna, Ohio

Chemical	CAS Registry Number	Log Kow	Source	BAF MAX	Source
	141-78-6	0.69	EPA 1995e in Sample, et al 1996	NA	NA
Ethyl Acetate	100-41-4	3.14	EPA 1995a in Jones, et al 1996	NA	NA
Ethylbenzene	51-79-6	-0.15	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Ethyl carbamate		0.89	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Ethyl ether	60-29-7		Hansch, et al 1995 in Syracuse 1996	NA	NA
Ethylene Dibromide	106-93-4	1,96	Hansen, et al 1993 in Sylacuse 1990	NA	NA
Ethylene glycol	107-21-1	-1.36	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Famphur	52-85-7	2.23	Hansch and Leo 1985 in Syracuse 1996	NA	NA
luometuron	2164-17-2	1.34	Schwarzenbch et al 1993	NA NA	NA.
Fluoranthene	206-44-0	5.12	EPA 1995a in Jones, et al 1996		NA.
Fluorene	86-73-7	4.21	EPA 1995a in Jones, et al 1996	NA	NA
luorobenzene	462-06-6	2,27	Swarzenbch et al 1993	NA	
Formaldehyde	50-00-0	-0,05	EPA 1995e in Sample, et al 1996	NA	NA
Formamide	75-12-7	-1.51	Hansch and Leo 1985 in Syracuse 1996	NA	NA
formic acid	64-18-6	-0.54	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Furan	110-00-9	1,34	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Furfural	98-01-1	0.41	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Teptachlor	76-44-8	6.10	EPA 1995a in Jones, et al 1996	NA	NA
Teptachlor Epoxide	1024-57-3	5.40	SCDM 1993 in HAZWRAP 1994	NA	NA
Heptane	142-82-5	4.66	Miller, M.M., et al 1985 in Syracuse 1996	NA	NA
Teptane Hexachlorobenzene	118-74-1	5.50	Schwarzenbach, et al 1993	NA	NA
Hexachlorobenzene Hexachlorobutadiene	87-68-3	4.90	Schwarzenbach, et al 1993	NA	NA
	77-47-4	5.04	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Hexachlorocyclopentadiene	67-72-1	4.00	EPA 1995a in Jones, et al 1996	NA	NA
Hexachloroethane	2.1.1	7.54	Hansch, et al 1995 in Syracuse 1996	NA	NA
Hexachlorophene	70-30-4	0.34	Pesticide Manual, 1994in ARS 1999	NA	NA
mazaquin-ammonium	81335-47-9	3-10-1	British Crop Protection Council 1986 in ARS 1999	NA	NA
lmazilil	35554-44-0	3.82		NA	NA
isobutyl alcohol	78-83-1	0.76	Hansch and Leo 1985 in Syracuse 1996	NA	NA
sophorone	78-59-1	1.70	Veith, G.D., et al 1980 in Syracuse 1996	NA NA	NA
Lindane (gamma-BHC)	58-89-9	3.73	EPA 1995a in Jones, et al 1996		NA
Lindane	58-89-9	3.73	EPA 1995a in Jones, et al 1996	NA	
Malathion	121-75-5	2,89	Schwarzenbach, et al 1993	NA	NA
MCPA	94-74-6	2.80	Pionke, H.B., Deangelis, R.J. 1980 in ARS 1999	NA	NA
m-cresol	108-39-4	1.96	Howard 1990.	NA	NA
Methacrylonitril	126-98-7	0.68	Tanii and Hashimoto 1994 in Syracuse 1996	NA	NA
Methanol	67-56-1	-0.71	EPA 1995e in Sample, et al 1996	NA	NA
Methapyrilene	91-80-5	2.87	Sangster 1994 in Syracuse 1996	NA	NA
Methomyl	16752-77-5	0.57	Dupont Corporation Data 1989 In ARS 1999	NA.	NA
Methoxychlor	72-43-5	5.08	EPA 1995a in Jones, et al 1996	NA.	NA
Methyl bromide	74-83-9	1.19	Hansch and Leo 1985 in Syracuse 1996	NA.	NA
Methyl iodide	74-88-4	3.36	EPA 1995a in Jones, et al 1996	NA.	NA
	80-62-6	1.38	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Methyl metharcrylate	108-87-2	3.61	Hansch, et al 1995 in Syracuse 1996	NA.	NA
Methylcyclohexane	75-09-2	1.25	EPA 1995a in Jones, et al 1996	NA	NA
Methylene Chloride	60-34-4	-1.06	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Methylhydrazine	77.7.7		Hansch, et al 1995 in Syracuse 1996	NA	NA
Methylstyrene	98-83-9	3.48		NA	NA
Mirex	2385-85-5	6.89	Veith, et al 1979 in Syracuse 1996	NA NA	NA
M-nitrosodiphenylamine	86-30-6	3.13	Hansch and Leo 1985 in Syracuse 1996	NA.	NA
m-Nitrotoluene	99-08-1	2.45	Russom, et al 1996	NA NA	NA
3-Nitrotoluene	99-08-1	2.45	Russom, et al 1996		NA
Naphthalene	91-20-3	3.36	EPA 1995a in Jones, et al 1996	NA	
n-Butyl benzene	104-51-8	4.38	DeBruijn, J, et al 1989 in Syracuse 1996	NA.	NA
n-Hexane	110-54-3	4.11	Schwarzenbach, et al 1993	NA	NA
Nitrobenzene	98-95-3	1.83	Schwarzenbeh et al 1993	NA	NA
Nitroglycenn	55-63-0	1.62	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Nitromethane	75-52-5	-0.35	Hansch and Leo 1985 in Syracuse 1996	NA	NA
n-Nitrochlorobenzene	100-00-5	2.39	Hansch and Leo 1985 in Syracuse 1996	NA	NA
	55-18-5	0.48	Hansch and Leo 1985 in Syracuse 1996	NA	NA
N-Nitrosodiethylamine	59-89-2	-0.44	Hansch and Leo 1985 in Syracuse 1996	NA	NA.
N-Nitrosomorpholine N-Nitrosopiperidine	100-75-4	0.36	Hansch and Leo 1985 in Syracuse 1996	NA	NA.

Appendix Table C-1. Bioaccumulation Factors and Log Octanol-Water Partition Coefficients (Kows) For Analytes at 40 mm Range, Ravenna, Ohio

Chemical	CAS Registry Number	Log Kow (L/kg)	Source	BAF MAX	Source
N-Nitrosopyrrolidine	930-55-2	-0.19	Hansch and Leo 1985 in Syracuse 1996	NA	NA
n-Pentane	109-66-0	3,62	Swarzenbch, et al 1993	NA	NA
n-Pentylbenzene	538-68-1	4.90	Schwarzenbach, et al 1993	NA	NA
n-propyl benzene	103-65-1	3.69	Sangster 1994 in Syracuse 1996	NA	NA
o-Cresol	95-48-7	1.99	EPA 1995e in Sample, et al 1996	NA	NA
Octachloronaphthalene	2234-13-1	8.24	Opperhuizen, A 1985 in Syracuse 1996 <sup>b</sup>	NA	NA
o-Dichlorobenzene	95-50-1	3.38	EPA 1995d	NA	NA
o-Dinitrobenzene	528-29-0	1.69	Hansch, et al 1995 in Syracuse 1996	NA	NA
o-Nitroaniline	88-74-4	1.85	Hansch and Leo 1985 in Syracuse 1996	NA	NA
o-Nitrophenol	88-75-5	1.79	Howard 1990	NA	NA
o-Nitrotoluene	88-72-2	2.30	Opperhuizen, A 1985 in Syracuse 1996	NA	NA
2-Nitrotoluene	88-72-2	2.30	Opperhuizen, A 1985 in Syracuse 1996	NA	NA
Oxadiazon	19666-30-9	4.70	Rhone-Poulenc Corporation Data in ARS 1999	NA	NA
p,p'-DDD	72-54-8	6.10	EPA 1995a in Jones, et al 1996	NA	NA
4,4'-DDD	72-54-8	6.10	EPA 1995a in Jones, et al 1996	NA NA	NA
1,4'-DDE	72-55-9	6.26	EPA 1995a in Jones, et al 1996		
Parathion	(A)P), E E (E.			NA	NA
o-Cresol	56-38-2	3.81	Schwarzenbach, et al 1993	NA	NA
o-Cresol o-Dichlorobenzene	106-44-5	1.94	Hansch and Leo 1985 in Syracuse 1996	NA	NA
	106-46-7	3.37	EPA 1995d	NA	NA
Pentachloroaniline	527-20-8	4.82	Sangster 1994 in Syracuse 1996	NA	NA
Pentachlorobenzene	608-93-5	5.26	EPA1995a in Jones, et al 1996	NA	NA
Pentachloroethane	76-01-7	3.63	Russom, et al 1996	NA	NA
Pentachloro-nitrobenzene	82-68-8	4.64	EPA 1995e in Sample, et al 1996	NA	NA
Pentachlorophenol	87-86-5	5.09	EPA 1995e in Sample, et al 1996	NA	NA
Phenacetin	62-44-2	1.58	Nakagawa, Y, et al 1992 in Syracuse 1996	NA	NA
Phenanthrene	85-01-8	4.55	EPA1995a in Jones, et al 1996	NA	NA
Phenmediphan	13684-63-4	3.59	Noram Company Data in ARS 1999	NA	NA
Phenol	108-95-2	1.48	EPA1995a in Jones, et al 1996	NA	NA
Phorate	298-02-2	3.56	Hansch, et al 1995 in Syracuse 1996	NA	NA
Phosmet	732-11-6	3.00	Beguhn, M.A. 1989 in ARS 1989	NA	NA
Phthalic acid	100-21-0	2.00	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Phthalic anhydride	85-44-9	1.60	Panoma 1987 in Syracuse 1996	NA	NA
-Nitrophenol	100-02-07	1.91	Howard 1990	NA	NA
-Nitrotoluene	99-99-0	2.37	Howard 1990	NA	NA
-Nitrotoluene	99-99-0	2,37	Howard 1990	NA	NA
-Phenylenediamine	106-50-3	-0.30	Hansch, et al 1995 in Syracuse 1996	NA	NA
Profenofos	41198-08-7	1.70	Ciba-Geigy Corporation Data 1989 in ARS 1999	NA	NA
ronamide	23950-58-5	0.05	EPA1995a in Jones, et al 1996	NA	NA
Propionitril	107-12-0	0.16	Hansch and Leo 1985 in Syracuse 1996	NA	NA
ryidine	110-86-1	0.65	Russom, et al 1996	NA	NA
yrene	129-00-0	5.13	Schwarzenbach, et al 1993g	NA	NA
Duinoline	91-22-5	2.03	Hansch and Leo 1985 in Syracuse 1996	NA	NA
Duinone	106-51-4	0.20	Hansch and Leo 1985 in Syracuse 1996	NA NA	NA
XDX	121-82-4	0.87	Schwarzenbach, et al 1993	NA NA	NA
ec-Butyl benzene	135-98-8	4.57	Sherblom, et al 1988 in Syracuse 1996	NA.	NA NA
silvex	93-72-1	3.80	Hansch, et al 1995 in Syracuse 1996	NA.	NA
imazine	122-34-9	2.18	EPA 1995c	NA NA	NA NA
trychnine	57-24-9	1.93	Panoma 1987 in Syracuse 1996	NA NA	NA NA
tyrene	100-42-5	2.95	Schwarzenbach, et al 1993	NA NA	
ebuthiuron	34014-18-1	1.79	ARS 1999	NA NA	NA
	0.45200000000000000000000000000000000000		1	2.0001	NA
emephos	3383-96-8	4.90	British Crop Protection Council 1994 in ARS 1999	NA	NA
ert-Butyl benzene	98-06-6	4.11	Hansch and Leo 1985 in Syracuse 1996	NA	NA
etrachloroethane	25322-20-7	2.39	Schwarzenbach, et al 1993	NA	NA
etrachloroethene	127-18-4	2.88	Schwarzenbach, et al 1993	NA	NA
etrachloroethylene	127-18-4		EPA 1995d	NA	NA
etrachloromethane	56-23-5		EPA 1995a in Jones, et al 1996	NA.	NA
etrahydrofuran	109-99-9		Hansch and Leo 1985 in Syracuse 1996	NA	NA
oluene	108-883		EPA 1995a in Jones, et al 1996	NA	NA
oxaphene	8001-35-2		EPA 1995e in Sample, et al 1996	NA	NA
rans-1,3-Dichloropropene	10061-02-6		Tomlin 1994 in Syracuse 1996	NA	NA
ribromomethane	75-25-2		EPA 1995a in Jones, et al 1996	NA	NA
ributyl phosphate	126-73-8		Hansch and Leo 1985 in Syracuse 1996	NA	NA
richloroethene	636-30-6	2.71	EPA 1995a in Jones, et al 1996	NA	NA
richloroethylene	79-01-6		EPA 1995e in Sample, et al 1996	NA	NA
richlorofluoromethane	75-69-4	2.16	Schwarzenbach, et al 1993	NA	NA
riethylamine	121-44-8	1.45	Hansch and Leo 1985 in Syracuse 1996	NA	NA
rifluorobromomethane	75-63-8		Hansch and Leo 1985 in Syracuse 1996	NA	NA

Appendix Table C-1. Bioaccumulation Factors and Log Octanol-Water Partition Coefficients (Kows) For Analytes at 40 mm Range, Ravenna, Ohio

Chemical	CAS Registry Number	Log Kow'	Source	BAF MAX	Source
Vinvl acetate	108-05-4	0.73	EPA 1995a in Jones, et al 1996	NA.	NA
Vinyl Chloride	75-01-4	1.50	EPA 1995e in Sample, et al 1996	NA	NA
Xylene	1330-20-7	3.13	EPA 1995a in Jones, et al 1996	NA	NA
Xylene (mixed isomers)	1330-20-7	3.20	EPA 1995e in Sample, et al 1996	NA	NA
Ziram	137-30-4	1.09	British Crop Protection Council 1994 in ARS 1999	NA	NA

<sup>\*</sup>Log Octanol-Water partition coefficient.

BAF Max = Bioaccumulation factor maximum (if BAF Max is > 1, the inorganic chemical is likely to bioaccumulate)

-- = no log Kow found

NA = not applicable

<sup>b</sup> Syracuse 1996. Syracuse Research Corporation, Environmental Sciences Center's on-line experimental Log P database conducted June 7, 1996.

<sup>6</sup> Jones, D.S., R.N. Hull, G.W. Suter II. 1996. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1996 Revision. Lockheed Martin Energy Systems, Inc. Oak Ridge, TN 37831.-

EPA. 1995d. National Primary Drinking Water Regulations; Contaminated Specific Fact Sheets Volatile Organic Chemicals, Technical Version. USEPA Office of Water. EPA 811-F-95-004-T.

\*HAZWRAP (Hazardous Waste Remedial Action Program). 1994. Loring Air Force Base. Ecological Risk Assessment Methodology.

<sup>1</sup>Sample, B.E., D.M. Opresko, G.W. Suter II. 1996. Toxicological Benchmarks for Wildlife. Lockheed Martin Energy Systems, Inc. Oak Ridge, To. 37381

<sup>8</sup> Schwarzenbach, R.E., P.M. Gschwend, D.M. Imboden. 1993. Environmental Organic Chemistry. John Wiley & Sons, New York.

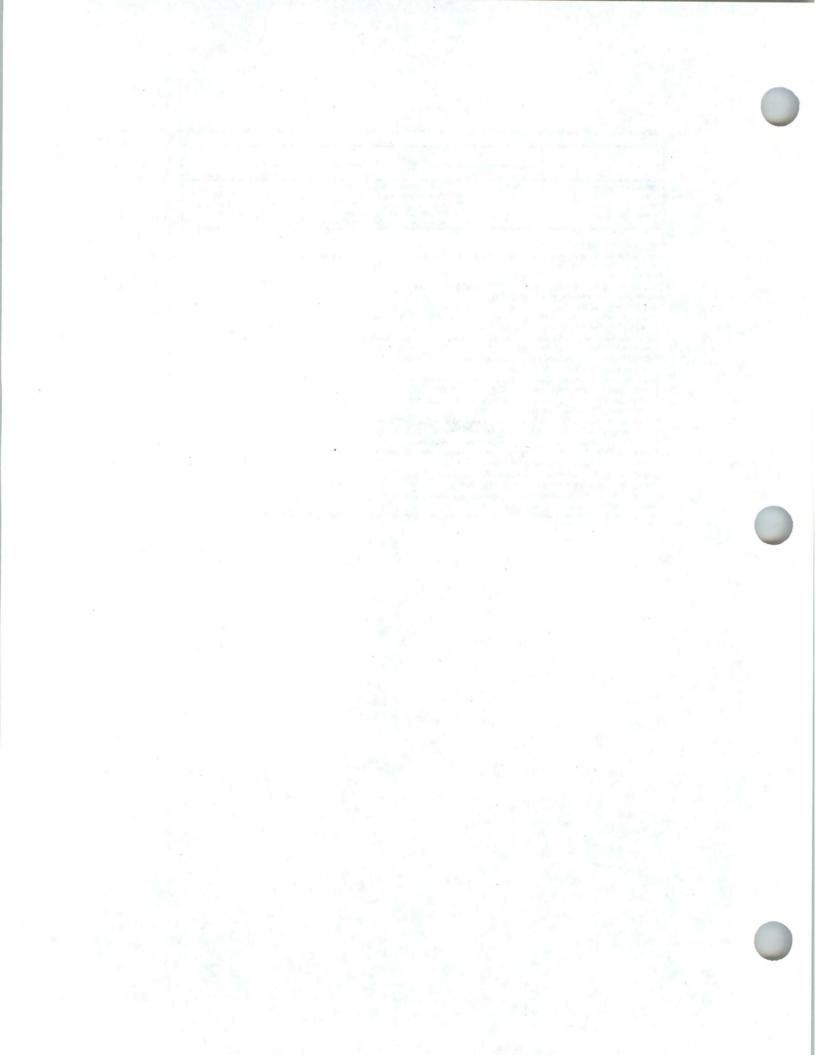
<sup>b</sup> United States Department of Agriculture, Agricultural Research Service (ARS) 1999. Remote Sensing and Modeling Lab. 10300 Baltimore Ave. Bldg. 007. Beltsville, MD. 20705.

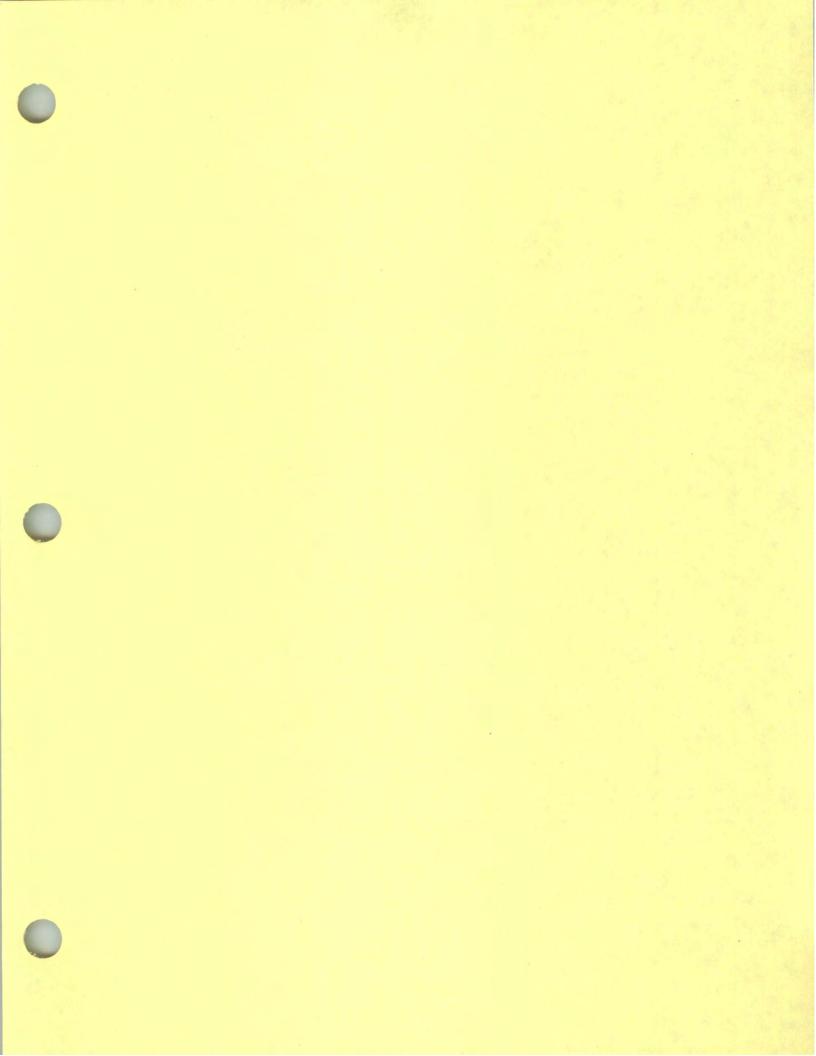
Russon, C.L., S. Bradbury, S. Broderius. 1996. Environmental Toxicology and Chemistry. V. 16. No. 5, pp. 948-967. Predicting Modes of Toxic Action from chemical Structure: Acute Toxicity in the Fathead Minnow (pimephales Promela).

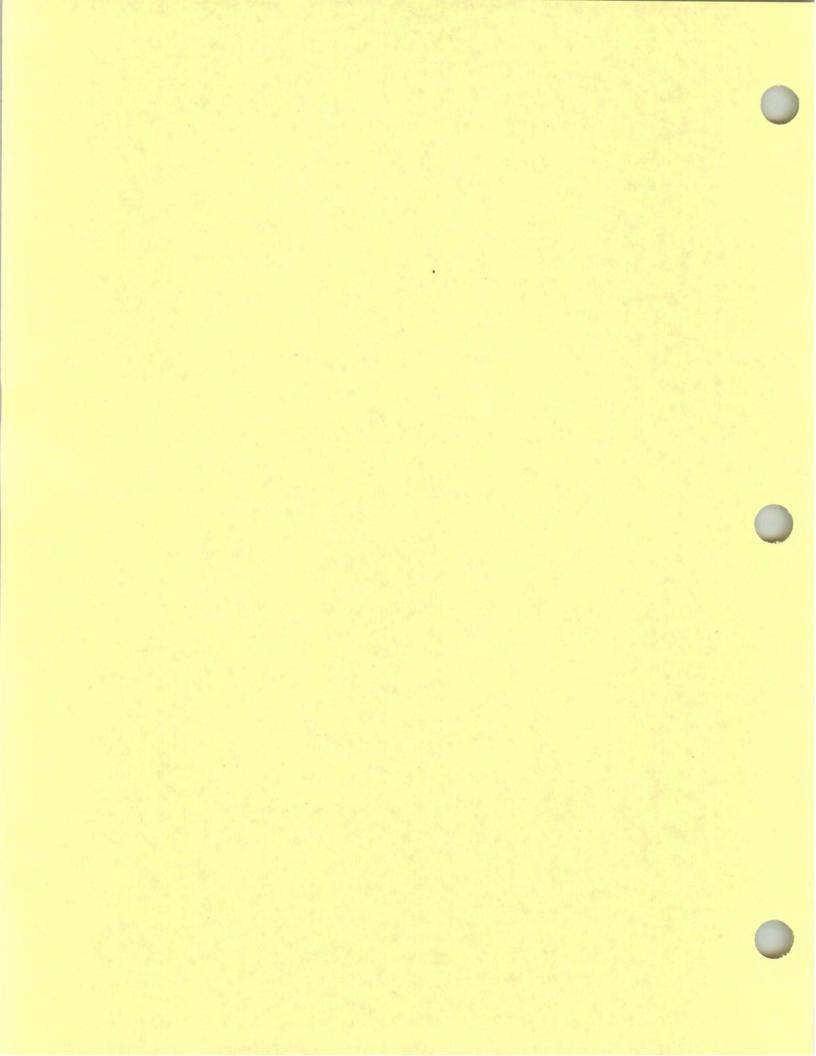
JHoward, Philip, H. 1990. Handbook of Environmental Fate and Exposure Data for Organic Chemicals VI. Lewis Publishers, Chelsea, Michigan.

<sup>k</sup> EPA. 1995c. National Primary Drinking Water Regulations; Contaminant Specific Fact Sheets. USEPA Ofice of Water. EPA 811-F-95-004-T.

U.S. EPA 1994b. Draft Report-Chemical Properties for Soil Screening Levels. Prepared for the OERR. Washington, D.C. July 26.







Page 1 of 8

No Soil, only Solution, LOEC Preferred Ecological Screening Value No Soil, only Solution, LOEC ESL EPA Region 5 (2003) PPL (SAIC 2002) PPL (SAIC 2002) No Source LOEC PRGs PRGs PRGs No Source No Source No Source No Source PRGS PRGs PRGs PRGs PRGs PRGs NOEC LOEC PRGs PRGs PRGs PRGs PRGs PRGs LOEC NOEC PRGs PRGs (ESV)" 2.00E+01 Number (mg/kg) 2.83E+02 1.00E+61 5.00E-01 1.00E+01 2.00E+01 1.39E+01 2.00E+02 5.00E+00 9.90E+00 4.00E+00 No ESV 4.00E-01 1.08E+00 4.00E+00 2.00E+02 5,00E+01 No ESV 5.10E-04 2.00E+00 3.00E+01 No ESV No ESV 2.10E-01 2.00E+00 1.00E+00 S.00E+01 4,00E-01 4.05E+01 2.00E+00 1.00E+02 2,00E+00 3.58E-03 2.00E-01 No ESV ESL EPA Region 5 (2003) Ecological Screening Level (ESL) ESL EPA Region 5 (2003) Number (mg/kg) 0.05373 0.00358 0.02765 0.05692 0.14033 1.04 4.04 7.62 5.5 0.4 13 only Solution, LOEC No Soil, only Solution, LOEC No Soil, only Solution, LOEC No Soil, only Solution, LOEC Soil Screening values for Plants Appendix Table C-2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Ohio (Efroymson et al. 1997c) Soil, LOEC Soil, LOEC Soil, LOEC Soil, LOEC Soil, LOEC Soil, LOEC Soil ,NOEC Soil, LOEC Soil, NOEC Soil, LOEC Sail, LOEC Soil, LOEC Soil, LOEC Soil, LOEC Soil, LOEC Soil ,NOEC Soil, LOEC (Solution) Soil, LOEC Soil, LOEC Soil NOEC Soil, LOEC Soil, LOEC Sod , NOEC Soil, NOEC Source Soil Screening Values Soil. No Number mg/kg mg/L 500 500 Benchmarks for Earthworm Benchmarks for soil microorganism Screening Value for Earthworms and Soil Microorganisms Source LOEC LOEC LOEC LOEC LOEC LOEC LOEC LOEC COEC NOEC NOEC LOEC NOEC LOEC LOEC (Efroymson et al. 1997b) Number (mg/kg) 1000 Source LOEC NOEC LOEC LOEC LOEC LOEC NOEC LOEC (mg/kg) Number 1 1 1 1 1 1 009 1 1 1 0 1 5 200 Prehiminary
Remediation Goals
for Ecological
Endpoints\* Efroymson et al. (1997a) PRGs Source PRGs **PRGs** Number (mg/kg) 0.00051 40.5 0.21 9.9 0.5 20 200 7440-09-7 7440-61-1 7440-36-0 7440-42-8 7440-48-4 7439-98-7 7440-22-4 7429-90-5 7440-38-2 7440-43-9 16065-83-1 (8540-29-9 57-12-5 7439-96-5 7439-97-6 8496-25-8 13494-80-9 7440-28-0 7440-32-6 Registry 7440-69-9 7440-70-2 7440-50-8 7782-41-4 7553-56-2 7439-91-0 7439-92-1 7439-93-2 7440-23-5 7440-26-8 7440-31-5 7440-39-3 7726-95-6 7439-89-6 7439-95-4 7440-02-0 7440-33-7 CAS Inorganics (Target Analyre List) hromium, bexavalent Copall
Copper
Copper
Cyanide
Flasorne
Ilouine
Ilouine Chemicals

No Soil, only Solution, LOEC No Soil, only Solution, LOEC ESL EPA Region 5 (2003) ESL EPA Region 5 (2003) Preferred Ecological Screening Value ESL EPA Region 5 (2003) No Source PRGs Source PRGs LOEC (ESV) ESL EPA Region 5 (2003) 8.96E+01 2.00E+02 5.21E+00 1.52E+00 8.50E+00 2.50E+00 3.05E-03 No ESV No ESV 2.55E-01 5.98E+01 1.19E+02 1.48E+02 No ESV 9.94E-02 3.98E-03 9.94E+00 5.00E-03 6.00E+01 3.02E-01 2.37E+01 9.26E-01 1.00E+02 5.40E-01 No ESV (mg/kg) No ESV No ESV 1.48E+03 No ESV No ESV No ESV No ESV No ESV 1.59E+01 No ESV 1.00E+03 3.32E-03 Number 2.00E+00 Ecological Screening Level (ESL) ESL EPA Region 5 (2003) (mg/kg) 0.25462 0.09939 23.7 Number 0.00305 0.05678 0.00398 0.305 0.00332 5.21 1.52 59.8 0.005 9'68 1480 9.94 0.54 15.9 1.59 682 682 2.5 1.37 119 148 6.62 No Soil, only Solution, LOEC No Soil, only Solution, LOEC Soil Screening values for Plants (Efroymson et al. 1997c) Soil, LOEC (Solution) Soil, LOEC Soil, NOEC Soil, LOEC Source (Soil) Soil Screening Values Number mg/kg 1 500 1111111111111111111111 1 00 20 5 Benchmarks for Earthworm Benchmarks for soil microorganism Screening Value for Earthworms and Soil Microorganisms LOEC LOEC (Efroymson et al. 1997b) Number (mg/kg) 000 20 Source LOEC Number (mg/kg) - 200 Preliminary
Remediation Goals
for Ecological
Endpoints\* Source Efroymson et al. (1997a) PRGs . PRGs PRGs PRGs Number (mg/kg) 2 5 20 71-43-2 309-00-2 35572-78-2 19406-51-0 120-12-7 2674-11-2 1104-28-2 11141-16-5 53469-21-9 3672-29-6 1-69-26011 205-99-2 207-08-9 608-73-1 319-85-7 319-86-8 6-68-89 92-52-4 1-16-111 111-44-4 117-81-7 106-40-1 75-27-4 75-25-2 78-93-3 8-96-802 107-13-1 62-53-3 56-55-3 50-32-8 191-24-2 319-84-6 Registry 7440-62-2 7440-66-6 92-67-1 83-32-9 67-64-1 Number is(2-chloroethoxy) methane omophenyl-phenylether Amino-4,6-dinitrotoluene Amino-2,6-dinitrotoluene s(2-Ethylhexy1)phthalate iis(2-Chloroethyl) ether Organic Compounds 120(b)fluoranthene nzo(k)fluoranthene nzo(g,h,i)perylene nzo(a)anthracene Aminobiphenyl :nzo(a)pyrene rochlor-1260 rochlor-1221 rochlor-1232 rochlor-1242 rochlor-1248 3HC, gamma CB-1254 3HC, delta BHC, alpha nzene nthracene CB-1016 cta-BHC Siphenyl Chemicals

Appendix Table C-2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Ohio

Page 3 of 8

Preferred Ecological Screening Value No Soil, only Solution, LOEC No Soil, only Solution, LOEC ESL EPA Region 5 (2003) No Source PRGS PRGs PRGs 1.10E+00 (mg/kg) 2,39E-01 2.67E-01 No ESV 1.00E+03 2,00E+00 1.10E+00 2.24E-01 2.24E-01 9.41E-02 4.00E+01 5.05E+00 2,24E-01 1.19E+00 1.22E-02 6,00E+01 5.00E+01 No ESV 1.44E-01 1.63E+02 3.52E-02 2.00E+01 No ESV No ESV 7.00E+00 No ESV 2.90E-03 4.73E+00 3.49E+00 2.72E-02 2.05E+00 4.04E+01 4.04E+01 7,95E+00 4.52E-01 7.58E-01 3.50E-03 5.96E-01 No ESV No ESV Ecological Screening Level (ESL) ESL EPA Region 5 (2003) (mg/kg) 0.26707 0.09412 Number 0.0122 0.243 0.0029 1.1 13.1 5.05 0.224 0.224 0.0272 2.98 1 19 0.144 3.49 40.4 7.95 163 0.452 E No Soil, only Solution, LOEC No Soil, only Solution, LOEC Soil Screening values for Plants (Efroymson et al. 1997c) Soil, LOEC Soil, LOEC (Soil) Soil Screening Value mg/kg mg/L Benchmarks for soil microorganism Screening Value for Earthworms and Soil Microorganisms LOEC (Efroymson et al. 1997b) Number (mg/kg) Benchmarks for Earthworm LOEC LOEC LOEC LOEC Number Efroymson et al. (1997a) Preliminary Remediation Goals for Ecological Source PRGs PRGs PRGS PRGs Endpoints\* Number (mg/kg) 2789-03-6 12789-03-6 Registry 2789-03-6 924-16-3 75-15-0 56-23-5 79-07-2 106-47-8 108-42-9 106-47-8 1-06-801 510-15-6 75-00-3 67-66-3 74-87-3 7-85-16 95-57-8 108-43-0 6-81-901 7005-72-3 107-05-1 218-01-9 534-52-1 95-48-7 59-50-7 2303-16-4 86-74-8 59-50-7 95-48-7 106-44-5 94-75-7 72-54-8 72-55-9 333-41-5 108-39-4 50-29-3 53-70-3 ,2-Dibromo-3-Chloropropane Chlorophenyl-phenyl ether Nitrosodi-a-Butylamine bloro-3-methylphenol benzo(a,h)anthracene Dibromochloromethane uty Ibenzyl phthalate rbon tetrachloride 5-dinitro-o-Cresol chloro-m-Cresol arbon disulfide nzofuran arbazole ddd-,t 4-DDE 4'-DDT

Appendix Table C.2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Ohio

Page 4 of 8

								2011 3	Soil Screening Values				
		Efroymson et al. (1997a)	ymson et al. (1997a)	Screeni	ng Value for Ea	Screening Value for Earthworms and Soil Microorganisms (Efroymson et al. 1997b)	Microorganisms						
	940	Preliminary Remediation Go for Ecologica Fadaciate	Preliminary Remediation Goals for Ecological Fadroints*	Henchmarke	Reachmarks for Farthworm	Benchmarks for soil microorganism	il microorganism	Soil	Soil Screening values for Plants (Efroymson et al. 1997c) <sup>6</sup>	Ecologica	Ecological Screening Level (ESL)		Preferred Ecological Screening Value (ESV)
	Registry	Number	Source	Number	Source	Number	Source	Number	Source	Number	Source		Source
	Number	(mg/kg)		(mg/kg)		(mg/kg)		mg/kg ms/L	(Soil)	(mg/kg)		(mg/kg)	
Chemicals	1 00 701							-		1.23	ESL EPA Region 5 (2003)	1.23E+00	ESL EPA Region 5 (2003)
Dibromoethane	100-93-4	1 9	2000	901	NOFC			1		1		1.00E+02	PRGs
2,4-Dichloroaniline	95-76-1	20	PRGs	20	LOEC	ı		10	No Soil, only Solution, LOEC	1		2.00E+01	PRGs
5,4-Dichlorobanime	95-50-1	1				1		1		2.96	ESL EPA Region 5 (2003)	2.96E+00	ESL EPA Region 5 (2003)
p-Dichlorobenzene	106-46-7	20	PRGs	20	LOEC	ı		í		0.546	ESL EPA Region 5 (2003)	2.00E+01	PRGs
1,2-Dichlorobenzene	95-50-1	t		1		1		1		2.96	ESL EPA Region 5 (2003)	2 775+01	ESL EFA Region 5 (2003)
,3-Dichlorobenzene	541-73-1	ı		1		,		1		37.7	ESL EPA Region 5 (2003)	3.77E+01	ESL EFA KEGION 3 (2003)
1,4-Dichlorobenzene	106-46-7	20	PRGs	20	LOEC	1		1		0.546	ESI. EPA Region 5 (2003)	6.46E-01	ESL EPA Region 5 (2003)
3,3'-Dichlorobenzidine	91-94-1	ı		1		1 0001	Jaor	1 1				1.00E+03	LOEC
Cis-1,4-dichloro-2-butene	14/6-11-5					1000	LOEC	1		1		1.00E+03	LOEC
Trans-1,4-dichloro-2-bulene	75-34-3	1 1		1		1		1		20.1	ESL EPA Region 5 (2003)	2.01E+01	ESL EPA Region 5 (2003)
2 Diethorothan	107-06-2	1		1		1		1		21.2	ESL EPA Region 5 (2003)	2.12E+01	ESL EPA Region 5 (2003)
1-Dichloroethene	75-35-4	1				1		1		8.28	ESL EPA Region 5 (2003)	8.28E+00	ESL EPA Region 5 (2003)
2-Dichloroethene	540-59-0	1		1		ı		1		1		No ESV	No Source
Dichlorodifluromethane	75-71-8	ì		)		1		1	The state of the s	39.5	ESL EPA Region 5 (2003)	3.95E+01	ESL EPA Region 5 (2003)
2,4-Dichlorophenol	120-83-2	1		ī		1		20	No Soil, only Solution, LOEC	87.5	ESL EPA Region 5 (2003)	2.005+01	FST FPA Region 5 (2003)
2,6-Dichlorophenol	87-65-0	Î,		1 3		1		1 8	Jaol Los	1.17	EST ELA MARION A (2002)	2 00E+01	PRGs
3,4-Dichlorophenol	95-77-2	20	PRGs	200	TOEC	1		2 1	2011, 1000	32.7	ESL EPA Region 5 (2003)	7.00E+02	PRGs
1,2-Dichloropropane	78-87-5		PKUS	00/	LUEL	L		1		0.398	ESL EPA Region 5 (2003)	3.98E-01	ESL EPA Region 5 (2003)
cis-1,3-Dichloropropene	5-10-19001							1		0.398	ESL EPA Region 5 (2003)	3.98E-01	ESL EPA Region 5 (2003)
rrans-1,3-Dichloropropene	0-70-10001	1 1				1		1		0.00238	_	2.38E-03	ESL EPA Region 5 (2003)
Diethylphhalate	84-66-2	100	PRGs	1		1		100	Soil, LOEC	24.8	ESL EPA Region 5 (2003)	1.00E+02	PRGs
33'-Dimethylbenzidine	119-93-7	1		1		t		ı		0.104	ESL EPA Region 5 (2003)	1.04E-01	ESL EPA Region 5 (2003)
Dimethoate	60-51-5	1		1		1		1		0.218	ESL EPA Region 5 (2003)	2.18E-01	ESL EPA Region 5 (2003)
7,12'-Dimethylbenz(a)anthracene	57-97-6	1		1		t		1		16.3	ESL EPA Region 5 (2003)	1.63E+01	ESL EPA Region 5 (2003)
Dimethylphthalate	131-11-3	200	PRGs	200	LOEC	í		1		/34	ESL EPA Region 5 (2003)	2.00E+02	Tree Pas B. C.
alpha, alpha-Dimethy Iphenethy lamine	122-09-8	1		j.		1	2.5	1		0.3	ESL EPA Region 5 (2003)	3.005-01	ESL EFA Region 5 (2003)
2,4-Dimethylphenol	105-67-9	_		ı		1		1 5	Paor II a	0.01	EST EPA Begins 5 (2003)	_	Page
Di-n-butylphthalate	84-74-2	7	PRGs	1		1		700	Soll, NOEC	200	FSI FPA Region 5 (2003)	7.09E+02	ESL EPA Region 5 (2003)
Di-a-octylphthalate	117-84-0	1		1		i				0.655	FSI. EPA Region 5 (2003)	6.55E-01	ESL EPA Region 5 (2003)
m-Dinitrobenzene	0-59-66	1		1				, ,		0.655	ESL EPA Region 5 (2003)	6.55E-01	ESL EPA Region 5 (2003)
,3-Dinitrobenzene	51.38.5	000	PRGe	1 1		1		20	Soil, NOEC	0.0609	ESL EPA Region 5 (2003)	2.00E+01	PRGs
2.4-Dinipolojiene	121-14-2			1		1		1		1.28	ESL EPA Region 5 (2003)	1.28E+00	ESL EPA Region 5 (2003)
2, + Dinitrotoluene	606-20-2	1		1		1		1		0.0328	ESL EPA Region 5 (2003)	3.28E-02	ESL EPA Region 5 (2003)
4 6-Dinitro-2-methylohenol	534-52-1	1		1		1		1		1		_	No Source
Dinoseb	88-85-7	1		1		1		1		0.0218		_	ESL EPA Region 5 (2003)
1,4-Dioxane	123-91-1	1		ı		1		1		2.05	ESL EPA Region 5 (2003)		ESL EPA Region 5 (2003)
	133-30-4					1		1		1.01	ESL EPA Region 5 (2003)	1.01E+00	ESL EPA Region 5 (2003)

Appendix Table C-2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Obio

Appendix Table C-2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Ohio

								SoilS	Soil Screening Values				
		Efroymson et al (1997a)	ymson et al. (1997a)	Screen	ing Value for Ear (Efroyn	Screening Value for Earthworms and Soil Microorganisms (Efroymson et al. 1997b)*	ficroorganisms						
	CAS	Preliminary Remediation Goa for Ecological Endpoints	Preliminary Remediation Goals for Ecological Endpoints*	Benchmarks	Benchmarks for Earthworm	Benchmarks for soil microorganism	l microorganism	Suil S	Soil Screening values for Plants (Efroymson et al. 1997c)	Ecologic	Ecological Screening Level (ESL) <sup>d</sup>	Preferre	Preferred Ecological Screening Value (ESV)*
	Registry	Number	Source	Number	Source	Number	Source	Number	Source	Number	Source	Number	Source
Chemicals	Number	(mg/kg)		(mg/kg)		(mg/kg)		mg/kg	(Soil)	(mg/kg)		(mg/kg)	
Disulfoton	298-04-4	1		1		7		mg/L	(Souther)	00100	DCI CDA Danies 6 (2003)	1 000 00	Der Das D. L. L. Amany
Endosulfan, alpha	8-86-656	1		:		-1				0.110	ESL EPA Kegion 5 (2003)	1.998-02	ESL EPA Region 5 (2003)
Endosulfan, beta	33213-65-9	t		1				,		0110	FSI EPA Pesion 5 (2003)	10-3611	ESL EPA Region 5 (2003)
Endosulfan, mixed isomers		1		1		j		-1		11.0	EST EL MCBIOR 3 (2003)	No Bev	No Course
Endosulfan sulfate	1031-07-8	1		ı		9		- 1		0.0358	ESI. EPA Region 5 (2003)	3 SRE-IID	FCI FDA Benion 5 (2003)
Endrin	72-20-8	J		1		i		1		0.0101	ESL EPA Region 5 (2003)	1 01E-02	ESI FPA Region 5 (2003)
Endrin aldehyde	7421-93-4	1		1		ı		1		0.0105	ESL EPA Region 5 (2003)	1.05E-02	ESL EPA Region 5 (2003)
Ethyl metharerylate	97-63-2	1		1		1		1		30	ESL EPA Region 5 (2003)	3.00E+01	ESL EPA Region 5 (2003)
Enylbenzene	100-41-4	1		t		1		1		5.16	ESL EPA Region 5 (2003)	5.16E+00	ESL EPA Region 5 (2003)
Fluoranthene	32-83-7	(		ı		ı		ñ		0.0497	ESL EPA Region 5 (2003)	4.97E-02	ESL EPA Region 5 (2003)
Fluorenc	86.73.7	92	5000	1 2	CHO.	1		1		122	ESL EPA Region 5 (2003)	1.22E+02	ESL EPA Region 5 (2003)
Furan	110-00-6	009	PRCs	757	TOBO	1		1 000	000000000000000000000000000000000000000	122	ESL EPA Region 5 (2003)	3.00E+01	PRGs
gamma-BHC (lindane)	58-89-9			1		1 1		000	Soil, LUEC	1 000	The state of the s	6.00E+02	PRGs
indane	6-88-85	1		1		1		n i		0.005	GEL EPA REGION 5 (2003)	5,00E-03	ESL EPA Region 5 (2003)
Heptane	142-82-5	3		1		4		1	No Soil, only Solution, LOEC	1	(cons) configura con sens	1.00E+00	No Soil only Solution 1 OGC
Heptachlor	26-44-8	1		1		1		Т		0.00598	ESL EPA Region 5 (2003)	5.98E-03	ESI. EPA Reviou 5 (2003)
deptachlor Epoxide	1024-57-3	1		r		ı		1		0.152		1.52E-01	ESL EPA Region 5 (2003)
Texachiorobenzene Herachiorobundund	1.18-74-1	ť.		1		1000	LOEC	p		0.199	ESL EPA Region 5 (2003)	1.00E+03	LOEC
dexactly recovered and the re-	77.47.4	1 3	Dag	1		i:		1		0.0398	ESL EPA Region 5 (2003)	3.98E-02	ESL EPA Region 5 (2003)
Hexachlorochane	1-62-29	2	FRUS			1		10	Soil, LOEC	0.755	ESL EPA Region 5 (2003)	1,00E+01	PRGs
Hexachorophene	70-30-4	1		1 1		r i		1		0.596	ESL EPA Region 5 (2003)	5.96E-01	ESL EPA Region 5 (2003)
2-Hexanone	591-78-6	1		- 3				1		17.6	ESL EPA Region 5 (2003)	1.995-01	ESL EPA Region 5 (2003)
HMX	0-11-1692	į.		1		1		1		1	ראר דנט ארפוסוו א (דומא)	No ESV	No Source
Indeno(1,2,3-ed)pyrene	193-39-5	į		ı		f		.1		109	ESL EPA Region 5 (2003)	1.09E+02	ESL EPA Region 5 (2003)
Isobulyl alcohol	78-83-1	1		,		ą		£		20.8	ESL EPA Region 5 (2003)	2.08E+01	ESL EPA Region 5 (2003)
sonhorne	79 50 1	1				¢.		i		0.00332	ESL EPA Region 5 (2003)	3.32E-03	ESL EPA Region 5 (2003)
sosafrole	120-58-1			1		1		1		139	ESL EPA Region 5 (2003)	1.39E+02	ESL EPA Region 5 (2003)
Kepone	143-50-0					1		ı		6.6	ESL EPA Region 5 (2003)	9.94E+00	ESL EPA Region 5 (2003)
Malathion	121-75-5	1				1		ſ		0.0327	ESL EPA Region 5 (2003)	3.27E-02	ESL EPA Region 5 (2003)
Methacivlonitrile	126-98-7					1				f		No ESV	No Source
Methapyrilene	91-80-5			0 0		ı		i		0.057	ESL EPA Region 5 (2003)	5.70E-02	ESL EPA Region 5 (2003)
Methoxychlor	72-43-5	1		1						2.78	ESL EPA Kegion 5 (2003)	2.78E+00	ESL EPA Region 5 (2003)
Methyl bromide	74-83-9	1		1		. 1				0.0199	EST CDA Paris 5 (2003)	1.996-02	ESL EPA Region 5 (2003)
Methy 1 chloride	74-87-3	1		1		1		1		10.4	PST FPA Perion 5 (2003)	1045-01	ESU EPA Region 5 (2003)
Methy I iodide	74-88-4	1		1		1		0		1.23	ESL EPA Region 5 (2003)	1238+00	EST EPA Region 5 (2003)
Methy lene chloride	75-09-2	1		Ė		1		ń		1.05	ESL EPA Region 5 (2003)	1.05E+00	ESL EPA Region 5 (2003)
2-Methylnaphthalene	9-25-16	ν.		I		ı		ji.		3.24	ESL EPA Region 5 (2003)	3.24E+00	ESL EPA Region 5 (2003)
2-Mcmylphenol	95-48-7	1		1		1		1				2000	

Appendix Table C.2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Ohio

Color   Colo									2011 2	Soli Sercening Vaines				
Professional Column			Efroymso (1997	on et al.	Screenin	g Value for Earl	hworms and Soil son et al. 1997b) <sup>b</sup>	Microorganisms						
Page 14   Page		970	Prelimi Remediatio for Ecol	inary on Goals ogical	Renchmarke		Benchmarks for s	oil microorganism	Soil S	Screening values for Plants (froymson et al. 1997c)	Ecologic			Ecological Screening Valu
Notation		Benitra	Number	Source	Number		Number	Source	Number	Source	Number	Source		Source
1845  1		Number	(mg/kg)		(mg/kg)		(mg/kg)		mg/kg me/l.	(Soil)	(mg/kg)		(mg/kg)	
1845-14   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0	Themicals	200,000							-		1		No ESV	No Source
115-15-5   1-   1-   1-   1-   1-   1-	-Methylphenol	108-10-1					í		1		443	ESL EPA Region 5 (2003)	4.43E+02	ESL EPA Region 5 (2003)
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	-Metny I-2-pentanone	7385-85-5	1		1		t		1		1		No ESV	No Source
1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942   1942	Alicx	91-20-3	1		1		1		10	No Soil, only Solution, LOEC	0.0994	ESL EPA Region 5 (2003)	1.00E+01	No Soil, only Solution, LOE
1964-54   1	-Naphthylamine	134-32-7	1		1		ì		1		9.34	ESL EPA Region 5 (2003)	9.34E+00	ESL EPA Region 5 (2003)
10,004    10,004    1	2-Naphthylamine	8-65-16	1		1		1		ſ		3.03	ESL EPA Kegion 5 (2003)	3,035+00	EST EPA Perion 5 (2003)
100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-04-16   100-	1,4-Naphthoquinone	130-15-4	1		t		i		ı		1.67	ESL EPA Region 5 (2003)	3.16F+00	FSL EPA Region 5 (2003)
100-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016   101-1016	m-Nitroaniline	99-09-2	1		t		1				74.1	ESL EPA Region 5 (2003)	7.41E+01	ESL EPA Region 5 (2003)
100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-101-6   100-	-Nitrouniline	88-74-4	1		1		1				21.9	ESL EPA Region 5 (2003)	2.19E+01	ESL EPA Region 5 (2003)
10,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,004   2,0	-Nitroaniline	0-10-01-0	1						1		74.1	ESL EPA Region 5 (2003)	7.41E+01	ESL EPA Region 5 (2003)
10-0-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	2-Nitroaniline	00 00 0			1 1		1		1		3.16	ESL EPA Region 5 (2003)	3.16E+00	ESL EPA Region 5 (2003)
99-95-3 40 PRGs 40 LOBC 1000 LOGC 8 No Soul onb Solution, LOCC 131 ESLEPA Region 5 (2007) 4 (1000 LOGC 100 LOGC 100 LOGC 100 LOGC 100 LOGC 100 No Soul onb Solution, LOCG 100 LOGC 100 No ESL PA Region 5 (2007) 1 (1000 LOGC 100 LO		9-10-001	1		1		1		1		21.9	ESL EPA Region 5 (2003)	2.19E+01	ESL EPA Region 5 (2003)
10   10   10   10   10   10   10   10	Virolenzene	99-95-3	40	PRGs	40	TOEC	1000	LOEC	00	No Soil, only Solution, LOEC	1.31	ESL EPA Region 5 (2003)	4.00E+01	PRGs
18.4534   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0	Vitrocellulose	9004-70-0	i		í		1		1		1		No ESV	No Source
84-75-5 <t< td=""><td>Vitroelycerin</td><td>55-63-0</td><td></td><td></td><td>i</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td><td></td><td>No ESV</td><td>No Source</td></t<>	Vitroelycerin	55-63-0			i		1		1		1		No ESV	No Source
84-55-5 <t< td=""><td>Vitroquanidine</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1</td><td></td><td>1.</td><td></td><td>No ESV</td><td>No Source</td></t<>	Vitroquanidine		1		1		1		1		1.		No ESV	No Source
164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164   164	-Nitrophenol	88-75-5	í		1		1		1		1.6	ESL EPA Region 5 (2003)	1.60E+00	ESL EPA Region 5 (200
14   15   15   15   15   15   15   15	-Nitrophenol	100-02-7	1		1		1		1		5.12	ESL EPA Region 5 (2003)	3.12E+00	ESL EPA Region 3 (200
100-027	2-Nitrophenol	88-75-5	ı		ſ		1		t		1.0	ESL EPA Region 5 (2003)	5 17E+00	FSI FPA Region 5 (200)
9.6451-5	+-Nitrophenol	100-02-7	t		ı		1		1		21.12	EST GDA Pegion 5 (2003)	1 22E-01	FSI FPA Region 5 (200
95-08-1         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         - </td <td>4-Nitroquinoline-1-oxide</td> <td>56-57-5</td> <td>T</td> <td></td> <td>ı</td> <td></td> <td>ì</td> <td></td> <td>1</td> <td></td> <td>0.122</td> <td>ESE EFA Negion 3 (2003)</td> <td>No ESV</td> <td>No Source</td>	4-Nitroquinoline-1-oxide	56-57-5	T		ı		ì		1		0.122	ESE EFA Negion 3 (2003)	No ESV	No Source
627-18-5         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -<	3-Nitrotoluene	1-80-66	1		1		1		1		0.0693	_	6.93E-02	ESL EPA Region 5 (200)
1059-59-54 — — — — — — — — — — — — — — — — — — —	N-Nitrosodicthy lamine	23-18-2			1						3 2E-0		3.21E-05	ESL EPA Region 5 (200)
100-75-4	N-Nitrosodimethylamine	6-51-79			( )				1		0.0016		1.66E-03	ESL EPA Region 5 (200)
100-754	N-Nitrosomethy lamine	50-80-7			1		1		1		0.0706	_	7.06E-02	ESL EPA Region 5 (2003)
930-55-2             0.0126         ESL EPA Regions 5 (2003)         1.26E-0.2           621-64-7              No ESV           86-30-6         20         PRGs         20         LOEC            No ESV           88-72-2             No ESV         No ESV           108-60-1            8.73         ESL EPA Regions 5 (2003)         1.00E-01           108-60-1             8.73         ESL EPA Regions 5 (2003)         1.00E-01           87-38-2              8.73         BSL EPA Regions 5 (2003)         1.00E-01           87-38-2               No ESV           108-6-1              1.00E-01         1.00E-01<	N-Nirosoninor dina	100-75-4	,		1		ì		1		9900'0		6.65E-03	ESL EPA Region 5 (200)
621-64-7         -         -         -         -         -         No ESV           86-30-6         20         PRGs         20         LOEC         -         -         -         -         No ESV           99-55-8         -         -         -         -         -         -         No ESV           108-60-1         -         -         -         -         -         -         No ESV           108-60-1         -         -         -         -         -         -         No ESV           108-60-1         -         -         -         -         -         -         No ESV           108-60-1         -         -         -         -         -         -         No ESV           108-60-1         -         -         -         -         -         -         No ESV           87-36-5         -         -         -         -         -         -         -         No ESV           87-36-5         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         - <td>N-Nitrosopytrolidine</td> <td>930-55-2</td> <td>1</td> <td></td> <td>1</td> <td></td> <td>1</td> <td></td> <td>1</td> <td></td> <td>0.0126</td> <td>_</td> <td>1.26E-02</td> <td>ESL EPA Region 5 (200)</td>	N-Nitrosopytrolidine	930-55-2	1		1		1		1		0.0126	_	1.26E-02	ESL EPA Region 5 (200)
86-30-6 20 PRGs 20 LOEC — — — — — — — — — — — — — — — — — — —	N-nitroso-di-n-dipropylamine	621-64-7	1		ı		1		t		1		No ESV	No Source
88-72-2 -	N-nitrosodiphenylamine	86-30-6	20	PRGs	20	LOEC	1		ı,		0.545	-	2.00E+01	PRGs
99-55-8 — 8.73 ESL EPA Regions 5 (2003) 8.73E+00  108-60-1 — — — — — — — — — — — — — — — — — — —	2-Nitrotoluene	88-72-2	1		1		1		t		1		No ESV	No Source
108-60-1 — 3.40E-04 ESL EPA Regions 5 (2003) 3.40E-04 ESL EPA REGIONS 5 (2	5-nitro-o-Toluidine	99-55-8	1		1		1		1		8.73	ESL EPA Region 5 (2003)	8.73E+00	ESL EPA Region 5 (200
56-38-2 — 3.40E-04 ESL EPA Regions 5 (2003) 3.40E-04 ESL EPA REGIONS 5 (20	2,2'- oxybis(1-Chloropropane)	1-09-801	1		1		1		1		1		No ESV	No Source
87-86-5 3 PRGs 6 NOEC 400 LOEC 3 Soil, LOEC 0.119 ESL EPA Regions 5 (2003) 1.99E-07 SOIL PRGs 100 PRGs 100 LOEC	Parathion	56-38-2	1		1		ı		1		3.40E-0		_	ESL EPA Region 5 (2003
87-86-5 3 PRGs 6 NOEC 400 LOEC 3 Soil, LOEC 0.119 ESL EPA Region 5 (2003) 3.00E+00 1.00E+02 2.00E+01 2	PCDD-S		1		,		r		1		1.99E-(		-	ESL EPA Region 5 (2003
527-20-8 100 PRGs 100 LOEC 0.497 ESLEPA Region 5 (2003) 2.00E+01 10.7 ESLEPA Region 5 (2003) 1.07E+01 10.7 ESLEPA Region 5 (2003) 1.07E+01	Pentachlorophenol	87-86-5	3	PRGs	9	NOEC	400	LOEC	m	Soil, LOEC	0.119	_	3.00E+00	PRGS
608-93-5 20 PRGs 20 LOEC - LOE	Pentachloroaniline	527-20-8	100	PRGs	100	LOEC	ſ		1		1	-		PRGS
76-01-7 ESLEYA Kegton 3 (2003) 1.07E-401	Pentachlorobenzene	608-93-5	20	PRGs	20	LOEC	1		1		0.497	-		PROS
The same of the sa	Pentachloroethane	2-10-92	1		1		1		1		10.7	-		ESL EPA Kegion 5 (200



Page 7 of 8

ESL EPA Region 5 (2003) ESL EPA Region 5 (2003) ESL EPA Region 5 (2003) Preferred Ecological Screening Value No Soil, only Solution, LOEC ESL EPA Region 5 (2003) No Soil, only Solution No Soil, only Solution No Source PRGs PRGs PRGs PRGs 3.00E+01 4.96E-04 1.17E+01 4.57E+01 6.16E+00 9.90E+00 3.86E-05 4.98E-02 No ESV 7.85E+01 1.03E+00 No ESV No ESV 1.99E-07 9.92E+00 3.71E-01 1,36E-02 4.04E-01 1.09E-01 3.00E+02 3.15E-06 2.00E+01 2.02E+00 1.00E+01 1.00E+01 2,25E+02 No ESV 1.00E+02 1.19E-01 No ESV 1.00E+02 No ESV 8.40E-04 1.27E-01 2.00E+01 1.99E-01 5.96E-01 2.00E+02 2.97E+00 2.00E+01 No ESV Ecological Screening Level (ESL) ESL EPA Region 5 (2003) (mg/kg) 4.96E-04 3.32E-04 1.99E-07 3.86E-05 0.0136 0.0498 120 6.6 0.404 9.92 9.92 225 0.127 0.199 12.4 4.69 2.02 5.45 No Soil, only Solution, LOEC Soil Screening values for Plants Soil, LOEC No Soil, only Solution No Soil, only Solution (Efroymson et al. 1997c) Soil, NOEC Soil, LOEC Soil, LOEC Soil, NOEC Source (Soil) Soil Soil Screening Value Number mg/kg mg/L 121111111111111 201111111111112 100 Benchmarks for soil microorganism Screening Value for Earthworms and Soil Microorganisms LOEC (Efroymson et al. 1997b) (mg/kg) Number Benchmarks for Earthworm Source LOEC LOEC LOEC LOEC LOEC (mg/kg) Number Preliminary Remediation Goals for Ecological Efroymson et al. (1997a) PRGs PRGs PRGs Source PRGS PRGs PRGs PRGS PRGs PRGs PRG5 Endpoints\* Number (mg/kg) 3.15E-06 8.40E-04 0.371 1 25 20 10 200 1 50 1 1 2 1 298-02-2 336-36-3 23950-58-5 107-12-0 Registry 108-95-2 106-50-3 8-90-601 0-66-66 110-86-1 100-42-5 634-66-2 Number 62-44-2 8-10-58 129-00-0 121-82-4 121-82-4 7-65-46 93-72-1 1746-1-6 3481-20-7 1746-01-6 95-94-3 127-18-4 127-18-4 630-20-6 79-34-5 56-23-5 1901-51-3 58-90-2 3689-24-5 E-88-801 95-53-4 8001-35-2 479-45-8 106-49-0 75-25-2 CAS ADX (cyclonile) Hexahydro-1,3,5-trinitro-1,3,5-triazine 3,7,8-Tetrachlorodibenzo-p-dioxin lynuclear aromatic hydrocarbons ctracthyl dithiopyrophosphate lychlorinated dibenzofurans dychlorinated biphenyls ,2,4,5-Tetrachlorobenzene 1,3,5,6-Tetrachloroaniline ,2,3,4-Tetrachlorobenzene 2,3,4,5-Tetrachlorophenol 1,1,2-Tetrachlorocthane 1,2,2-Tetrachloroethane 3,4,6-Tetrachlorophenol Pheny lenediamine etrachloromethane ctrachloroethylene etrachloroethene 4,5-TP (Silvex) ,4,5-Trichloro hemicals enacetin Toluidine lyrene. CDD CDF ctryl

Appendix Table C.2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Ohio

Appendix Table C-2. Soil Ecological Screening Values For Level II Screen For 40 mm Range at Ravenna, Ohio

								Soil S	Soil Screening Values				
		Efroymson (1997a)	Efroymson et al. (1997a)	Screenii	ng Value for Ea (Efroyn	Screening Value for Earthworms and Soil Microorganisms (Efroymson et al. 1997b) <sup>b</sup>	Microorganisms						
	SAS	Preliminary Remediation Gor for Ecologica Endboints*	Preliminary Remediation Goals for Ecological Endpoints*	Benchmarks fo	Benchmarks for Earthworm	Benchmarks for soil microorganism	oil microorganism	Soil S	Soil Screening values for Plants (Efroymson et al. 1997c) <sup>6</sup>	Ecologica	Ecological Screening Level (ESL)	Preferre	Preferred Ecological Screening Value (ESV)*
	Registry	Number (mg/kg)	Source	Number (mg/kg)	Source		Source	Number mg/kg	Source (Soil)	Number (mg/kg)	Source	Number (mg/kg)	Source
Chemicals	2 12 20	00	Spag	90	LOBC			-	(manufacture)			2.00E+01	PRGs
1,2,3-1richlorobenzene	120-82-1	20	PRGs	20	LOEC	1		1		11.1	ESL EPA Region 5 (2003)	2.00E+01	PRGs
1,2,4-1 nemotocazane	71-55-6			1		1		1		29.8	ESL EPA Region 5 (2003)	2.98E+01	ESL EPA Region 5 (2003)
1 1 2 Trick overhous	79-00-5	1		1		1		1		28.6	ESL EPA Region 5 (2003)	2.86E+01	ESL EPA Region 5 (2003)
Tichloroshulosa	9-10-62	1		1		1		1		12.4	ESL EPA Region 5 (2003)	1.24E+01	ESL EPA Region 5 (2003)
Tiellord and the	75-69-4			1		1		1		16.4	ESL EPA Region 5 (2003)	1.64E+01	ESL EPA Region 5 (2003)
THE HOLD DESCRIPTION OF THE PARTY OF THE PAR	05 05 4	o	ppCe	o	LOFC	1		4	Soil, LOEC	14.1	ESL EPA Region 5 (2003)	9.00E+00	PRGs
2,4,5-1nchlorophenol	C 20 00		ppe	. 9	1 OEC	1		10	No Soil, only Solution, LOEC	9.94	ESL EPA Region 5 (2003)	4.00E+00	PRGs
2,4,6-Irichiorophenol	7-00-99	,	LAG	2 1	200	1		1		3.36	ESL EPA Region 5 (2003)	3.36E+00	ESL EPA Region 5 (2003)
1,2,3-1 richioropropane	90-10-4					1		1		0.596	ESL EPA Region 5 (2003)	5.96E-01	ESL EPA Region 5 (2003)
2,4,3-111chotophenoxyacene acid	00 35 4			1		1		1		0.376	ESL EPA Region 5 (2003)	8.60E-01	PPL (SAIC 2002)
1,3,3-Itminobenzene	118-96-7			1		1		1		1		7.10E+01	PPL (SAIC 2002)
Z, Z, O- I I I I I I I I I I I I I I I I I I	P-50-801	-		1		1		1		12.7	ESL EPA Region 5 (2003)	1.27E+01	ESL EPA Region 5 (2003)
Vinyl actaic	75-01-4	1		1		1		1		0.646	ESL EPA Region 5 (2003)	6.46E-01	ESL EPA Region 5 (2003)
A LINE COLOR	1330.20.7	1				1		100	No Soil, only Solution, LOEC	10	ESL EPA Region 5 (2003)	1.00E+02	No Soil, only Solution, LOEC

\* Efroymson, R.A., G.W. Suter, II, B.E. Sample, and D.S. Jones. (1997a). Preliminary Remediation Goals for Ecological Endpoints. ES/ER/TM-162/R2.

\* Efroymson, R.A. M. E.Will., and G.W. Suter, 1997b Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process

Martin Marietta Energy Systems, INC. ES/ER/TM-126/R1 Oak Ridge National Laboratory, Oak Ridge, TN

ÉEtoymson, R. A., M.E. Will, G.W. Suter, and A.C. Wooten, 1997e. Toxicological Benchmarks for Serecening Contaminants of Concern for Effects on Terrestrial Plants. 1997 Revision

Lockheed Martin Energy Systems, INC. ES/ER/TM-85/R3 Oak Ridge National Laboratory, Oak Ridge, TN

The Prefered Soil Value heirarcy is as follows: Efroymson et al. (1997a), followed by Efroymson et al. (1997b), followed by Efroymson et al. (1997c), followed by ESLs. Note that plant protection levels (PPLs) (SAIC 2002) that were developed for Winklepeck Burning Grounds are used for copper, cyanide, Ecological Screening Levels (ESL), U.S. EPA Region 5, Updated per website: http://www.cpa.gov/reg5rera/ca/edql.htm, August 2003

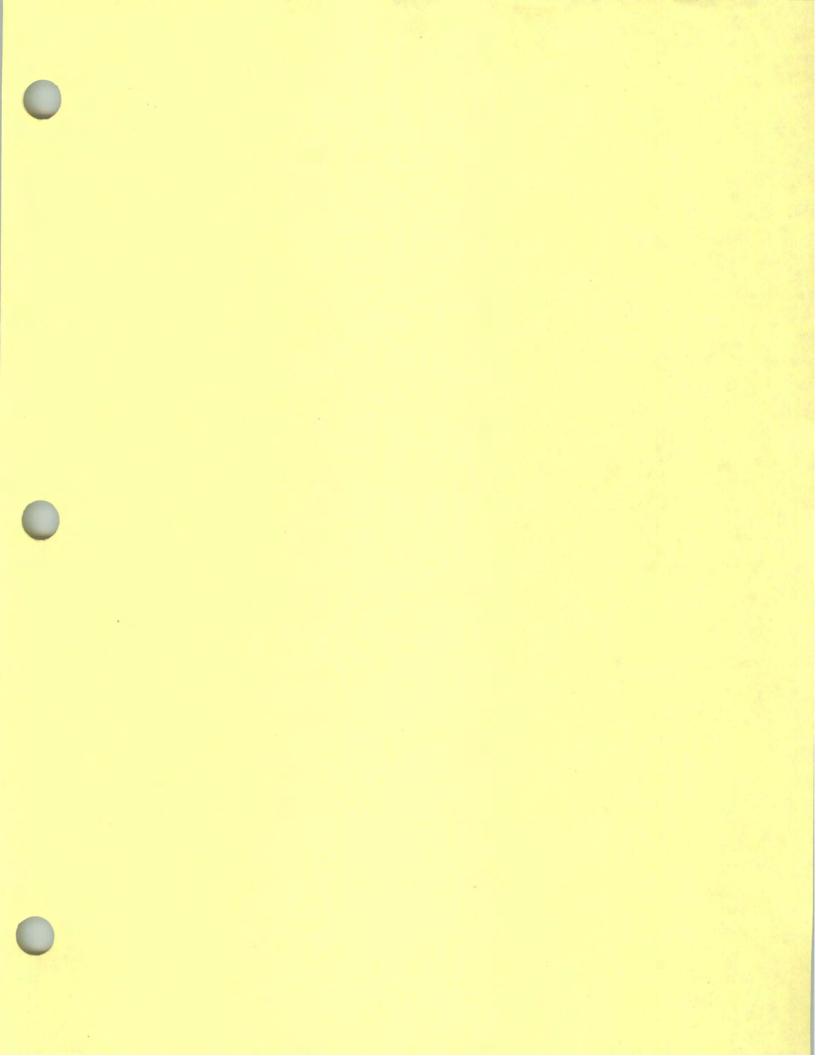
NOEC = No Observed Effect Concentration

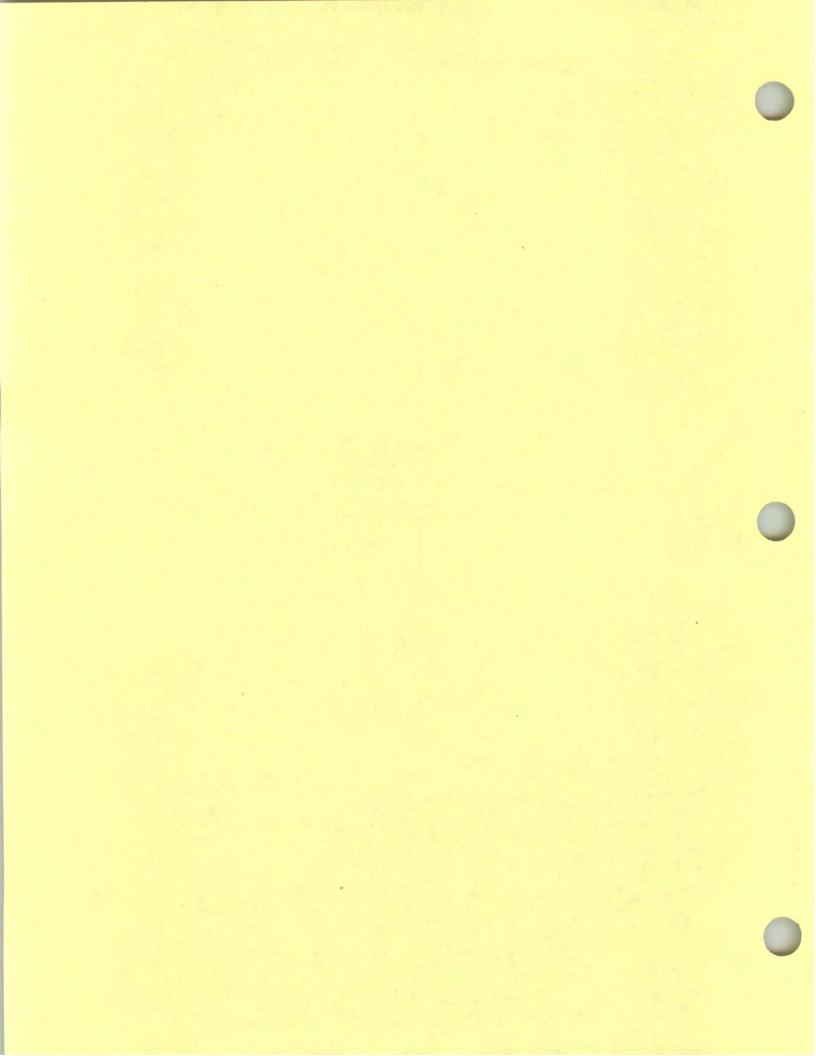
1,3,5-trinitrobenzene, and 2,4,6-trinitrotoluene.

LOEC = Lowest Observed Effect Concentration

Diss = Dissolved Analyte

no value
 PRGs = Preliminary Remediation Goals





Appendix Table C-3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP DRAFT

Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum	Maximum	Average	Minimum	Maximum	95% UCL	Exposure	Background
Metals							THE SHITE	DEFECT	Delect	OI MICAII	Concentration	Cotena
Aluminum	7429905	mg/kg	40/ 40	100			11100	3470	21000	12400	12400	17700
Antimony	7440360	mg/kg	0/ 40	0	0.18	0.52	0.157			0.167	0.167	96.0
Arsenic	7440382	mg/kg	40/ 40	100			11.4	5.7	20.5	12.5	12.5	15.4
Barium	7440393	mg/kg	40/ 40	100			65.8	21.9	144	76.8	76.8	200
Beryllium	7440417	mg/kg	36/36	100			99'0	0.42	-	0.704	0.704	0.88
Cadmium	7440439	mg/kg	20/ 40	50	0.018	0.074	0.129	0.057	0.87	0.178	0.178	0
Calcium	7440702	mg/kg	40/ 40	100			1150	153	9250	1620	1620	15800
Chromium	7440473	mg/kg.	40/ 40	100			26.5	7.5	429	43.0	43.0	17.4
Chromium, hexavalent	18540299	mg/kg	0/ 4	0	2.9	5.9	1.9			2.73	2.73	100
Cobalt	7440484	mg/kg	40/ 40	100			8.83	4.4	13	9.46	9.46	10.4
Copper	7440508	mg/kg	40/40	100			17.3	9	989	202	202	127
Iron	7439896	mg/kg	40/ 40	100			23400	15200	34700	24600	24600	23100
ead	7439921	mg/kg	40/ 40	100			691	11.6	49.5	18.5	18.5	261
Magnesium	7439954	mg/kg	40/ 40	100			2160	575	4290	2390	2390	3030
Manganese	7439965	mg/kg	40/ 40	100			546	204	1300	632	632	1450
Mercury	7439976	mg/kg	0/ 40	0	0.014	0.061	0.0123			0.0136	0.0136	0.036
Nickel	7440020	mg/kg	40/ 40	100			16.5	9.2	28.2	17.7	177	21.1
Potassium	7440097	mg/kg	40/ 40	100			1080	578	2010	1170	1170	927
Selenum	7782492	mg/kg	0/ 40	0	0.27	0.93	0.246			0.27	0.27	1.4
Silver	7440224	mg/kg	0/ 40	0	0.039	0.17	0.0329			0.0367	0.0367	0
Sodium	7440235	mg/kg	36/ 40	06	47.7	52.3	99	30.4	118	72.1	72.1	123
I hallium	7440280	mg/kg	04 /9	15	0.36	1.8	0.611	2	2.6	0.804	0.804	0
V anadium	7440622	mg/kg	40/ 40	100			20.7	9.2	34,1	22.7	22.7	31.1
Zinc	7440666	mg/kg	40/ 40	100			9.09	44.2	114	63.9	63.9	819
Organics-Explosives												
3,3-1 mntrobenzene	99354	mg/kg	0/ 30	0	0.1	1.0	0.05			0.05	0.05	
,3-Dinitrobenzene	99650	mg/kg	0/ 40	0	0.1	0.1	0.05			0.05	0.05	
2,4,0-I nnitrotoluene	118967	mg/kg	1/ 40	2.5	0.1	0.1	0,0515	0.11	0.11	0.054	0.054	
2,4-Dinitrotoluene	121142	mg/kg	1/ 40	2.5	0.1	1.0	0.0512	9600	960.0	0.0531	0.0531	
2,0-Dinitrotoluene	606202	mg/kg	0/ 40	0	0.1	0.1	0.05			0.05	0.05	
2-Amino-4,0-dinitrololuene	35572782	mg/kg	0/ 40	0	0.1	0.1	0.05			0.05	0.05	
2-Nitrotoluene	88722	mg/kg	0/ 40	0	0.2	0.2	0.1			0.1	0.1	
3-Nitrotoluene	18066	mg/kg	1/ 40	2.5	0.2	0.2	0.1	0.1	0.1	0.1	0.1	
4-Amino-2,o-dinitrotoluene	19406510	mg/kg	0/ 40	0	0.1	0.1	0.05			0.05	0.05	
4-Mirotoluene	06666	mg/kg	0/ 40	0	0.2	0.2	0.1			0.1	0.1	
HMA	2691410	mg/kg	1/ 40	2.5	0.2	0.2	0.105	0.28	0.28	0.112	0.112	
Nieseslisten	98933	mg/kg	11.	10	0.037	0.1	0.0483	0.033	990.0	0.0506	0.0506	
Deciliose	3004 700	mg/kg		001			43	20	64	65	64	
Nitrogrycenn	55630	mg/kg		0	10	10	5			5	3	
Minoguamame	220887	mg/kg	0/ 4	0	0.13	0.13	0.065			0.065	0.065	
NDA Potent	121824	mg/kg	0/ 40	0	0.2	0.2	0.1			0.1	0.1	
Organiza Passicida/DCD	479458	mg/kg	1/ 30	3.33	0.2	0.2	0.102	0.17	0.17	901.0	901.0	
4 45DDD	77548	marke.	* /0		0 000							
4.4'-DDE	77550	may A.	17.4	26	0.002	0.0024	0.00105			0.00117	0.00117	

							Т			
nalyte	CAS Registry Number	Justification	Soil ESV	Max Exceeds ESV?	PBT Compound?	Detected?	Max.> Bkg.?	SRC?	COPEC"?	Dist
fetals								1		2
luminum	7429905	Above Background	009	Yes	no	Not PB1	Yes	Yes	res	<
ntimony	7440360	No Detects	2	No	no	Not PB1	ON:	res	INO	
rsenic	7440382	Above Background	6.6	Yes	ou	Not PB1	res	res	I CS	1.
arium	7440393	Above Background	283	No	no	Not PB1	res	1 63	INO	1,
eryllium	7440417	Above Background	10	No	no	Not PB1	Yes	Yes	ON .	2 3
admium	7440439	Above Background	4	No	yes	Yes	Yes	Yes	Yes	×
alcium	7440702	Below Background	No ESV	No ESV	no	Not PBT	No	Yes	No	×
hromium	7440473	Above Background	0.4	Yes	no	Not PBT	Yes	Yes	Yes	×
hromium hexavalent	18540299	No Background Data Available	0.4	Yes	ou	Not PBT		Yes	Yes	0
Chalt	7440484	Above Background	20	No	no	Not PBT	Yes	Yes	No	z
in one	7440508	Above Background	13.9	Yes	ou	Not PBT	Yes	Yes	Yes	L
10000	7439896	Above Background	200	Yes	ou	Not PBT	Yes	No	No	T
Oil	7439921	Above Background	40.5	Yes	yes	Yes	Yes	Yes	Yes	×
	7430054	Hecential Flamont	No ESV	No ESV	no	Not PBT	Yes	Yes	No	z
Concession	7439965	Relow Background	100	Yes	ou	Not PBT	No	Yes	No	Г
Parison Committee Committe	7430076	No Detects	0 00051	Yes	ves	ou	Yes	Yes	Yes	0
Tolon	7440020	Above Background	30	No	ОП	Not PBT	Yes	Yes	No	z
5	7440007	About Background	No ESV	No FSV	no	Not PBT	Yes	Yes	No	T
otassium	7787497	No Defects	0.21	Yes	ОП	Not PBT	No	Yes	No	0
ilve	7440224	No Background Data Available	2	No	ou	Not PBT		Yes	No	0
liver	7440235	Below Background	No ESV	No ESV	no	Not PBT	No	Yes	No	z
hallism	7440280	Above Background	-	Yes	no	Not PBT	Yes	Yes	Yes	D
Tanadium Tanadium	7440622	Above Background	2	Yes	по	Not PBT	Yes	Yes	Yes	X
inc.	7440666	Above Background	8.5	Yes	yes	Yes	Yes	Yes	Yes	×
Preanice-Explosives										
3 5-Trinitrohenzene	99354	No Detects	0.86	No	оп	Not PBT		Yes	No	0
3-Dinitrohenzene	99650	No Detects	0.655	No	ou	Not PBT		Yes	No	0
4 6-Trinitrologuene	118967	No Background Data Available	11/	No	ou	Not PBT		Yes	No	D
4-Dinitrotoluene	121142	No Background Data Available	1.28	No	ou	Not PBT		Yes	No	Ω
6-Dinitrotoluene	606202	No Detects	0.0328	Yes	ou	Not PBT		Yes	Yes	0
-Amino-4.6-dinitrotoluene	35572782	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
-Nitrotoluene	88722	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
-Nitrotoluene	18066	No Background Data Available	No ESV	No ESV	ou	Not PBT		Yes	No	۵
-Amino-2.6-dinitrotoluene	19406510		No ESV	No ESV	No Kow	Not PBT		Yes	No	0
-Nitrotoluene	06666	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
IMX	2691410	No Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	Ω
Vitrobenzene	98953	No Background Data Available	40	No	ou	Not PBT		Yes	No	Ω
Vitrocellulose	9004700	No Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	z
Vitroelycerin	55630	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
Vitroguanidine	556887	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
XOX.	121824	No Detects	No ESV	No ESV	ou ·	Not PBT		Yes	No	0
Cetrvl	479458	No Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	۵
Organics-Pesticide/PCB										1
1.4'-DDD	72548	No Detects	0.758	No	yes	ou		Yes	No	0
4,4'-DDE	72559	No Background Data Available	0.596	No	yes	Yes		Yes	Yes	
			40000	NT.		-		Ver	Ma	<

Appendix Table C-3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP (cont'd)



Page 3 of 8

Appendix Table C.3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP UKAFT

Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum	Maximum	Average	Minimum	Maximum	95% UCL	Exposure	Background
Aldrin	309002	mg/kg	1/4	25	0.002	0.0024	0.0011	0,000	Delect	of Mean	Concentration	Criteria
Chlordane	57749	mg/kg	0/ 4	0	0.039	0.047	0.021	1000	71000	0.00124	21000	
Dieldrin	60571	mg/kg	0/ 4	0	0.002	0.0024	0.00106			0.00117	0.003	
Endosultan	886656	mg/kg	0/ 4	0	0.002	0.0024	0.00105			0.00117	0.00117	
Endosultan II	33213659	mg/kg		0	0.002	0.0024	0.00105			0.00117	0.00117	
Endosultan sultate	1031078	mg/kg		0	0.002	0.0024	0.00105			0.00117	0.00117	
Engrin	72208	mg/kg	- 1	0	0.002	0.0026	0.00113			0.0013	0.0013	
Endrin aldehyde	7421934	mg/kg	1/ 4	25	0.002	0.0024	0.00101	0.00085	0.00085	0.000118	20000	
Endrin ketone	53494705	mg/kg	1/4	25	0.002	0.0024	0.000885	0.00034	0.00034	0.00133	0.00063	
Heptachlor	76448	mg/kg	1/4	25	0.002	0.0024	0.000998	0.00079	0.00079	0.00119	0,00034	
Heptachior epoxide	1024573	mg/kg	0/ 4	0	0.002	0.0024	0.00105		20000	0.0001	0.00073	
undane	58899	mg/kg	1/ 4	25	0.002	0.0024	0.00103	0.00093	1,0000	0.00017	0,00003	
Methoxychlor	72435	mg/kg	0/ 4	0	0.002	0.0024	0.00105		COMP.	0.00017	0.00033	
PCB-1016	12674112	mg/kg	0/ 4	0	0.039	0.047	0.021			0.073	11000	
PCB-1221	11104282	mg/kg	0/ 4	0	0.039	0.047	0.021			0.073	0.073	
PCB-1232	11141165	mg/kg	0/ 4	0	0.039	0.047	0.021			0.002	0.003	
PCB-1242	53469219	mg/kg	0/ 4	0	0.039	0.047	0.021			0.031	0.023	
PCB-1248	12672296	mg/kg	0/ 4	0	0.039	0.047	0.021			0.033	0.023	
PCB-1254	16926011	mg/kg	0/ 4	0	0.039	0.047	0.021			0.023	0.023	
PCB-1260	11096825	mg/kg	0/ 4	0	0.039	0.047	0.021			0.023	0.023	
oxaphene	8001352	mg/kg	0/ 4	0	0.039	0.047	0.021			0.023	0.023	
alpha-BHC	319846	mg/kg	0/ 4	0	0.002	0.0024	0.00105			0.00117	0.023	
apha-Chlordane	5103719	mg/kg	0/ 4	0	0 002	0,0024	0.00105			0.00117	0.00117	
beta-BHC	319857	mg/kg	0/ 4	0	0.002	0.0024	0.00105			0.00117	0.00117	
della-BHC	319868	mg/kg	0/ 4	0	0.002	0.0024	0.00105			0.00117	0.00117	
gamma-Chlordane	5103742	mg/kg	0/ 4	0	0.002	0.0024	0.00105			0.000117	0.00112	
Organics-Semivolatile										0.00117	/11000	
1-Biphenyl	92524	mg/kg	0/ 4	0	0.39	0.47	0.21			0.73	0.33	
2,4,3-1 inchlorophenol	95954	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
2,4,6-Trichlorophenol	88062	mg/kg	0/ 4	0	0.39	0.47	0.21			0,23	0.23	
2,4-Dichlorophenol	120832	mg/kg	6 /0	0	0.39	0.47	100			0.23	0.23	
2,4-Dimethylphenol	105679	mg/kg	0/ 4	0	0.39	0.47	0.01			0.23	0.23	
2-Chloronaphthalene	91587	mg/kg		0	0.39	0.47	150			0.23	0.23	
2-Chlorophenol	95578	mg/kg	0/ 4	0	0.10	0.47	100			0.25	0.23	
2-Methyl-4,6-dinitrophenol	534521	mg/kg		0	0.78	0.04	0.410			0.23	0.23	
2-Methylnaphthalene	91576	mg/kg		0	0.10	0.47	0.419	1		0.46	0.46	
2-Methylphenol	95487	ma/ke		C	010	100	0.21			0.23	0.23	
2-Nitrobenzenamine	88744	me/kg		0	0.30	0.47	0.21			0.23	0.23	
2-Nitrophenol	88755	and A.o.			0.00	74.0	0.21			0.23	0.23	
3-Nitrobenzenamine	00000	SW SW		0	0.39	0.47	0.21			0.23	0.23	
4-Bromonhenvi ohenvi other	101663	MA/Am		0	0.39	0.47	0.21			0.23	0,23	
4-Chloro-3-methylobenot	50507	HING K.B.	- 1	0	0.39	0.47	0.21			0.23	0,23	
4-Chlorobanzanamina	106470	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
d-Chlorophand shamil at	1004/8	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
d Moderal Land	/002/23	пу/кд	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
4 Nitrobardina	106445	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
4 Nitronhamal	910001	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.73	
nophenol	100027	mg/kg	0/ 4	0	0.78	0.94	0.419			0.46	0.46	
Acenaphthene	83329	mg/kg	0/ 4	0	0.39	0.47	0.21			0.53	0.40	
Acetophenone	98862	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Anthracene	120127	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Democking	1912249	mg/kg	- 4	0	0.39	0.47	0.21			0.23	0.33	
nzo(a)antricacene	156553	100										

					PBT	T	_			_
	CAS			Max Exceeds	PBT		Max. >	Sas	4,Jaco	, d
Analyte	Number	Justification	Soil ESV	ESV?	Compound?	Detected?	Bkg.7	SKC	Voe	2
Aldrin	309002	No Background Data Available	0.00332	No	yes	ICS		Nac V	No	c
Chlordane	57749	No Detects	0.224	No	yes	no	-	Vac	Voc	o
Dieldrin	60571	No Detects	0.00238	Yes	yes	DI U		Vac	No	0
Endosulfan I	886656	No Detects	No ESV	NOESV	Yes	Mes DDT		Vac	S. Z	0
Endosulfan II	33213659	No Detects	No ESV	No ESV	No Now	northon		Yes	No	0
Endosulfan sulfate	1031078	No Detects	0.0358	No	S A	Oll		Vec	No	0
Endrin	72208	No Detects	0.0101	No.	yes	OH A	-	Vac	Vec	0
Endrin aldehyde	7421934	No Background Data Available	0.0105	No	yes	Not DRT		Ves	No	10
Endrin ketone	53494705	No Background Data Available	No ESV	NO ESV	NO NOW	Vor		Vec	Yes	9
Heptachlor	76448	No Background Data Available	0.00598	No	yes	S C		N N	No	0
Heptachlor epoxide	1024573	No Detects	0.152	No.	yes	Ves		Yes	Yes	Q
Lindane	58899	No Background Data Available	00100	No	Ves	no		Yes	No	0
Methoxychlor	12624112	No Defects	No ESV	No ESV	ves	ОП		Yes	No	0
PCB-1016	11104767	No Defects	No ESV	No ESV	yes	ou		Yes	No	9
PCB-1221	11141165	No Detects	No ESV	No ESV	yes	no		Yes	No	9
PCD-1232	53469219		No ESV	No ESV	yes	ou		Yes	No	0
PCB-1242	12672296		No ESV	No ESV	yes	no		Yes	No	9
DCB-1254	11097691	No Detects	No ESV	No ESV	yes	OU	-	Yes	No	0
PCR-1260	11096825	No Detects	No ESV	No ESV	yes	ou		Yes	No	0
Toxaphene	8001352	No Detects	0.119	No	yes	no		Yes	ON ?	9
alpha-BHC	319846	No Detects	No ESV	No ESV	yes	ou	1	Yes	No	
alpha-Chlordane	5103719	No Detects	0.224	No	No Kow	Not PB1	1	Yes	NO	
beta-BHC	319857	No Detects	0.00398	No	yes	no	-	2 2	No.	0
delta-BHC	319868	No Detects	No ESV	No ESV	yes	no no	-	N N	Mo	9
gamma-Chlordane	5103742	No Detects	0.224	No	No Now	NOTEDI		163	ONT	+
Organics-Semivolatile	20200	N. Paris	VAPEN	NAFEV	No Kow	Not PBT		Yes	No	0
1,1-Biphenyl	92224	No Detects	0	Т	NoKow	Not PBT		Yes	No	0
2,4,5-Trichlorophenol	95954	No Detects		No	VAC	ou	-	Yes	No	0
2,4,6-Trichlorophenol	88062	No Detects	30	No.	Nes	no		Yes	No	0
2,4-Dichlorophenol	120832	No Detects	100	No	000	Not PBT		No	No	0
2,4-Dimethylphenol	103079	No Detects	0.0122	Yes	ves	ou		No	No	0
Z-Chloronaphualene	04478	No Defects	09 .	No	no	Not PBT		Yes	No	0
2-Methyl 4 6-dinitrophenol	534521	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	9
2-Methylnanhthalene	91576	No Detects	3.24	No	ou	Not PBT	-	Yes	No	9
2-Methylphenol	95487	No Detects	No ESV		ou	Not PBT	-	Yes	oN:	
2-Nitrobenzenamine	88744	No Detects	No ESV	No ESV	No Kow	Not PBT	-	Yes	No	
2-Nitrophenol	88755	No Detects	1.6	No	OU	Not PB1	-	Yes	INO	
3-Nitrobenzenamine	26066	No Detects	No ESV	No ESV	No Kow	Not PB1	+	Vec	No.	0
4-Bromophenyl phenyl ether	101553	No Detects	NOESV	No ESV	NO NOW	TO JON	-	Yes	No	0
4-Chloro-3-methylphenol	59507	No Detects	NOESV	No BSV	No Kow	Not PBT		Yes	No	0
4-Chlorobenzenamine	100478	No Detects	No ESV	Т	No Kow	Not PBT		Yes	No	0
4-Chlorophenyl pnenyl emer	106445	No Defects	No ESV	Т	ou	Not PBT		Yes	No	0
4 Misselly splicing	910001	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
4-Nitrophanol	100027	No Detects	5.12		ou	Not PBT		Yes	No	0
Acenaphhene	83329	No Detects	20	No	yes	ou		Yes	No	0
Acetophenone	98862	No Detects	No ESV	No ESV	No Kow	Not PBT	-	Yes	No	00
Anthracene	120127	No Detects	1480		yes	ou	-	Yes	No.	
Atrazine	1912249	No Detects	No ESV	No ESV	no	Not PBT	-	Yes	No.	1
Daniel alambanana	56553	No Detects	5.21	No	yes	ou	-	Yes	No	0

Appendix Table C-3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP (cont'd)



Appendix Table C-3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP DICA F T

Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum Nondetect	Maximum	Average	Minimum Detect	Maximum Detect	95% UCL of Mean	Exposure Concentration	Background
Benzo(a)pyrene	50328	mg/kg.		0	0.39	0.47	0.21			0.23	0.23	
Benzo(b)fluoranthene	205992	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Benzo(g,h,i)perylene	191242	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Benzo(k)fluoranthene	207089	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.73	
Bis(2-chloroethoxy)methane	1119111	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Bis(2-chloroisopropyl) ether	108601	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Bis(2-ethylhexyl)phthalate	117817	mg/kg	1/ 4	25	0.39	0.47	9610	0.15	0.15	0.238	0.15	
Butylbenzylphthalate	85687	mg/kg	0/ 4	0	0.39	0.47	0.21			0.73	0.73	
Caprolactam	105602	mg/kg	0/ 4	0	0.39	0.47	0.21			0.73	0.23	
Carbazole	86748	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Chrysene	218019	mg/kg		0	0.39	0.47	0.21			0.23	0.23	
Di-n-buty [phthalate	84742	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
Dibenzo(a,h)anthracene	53703	mg/kg		0	0.39	0.47	0.21			0.23	0.23	
Dibenzofuran	132649	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Diethylphthalate	84662	mg/kg	- 1	25	0.39	0.47	1.56	5.6	5.6	4.73	4.73	
Dimethylphthalate	131113	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
Fluoranthene	206440	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Fluorene	86737	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
Texachlorobenzene	118741	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
Hexachlorocyclopentadiene	77474	mg/kg	0/ 4	0	0.39	0.47	0.21			0.23	0.23	
Hexachloroemane	67721	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
indeno(1,2,3-cd)pyrene	193395	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
Sopnorone	78591	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
N-INITIOSO-di-n-propylamine	621647	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
N-MIDOSOGIphenylamine	86306	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
Naprimaiene	91203	mg/kg		0	0.39	0.47	0.21			0.23	0.23	
machorophenol	8/865	mg/kg	- 1	0	0.78	0.94	0,419			0.46	0.46	
Phenanthrene	82018	mg/kg	- 1	0	0.39	0.47	0.21			0.23	0.23	
rhenoi	108952	mg/kg		0	0.39	0.47	0.21			0.23	0.23	
ryrene	129000	mg/kg	0/4	0	0.39	0.47	0.21			0.23	0.23	
Faires Volume	100000	-										
I,I-Inchloroethane	71556	mg/kg	a 1	25	0.0059	6900'0	0.00561	0.013	0.013	0.0114	0.0114	
o Technologualie	79343	mg/kg	- 1	0	0.0059	6900.0	0.00313			0.00339	0.00339	
1.2-Inchioro-1,2,2-minoroemane	70000	mg/kg	- 1	0	0.0059	6900.0	0.003			0.00332	0.00305	
.t-Inchioremane	(900)	mg/kg	- 1	0	0.0059	6900'0	0.00313			0.00339	0.00339	
1-Dichloroethane	75343	mg/kg	0/ 4	0	0.0059	6900:0	0.00313			0.00339	0.00339	
1-Dichloroethene	75354	mg/kg	- 1	33.3	0.0059	6900.0	0.00463	0.0074	0.0074	0.00869	0.0074	
Z-4-Inchlorobenzene	120821	mg/kg	0/2	0	0.0059	6900.0	0.003			0.00332	0.00305	
,2-Dibromo-3-chloropropane	96128	mg/kg	0/2	0	0.0059	69000	0.003			0.00332	0.00305	
.z-Dibromoethane	106934	mg/kg	0/ 4	0	0.0059	6900.0	0.00111			0.00330	0.0000	

					T.	PBI				_
	CAS Registry	Instification	Soil ESV	Max Exceeds ESV?	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC"?	Dist
nalyte	SO222	No Detects	1.52	No	yes	ou		No	No	0
enzo(a)pyrene	200500	No Defects	59.8	No	yes	ou		Yes	No	0
enzo(o)nuoranniene	101247	No Detects	119	No	yes	ou		Yes	No	0
enzo(g,n,r)perylene	202000	No Detacte	148	No	ves	ou		Yes	No	0
senzo (k)moranmene	1110111	No Detecte	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
is(z-chloroemoxy)memane	108601	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
sis(2-chloroisopropyi) emer	117617	No Becharound Data Available	0 92594	No	ves	Yes		Yes	Yes	D
us(2-ethylnexy1)phthalaie	110111	No Detacte	No ESV	No ESV	yes	ou		Yes	No	0
utylbenzylpnthalate	105602	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
aprolactam	86748	No Detects	No ESV	No ESV	yes	ou		Yes	No	0
Therease	218019	No Detects	4.73	No	yes	ou		Yes	No	0
All years	84742	No Detects	200	No	yes	ou		Yes	No	0
Militario (a h) anthropana	53703	No Detects	18.4	No	yes	ou		No	No	0
North and American	132649	No Detects	No ESV	No ESV	yes	ОП		Yes	No	0
nenzorulari Si-di-delidialete	84667	No Backeround Data Available	100	No	ou	Not PBT		Yes	No	۵
Neury iprimitation	131113	No Detects	200	No	ou	Not PBT		Yes	No	0
Ameny phinister	206440	No Defects	122	No	yes	ou		Yes	No	0
Thoran	86737	No Detects	30	No	yes	ou		Yes	No	0
Tavachlorohanzene	118741	No Detects	1000	No	yes	ou		Yes	No	0
Jevachlorocyclopentadiene	77474	No Detects	10	No	yes	ou		Yes	No	0
Tevachlorosthane	67721	No Detects	0.596	No	yes	ou		Yes	No	0
ndeno(1 2 3-cd)nyrene	193395	No Detects	109	No	yes	ou		Yes	No	0
conhorone	78591	No Detects	139	No	ou	Not PBT		Yes	No	0
d Nieses din promine	621647	No Defects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
N. Nitrosodinhandamina	86306	No Defects	20	No	yes	ou		Yes	No	0
Variables	91203	No Detects	10	No	yes	ou		Yes	No	0
Vapiniarene	87865	No Detects	3	No	yes	по		Yes	No	0
Observe Areas	85018	No Defects	45.7	No	yes	ou		Yes	No	0
Phenol	108952	No Detects	30	No	ОП	Not PBT		Yes	No	0
Pyrene	129000	No Detects	78.5	No	yes	00	_	Yes	No	0
Organics-Volatile							-	1	- 141	4
1.1.1-Trichloroethane	71556	No Background Data Available	29.8	No	ou	Not PB I	-	Yes	ON	1
1.1.2.2-Tetrachloroethane	79345	No Detects	0.127	No	no	Not PBT		Yes	No	0
1.1.2-Trichloro-1.2.2-trifluoroethand 76131	ne 76131	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	oN.	0
1.1.2-Trichloroethane	79005	No Detects	28.6	No	ou	Not PBT		Yes	No	9
1.1-Dichloroethane	75343	No Detects	20.1	No	yes	ou	-	Yes	No	0
1.1-Dichloroethene	75354	No Background Data Available	8.28	No	00	Not PBT	-	Yes	No	9
1.2.4-Trichlorobenzene	120821	No Detects	20	No	yes	ou	-	Yes	No	0
1 2-Dibromo-3-chloropropane	96128	No Detects	0.0352	No	ОП	Not PBT		Yes	No	
1.3 Dibramachan	106934	No Detects	No ESV	No ESV	No Kow	ou		Yes	No	0

Appendix Table C.3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP (cont'd)

Page 6 of 8

Appendix Table C-3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP  $\mathbf{D}\mathbf{RAFT}$ 

Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum Nondetect	Maximum	Average Result	Minimum Detect	Maximum Detect	95% UCL	Exposure	Background
2-Dichlorobenzene	95501	mg/kg	0/ 4	0	0.0059	6900.0	0.00313			0.00339	0.00339	
2-Dichloroethane	107062	mg/kg	0/ 4	0	0.0059	0.0069	0.00313			0.00339	0.00339	
,2-Dichloropropane	78875	mg/kg	0/ 4	0	6500.0	6900'0	0.00313			0.00339	0.00339	
2-Dimethylbenzene	95476	mg/kg	0/ 4	0	0.0059	6900'0	0.00313			0.00339	0.00139	
3-Dichlorobenzene	541731	mg/kg	0/ 4	0	0.0059	69000	0.00313			0.00339	0.000130	
4-Dichlorobenzene	106467	mg/kg	0/ 4	0	0.0059	6900.0	0.00313			0.00339	0.00010	
2-Butanone	78933	mg/kg	0/ 2	0	0.012	0.014	0.006			9000	0.006	
2-Hexanone	591786	mg/kg	0/ 2	0	0.012	0.014	0.006			9000	9000	
2-Methoxy-2-methylpropane	1634044	mg/kg	0/ 4	0	0.0059	6900.0	0.00313			0.00339	0.000	
4-Methyl-2-pentanone	108101	mg/kg	0/ 4	0	0.012	0.014	0.00625			0.00684	0.00584	
Acetone	67641	mg/kg	0/ 2	0	99000	0.015	0.00445			0.00698	0.00084	
Benzene	71432	mg/kg	6/ 4	0	0.0059	0.0069	0.00313			0.00039	0.000330	
Bromodichloromethane	75274	mg/kg	0/ 4	0	0,0059	0.0069	0.00313			0.00339	0.00338	
Bromomethane	74839	mg/kg	0/ 2	0	0.012	0.014	9000			9000	9000	
arbon disulfide	75150	mg/kg	0/ 4	0	0.0059	6900.0	0.00313			0.00339	0.0039	
Carbon tetrachloride	56235	mg/kg	6 /0	0	0.0059	0.0069	0.00313			0.000339	0.00339	
hlorobenzene	108907	mg/kg	0/ 4	0	0.0059	6900.0	0.00313			0.00339	0.00339	
Chloroethane	75003	mg/kg	0/ 4	0	0.012	0.014	0.00625			0.00684	0.0068d	
Chlorotorm	67663	mg/kg		0	0.0059	0.0069	0.00313			0.00339	0.00339	
hloromethane	74873	mg/kg	0/ 4	0	0.012	0.014	0.00625			0.00684	0.00684	
umene	98828	mg/kg		0	0.0059	6900.0	0.00313			0.00339	0.00339	
yclohexane	110827	mg/kg	0/ 2	0	0.0059	69000	0.003			0.00112	0.00305	
Dibromochloromethane	124481	mg/kg		0	0.0059	6900.0	0.00313			0.00339	0.00339	
Dichlorodiffuoromethane	75718	mg/kg		0	0.0059	6900'0	0.00313			0.00339	0.00339	
cuyloenzene	100414	mg/kg		0	0.0059	6900.0	0.00313			0.00339	0.00339	
M+F Aylene	136777612	mg/kg		0	0.0059	6900.0	0.00313			0.00339	0.00339	
Methylcyclonexane	108872	mg/kg		0	0.0059	6900.0	0.00313			0.00339	0.00339	
Methylene chlonde	75092	ту/кд	- 1	0	0.0085	0.012	900.0			90000	9000	
Styrene	100425	mg/kg		0	0.0059	6900.0	0.00313			0.00339	0.00339	
nathoroemene	127184	mg/kg	0/ 4	0	0.0059	6900 0	0.00313			0.00339	0.00339	
Tolliene	108883	mg/kg		25	0.0059	6900.0	0.00286	0.002	0.002	0.00359	0.002	
I nonioroethene	2010	mg/kg	0/ 4	0	0.0059	6900.0	0.00313			0.00339	0.00339	
nentorornoromethane	75694	mg/kg		0	0.0059	6900'0	0.00313			0.00339	0.00339	
Vinyl chloride	75014	mg/kg		0	0.012	0.014	0.00625			0.00684	0.00684	
cis-1,z-Dichloroethene	156592	mg/kg		0	0.0059	0.0069	0.00313			0.00339	0.00339	
cts-1,3-Dichloropropene	10061015	mg/kg		0	0.0059	0.0069	0.00313			0.00339	0.00339	
13-1,2-Lichloroemene	136603	mg/kg	0/ 4	0	0.0059	0.0069	0.00113			0.0000	0.000.0	

"COPEC = chemical of potential ecological concern ["Yes" = 1) maximum concentration (detect if at least one detection, or, non detect if no detections) > ESY, or if detected and below ESY or "No ESY and is a PBT compound, and 2) maximum concentration is above background (inorganics) or there is no background data (inorganics), and 3) analyte is a SRC, else, "No" Dist = data distribution (X = neither normal nor lognormal; O = no detected concentrations; L = lognormal; N = normal; D = fewer than \$50% detected or fewer than \$8\$ detected - distribution not determined) PCBs = polychlorinated biplemyls
Note that 10 analytes were eliminated per 0/0 detects, including 2,4-dinitrophenol; 3,3-dichlorobenzidine, accompliable, bestzaldetyde, bis(2-chloroethyl) ether, di-n-octylphthalate; hexachlorobundiene, bronoform; methyl acetate, and trans-1,3-dichloropropane RVAAP = Ravenna Army Ammunition Plant

CAS = Chemical Abstract Service

CAS = Chemical Abstract Service

UCL = upper confidence limit

ESV = ecological screening value

Max = maximum concentration (maximum detect if at least one detect, otherwise maximum non detect)

BBI = persistant, bioaccumulative, and toxic compound (inorganics include cadmium, lead, merucy, and zinc; organics are chemicals with log Kow >= 3)

BRC = Site related chemical (from Army's usage records)

Non-SRC's based on knowledge of the historical processes at the 40 mm range are: metals -- iron; organics-semivolatiles -- 2.4-Dimethylphemol, 2-Chloronaphthalene, Benzo(a)pyrene,

SRC = Site related chemical (from Army's usage records)

Non-SRC's based on knowledge of the historical processes at the 40 mm range are: metals -- iron; organics-semivolatiles -- 2.4-Dimethylphemol, 2-Chloronaphthalene, Benzo(a)pyrene,

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SRC = Site related chemical (from Army's usage records)

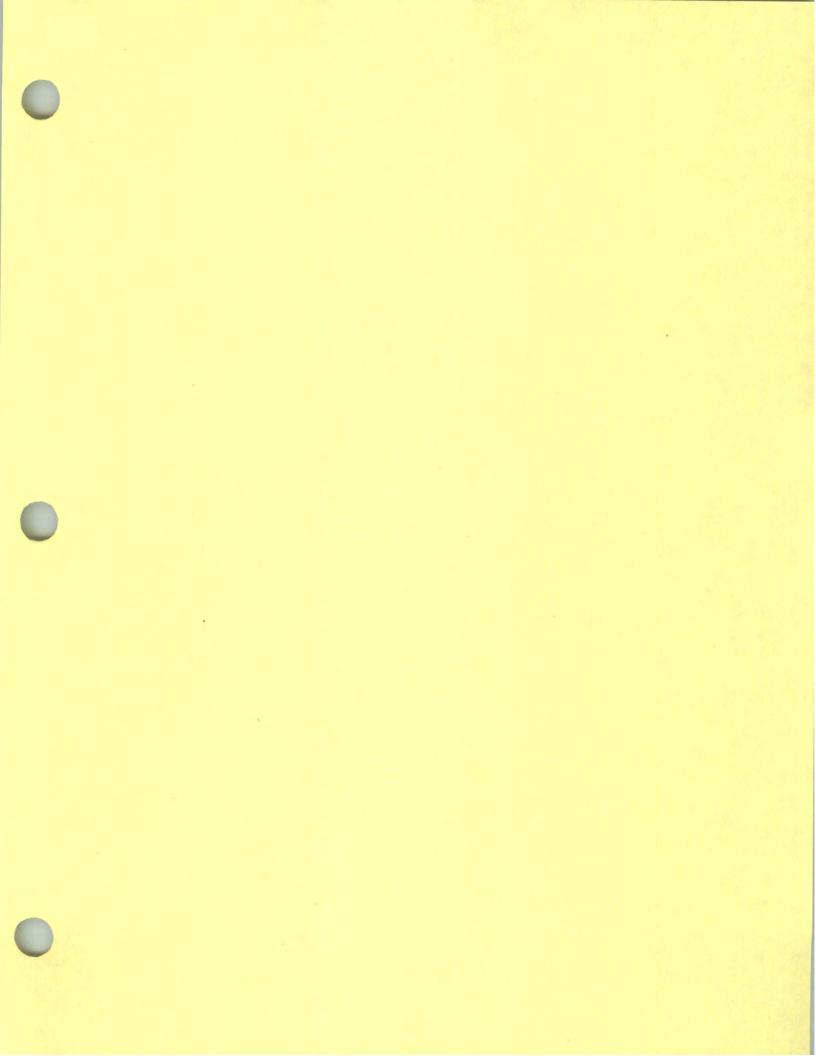
Non-SRC's based on knowledge of the historical processes at the 40 mm range are: metals -- iron; organics-semivolatiles -- 2.4-Dimethylphemol, 2-Chloronaphthalene, Benzo(a)pyrene,

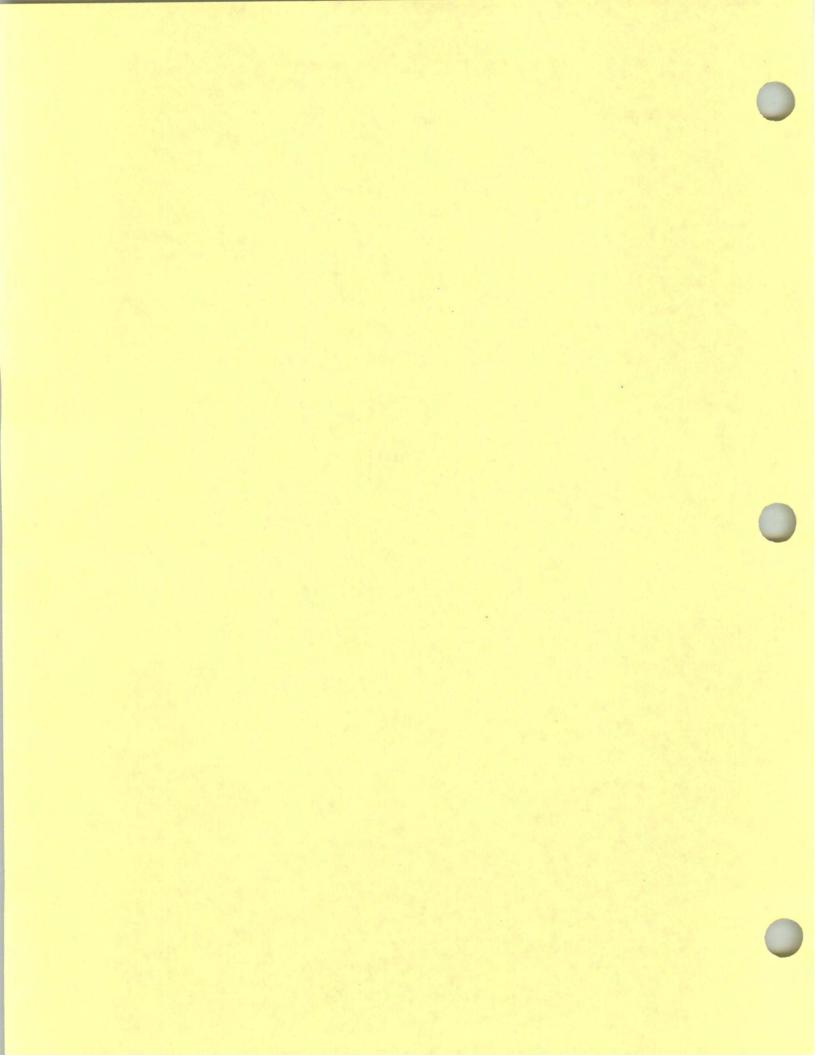
SRC = Site related chemical (from Army's usage records)

SRC = Site related at the 40 mm range are: metals -- iron; organics-semivolatiles -- 2.4-Dimethylphemol, 2-Chloronaphthalene, Benzo(a)pyrene,

					PBT	п	_			
	CAS Registry		ASA ESS	Max Exceeds	PBT Compound?	Detected?	Max. >	SRC?	COPEC*	Dist
Analyte	Number	Justincation	2 96	No	ves	ou		Yes	No	0
2-Dichlorobenzene	1020501	No Detects	212	No	no	Not PBT	1	Yes	No	0
,z-Dichloroethane	700/07	No Delects	200	No	No Kow	Not PBT		Yes	No	0
,2-Dichloropropane	(88/3	No Detects	No Dev	No BCV	VAC	ou		Yes	No	0
,2-Dimethylbenzene	93476	No Detects	37.7	No	NAC	no		Yes	No	0
3-Dichlorobenzene	541731	No Defects	200	Mo	200	ou		Yes	No	0
,4-Dichlorobenzene	106467	No Detects	700	No	200	Not PRT		Yes	No	0
-Butanone	78933	No Detects	0.20	TAO TAO	Oli	Tad toN		Ves	No	0
2-Hexanone	591786	No Detects	0.71	No	N. V.	No. DBT		Vec	No	0
2-Methoxy-2-methylpropane	1634044	No Detects	NOESV	NOESA	NO NOW	Not DRT	-	Voe	No	0
4-Methyl-2-pentanone	108101	No Detects	443	ON	NO VOM	MACDET		Vac	No	c
Acetone	67641	No Detects	2.5	oN.	no	Not PDT	-	Vac	No	0
Benzene	71432	No Detects	0.25462	No	no	NOI LOI	-	200	No	0
Bromodichloromethane	75274	No Detects	0.54	No	OU	Not PB1	-	501	NIC	0
Bromomethane	74839	No Detects	No ESV	No ESV	No Kow	Not PB I	-	res	INO	
Carbon disulfide	75150	No Detects	0.09412	No	ou	Not PB1	1	res	INO	
Carbon tetrachloride	56235	No Detects	1000	No	no	Not PB1		res	ONI	
Chlorobenzene	108907	No Detects	40	No	no	Not PB I	-	Yes	ONI	
Chloroethane	75003	No Detects	No ESV	No ESV	no	Not PB1	-	Yes	ON .	
Chloroform	67663	No Detects	1.19	No	ou	Not PBT		Yes	ON	
Chloromethane	74873	No Detects	No ESV	No ESV	ou	Not PBT	-	Yes	No	0
Gumene	98828	No Detects	No ESV	No ESV	yes	ou		Yes	No	
Cyclohexane	110827	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
Dibromochloromethane	124481	No Detects	2.05	No	ou	Not PBT	-	Yes	No	0
Dichlorodifluoromethane	75718	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
Ethylbenzene	100414	No Detects	5.16	No	yes	no		Yes	No	0
M + P Xvlene	136777612	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
Methylcyclohexane	108872	No Detects	No ESV	No ESV	yes	ou	-	Yes	No	0
Methylene chloride	75092	No Detects	1.05	No	no	Not PBT	1	Xes	No.	0
Styrene	100425	No Detects	300	No	ou	Not PBT	-	Yes	No	0
Letrachloroethene	127184	No Detects	10	No	по	Not PBT	1	Yes	No	0
Coluene	108883	No Background Data Available	200	No	ou	Not PBT		Yes	No	
Trichloroethene	79016	No Detects	100	No	ou	Not PBT	-	Yes	No	0
Trichlorofluoromethane	75694	No Detects	16.4	No	ou	Not PBT	-	Yes	No	0
Vinvl chloride	75014	No Detects	0.646		ou	Not PBT		Yes	No	0
cis-1.2-Dichloroethene	156592	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
cis-1.3-Dichloropropene	10061015	No Detects	0.398		ou	Not PBT		Yes	No	
	155505	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0

Appendix Table C-3. Soil Screening in Shallow Surface Soil (0-1 ft) at 40 mm Range at RVAAP (cont'd)





Appendix Table C-4. Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP

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Mathematical Mat	Analyte Merals	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum Nondetect	Maximum Nondetect	Average Result	Minimum Detect	Maximum Detect	95% UCL of Mean	Exposure Concentration	Background Criteria
March   Marc	luminum	7429905	mg/kg	26/ 26	100			13600	6950	10000	20000	4444	
Table   Tabl	ntimony	7440360		0/ 26	0	0.18	0.45	0.154	0000	19000	0.166	13600	19500
	rsenic	7440382			100			17.5	8.1	30.3	10	10	10.8
	arrum	7440393			100			62	30.5	121	7.1	71	17.8
	ryllium	7440417		23/ 23	100			0.709	0.32	1.2	0.796	0.796	0.88
	loimm	7440439	$\neg$	3/ 26	11.5	0.016	0.061	0.0279	0.077	0.22	0.0424	0.0424	0
	rominm havanalani	19540702		26/ 26	100			589	144	1570	774	774	35500
1,000,000   1,000,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,00	rominm	18340299		0/ 3	0	2.7	6.3	1.98			3.69	3.15	
1,000,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000	halt	74404/3	т	26/ 26	100			17.9	10.5	27.7	19.2	19.2	27.2
1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00   1,199,00	The state of the s	7440404		70/ 70	100			10.9	4.7	23.8	12.5	12.5	23.2
1,499.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50   1,999.50	pper	7440508		26/ 26	100			21.6	9.4	36.5	23.2	23.2	323
1477   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470	-	7439896		26/ 26	100			26800	13300	36900	28400	28400	35200
Comparison   Com	ad	7439921	- 1	26/ 26	100			14.7	8.7	36.1	163	163	101
Table   Tabl	gnesium	7439954	- 1	26/ 26	100			2770	1430	4700	3120	3120	8790
Table   Tabl	anganese	7439965	- 1	26/ 26	100			333	152	840	375	275	2020
Table   Tabl	reury	7439976		0/ 26	0	0.013	0.023	90600.0			0.00048	0.00046	0000
T440021   Page 10	ckel	7440020		26/ 26	100			22.2	10.2	38.5	7.87	747	600
1472.242   mg/kg   0.75   0.0   0.027   0.077   0.077   0.027   0.0277   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297   0.0297	tassium	7440097		26/ 26	100			1310	760	2400	1440	1.47	00.7
Table   Tabl	enium	7782492		0/ 26	0	0.22	090	0.188	100	7.100	2000	1440	3550
Tablesia	ver	7440224		0/ 26	0	0.037	0.070	0.0077			17.0	17.0	1.3
Table   Tabl	dium	7440235		26/ 26	100		2000	8.1	46.2	000	0.0297	0.0297	0
Table   Tabl	allium	7440280		6/ 26	23.1	0.31	00	0.750	40.3	287	90.4	96.4	145
Particle	nadium	7440622		26/ 26	100		600	20.00	1.5	8.7	1.08	1.08	0.91
Explosives         String professor         Co.2         Co.	10	7440666	mg/kg	26/ 26	100			3 09	200	34	43.0	23.6	37.6
11   12   12   12   12   12   12   12	ganics-Explosives							000	77.67	11.4	04.1	04.1	93.3
Delication   Del	,5-Trinitrobenzene	99354	mg/kg	0/ 23	0	0.1	0.1	0.05			0.00	30.0	
Table   Tabl	-Dinitrobenzene	05966	mg/kg	0/ 26	0	0.1	0.1	0.05			0,00	0.03	
1,114.2   mg/kg   0/26   0   0   1   0   1   0   0   0   0   0	,6-Trinitrotoluene	118967	тв/кв	0/ 26	0	0.1	0.1	0.05			50.0	0.03	
Continue	-Dinitrotoluene	121142	mg/kg	0/ 26	0	0.1	0.1	0.05			0.05	50.0	
G-dinitrotollene         3552782 mg/kg         0/26         0         0.1         0.1         0.05         0.05           Genitrotollene         3552782 mg/kg         0/26         0         0.2         0.2         0.09         0.09         0.05           Genitrotollene         99870 mg/kg         1/26         3.85         0.2         0.2         0.099         0.08         0.01           G-dinitrotollene         19406510 mg/kg         0/26         0         0.1         0.1         0.05         0.03         0.05         0.01           G-dinitrotollene         19406510 mg/kg         0/26         0         0.1         0.1         0.05         0.03         0.05         0.01         0.01           Gene         19990         0         0.26         0         0.2         0.1         0.05         0.05         0.01         0.01           nee         99990         mg/kg         0/26         0         0.1         0.1         0.02         0.1         0.05         0.05         0.05           see         9004700         mg/kg         0/3         0         0.1         0         2         2         2         3         7.28           fine	-Dinitrotoluene	606202		0/ 26	0	0.1	1.0	0.05			50.0	50.0	
September   Sept	vmino-4,6-dinitrotoluene	35572782		0/ 26	0	0.1	0.1	0.05			0.05	0.00	
Post	itrotoluene	88722	mg/kg	0/ 26	0	0.2	0.2	0.1			0.1	50.0	
Deciding   19406510 mg/kg   0.26   0.01   0.01   0.05   0.05	itrotoluene	18066		1/ 26	3.85	0.2	0.2	0.0999	0.098	0.098	0.1	0.008	
cente         99990         mg/kg         0/26         0         0.2         0.1         0.1         0.1           ese         99990         mg/kg         0/26         0         0.2         0.1         0.1         0.1           ese         98953         mg/kg         0/26         16         0.2         0.1         0.0473         0.042         0.1         0.1           sie         98953         mg/kg         0/36         116         0.035         0.1         0.0473         0.042         0.01           sin         55630         mg/kg         0/3         100         10         10         43         24         59         7.8           sin         55630         mg/kg         0/3         0         10         10         43         24         59         7.8           sin         55630         mg/kg         0/3         0         0         10         43         24         59         7.8           sin         55630         mg/kg         0/3         0         0         0         1         0         1         0         0         0           sin         0         0         0	Amino-2,6-dinitrotoluene	19406510		0/ 26	0	0.1	0.1	0.05			50.0	0.05	
2691410   mg/kg   0, 26   0   0, 2   0, 1   0, 0473   0, 042   0, 07   0, 0506     286	litrotoluene	06666		0/ 26	0	0.2	0.2	0.1			0.10	0.03	
Page 5   11   12   12   12   12   13   10   11   10   10   10   10   10	X	2691410		0/.26	0	0.2	0.2	0.1			0.1	0.1	
12   25,543   10,54   10   10   10   43   24   59   72.8     13   13   13   13   10   10   10   5   5   5   5     14   15   15   15   15   15   15   10   10	robenzene	98953	mg/kg	3/ 26	11.5	0.035	0.1	0.0473	0.042	0.07	0.0506	0.0506	
11824   121824   mg/kg   0/3   0   10   10   5   5   5	rocellulose	9004700	mg/kg	3/ 3	100			43	24	59	72.8	50	
121824   mg/kg   0/3   0   0.13   0.15   0.065   0.065     121824   mg/kg   0/26   0   0.2   0.2   0.1   0.1     121824   mg/kg   0/23   0   0.2   0.2   0.1   0.1     121824   mg/kg   0/23   0   0.02   0.02   0.01   0.01     122548   mg/kg   0/3   0   0.0019   0.0021   0.001   0.0018     122549   mg/kg   0/3   0   0.0019   0.0021   0.001   0.0018     1309002   mg/kg   0/3   0   0.0019   0.0021   0.001   0.0018     14   0.55988   mg/kg   0/3   0   0.0019   0.0021   0.001   0.0018     15   0.11078   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     15   0.11078   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     15   0.11078   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     15   0.12038   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     16   0.11078   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     17   0.12038   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     18   0.12038   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     18   0.12038   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     18   0.12038   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     18   0.12038   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108     18   0.12038   0.1308   0.1308   0.0019   0.0021   0.001   0.00108     18   0.12038   0.1308   0.1308   0.0019   0.0021   0.001   0.00108     18   0.12038   0.1308   0.1308   0.0019   0.0021   0.001   0.00108     18   0.12038   0.1308   0.1308   0.0019   0.0021   0.001   0.00108     18   0.12038   0.1308   0.1308   0.1308   0.0019   0.0011   0.001108     18   0.12038   0.1308   0.1308   0.0019   0.0021   0.0019   0.001108     18   0.12038   0.1308   0.1308   0.0019   0.0021   0.0019   0.001108     18   0.12038   0.1308   0.1308   0.1308   0.0019   0.0021   0.0019   0.001108     18   0.12038   0.12038   0.12038   0.0019   0.0019   0.0019   0.0019	roglycerin	55630	mg/kg	0/ 3	0	10	10	5			5		
121824   mg/kg   0 '26   0   0   0   0   0   0   0   0   0	roguanidine	556887	mg/kg	0/3	0	0.13	0.13	0.065			0.065	0.065	
17248   mg/kg   0/23   0 0.001   0.0021   0.001   0.00108   0.00108   0.0021   0.00108   0.00108   0.00108   0.0023   mg/kg   0/3   0 0.0019   0.0021   0.001   0.00108   0.00108   0.0023   mg/kg   0/3   0 0.0019   0.0021   0.001   0.00108   0.00108   0.0023   mg/kg   0/3   0 0.0019   0.0021   0.001   0.00108   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00119   0.0021   0.0011   0.00108   0.00118   0.00118   0.00118   0.00118   0.00119   0.0021   0.0011   0.00108   0.00118   0.00118   0.00118   0.00118   0.00118   0.00119   0.0011   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118   0.00118	×	121824	mg/kg	0/ 26	0	0.2	0.2	0.1			0.1	0.1	
Comparing the PCB   T2548   mg/kg   0/3   0   0.0019   0.0021   0.0021   0.0010   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.	ryl	479458	те/кв	0/ 23	0	0.2	0.2	0.1			0.1	0.1	
12548   mg/kg   0/3   0 0,0019   0,0021   0,0001   0,00108   0,00108     12559   mg/kg   0/3   0 0,0019   0,0021   0,001   0,00108     20233   mg/kg   0/3   0 0,0019   0,0021   0,001   0,00108     202902   mg/kg   0/3   0 0,0019   0,0021   0,001   0,00108     27749   mg/kg   0/3   0 0,0019   0,0021   0,001   0,00108     1	ganics-Pesticide/PCB												
12559   mg/kg   0/3   0 0019   0.0021   0.0010   0.00108     20233   mg/kg   0/3   0 0 0019   0.0021   0.0021   0.0011   0.001108     309002   mg/kg   0/3   0 0 0.0019   0.0021   0.0021   0.0011   0.001108     57749   mg/kg   0/3   0 0 0.0019   0.0021   0.0021   0.00118     11   33213659   mg/kg   0/3   0 0 0.0019   0.0021   0.0011   0.001108     12   33213659   mg/kg   0/3   0 0 0.0019   0.0021   0.0011   0.001108     13   32   34   34   34   34   34   34   3	-000	72548	mg/kg		0	0.0019	0.0021	0.001			0.00108	0.00105	
50293   mg/kg   0/3   0 0.0019   0.0021   0.0010   0.00108     502902   mg/kg   0/3   0 0.0019   0.0021   0.0021   0.00108     503902   mg/kg   0/3   0 0.0019   0.0021   0.0021   0.00108     60571   mg/kg   0/3   0 0 0.0019   0.0021   0.0011   0.00108     11   33213659   mg/kg   0/3   0 0 0.0019   0.0021   0.0011   0.00108     12208   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     13107   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     1411   0.0018   0/3   0 0 0.0019   0.0021   0.001   0.00108     15208   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154104   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.001   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.0010   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.0010   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.0010   0.00108     154204705   mg/kg   0/3   0 0 0.0019   0.0021   0.0010   0.00108     154204705   mg/kg   0/3   0 0 0.00108   0.0021   0.0010   0.00108     154204705   mg/kg   0/3   0 0 0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.	-DDE	72559	mg/kg		0	0.0019	0.0021	0.001			0.00108	0.00105	
37749   379002   mg/kg   0/ 3   0   0.0019   0.0021   0.001   0.00108     1	-DDT	50293	mg/kg	0/ 3	0	0.0019	0.0021	0.001			0.00108	0.00105	
Total   Tota	rin	309002	mg/kg	0/ 3	0	0.0019	0.0021	100.0			0.00108	0.00105	
Control   Cont	ordane	57749	mg/kg		0	0.039	0.042	0.0202			0.0215	0.021	
Table   959988   mg/kg   0/3   0   0.0019   0.0021   0.001   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.00108   0.0	ldrin	60571	mg/kg	0/ 3	0	0.0019	0.0021	100.0			0.00108	0.00105	
Table   Tabl	Josephan I	886656	mg/kg	- 1	0	0.0019	0.0021	100.0			0.00108	0.00105	
fan sulfate         1031078         mg/kg         0/3         0         0.0019         0.0021         0.001         0.00108           72208         mg/kg         0/3         0         0.0019         0.0021         0.001         0.00108           cetone         53494705         mg/kg         0/3         0         0.0019         0.0021         0.001           of         7648         mg/kg         0/3         0         0.0019         0.0021         0.001	dosulfan II	33213659	mg/kg		0	0.0019	0.0021	0.001			0.00108	0.00105	
72208   mg/kg   0/3   0 0.0019   0.0021   0.0019   0.00108     7421934   mg/kg   0/3   0 0.0019   0.0021   0.0019   0.00108     53494705   mg/kg   0/3   0 0.0019   0.0021   0.0019   0.00108     10	iosulfan sulfate	1031078	mg/kg	0/ 3	0	0.0019	0.0021	0.001			0.00108	0.00105	
7421934 mg/kg 0/3 0 0.0019 0.0021 0.001 0.0018   23494705 mg/kg 0/3 0 0.0019 0.0021 0.001 0.0018   76448 mg/kg 0/3 0 0.0019 0.0021 0.001 0.0018   76448 mg/kg 0/3 0 0.0019 0.0021 0.001 0.0018	lrin	72208	mg/kg		0	0.0019	0.0021	0.001			0.00108	0.00105	
23494705 mg/kg 0/3 0 0.0019 0.0021 0.001 0.0018 0.0018 0.0018 0/3 0 0.0019 0.0021 0.001 0.0018	nn aldehyde	7421934		0/ 3	0	0.0019	0.0021	0.001			0.00108	0.00105	
76448 mg/kg 0/3 0 0.0019 0.0021 0.001 0.00108	inn ketone	53494705	mg/kg		0	0.0019	0.0021	0.001			0.00108	0.00105	
The same of the sa	otachlor	76448	mg/kg	0/ 3	0	0.0019	0.0021	0.001			0.00108	0.00105	

Appendix Table C-4. Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP (cont'd)

							PBI	_			
Triangle	knalyte	CAS Registry Number	Justification	Soil ESV	Max Exceeds	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC"?	Dist
1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,000,000   1,00	Metals				Vac	No.	Not PRT	Yes	Yes	Yes	z
TATASTON         NATIONAL PROPERSONAL         SYREGON         Ver.         No.         Ver.         No.	Aluminum	7429905	Above Background		No.	No.	Not PBT	No	Yes	No	0
Table   Tabl	Antimony	7440360	Above Background	9.90E+00	Yes	No	Not PBT	Yes	Yes	Yes	z
m         TAGAGOS         Dependent         100E-01         No.	Arsenic	7440393	Relow Background	2.83E+02	No	No	Not PBT	No	Yes	No	_
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	Sanum	7440417	Above Background	1.00E+01	No	No	Not PBT	Yes	Yes	No	٦
Macanalem	Seryinum	7440439	Above Background	4.00E+00	No	Yes	Yes	Yes	Yes	Yes	۵
Macanalent   155,000   No. Descent   155,000   No. Briggeround   100E-01   Vest   No. No. Briggeround   No. Briggeround   No. Briggeround   100E-01   Vest   No. Briggeround	Cadmium	7440702	Essential Element	No ESV	No ESV	No	Not PBT	No	Yes	No	-1
1,000,000,000,000,000,000,000,000,000,0	Chromium hexavalent	18540299	No Detects	4.00E-01	Yes	No	Not PBT		Yes	Yes	0
1440508   Above Background   1995-01   Yes   No   No   PBT   Yes	Chromium, accavatent	7440473	Above Background	4.00E-01	Yes	No	Not PBT	Yes	Yes	Yes	2
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	Cobalt	7440484	Above Background	2.00E+01	Yes	No	Not PBT	Yes	Yes	Yes	1
1,195964   Enternal Enternal 2,000E-101   Ves   Not Part   N	Cooper	7440508	Above Background	1.39E+01	Yes	No	Not PBT	Yes	Yes	Yes	×
1,199221   Robert Background   1,00E+02   Nea Part No.   N	Lopper	7439896	Essential Element	2.00E+02	Yes	No	Not PBT	Yes	No	No.	×
1,399.54   Received Element   No ESV	Dee.	7439921	Above Background	4.05E+01	No	Yes	Yes	Yes	Yes	Yes	×.
1,1996.56   Particular   1,1996.67   Particu	Magnesium	7439954	Essential Element	No ESV	No ESV	No	Not PBT	No	Yes	ON:	4.
1,440,020   Below Background   1,00E-01   Vest   No   No   No   Vest   No   No   No   No   No   No   No   N	Manganese	7439965	Below Background	1.00E+02	Yes	No	Not PBT	No.	Yes	No	10
1440020   Essential Element   No ESV   No   No   No   FBT   No   1555   No   1555   No   1555   No   1555   No   1555   No   No   No   FBT   No   No   No   No   No   No   No   N	Mercury	7439976	No Detects	S.10E-04	Yes	Yes	No	No.	Yes	No	-
Triggley   Essential Element   No ESV	Nickel	7440020	Below Background	3.00E+01	Yes	No	Not PB1	No	I CS	No	1
7440224   No Detects   2 108-01   Ves   No   Not PB1   No   No   Not PB1   No   No   Not PB1   No   No   Not PB1   No   No   No   No   No   No   No   N	Potassium	7440097	Essential Element	No ESV	No ESV	oN ;	Not PB1	NO NI	Ves Ves	No	10
Table   Tabl	Selenium	7782492	No Detects	2.10E-01	Yes	No	Notibil	OAT	Vec	No.	0
Total Colored   Total Colore	Silver	7440224	No Detects	2.00E+00	No	No	Not DRT	Vec	Ves	No	×
tuling         7440250         Rover Background         2.006-00         Yes         No.         Not PBT         No.         No. <th< td=""><td>Sodium</td><td>7440235</td><td>Essential Element</td><td>NOESV</td><td>Ves</td><td>No.</td><td>Not PRT</td><td>Ves</td><td>Yes</td><td>Yes</td><td>Q</td></th<>	Sodium	7440235	Essential Element	NOESV	Ves	No.	Not PRT	Ves	Yes	Yes	Q
Table   Tabl	Thallium	7440280	Above Background	2 00E+00	Ves	No	Not PBT	No	Yes	No	z
mice-Explosives         99554         No Detects         £ 60E-01         No         no         Not PBT         Yes         No           Trinintrochaeme         99554         No Detects         5.5E-01         No         no         Not PBT         Yes         No           Philitrochaeme         118967         No Detects         1.28E-02         Yes         No         No         PBT         Yes         No         C           Trinintrochaeme         118967         No Detects         1.28E-02         Yes         no         Not PBT         Yes         No         C           Inintrochaeme         606202         No Detects         1.28E-02         Yes         no         Not PBT         Yes         No           Inintrochaeme         89721         No Detects         No ESV         no         No ESV         no         No ESV         No ESV <t< td=""><td>Vanadium</td><td>7440666</td><td>Below Background</td><td>8.50E+00</td><td>Yes</td><td>Yes</td><td>Yes</td><td>No</td><td>Yes</td><td>No</td><td>z</td></t<>	Vanadium	7440666	Below Background	8.50E+00	Yes	Yes	Yes	No	Yes	No	z
121142	Organice-Fynlosives	2000							-	-	-
18957   No Detects	1 3 5-Trinitrobenzene	99354	No Detects	8.60E-01	No	ou	Not PBT	-	Yes	No	0
18967   No Detects   7.10E-01   No   Not PET   155   No   No   No   Not PET   155   No   No   No   No   No   No   No	1.3-Dinitrobenzene	99650	No Detects	6.55E-01	No	ou	Not PB1	-	Yes	No	0
121142   No Detects   1.28E-02   No ESV   No E	2,4,6-Trinitrotoluene	118967	No Detects	7.10E+01	oN :	ou	Not PB1		Vac	No.	0
9057202         No Detects         No ESV         no         Not PBT         Yes         No           88772         No Detects         No ESV         No ESV         no         Not PBT         Yes         No           88772         No Detects         No ESV         No ESV         no         No PBT         Yes         No           99051         No Detects         No ESV         No ESV         No ESV         No ESV         No CO         No         No </td <td>2,4-Dinitrotoluene</td> <td>121142</td> <td>No Detects</td> <td>1.28E+00</td> <td>No</td> <td>Oll</td> <td>Not PRT</td> <td>-</td> <td>Yes</td> <td>Yes</td> <td>0</td>	2,4-Dinitrotoluene	121142	No Detects	1.28E+00	No	Oll	Not PRT	-	Yes	Yes	0
83732.73         No Detects         No ESV         no         Not PBT         Yes         No           83732.73         No Detects         No Ector         No ESV         No ESV         no         Not PBT         Yes         No           9908.1         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes         No           19406510         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes         No           19406510         No Detects         No ESV         No Kow         Not PBT         Yes         No           2091700         No Background Data Available         A'0E-Y         No ESV         No Kow         Not PBT         Yes         No           20041700         No Background Data Available         A'0E-Y         No ESV         No Kow         Not PBT         Yes         No           20041700         No Background Data Available         No ESV         No ESV         No Kow         Not PBT         Yes         No           2004170         No Detects         No ESV         No Kow         No Kow         Not PBT         Yes         No           2004170         No Detects         No Detects         No ESV <td< td=""><td>2,6-Dinitrotoluene</td><td>606202</td><td>No Detects</td><td>No ECV</td><td>No FSV</td><td>ou</td><td>Not PBT</td><td></td><td>Yes</td><td>No</td><td>0</td></td<>	2,6-Dinitrotoluene	606202	No Detects	No ECV	No FSV	ou	Not PBT		Yes	No	0
88/12, colorects         NO Detects         NO Detects         NO Each         NO Each<	2-Amino-4,6-dinitrotoluene	35572782	No Defects	No FSV	No ESV	ou	Not PBT		Yes	No	0
19406510   No Detects   No ESV   No ESV   No Kow   Not PBT   Yes   No C E9990   No Detects   No ESV   No ESV   No Kow   Not PBT   Yes   No C E99410   No Detects   No ESV   No ESV   No Kow   Not PBT   Yes   No D E9990   No Detects   No ESV   No ESV   No Kow   Not PBT   Yes   No D E9990   No Detects   No ESV   No ESV   No ESV   No Kow   Not PBT   Yes   No D E9990   No Detects   No ESV   No ESV   No Kow   Not PBT   Yes   No D E9990   No Detects   No ESV   No D E9990   No Detects   SoEC-03   No ESV   No	2-Nitrotoluene	27/22	No Backeround Data Available	No ESV	No ESV	ou	Not PBT		Yes	No	9
12,000,000,000,000,000,000,000,000,000,0	3-Nitrotoluene	10406510	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
2651410   No Detects   No ESV   No ESV   No Kow   Not PBT   Yes   No   No PBT	4-Amino-2,0-dimuoloiueile	00000	No Defects	No ESV	No ESV	ou	Not PBT	-	Yes	No	9
Petaloge	HMX	2691410	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	oN :	9
Colored   Colo	Nitrohenzene	98953	No Background Data Available	4.00E+01	No	-	Not PBT	-	Yes	No	2 2
1.563.0   No Detects	Nitrocellulose	9004700	No Background Data Available	No ESV	No ESV	+	Not PB1	-	Yes	No	2 0
121824   No Detects	Nitroglycerin	55630	No Detects	No ESV	No ESV	00	Not PB1	-	Vec	No.	0
121824   No Detects	Nitroguanidine	556887	No Detects	NOESV	NOESV	MONOM	Not PBT	-	Yes	No	0
Pesticide/PCB	RDX	121824	No Detects	NoESV	NO ESV	NoKow	Not PBT	-	Yes	No	0
12548   No Detects   7.58E-01   No yes   No Ye	Tetryl	479458	No Detects	NOESY	TOT ON						1
12559   No Detects   5.96E-01   No yes   Yes   No Yes   Yes   Yes   Yes	Organics-Festicide/FCB	73548	No Detects	7.58E-01	No	yes	No		Yes	No	9
50293         No Detects         3.0g-0.3         No         yes         No         Yes         No           8.0293         No Detects         3.32E-0.3         No         yes         No         Yes         No           8.0902         No Detects         2.32E-0.3         No         yes         No         Yes         No           8.07749         No Detects         2.38E-0.3         No         yes         No         Yes         No           8.03186         No Detects         2.38E-0.3         No         yes         No         Yes         No           8.03186         No Detects         No Detects         1.01E-0.2         No         yes         No         Yes         No           9.4404         No Detects         1.01E-0.2         No         yes         No         Yes         No           9.4404         No Detects         1.05E-0.2         No         yes         No         Yes         No           9.748         No Detects         1.05E-0.2         No         yes         No         Yes         No           9.4404         No Detects         1.05E-0.2         No         yes         No         Yes         No	4,4-DDF	72559	No Detects	5.96E-01	No	yes	oN.	-	Yes	No	
109002   No Detects   3.32E-03   No   Yes   Y	44-DDT	50293	No Detects	3.50E-03	No	yes	ON.	+	Y Cos	No.	
ine         57749         No Detects         2.24E-01         No         yes         No         yes         No           fila         160571         No Detects         2.38E-03         No         yes         No         Yes         No           fila         33213659         No Detects         No ESV         No ESV         No Kow         No Per         No           fila         13213659         No Detects         1.01E-02         No         yes         No         Yes         No           fila         1031078         No Detects         1.01E-02         No         yes         No         Yes         No           factore         53494705         No Detects         1.05E-02         No         yes         No         Yes         No           ketone         53494705         No Detects         No ESV         No Kow         No Row         No Per         No         Yes         No           filor         53494105         No Detects         No Detects         No         Yes         No         Yes         No           filor         7648         No Detects         No         Yes         No         Yes         No	Aldrin	309002	No Detects	3.32E-03	No.	yes	No		Vac	No.	0
Modelects	Chlordane	57749	No Detects	2.24E-01	No.	yes	No.	-	Yes	No.	0
1	Dieldrin	12509	No Detects	2.38E-03	NO ON	-	No.		Yes	No	0
332,13659         No Detects         No Detec	Endosulfan I	886656	1	NOESV	Т	+	Not PBT		Yes	No	0
103 107 8 No Detects	Endosulfan II	33213659	T	3 58E-02	T	ves	No		Yes	No	0
1.05E-02	Endosulfan sulfate	72200	No Defects	1.01E-02		yes	No		Yes	No	0
	Endrin aldahode	7421934	No Detects	1.05E-02	No	-	+	-	Yes	No	0
76448 No Detects   5.98E-03 No   Ves No   1 cs	Endrin ketone	53494705		No ESV	No ESV	+	+	-	Yes	No No	
ON ON OUR PROPERTY OF THE PROP	Heptachlor	76448	No Detects	5.98E-03		+	No	-	Nos	No	0

Page 3 of 8

Appendix Table C-4, Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP

## DRAFT

Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum	Maximum	Average	Minimum	Maximum	95% UCL of	Exposure	Background
Lindane	58899	mg/kg		0	0.0019	0.0021	0.001		-	0.00108	Concentration	Criteria
Memoxychlor	72435	mg/kg	- 1	0	0.0019	0.0021	0.001			000000	0.00103	
PCB-1016	12674112	mg/kg	0/ 3	0	0.039	0.042	0.0202			0.0015	0.000	
PCB-1221	11104282	mg/kg	- 1	0	0.039	0.042	0.0202			0.0215	0.021	
PCB-1232	11141165 mg/kg	mg/kg	21	0	0.039	0.042	0.0202			0.0215	120.0	
CB-1242	53469219 mg/kg	mg/kg	9.1	0	0.039	0.042	0.0202			0.0015	120.0	
PCB-1248	12672296 mg/kg	mg/kg	5 1	0	0,039	0.042	0.0202			0.0016	0.021	
PCB-1254	11097691	mg/kg	- 1	0	0.039	0.042	0.0202			0.0215	0.021	
PCB-1260	11096825		0/ 3	0	0.039	0.042	0.0202			0.0215	0.021	
Loxaphene	8001352	mg/kg	-	0	0.039	0.042	0.0202			0.000	0.021	
alpha-BHC	319846	те/кв	- 1	0	0.0019	0.0021	0.001			001000	0.021	
aipna-Chlordane	5103719	mg/kg	0/ 3	0	0.0019	0.0021	0.001			001000	0.00105	
Deta-BHC	319857	mg/kg	0/ 3	0	0.0019	0.0021	0.001			0.00100	0.00105	
delta-BHC	319868	mg/kg	0/ 3	0	0.0019	0.0021	0.001			0.00100	0.00103	
gamma-Chlordane	5103742	mg/kg	0/ 3	0	0.0019	0.0021	0.001			00100	0.00103	
Organics-Semivolatile										0.00108	0.00105	
,1-Biphenyl	92524	mg/kg	0/ 3	0	0.39	0.42	0.202			2100		
2,4,5-1 richlorophenol	95954	mg/kg	0/3	0	0.39	0.42	0 202			0.015	0.21	
2,4,6-Inchlorophenol	88062	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0.21	
2,4-Dichlorophenol	120832	mg/kg	0/ 3	0	0.39	0.42	0.202			0.515	17.0	
2,4-Dimethylphenol	105679	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	12.0	
2,4-Dinitrophenol	51285	тв/кв	- 1	0	0.78	0.85	0.4			0.410	0.4	
Chloronaphthalene	91587	mg/kg		0	0.39	0.42	0.202			0.215	100	
Z-Chorophenol	95578	mg/kg	27	0	0.39	0.42	0.202			0.215	0.21	
Markethyl-4,0-dimtrophenol	534521	mg/kg		0	0.78	0.85	0.405			0.435	0.425	
Market Share	915/6	mg/kg	- 1	0	0.39	0.42	0.202			0.215	0.21	
2-Mitrohanzanamina	95487	mg/kg		0	0.39	0.42	0.202			0.215	0.21	
2-Nitronhanol	900/44	mg/kg	5 70	0	0.39	0.42	0.202			0.215	0.21	
3 3'-Dichlorohenzidina	00103	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0.21	
1-Nitrobenzensmine	21341	mg/kg	- 1	0	0.78	0.85	0.4				0.4	
4 Bromonhand nhamil ashar	76066	mg/kg	- 1	0	0.39	0.42	0.202			0.215	0.21	
Chloro I mathematic	101333	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0.21	
Chlorekonson	39307	mg/kg		0	0.39	0.42	0.202			0.215	0.21	
Chlorophanul abanul att	1004/8	mg/kg		0	0.39	0.42	0.202			0.215	0.21	
Mathylahamal	1003/23	mg/kg	- 1	0	0.39	0.42	0.202			0.215	0.21	
Missippliend	100443	mg/kg		0	0.39	0.42	0.202			0.215	0.21	
4 Nitronhamine	100016	mg/kg		0	0.39	0.42	0.202			0.215	0.21	
4-INITrophenol	100027	mo/kp	0/ 3	0	0 40	200					0.44	



Appendix Table C-4. Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP (cont'd) DRAFT

							Т			
	CAS Registry		AND BAS	Max Exceeds	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC"?	Dist
Analyte	Number	Justinication	\$ 00F-03	No	ves	No		Yes	No	0
indane	28899	No Detects	1 00E-02	S. S.	ves	No		Yes	No	0
Methoxychlor	12435	No Defects	No ECV	NOFSV	ves	No		Yes	No	0
PCB-1016	7116/071	No Detects	No ESV	No FSV	ves	No		Yes	No	0
PCB-1221	11104282	No Detects	No FSV	No ESV	ves	No		Yes	No	0
PCB-1232	11141165	No Detects	No ECV	NoFSV	ves	No		Yes	No	0
PCB-1242	53469219	No Detects	No ECV	No ESV	ves	No		Yes	No	0
PCB-1248	12672296	No Detects	No PSV	No FCV	ves	No		Yes	No	0
PCB-1254	11097691	No Detects	No ECU	No FCV	ves	No		Yes	No	0
PCB-1260	11096825	No Detects	1 105-01	No	ves	No		Yes	No	0
Foxaphene	8001352	No Detects	No Bev	No FCV	ves	No		Yes	No	0
alpha-BHC	319846	No Detects	2245.01	No	No Kow	Not PBT		Yes	No	0
alpha-Chlordane	5103719	No Detects	3 08E-03	No	ves	No		Yes	No	0
beta-BHC	319857	No Detects	No ECV	NOFSV	ves	No		Yes	No	0
delta-BHC	319808	No Detects	2.24E_01	No	No Kow	Not PBT		Yes	No	0
gamma-Chlordane	5103/42	No Detects	10.71.414							
Organics-Semivolatile	20000	Mr. Printer	No PCV	No FSV	No Kow	Not PBT		Yes	No	0
,1-Biphenyl	92524	No Detects	0 00E+00	No	No Kow	Not PBT		Yes	No	0
2,4,5-Trichlorophenol	92924	No Detects	4 DOE+00	S. S.	ves	No		Yes	No	0
2,4,6-Trichlorophenol	88062	No Detects	2 00E+01	No.	ves	No		Yes	No	0
2,4-Dichlorophenol	120832	No Detects	1 OOE 02	Vec	no	Not PBT		No	No	0
2,4-Dimethylphenol	105679	No Detects	2 DOE+01	No	ou	Not PBT		Yes	No	0
2,4-Dinitrophenol	51285	No Detects	1 225.02	Vec	ves	No		No	No	0
2-Chloronaphthalene	91587	No Detects	K 00E+01	S V	ou	Not PBT		Yes	No	0
2-Chlorophenol	95578	No Detects	No ESV	No FSV	No Kow	Not PBT		Yes	No	0
2-Methyl-4,6-dinitrophenol	534521	No Detects	3 24E+00	No	ou	Not PBT		Yes	No	0
2-Methylnaphthalene	915/0	No Detects	No FSV	No ESV	Ou	Not PBT		Yes	No	0
2-Methylphenol	9548/	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
2-Nitrobenzenamine	88/44	No Detects	1 60E+00	No	Ou	Not PBT		Yes	No	0
2-Nitrophenol	88/33	No Detects	6 46F-01	Yes	ves	No		Yes	Yes	0
3,3'-Dichlorobenzidine	91941	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
3-Nitrobenzenamine	101663	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
4-Bromophenyl phenyl ether	101333	No Detects	No ESV	No ESV	yes	No		Yes	No	0
4-Chloro-3-methylphenol	39307	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	9
4-Chlorobenzenamine	1004/0	No Detecte	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
4-Chlorophenyl phenyl ether	1003/23	No Detects	No ESV	No ESV	ОП	Not PBT		Yes	No	9
4-Methylphenol	100016	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	9
4-Nitrobenzenamine	100010	N. Detecto	\$ 12E+00	No	ou	Not PBT		Yes	No	0

Appendix Table C-4. Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP

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Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum	Maximum	Average	Minimum	Maximum	95% UCL of	Exposure	Background
Acenaphthene	83329	mg/kg	0/ 3	0	0.10	130BBEECE	Kesuit	Detect	Detect	Mean	Concentration	Criteria
Acenaphthylene	208968	mg/kg	0/ 1	0	0.30	0.42	0.202			0.215	0.21	
Acetophenone	98862	mg/kg	0/ 3	0	030	0.42	2.00				0.2	
Anthracene	120127	mg/kg	0/ 3	0	030	0.47	20270			0.215	0.21	
Atrazine	1912249	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0.21	
Benz(a)anthracene	56553	mg/kg	0/ 3	0	0.39	0.47	0.202			0.215	0.21	
Benzaldehyde	100527	mg/kg	1 /0	0	0.39	0.42	0.0			0.215	0.21	
Benzo(a)pyrene	50328	mg/kg	0/ 3	0	0.39	0.42	0.00				0,2	
Benzo(b)fluoranthene	205992	mg/kg	0/ 3	0	0.30	0.42	0.202			0.215	0.21	
Benzo(ghi)perylene	191242	mg/kg	0/ 3	0	0.40	0.42	2020			0.215	0.21	
Benzo(k)fluoranthene	207089	mg/kg	1	0	030	0.42	0.202			0.215	0.21	
Bis(2-chloroethoxy)methane	1119111	mo/ko	0/3	0	0.09	0.42	0.202			0.215	0.21	
Bis(2-chloroethyl) ether	111444	molka	0 70		0.39	0.42	0.202			0.215	0.21	
Bis(2-chloroisopropyl) ether	108601	malla	6 70	0 0	0.39	0.42	0.2				0.2	
Bis(2-ethylhexyl)ohthalate	117817	SA CALL	0, 3	0	0.39	0.42	0.202			0.215	0.21	
Butyl henzyl phehalota	110/11	mg/kg	07.3	0	0.39	0.42	0.202			0.215	0.21	
Canrolactam	10000	mg/Kg	0/ 3	0	0.39	0.42	0.202			9100	100	
Carterole	709001	mg/kg	0/ 3	0	0.39	0.42	0.202			0.715	17.0	
ar Dazolle	86/48	mg/kg	0/ 3	0	0.39	0.42	0.202			2150	17.0	
Cin ysene	218019	mg/kg	0/ 3	0	0.39	0.42	0 202			0.00	0.21	
Di-n-butyl phthalate	84742	mg/kg	0/ 3	0	0.39	0.42	0 202			0.215	0.21	
DI-n-octylphthalate	117840	mg/kg	0/ 1	0	0.39	0.42	0.0			0.413	0.21	
Dibenz(a,h)anthracene	53703	mg/kg	0/ 3	0	0.39	0.42	0000				0.2	
Dibenzofuran	132649	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0.21	
Diethyl phthalate	84662	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0.21	
Dimethyl phthalate	131113	mg/kg	0/ 3	0	0.39	0.47	0.502			0.215	0.21	
Fluoranthene	206440	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0,21	
Huorene	86737	mg/kg	0/ 3	0	0.39	0.47	0.202			0.215	0.21	
Hexachlorobenzene	118741	mg/kg	0/ 3	0	0.39	0.42	0.202			0.215	0.21	
Hexachlorobutadiene	87683	mg/kg	0/ 1	0	0.10	0.47	0.202			0.215	0.21	
Hexachlorocyclopentadiene	77474	mg/kg	0/ 3	0	0.30	0.40	2.00				0.2	
Hexachloroethane	67721	mg/kg	0/ 3	0	030	24.0	0.202			0.215	0.21	
Indeno(1,2,3-cd)pyrene	193395	mg/kg	0/ 3	0	0.30	0.42	0.202			0.215	0.21	
sophorone	78591	mg/kg	0/ 3	0	0.30	0.43	0.202			0.215	0.21	
N-Nitroso-di-n-propylamine	621647	mg/kg	0/ 3	0	0.30	0.42	20202			0.215	0.21	
N-Nitrosodiphenylamine	86306	mg/kg	0/ 3	0	0.10	0.43	0.202	1		0.215	0.21	
Naphthalene	91203	mg/kg	0/ 3	0	0.30	24.0	0.202	1		0.215	0.21	
Pentachlorophenol	87865	mg/kg	0/ 3	0	0.78	0.85	0.202			0.215	0.21	
Phenanthrene	82018	mg/kg	0/ 3	0	0.10	0.43	505.0			0.435	0.425	
Phenol	108952	mg/kg	0/ 3	0	0.10	0.47	0.202			0.215	0.21	
Pyrene	129000	mg/kg	0/ 3	0	0.30	0.47	0.202			0.215	0.21	
Organics-Volatile					2000	24.0	0.202			0.215	0.21	
I, I-Trichloroethane	71556	mg/kg	0/ 3	0	0.0058	0.0065	000000	ľ				
.1,2,2-Tetrachloroethane	79345	mg/kg		0	0.0058	0.0065	0.00308	Ī	1	0.00338	0.00325	
1,2-Trichloro-1,2,2-trifluoroethar	76131	mg/kg		0	0.0058	0.0065	0.0000			0.00338	0.00325	
1,2-Trichloroethane	79005	те/кв	0/ 3	0	0.0058	0.0065	0.00308		Ī	0.0000	0.0029	
I-Dichloroethane	75343	mg/kg	0/ 3	0	0.0058	0.0065	0.00000			0.00338	0.00325	
1-Dichloroethene	75354	mg/kg		0	0.0058	0,000	0.00308			0.00338	0.00325	
,2,4-Trichlorobenzene	120821	mg/kg		0	0.0058	0,0005	815000			0.00365	0.00325	
,2-Dibromo-3-chloropropane	Г	me/ka	0/ 1	0 0	0.0000	0.0003	0.0029				0.0029	
		a Vom			0.0038	0.0005	0.0029				0.0029	



Appendix Table C-4. Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP (cont'd)

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					4	PBT	_			
	CAS Registry		AND RES	Max Exceeds	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC"?	Dist
nalyte	Number	Justification	2 00E+01	No	yes	No		Yes	No	0
cenaphthene	93976	No Detects	6.82E+02	No	yes	No		Yes	No	0
cenaphuyiene	98862	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
veropienone	120127	No Detects	1.48E+03	No	yes	No		Yes	No	
trazine	1912249	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No No	0
3enz(a)anthracene	56553	No Detects	No ESV	No ESV	No Kow	Not PB1	-	Voe	No	0
Senzaldehyde	100527	No Detects	No ESV	No ESV	ou	Not PB1		No.	No.	0
senzo(a)pyrene	50328	No Detects	1.52E+00	No	yes	No		Ves	No	0
Senzo(b)fluoranthene	205992	No Detects	5.98E+01	No DOW	No Kow	Not PRT		Yes	No	0
Senzo(ghi)perylene	191242	No Detects	NOESV	NOESV	MONOW	No		Yes	No	0
Senzo(k)fluoranthene	207089	No Detects	1.48E+02	Money	No Kow	Not PBT		Yes	No	0
3is(2-chloroethoxy)methane	111911	No Detects	2 37F+01	No	No Kow	Not PBT		Yes	No	0
3is(2-chloroethyl) ether	111444	No Detects	No FCV	No FSV	No Kow	Not PBT		Yes	No	0
Bis(2-chloroisopropyl) ether	108601	No Detects	9.26E-01	No	yes	No		Yes	No	0
3is(2-ethylhexyl)phthalate	11/81/	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
Sutyl benzyl phthalate	105602	No Detecte	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
aprofactam	86748	No Detects	No ESV	NoESV	yes	No		Yes	ON :	0
Carbazole	218019	No Detects	4.73E+00	No	yes	No	-	Yes	No	
Chrysene Chrysene Chrysene	84742	No Detects	No ESV	No ESV	No Kow	Not PBT	1	Yes	No	0
Oi a contributhalate	117840	No Detects	7.09E+02	No	yes	No	-	Yes	No	
Dibenz(a h)anthracene	53703	No Detects	No ESV	No ESV	No Kow	Not PBT	-	No	No	0
Dibenzofiran	132649	No Detects	No ESV	No ESV	yes	No	-	Vac	No.	0
Diethyl phthalate	84662	No Detects	No ESV	No ESV	No Kow	Not PB1	-	Vec	No	0
Dimethyl phthalate	131113	No Detects	No ESV	T	NO NOW	No	-	Ves	No	0
Fluoranthene	206440	No Detects	1.22E+02	T	yes	No	-	Yes	No	0
Fluorene	86737	No Detects	3.00E+01	1	yes	ON ON	-	Yes	No	0
Hexachlorobenzene	118741	No Detects	1.00E+03	1	No.	No	-	No	No	0
Hexachlorobutadiene	87683	No Detects	3.98E-02	T	yes	No		Yes	No	0
Hexachlorocyclopentadiene	77474	No Detects	1.00E+01	NO	yes	No.		Yes	No	0
Hexachloroethane	67721	No Detects	1 000-01		ves	No.		Yes	No	0
Indeno(1,2,3-cd)pyrene	193395	No Detects	1.39E+02	Т	ou	Not PBT		Yes	No	0
Isophorone	18391	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	ON	0
N-Nitroso-di-n-propylamine	96306	No Detects	2.00E+01	No	yes	No		Yes	No.	9
N-Nitrosodiphenylamine	91203	No Detects	1.00E+01		yes	No	+	Yes	No	9
Daniachlorophenol	87865	No Detects	3.00E+00		yes	No.	1	res	No	0
Dhenanthrene	85018	No Detects	4.57E+01		yes	No	-	Nas V	ON ON	0
Phenol	108952	No Detects	3.00E+01		ou	Not PB1	+	Vac	No.	0
Pyrene	129000	No Detects	7.85E+01	No	yes	ONI	-			1
Organics-Volatile			1012000	No	00	Not PBT		Yes	No	0
1,1,1-Trichloroethane	71556	No Detects	1,775,01	T	OH OH	Not PBT		Yes	No	0
1,1,2,2-Tetrachloroethane	79345	No Detects	No ECV	T	No Kow	Not PBT		Yes	No	0
1,1,2-Trichloro-1,2,2-trifluoroethar 76131	than 76131	No Detects	2.86E+01	T	OU	Not PBT		Yes	No	9
1,1,2-Trichloroethane	75005	No Detects	2.01E+01	T	yes	No		Yes	No.	9
1,1-Dichloroethane	75254	No Detects	8.28E+00		ou	Not PBT		Yes	No.	00
I.I-Dichloroethene	120821	No Detects	2.00E+01		yes	No		Yes	No.	
1,2,4-1 noniorocenzene	96128	No Detects	3.52E-02	2 No	-	Ž		Yes	NO.	
1,4-Dinoidin-E-Dinoidin-2,1	106034	No Detects	No ESV		No Kow	No	-	103	710	۲

Appendix Table C-4. Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP

## DRAFT

Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection	Minimum	Maximum	Average	Minimum	Maximum		Exposure	Background
,2-Dichlorobenzene	95501	mg/kg	0/ 3	0	0.0058	0.0065	0.00308	Detect	Detect	Mean	Concentration	Criteria
,2-Dichloroethane	107062	mg/kg	0/ 3	0	0.0058	00000	0.00308			0,00338	0.00325	
,2-Dichloropropane	78875	mg/kg	0/ 3	0	0.0058	00000	0.00300			0.00338	0.00325	
,2-Dimethylbenzene	95476	mg/kg	-	33.3	0.0062	0.0065	0.00308	2000	0000	0.00338	0.00325	
,3-Dichlorobenzene	541731	mg/kg	0/ 3	0	0.0058	00000	0.00270	0.002	0.002	0.00393	0.002	
,4-Dichlorobenzene	106467	mg/kg		0	0.0058	0.0065	0.00308			0.00338	0.00325	
2-Butanone	78933	mg/kg	0/ 1	0	0.000	0.0003	0.00308			0.00338	0.00325	
2-Hexanone	591786	mg/kg	1 /0	0	0.012	0.013	0000				9000	
2-Methoxy-2-methylpropane	1634044	mg/kg	0/ 3	0	0.0058	0.0065	0.00308			000000	90000	
4-Methyl-2-pentanone	108101	mg/kg	0/ 3	0	0.012	0.013	0.00617			0.00338	0.00323	
Acetone	67641	mg/kg	1 /0	0	0.012	0.013	0.0065			0.0000	0.0000	
Benzene	71432	mg/kg	0/ 3	0	0.0058	0.0065	0.00308			0.000338	0.0003	
Bromodichloromethane	75274	mg/kg	0/ 3	0	0.0058	0.0065	0.00308			0.00338	0.00323	
Bromomethane	74839	mg/kg	- 1	0	0.012	0,013	900'0				0.000	
arbon disultide	75150	mg/kg	- 1	66.7	0.0065	0.0065	0.00745	0,0031	0.016	00100	0.016	
Carbon tetrachlonde	56235	mg/kg		0	0.0058	0.0065	0.00308			0.00338	0.00325	
Cilioroenzene	108907	mg/kg		0	0.0058	0.0065	0.00308			0.00338	0.00325	
Chloroform	/2003	mg/kg	- 1	0	0.012	0.013	0.00617			0.00665	0.0065	
Chloromethere	74073	mg/kg		0	0.0058	0.0065	0.00308			0.00338	0.00325	
Motoriemane	148/3	mg/kg	- 1	0	0,012	0.013	0.00617			0.00665	0.0065	
Comene	98878	mg/kg	0/ 3	0	0.0058	0.0065	0.00308			0.00338	0.00325	
Dihromochlosomother	110827	mg/kg	- 1	0	0.0058	0.0065	0.0029				0.0029	
Dichlorodiffuoromethere	124481	mg/kg	0/ 3	0	0.0058	0.0065	0.00308			0.00338	0.00325	
Ethylbenzene	100414	mg/kg		0 0	0.0058	0.0065	0.00308			0.00338	0.00325	
M + P Xvlene	136777611 mg/kg	mg/kg	17.3	0	0.0058	0.0065	0.00308			0.00338	0.00325	
Methylcyclohexane	108877	ma/kg	- 10	33.3	0,0062	0.0065	0.00382	0.0051	0.0051	0.00569	0.0051	
Methylene chloride	75092	mo/ko	- 1 -	0 0	0.0058	0.0065	0.00308			0.00338	0.00325	
Styrene	100425	mg/kg	0/ 3	0	0.007	0.0065	0.0033				0.0035	
Tetrachloroethene	127184	mg/kg	0/ 3	0	0.0058	59000	0.00308			0.00338	0.00325	
Toluene	108883	mg/kg	1/ 3	33.3	0.0062	0.0065	0.00332	0.0036	0.0036	0.00338	0.00325	
richloroethene	20106	mg/kg	0/ 3	0	0.0058	0.0065	0.00308	2000	0.000.0	0.00373	0.0036	
richlorofluoromethane	75694	mg/kg	0/ 3	0	0.0058	0.0065	0.00308			0.00338	0.00325	
Vinyl chlonde	75014	mg/kg	- 4	0	0.012	0.013	0.00617			0.00665	0.0065	
cis-1,2-Dichloroethene	156592	mg/kg		0	0.0058	0.0065	0.00308			0.00338	0.00325	
case 1.3-Dicinolopropene	10061015 mg/kg	тв/кв	- 1	0	0.0058	0.0065	0.00308			0.00338	0.00325	
na-1,4-Ericinoroemene	126603	mg/kg	0/ 3	0	0.0058	0.0065	0.00308			0.00338	0.00325	

RVAAP = Ravenna Army Ammunition Plant

CAS = Chemical Abstract Service

UCL = upper confidence limit ESV = ecological screening value

Max = maximum concentration (maximum detect if at least one detect, otherwise maximum non detect)

PBT = persistant, bioaccumulative, and toxic compound (inorganics include cadmium, lead, menucy, and zine; organics are chemicals with log Kow >= 3)

Bkg = background concentration

SRC = Site related chemical (from Army's usage records)

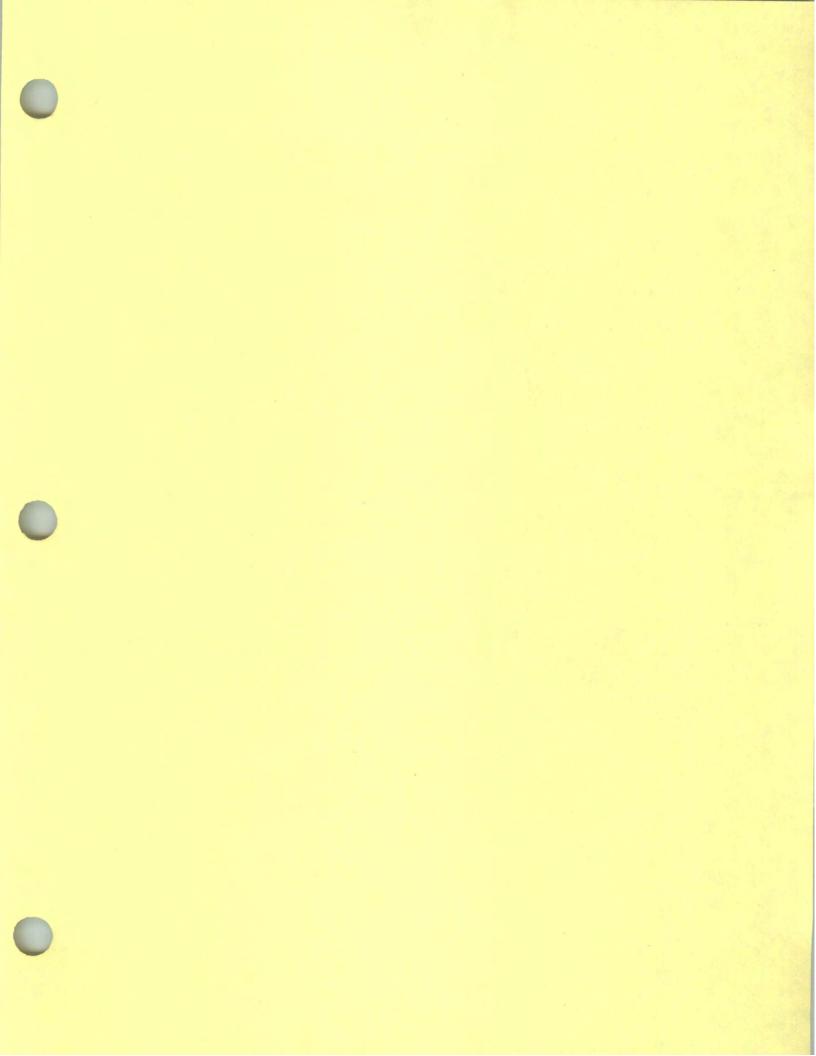
Non-SRCs based on knowledge of the historical processes at the 40 mm range are: metals — iron; organics-semivolatiles — 2,4-Dimethylphenol, 2-Chloronaphthalene, Benzo(a)pyrene,
Dibenzo(a,h) anthracene, and Hexachlorobutadiene

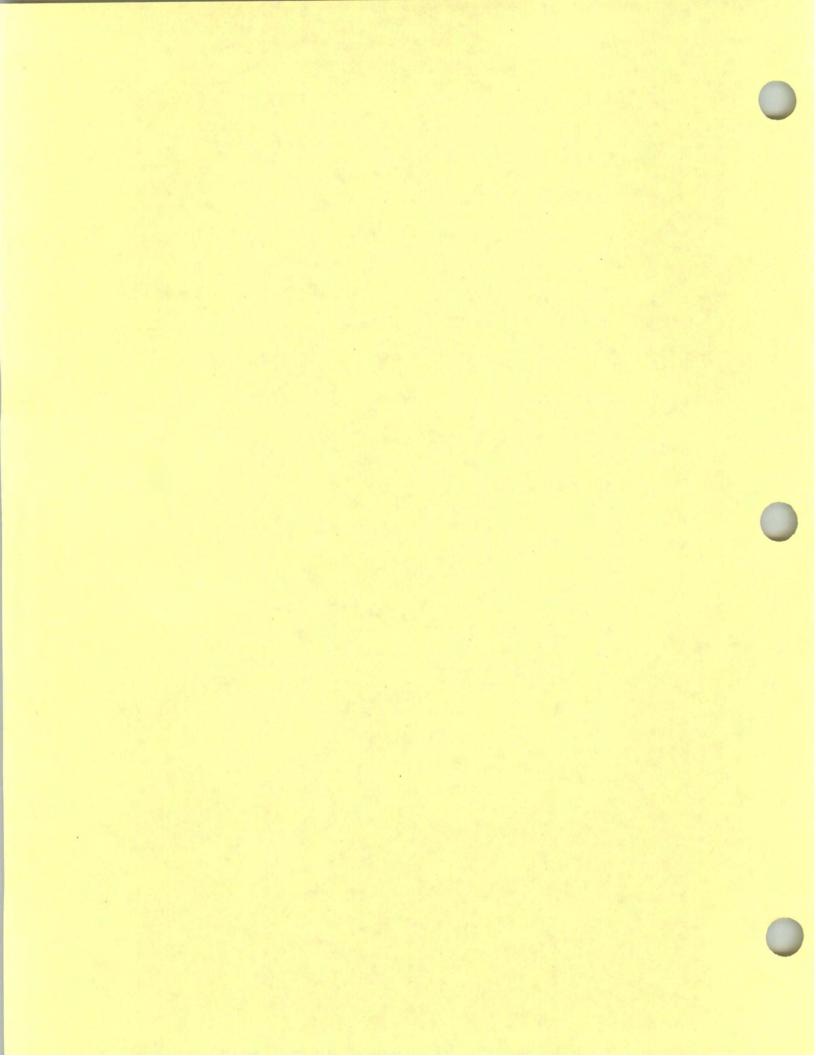
\*COPEC = chemical of potential ecological concern ["Yes" = 1) maximum concentration (detect if at least one detection, or, non detect if no detections) > ESV, or if detected and below ESV or "No ESV and its a PBT compound, and 2) maximum concentration is above background (inorganics) or there is no background data (inorganics and organics), and 3) analyte is a SRC; else, "No" Dist = data distribution (X = neither normal nor lognormal; O = no detected concentrations; L = lognormal; N = normal, D = fewer than 50% detected or fewer than 8 detected - distribution not determined) PCBs = polychlorinated biphenyls Note that 3 analytes were eliminated per 0/0 detects, including bromoform; methyl acetate; and trans-1,3-dichloropropene;



Appendix Table C-4. Soil Screening in Subsurface Soil (1-3 ft) at 40 mm Range at RVAAP (cont'd)

					_	PBT	_			_
	CAS Registry	Tuestificantin	V24 Eo2	Max Exceeds	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC	0.
Analyte	Number	Me Deserte	2 96F+00	No.	ves	No		Yes	No	
1,2-Dichlorobenzene	102063	No Detects	2 12E+01	No	no	Not PBT		Yes	No	
1,2-Dichloroethane	70076	No Detects	7.00F+02	No	No Kow	No		Yes	No	
1,2-Dichloropropane	05476	No Background Data Available	No ESV	No ESV	ves	Yes		Yes	Yes	
1,2-Dimemyloenzene	541731	No Defects	3.77E+01	No	yes	No		Yes	No	
1.3-Dichlorobenzene	106467	No Detects	2.00E+01	No	yes	No		Yes	No	
1,4-Digital Openization	78033	No Detects	8.96E+01	No	ou	Not PBT		Yes	No	
2-Dutanone	591786	No Detects	1.26E+01	No	ou	Not PBT		Yes	No	
Z-riexanone	1634044	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	
4 Mothal 2 postanone	108101	No Defects	4.43E+02	No	No Kow	Not PBT		Yes	No	П
A catona	67641	No Detects	2,50E+00	No	ou	Not PBT		Yes	No	
Accione	71432	No Detects	2.55E-01	No	ош	Not PBT		Yes	No	П
Dromodichloromethene	75774	No Detects	5.40E-01	No	ОП	Not PBT		Yes	No	П
Bromomethane	74839	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	П
Orthon dissiffds	75150	No Background Data Available	9.41E-02	No	ОШ	Not PBT		Yes	No	П
Carbon detrockloride	56735	No Defects	1.00E+03	No	Ou	Not PBT		Yes	No	
Chlorohenzene	108907	No Detects	4.00E+01	No	ou	Not PBT		Yes	No	1
Chloroethane	75003	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	
Chloroform	67663	No Detects	1.19E+00	No	ou	Not PBT	V	Yes	No	1
Chloromethane	74873	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	
Cimene	98828	No Detects	No ESV	No ESV	yes	No		Yes	No	
Curlohevane	110827	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	
Dibromochloromethane	124481	No Detects	2.05E+00	No	ou	Not PBT		Yes	No	1
Dicklorodifluoromethane	75718	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	
Ethylbenzene	100414	No Detects	5.16E+00	No	yes	No		Yes	oN.	
M + P Xvlene	136777612	No Background Data Available	No ESV	No ESV	No Kow	Not PBT	-	Yes	No	1
Methylcyclohexane	108872	No Detects	No ESV	No ESV	yes	No		Yes	No.	1
Mathylana chlorida	75092	No Detects	1.05E+00	No	ou	Not PBT		Yes	No	1
Street	100425	No Detects	3.00E+02	No	ou	Not PBT		Yes	No	
Tetrachloroethene	127184	No Detects	1.00E+01	No	no	Not PBT		Yes	No	1
Toluene	108883	No Background Data Available	2.00E+02	No	ou	Not PBT		Yes	No	1
Trichloroethene	79016	No Detects	1.00E+02	No	ОП	Not PBT		Yes	No.	1
Trickloroffuoromethane	75694	No Detects	1.64E+01	No	ou	Not PBT		Yes	No	1
Vinul chloride	75014	No Detects	6.46E-01	No	ou	Not PBT		Yes	oN.	
cis-1 2-Dichloroethene	156592	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No.	1
cis-1 3-Dichloropropene	10061015	No Detects	3.98E-01	No	ou	Not PBT		Yes	No	
CIS-11-CIDINICIPAL COLOR	156605	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	





Appendix Table C-5. Soil Screening in Deep Surface Soil (0-3 ft) at 40 mm Range at RVAAP

Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum	Maximum	Average	Minimum	Maximum	95% UCL	Exposure	Background
Metals					7			1	Total Control	or mean	Concentration	Criteria
Aluminum	7429905	mg/kg	99 /99	100			11700	3470	21000	12600	12600	17700
Antimony	7440360	mg/kg	99 /0	0	0.18	0.52	0.156			0.164	0.164	90.0
Arsenic	7440382	mg/kg	99 /99	100			13.8	5.7	30.3	15	15	15.4
Barnum	7440393	mg/kg	99 /99	100			64.3	21.9	144	71.3	71.3	88.4
Beryllium	7440417	mg/kg	59/ 59	100			629'0	0.32	1.2	0.719	0.719	0.88
Cadmium	7440439	mg/kg	23/ 66	34.8	910.0	0.074	0.0889	0.057	0.87	0.121	0.121	0
Calcium	7440702	mg/kg	99 /99	100			931	144	9250	1220	1220	15800
Chromium, hexavalent	18540299	mg/kg	2 /0	0	2.7	6.3	1.94			2.5	25	OVECT
Chromium	7440473	mg/kg	99 /99	100			23.1	7.5	429	33.6	33.6	17.4
Cobalt	7440484	mg/kg	99 /99	100			9.65	4.4	23.8	10.4	F 01	10.4
Copper	7440508	mg/kg	99 /99	100			19	9	989	21	21	1.01
Iron	7439896	mg/kg	99 /99	100			24700	13300	36900	25700	00236	22100
read	7439921	mg/kg	99 /99	100			91	8.7	49.5	17.0	17.0	25100
Magnesium	7439954	mg/kg	99 /99	100			2400	575	4200	2500	2.71	1.02
Manganese	7439965	mg/kg	99 /99	100			698	153	1300	0667	0667	3030
Mercury	7439976	mg/kg	99 /0	0	0.013	0.061	1100	135	1200	217	217	1450
Nickel	7440020	me/ke	99 /99	100	0.000	0.00	100	00	000	0.0119	0.0119	0.036
Potassium	7440097	mo/Lo	99 /99	1001			10.0	7.7	38.5	20.1	20.1	21.1
Selenium	7787497	o Vous	00 00	001	0000	000	0/11	2/8	2400	1250	1250	927
Silver	7440734	Salar Salar	00 10		77.0	0.93	0.223			0.24	0.24	1.4
Codium	4770447	mg/kg	00 /0	0	0.037	0.17	0.0309			0.0333	0.0333	0
Thallinm	7440233	mg/kg	99 /79	93.9	47.7	52.3	71.9	30.4	288	42	79	123
Veredim	7440280	mg/kg	99 /71	18.2	0.31	1.8	699.0	1.9	2.8	0.838	0.838	0
adium	7440622	mg/kg	99 /99	100			21.2	9.2	34.1	22.5	22.5	31.1
Curc	7440666	mg/kg	99 /99	100			60.5	29.2	114	62.9	6.29	819
Organics-Explosives												0110
,3,5-Trinitrobenzene	99354	mg/kg	0/ 53	0	0.1	0.1	0.05			0.05	0.05	
,3-Unitrobenzene	99650	mg/kg	99 /0	0	0.1	0.1	0.03			0.05	0.05	
2,4,6- Imitrotoluene	118967	mg/kg	1/ 66	1.52	0.1	0.1	0.0509	0.11	0.11	0.0524	PC500	
2,4-Dinitrotoluene	121142	mg/kg	1/ 66	1.52	0.1	0.1	0.0507	960 0	960 0	0.0519	0.0010	
2,6-Dinitrotoluene	606202	mg/kg	99 /0	0	0.1	0.1	0.05			0.00	0.00	
2-Amino-4,6-dinitrotoluene	35572782	mg/kg	99 /0	0	0.1	0.1	0.05			50.0	0.00	
2-Nitrotoluene	88722	mg/kg	99 /0	0	0.2	0.5	0 1			200	0.00	
3-Nitrotoluene	18066	mg/kg	2/ 66	3.03	0.2	0.0	0.1	0.000	1.0	0.0	0.1	
1-Amino-2,6-dinitrotoluene	19406510	mg/kg	99 /0	0	0.1	0 1	0.05	2000	170	0.05	0.05	
4-Nitrotoluene	06666	mg/kg	99 /0	0	0.2	0.0	0.1			0.0	0.03	
HMX	2691410	mg/kg	99 /1	1.52	0.5	0.0	0.103	0.08	90.0	0.107	1.0	
Nitrobenzene	98953	mg/kg	99 //	10.6	0.035	10	0.0470	0.20	0.20	00.107	0.107	
Nitrocellulose	9004700	mg/kg	717	100			43	0000	70.0	0.0498	0.0498	
Nitroglycerin	55630	mg/kg	7 /0	0	10	10	2	77	+0	53.3	33.3	
Nitroguanidine	556887	mg/kg		0	0.13	0.13	2900			0000	0	
RDX	121824	mg/kg		0	0.0	0.0	0.00			0.000	0.065	
Fetryl	479458	mg/kg	1/ 53	1 89	0.0	0.0	1010	21.0	41.0	0.1	0.1	
Organics-Pesticide/PCB					4:5	7.0	0.101	0.17	0.17	0.104	0.104	
4,4'-DDD	72548	mg/kg	0/ 7	0	01000	PC0000	0.00103			000000		
4,4'-DDE	72559	me/kg		143	01000	0.0034	0.00103	0,00000	0.0000	0.00109	0.00109	
4,4'-DDT	50293	mg/kg	2 /0	0	0.0019	0.0024	0.000933	0.000033	0,00033	0.00114	0.00033	
Aldrin	309002	mg/kg		143	0.0019	0.0024	0.00106	51000	0.000	0.00113	0.00113	
Chlordane	57749	mg/kg	7 /0	0	0.039	0.047	90000	21000	2100.0	0.00113	0.00113	
Dieldrin	60571	mg/kg	0/7	0	0.0019	0.0024	0.00104			0.0217	0.0217	
Endosulfan I	986656	mg/kg	2 /0	0	0.0019	0.0024	0.00103			0.00100	0.00100	
Endosulfan II	33213659	mg/kg	2 /0	0	0.0019	0.0024	0.00103			001000	0.00109	
Endosulfan sulfate	1031078	mg/kg	2 /0	0	0.0019	0.0024	0.00103			0.00109	0,00109	
Endrin	72208	mg/kg		0	0.0019	0.0026	0.00107			0.00103	0.00109	
Endrin aldahuda						The state of the s				U.UUIIII	/	

Analyte	CAS Registry Number	Justification	Soil ESV	Max Exceeds ESV?	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC"?	Dist
Metals		44	COLTOO	Vac	No.	Not PRT	Vec	Yes	Yes	×
Aluminum	1429905	Above background	\$ 00E+00	S. N	No	Not PBT	No	Yes	No	0
Antimony	7440300	At Defects	9 90E+00	Yes	No	Not PBT	Yes	Yes	Yes	r
Arsenic	7440362	Above Background	2.83E+02	No	No.	Not PBT	Yes	Yes	No	r
	7440417	Above Background	1.00E+01	No	No	Not PBT	Yes	Yes	No	T
Codminm	7440439	Above Background	4.00E+00	No	Yes	Yes	Yes	Yes	Yes	D
	7440702	Feential Flement	No ESV	No ESV	No	Not PBT	No	Yes	No	×
Calcium harmalant	18540799	No Defecte	4 00E-01	Yes	No	Not PBT		Yes	Yes	0
	7440473	Above Background	4,00E-01	Yes	No	Not PBT	Yes	Yes	Yes	×
	7440484	Above Background	2.00E+01	Yes	No	Not PBT	Yes	Yes	Yes	×
	7440508	Above Background	1.39E+01	Yes	No	Not PBT	Yes	Yes	Yes	×
Copper	7439896	Fssential Flement	2.00E+02	Yes	No	Not PBT	Yes	No	No	z
	7439971	Above Background	4.05E+01	Yes	Yes	Yes	Yes	Yes	Yes	×
Mameeinm	7439954	Fssential Flement	No ESV	No ESV	No	Not PBT	Yes	Yes	No	Z
Manganese	7439965	Below Background	1.00E+02	Yes	No	Not PBT	No	Yes	No	1
Marganese	7439976	No Detects	5.10E-04	Yes	Yes	No	No	Yes	No	0
Nichal	7440020	Above Background	3.00E+01	Yes	No	Not PBT	Yes	Yes	Yes	-1
Dotaceium	7440097	Essential Element	No ESV	No ESV	No	Not PBT	Yes	Yes	No	L
Colonium	7787497	No Detects	2.10E-01	Yes	No	Not PBT	No	Yes	No	0
Silvar	7440224	No Detects	2.00E+00	No	No	Not PBT		Yes	No	0
Sodium	7440235	Essential Element	No ESV	No ESV	No.	Not PBT	Yes	Yes	No	×
Thallium	7440280	Above Background	1.00E+00	Yes	No	Not PBT	Yes	Yes	Yes	
Vanadium	7440622	Above Background	2.00E+00	Yes	No	Not PBT	Yes	Yes	Yes	Z
Zinc	7440666	Above Background	8.50E+00	Yes	Yes	Yes	Yes	Yes	Yes	×
Organics-Explosives						TOO IN	-	Vac	No	0
3,5-Trinitrobenzene	99354	No Detects ·	8.60E-01	ON	no	MALEDI	-	Vac	No	0
1,3-Dinitrobenzene	99650	No Detects	0.33E-01	NO N	no	Not DRT		Yes Y	No.	-
2,4,6-Trinitrotoluene	118967	No Background Data Available	1,305:00	No	OII	Not DRT	-	Ves	No	9
2,4-Dinitrotoluene	121142	No Background Data Available	2385 03	ONI	OII	Not DRT	-	Vec	Ves	0
2,6-Dinitrotoluene	606202	No Detects	3.26E-02	MA DOW	Oll	Not DRT	-	Yes	No.	0
2-Amino-4,6-dinitrotoluene	355/2/82	No Detects	No ECV	No ECV	OII OII	Not PRT	-	Yes	No	0
2-Nitrotoluene	27/88/77	No Defects	No ESV	No FSV	000	Not PBT		Yes	No	٩
3-Nitrotoluene	199081	No Dackground Data Available	No ECV	No FSV	No Kow	Not PBT		Yes	No	0
4-Amino-2,0-dinitrotoluene	000000	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
TIME	2601410	No Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	D
Nitrobenzene	98953	No Back ground Data Available	4,00E+01	No	по	Not PBT		Yes	No	D
Nitrocellulose	9004700	No Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	Z
Nitroolycerin	55630	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
Nitroguanidine	556887	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
RDX	121824	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
Tetrvl	479458	No Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	۵
Organics-Pesticide/PCB							-		-	-
4,4'-DDD	72548	No Detects	7.58E-01	No	yes	No		Yes	ON	
4.4'-DDE	72559	No Background Data Available	5.96E-01	No	yes	Yes		Yes	Yes	
4.4'-DDT	50293	No Detects	3.50E-03	No	yes	No		Yes	No	9
Aldrin	309002	No Background Data Available	3.32E-03	No	yes	Yes		Yes	Yes	۵
Chlordane	57749	No Detects	2.24E-01	No	yes	No		Yes	No	0
Dieldrin	60571	No Detects	2.38E-03	Yes	yes	No		Yes	Yes	0
Endosulfan I	986656	No Detects	No ESV	No ESV	yes	No		Yes	No	0
Endosulfan II	33213659	No Detects	No ESV	No ESV	No Kow	Not PBT	-	Yes	No	0
Endosulfan sulfate	1031078	No Detects	3.58E-02	No	yes	No		Yes	No	9
Endrin	72208	No Detects	1.01E-02	No	yes	No		Yes	No	0
CHAIR	I man a com-							**		

Appendix Table C-5. Soil Screening in Deep Surface Soil (0-3 ft) at 40 mm Range at RVAAP (cont'd)

Appendix Table C-5. Soil Screening in Deep Surface Soil (0-3 ft) at 40 mm Range at RVAAP

1985   1985   1987   1987   1987   1987   1988   1987   1988   1987   1988   1987   1988   1987   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988   1988	10,000,000,000,000,000,000,000,000,000,	Analyte	CAS Registry Number	Units	Results >Detection Limit	% Results >Detection Limit	Minimum	Maximum	Average	Minimum	Maximum	95% UCL	Exposure	Background
102453   mag/kg   1/7   143   0.00193   0.00293   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00	10,000,000,000,000,000,000,000,000,000,	ndrin ketone	53494705	mg/kg	1/7	14.3	0.0010	0.0024	0.000034	Detect	Defect	of Mean	Concentration	Criteria
102473   marker   0.7   0.0019   0.0024   0.00107   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.0019   0.001	1024573   mg/kg   0,7   0   0,0019   0,0024   0,00102   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093   0,00093	eptachlor	76448	mg/kg	1/ 7	14.3	0.0019	0.0024	0.00000	0.00034	0.00034	0.00114	0.00034	
158899   mgkkg   17   143   0.00093   0.00234   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.00093   0.0009	1104782	eptachlor epoxide	1024573	mg/kg	7 /0	0	0.0019	0.0024	0.00103	20000	0.000.0	0.00109	0,000,00	
15674151   mg/kg   0.7   0.0019   0.0024   0.0010   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0	1567415   mg/kg   0/7   0   0.0019   0.0024   0.0010   0.0020   0.047   0.0020   0.047   0.0020   0.047   0.0020   0.047   0.0020   0.047   0.0020   0.047   0.0020   0.047   0.0020   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.047   0.0206   0.00103   0.04	indane	58899	mg/kg	1/ 7	14.3	0.0019	0.0024	0.00102	0.00093	0.00003	0.00109	0.0000	
11674122	11657412   11567412   100705   11567412   100705   11567412   100705   11567412   100705   1167752   100848   077   0 0.039   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.047   0.0206   0.0204   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0013   0.0024   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026   0.0026	lethoxychlor	72435	mg/kg		0	0.0019	0.0024	0.00103		200000	0.00109	0,00000	
111411622   magkkg   0/7   0   0.039   0.047   0.0206     1545291   magkkg   0/7   0   0.039   0.047   0.0206     1545291   magkkg   0/7   0   0.039   0.047   0.0206     1565292   magkkg   0/7   0   0.039   0.047   0.0206     110970611   magkkg   0/7   0   0.039   0.047   0.0206     110970611   magkkg   0/7   0   0.039   0.047   0.0206     11097061   magkkg   0/7   0   0.039   0.047   0.0206     1109862   magkkg   0/7   0   0.0019   0.0024   0.00103     110982   magkkg   0/7   0   0.0019   0.0024   0.00103     110982   magkkg   0/7   0   0.0019   0.0024   0.00103     110982   magkkg   0/7   0   0.039   0.47   0.206     120882   magkkg   0/7   0   0.039   0.47   0.206     120882   magkkg   0/7   0   0.39   0.47   0.206     120883   magkkg   0/7   0   0.39   0.47   0.206     120884   0/7   0   0.39   0.47   0.206     120884   0/7   0   0.39   0.47   0.206     120885   magkkg   0/7   0   0.39   0.47   0.206     120896   magkkg   0/7   0   0.	111411622   magkkg   0/7	B-1016	12674112	mg/kg		0	0.039	0.047	0.0206			0.0217	71000	
11056823   mg/kg   0/7   0   0.039   0.047   0.0206     15469219   mg/kg   0/7   0   0.039   0.047   0.0206     1567296   mg/kg   0/7   0   0.039   0.047   0.0206     11056823   mg/kg   0/7   0   0.039   0.047   0.0206     11056823   mg/kg   0/7   0   0.039   0.047   0.0206     11056824   mg/kg   0/7   0   0.039   0.047   0.0206     1105825   mg/kg   0/7   0   0.0019   0.0024   0.00103     1105826   mg/kg   0/7   0   0.0019   0.0024   0.00103     110582   mg/kg   0/7   0   0.039   0.47   0.206     12082   mg/kg   0/7   0   0.039   0.47   0.206     12082   mg/kg   0/7   0   0.39   0.47   0.206     12083   mg/kg   0/7   0   0.39   0.47   0.206     12083   mg/kg   0/7   0   0.39   0.47   0.206     12084   0/7   0   0	11056296   mag/kg   0/7   0   0.039   0.047   0.0206     12067296   mag/kg   0/7   0   0.039   0.047   0.0206     12067296   mag/kg   0/7   0   0.039   0.047   0.0206     12067296   mag/kg   0/7   0   0.039   0.047   0.0206     12067291   mag/kg   0/7   0   0.039   0.047   0.0206     1206729   mag/kg   0/7   0   0.039   0.047   0.0206     1206720   mag/kg   0/7   0   0.0019   0.0024   0.00103     1206720   mag/kg   0/7   0   0.0019   0.0024   0.00103     1206721   mag/kg   0/7   0   0.0019   0.0024   0.00103     120672   mag/kg   0/7   0   0.0019   0.0024   0.00103     120672   mag/kg   0/7   0   0.0019   0.0024   0.00103     120673   mag/kg   0/7   0   0.039   0.47   0.206     120673   mag/kg   0/7   0   0.39   0.47   0.206     120674   mag/kg   0/7   0   0.39   0.47   0.206     120675   mag/kg   0/7   0   0.39   0.47   0.206     120675   mag/kg   0/7   0   0.39   0.47   0.206     120676   mag/kg   0/7   0   0.39   0.47   0.206     120677   mag/kg   0/7   0   0.39   0.47   0.206     120678   mag/kg   0/7   0   0.39   0.47   0.206     120678   mag/kg   0/7   0   0.39   0.47   0.206     120679   mag/kg   0/7   0   0.39   0.47   0.206     12068   mag/kg   0/7   0   0.39   0.47   0.206     12069   0.2069   0.2069   0.2069     120724   0.2069   0.2	B-1221	11104282	mg/kg	6.73	0	0.039	0.047	0.0206			0 0 2 1 7	0.0217	
1007201   mg/kg   0/7   0   0.039   0.047   0.0206     11072206   mg/kg   0/7   0   0.039   0.047   0.0206     11072201   mg/kg   0/7   0   0.039   0.0024   0.00103     11072201   mg/kg   0/7   0   0.0019   0.0024   0.00103     11072202   mg/kg   0/7   0   0.0019   0.0024   0.00103     11072203   mg/kg   0/7   0   0.0019   0.0024   0.00103     1107204   mg/kg   0/7   0   0.0019   0.0024   0.00103     1107205   mg/kg   0/7   0   0.0019   0.0024   0.00103     1107206   mg/kg   0/7   0   0.039   0.47   0.206     120720   mg/kg   0/7   0   0.39   0.47   0.206     120721   mg/kg   0/7   0   0.39   0.47   0.206     120721   mg/kg   0/7   0   0.39   0.47   0.206     120721   mg/kg   0/7   0   0.39   0.47   0.206     12072	10752296   mg/kg   0/7   0   0   0   0   0   0   0   0   0	CB-1232	11141165	mg/kg	- 1	0	0.039	0.047	0.0206			0.0217	0.0217	
1907/1535   mg/kg   0/7   0   0.039   0.047   0.0206     1908/153   mg/kg   0/7   0   0.0019   0.0024   0.00103     1908/153   mg/kg   0/7   0   0.0019   0.0024   0.00103     1908/153   mg/kg   0/7   0   0.0019   0.0024   0.00103     1908/154   mg/kg   0/7   0   0.0019   0.0024   0.00103     1908/155   mg/kg   0/7   0   0.0019   0.0024   0.00103     1908/155   mg/kg   0/7   0   0.0019   0.0024   0.00103     1908/155   mg/kg   0/7   0   0.039   0.47   0.206     1008/155   mg/kg   0/7   0   0.39	11007621   mg/kg   0/7   0   0.039   0.047   0.0206     11007621   mg/kg   0/7   0   0.039   0.047   0.0206     11007621   mg/kg   0/7   0   0.039   0.047   0.0206     1100622   mg/kg   0/7   0   0.039   0.047   0.0206     1100623   mg/kg   0/7   0   0.0019   0.0024   0.00103     119846   mg/kg   0/7   0   0.0019   0.0024   0.00103     119857   mg/kg   0/7   0   0.0019   0.0024   0.00103     119858   mg/kg   0/7   0   0.0019   0.0024   0.00103     119857   mg/kg   0/7   0   0.0019   0.0024   0.00103     119858   mg/kg   0/7   0   0.0019   0.0024   0.00103     119858   mg/kg   0/7   0   0.0019   0.0024   0.00103     110052   mg/kg   0/7   0   0.039   0.47   0.206     120851   mg/kg   0/7   0   0.39   0.47   0.206     120852   mg/kg   0/7   0   0.39   0.47   0.206     120853   mg/kg   0/7   0   0.39   0.47   0.206     120854   mg/kg   0/7   0   0.39   0.47   0.206     120855   mg/kg   0/7   0   0.39   0.47   0.206     120856   mg/kg   0/7   0   0.39   0.47   0.206     120857   mg/kg   0/7   0   0.39   0.47   0.206     120858   mg/kg   0/7   0   0.39   0.47   0.206     120859   mg/kg   0/7   0   0.39   0.47   0.206     120859   mg/kg   0/7   0   0.39   0.47   0.206     120850   mg/kg   0/7   0   0.39   0.47   0.206     120851   mg/kg   0/7   0   0.39   0.47   0.206     120850   0.39   0.47   0.206     120850   0	CB-1242	53469219	mg/kg		0	0.039	0.047	0.0206			0.0217	0.0217	
1109/6812   mg/kg   0/7   0   0.039   0.047   0.0206     1109/6812   mg/kg   0/7   0   0.039   0.047   0.0206     1103/12   mg/kg   0/7   0   0.039   0.047   0.0206     1103/12   mg/kg   0/7   0   0.0019   0.0024   0.00103     1103/12   mg/kg   0/7   0   0.39   0.47   0.206     1103/12   mg/kg   0	11096825   mg/kg   0 / 7   0   0 0.039   0 0.047   0 0.0206     11096825   mg/kg   0 / 7   0   0 0.039   0 0.047   0 0.0206     1319846   mg/kg   0 / 7   0   0 0.0019   0 0.0024   0 0.0103     1319847   mg/kg   0 / 7   0   0 0.0019   0 0.0024   0 0.0103     1319848   mg/kg   0 / 7   0   0 0.0019   0 0.0024   0 0.0103     1319849   mg/kg   0 / 7   0   0 0.0019   0 0.0024   0 0.0103     1319849   mg/kg   0 / 7   0   0 0.0019   0 0.0024   0 0.0103     1319849   mg/kg   0 / 7   0   0 0.0019   0 0.0024   0 0.0103     1319849   mg/kg   0 / 7   0   0 0.0019   0 0.0024   0 0.0103     120822   mg/kg   0 / 7   0   0 0.039   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120832   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120834   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12083   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12083   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12084   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12085   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12086   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12087   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12088   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     12089   mg/kg   0 / 7   0   0 0.39   0 47   0 2.06     120802   mg/kg   0	.B-1248	12672296	mg/kg		0	0.039	0.047	0.0206			0.0217	0.0217	
11096825   mg/kg   0/7   0 0 0039   0 047   0 0206     11096826   mg/kg   0/7   0 0 0 0039   0 047   0 0206     119846   mg/kg   0/7   0 0 0 0019   0 0024   0 00103     119846   mg/kg   0/7   0 0 0 0019   0 0024   0 00103     119857   mg/kg   0/7   0 0 0 0019   0 0024   0 00103     119858   mg/kg   0/7   0 0 0 0019   0 0024   0 00103     119858   mg/kg   0/7   0 0 0 0019   0 0024   0 00103     119858   mg/kg   0/7   0 0 0 0019   0 0024   0 00103     119858   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12085   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12087   mg/kg   0/7   0 0 0 039   0 047   0 206     12086   mg/kg   0/7   0 0 0 039   0 047   0 206     12087   mg/kg   0/7   0 0 0 039   0 047   0 206     12088   mg/kg   0/7   0 0 0 039   0 047   0 206     12088   mg/kg   0/7   0 0 0 039   0 047   0 206     12088   mg/kg   0/7   0 0 0 039   0 047   0 206     12088   mg/kg   0/7   0 0 0 0	11096825   mg/kg   0/7   0 0 039   0.047   0.0206     1108462   mg/kg   0/7   0 0 0.039   0.047   0.0206     1198462   mg/kg   0/7   0 0 0.0019   0.0024   0.0103     1198462   mg/kg   0/7   0 0 0.0019   0.0024   0.0103     1198373   mg/kg   0/7   0 0 0.0019   0.0024   0.0103     1198373   mg/kg   0/7   0 0 0.0019   0.0024   0.0103     1108374   mg/kg   0/7   0 0 0.0019   0.0024   0.0103     1108375   mg/kg   0/7   0 0 0.039   0.47   0.206     120837   mg/kg   0/7   0 0 0.39   0.47   0.206     12084   mg/kg   0/7   0 0 0.39   0.47   0.206     12084   mg/kg   0/7   0 0 0.39   0.47   0.206     12085   mg/kg   0/7   0 0 0.39   0	B-1254	16926011	mg/kg	(3)	0	0.039	0.047	0.0206			0.0217	71500	
199846   199846   10,7   0   0   0   0   0   0   0   0   0	191846	.B-1260	11096825	mg/kg	24	0	0.039	0.047	0.0206			0.0217	0.0217	
19846   mukkg   0/7   0 0,0019   0,0024   0,00103     319857   mukkg   0/7   0 0,0019   0,0024   0,00103     319868   mukkg   0/7   0 0,0019   0,0024   0,00103     319868   mukkg   0/7   0 0,0019   0,0024   0,00103     319868   mukkg   0/7   0 0,0019   0,0024   0,00103     319869   mukkg   0/7   0 0,0019   0,0024   0,00103     319874   mukkg   0/7   0 0,039   0,47   0,206     32524   mukkg   0/7   0 0,039   0,47   0,206     319875   mukkg   0/7   0 0,039   0,47   0,206     31988   mukkg   0/7   0 0,039   0,47   0,206     319874   mukkg   0/7   0 0,039   0,47   0,206     319874   mukkg   0/7   0 0,039   0,47   0,206     319875   mukkg   0/7   0 0,039   0,47   0,206     319875   mukkg   0/7   0 0   0,39   0,47   0,206     319871   mukkg   0/7   0 0   0,39   0,47   0,206     319871   mukkg   0/7   0 0   0,39   0,47   0,206     319872   mukkg   0/7   0 0   0,39   0,47   0,206     319873   mukkg   0/7   0 0   0,39   0,47   0,206     319874   mukkg   0/7   0 0   0,39   0,47   0,206     319874   mukkg   0/7   0 0   0,39   0,47   0,206     319874   mukkg   0/7   0 0   0,39   0,47   0,206     3198875   mukkg   0/7   0 0   0,39   0,47   0,206     319887   mukkg   0/7   0   0,39   0,47   0,206     319888   mukkg   0/7   0   0,39   0,47   0,206     319888   mukkg   0/7   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0,47   0,206     31989   0/47   0   0,39   0	198346   mg/kg   0/7   0   0.0019   0.0024   0.00103     198373   mg/kg   0/7   0   0.0019   0.0024   0.00103     198373   mg/kg   0/7   0   0.0019   0.0024   0.00103     198374   mg/kg   0/7   0   0.0019   0.0024   0.00103     198375   mg/kg   0/7   0   0.0019   0.0024   0.00103     198375   mg/kg   0/7   0   0.39   0.47   0.206     19837   mg/kg   0/7   0   0.39   0.47   0.206     19837   mg/kg   0/7   0   0.39   0.47   0.206     19838   mg/kg   0/7   0   0.39   0.47   0.206     19837   mg/kg   0/7   0   0.39   0.47   0.206     19838   mg/kg   0/7   0   0.39   0.47   0.206     19848   mg/kg   0/7   0   0.39   0.47   0.206     19849   mg/kg   0/7   0   0.39   0.47   0.206     19840   mg/kg   0/7   0   0.39   0.47   0.206     19840   mg/kg   0/7   0   0.39   0.47   0.206     100165   mg/kg   0/7   0   0.39   0.47   0.206     100167   mg/kg   0/7   0   0.39   0.47   0	xaphene	8001352	mg/kg		0	0.039	0.047	0.0206			0.0217	0.0217	
\$103719   \$mg/kg   0/7   0 0 0.0019   0.0024   0.00103   119857   mg/kg   0/7   0 0 0.0019   0.0024   0.00103   119857   mg/kg   0/7   0 0 0.0019   0.0024   0.00103   0.0013   0.0024   0.00103   0.0024   0.00103   0.0024   0.00103   0.0024   0.00103   0.0024   0.00103   0.0024   0.00103   0.0024   0.00103   0.0024   0.00103   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025   0.0025	\$103719   \$m\tilde{k}kg   0/7   0   0,0019   0,0024   0,00103     \$119868   m\tilde{k}kg   0/7   0   0,00119   0,0024   0,00103     \$119868   m\tilde{k}kg   0/7   0   0,00119   0,0024   0,00103     \$119868   m\tilde{k}kg   0/7   0   0,0019   0,0024   0,00103     \$103742   m\tilde{k}kg   0/7   0   0,0019   0,0024   0,00103     \$103724   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$10362   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$10362   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$11083   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$1108478   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$110917   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$12017   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$12018   m\tilde{k}kg   0/7   0   0,39   0,47   0,206     \$12012   m\tilde{k}k	pha-BHC	319846	mg/kg		0	0.0019	0.0024	0.00103			00100	0,00100	
119857   maykg   0/7   0 00019   0.0024   0.00103     119868   maykg   0/7   0 0 0.0019   0.0024   0.00103     119868   maykg   0/7   0 0 0.0019   0.0024   0.00103     110372   maykg   0/7   0 0 0.39   0.47   0.206     120822   maykg   0/7   0 0 0.39   0.47   0.206     120823   maykg   0/7   0 0 0.39   0.47   0.206     120824   maykg   0/7   0 0 0.39   0.47   0.206     120825   maykg   0/7   0 0 0.39   0.47   0.206     120826   maykg   0/7   0 0 0.39   0.47   0.206     120827   maykg   0/7   0 0 0.39   0.47   0.206     10153   maykg   0/7   0 0 0.39   0.47   0.206     10153   maykg   0/7   0 0 0.39   0.47   0.206     10153   maykg   0/7   0 0 0.39   0.47   0.206     101647   maykg   0/7   0 0 0.39   0.47   0.206     101647   maykg   0/7   0 0 0.39   0.47   0.206     101648   maykg   0/7   0 0 0.39   0.47   0.206     101649   maykg   0/7   0 0 0.39   0.47   0.206     101641   maykg   0/7   0 0 0.39   0.47   0.206     10202   maykg   0/7   0 0 0.39   0.47   0.206     10208   maykg   0/7   0 0 0.39   0.47   0.206     10208   maykg   0/7   0 0 0.39   0.47   0.206     10208   0.206   0.206   0.206     10208   0.206   0.206   0.206   0.206     10208   0.206   0.206   0.206     10208   0.206   0.206   0.206     10208   0.206   0	119857   mg/kg   0/7   0 00019   0.0024   0.00103     119868   mg/kg   0/7   0 0.0019   0.0024   0.00103     119368   mg/kg   0/7   0 0.0019   0.0024   0.00103     11037   mg/kg   0/7   0 0.039   0.47   0.206     120824   mg/kg   0/7   0 0.399   0.47   0.206     120825   mg/kg   0/7   0 0.399   0.47   0.206     120825   mg/kg   0/7   0 0.399   0.47   0.206     120826   mg/kg   0/7   0 0.399   0.47   0.206     120827   mg/kg   0/7   0 0.399   0.47   0.206     120828   mg/kg   0/7   0 0.399   0.47   0.206     120828   mg/kg   0/7   0 0.399   0.47   0.206     120829   mg/kg   0/7   0 0.399   0.47   0.206     120821   mg/kg   0/7   0 0.399   0.47   0.206     120821   mg/kg   0/7   0 0.399   0.47   0.206     120821   mg/kg   0/7   0 0.399   0.47   0.206     1016418   mg/kg   0/7   0 0 0.399   0.47   0.206     1016419	pha-Chlordane	5103719	mg/kg		0	0.0019	0.0024	0.00103			00100	601000	
119866   mg/kg   0/7   0   0.0019   0.0024   0.00103     15103742   mg/kg   0/7   0   0.0019   0.0024   0.00103     15103742   mg/kg   0/7   0   0.39   0.47   0.206     152082   mg/kg   0/7   0   0.39   0.47   0.206     152083   mg/kg   0/7   0   0.39   0.47   0.206     15285   mg/kg   0/7   0   0.39   0.47   0.206     15287   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     1012249   mg/kg   0/7   0   0.39   0.47   0.206     1012249   mg/kg   0/7   0   0.39   0.47   0.206     101225   mg/kg   0/7   0   0.39   0.47   0.206     101226   mg/kg   0/7   0   0.39   0.47   0.206     101227   mg/kg   0/7   0   0.39   0.47   0.206     101228   mg/kg   0/7   0   0.39   0.47   0.206     101229   mg/kg   0/7   0   0.39   0.47   0.206	119868   mg/kg   0/7   0   0.0019   0.0024   0.00103     15103742   mg/kg   0/7   0   0.0019   0.0024   0.00103     15103742   mg/kg   0/7   0   0.39   0.47   0.206     152843   mg/kg   0/7   0   0.39   0.47   0.206     150852   mg/kg   0/7   0   0.39   0.47   0.206     15185   mg/kg   0/7   0   0.39   0.47   0.206     15187   mg/kg   0/7   0   0.39   0.47   0.206     15187   mg/kg   0/7   0   0.39   0.47   0.206     15187   mg/kg   0/7   0   0.39   0.47   0.206     15188   mg/kg   0/7   0   0.39   0.47   0.206     15185   mg/kg   0/7   0	ta-BHC	319857	mg/kg	1 /0	0	0.0019	0.0024	0.00103			00100	0.00100	
103742   mg/kg   0/7   0   0.019   0.0024   0.00103     92524   mg/kg   0/7   0   0.39   0.47   0.206     92525   mg/kg   0/7   0   0.39   0.47   0.206     92527   mg/kg   0/7   0   0.39   0.47   0.206     92578   mg/kg   0/7   0   0.39   0.47   0.206     92578   mg/kg   0/7   0   0.39   0.47   0.206     92578   mg/kg   0/7   0   0.39   0.47   0.206     92547   mg/kg   0/7   0   0.39   0.47   0.206     92547   mg/kg   0/7   0   0.39   0.47   0.206     92547   mg/kg   0/7   0   0.39   0.47   0.206     925487   mg/kg   0/7   0   0.39   0.47   0.206     925488   mg/kg   0/7   0   0.39   0.47   0.206     925492   mg/kg   0/7   0   0.39   0.47   0.206     925458   mg/kg   0/7   0   0.39   0.47   0.206     925458   mg/kg   0/7   0   0.39   0.47   0.206     9254592   mg/kg   0/7   0   0.39   0.47   0.206     925458   mg/kg   0/7   0   0.39   0.47   0.206     925459   mg/kg   0/7   0   0.39   0.47   0.206     925468   0	103742   mg/kg   0/7   0   0.019   0.0024   0.00103     92524   mg/kg   0/7   0   0.39   0.47   0.206     88062   mg/kg   0/7   0   0.39   0.47   0.206     81063   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     120834   mg/kg   0/7   0   0.39   0.47   0.206     120835   mg/kg   0/7   0   0.39   0.47   0.206     120836   mg/kg   0/7   0   0.39   0.47   0.206     120837   mg/kg   0/7   0   0.39   0.47   0.206     120838   mg/kg   0/7   0   0.39   0.47   0.206     120837   mg/kg   0/7   0   0.39   0.47   0.206     120838   mg/kg   0/7   0   0.39   0.47   0.206     120839   mg/kg   0/7   0   0.39   0.47   0.206     120840   mg/kg   0/7   0   0.39   0.47   0.206     120841   mg/kg   0/7   0   0.39   0.47   0.206     120851   mg/kg   0/7   0   0.39   0.47   0.206     120852   mg/kg   0/7   0   0.39   0.47   0.206     120853   mg/kg   0/7   0   0.39   0.47   0.206     120853   mg/kg   0/7   0   0.39   0.47   0.206     120853   mg/kg   0/7   0   0.39   0.47   0.206     12086	lta-BHC	319868	mg/kg		0	0.0019	0.0024	0.00103			00100	0,00100	
92224         mg/kg         0/7         0         0.39         0.47         0.206           95954         mg/kg         0/7         0         0.39         0.47         0.206           120832         mg/kg         0/7         0         0.39         0.47         0.206           120832         mg/kg         0/7         0         0.39         0.47         0.206           11283         mg/kg         0/7         0         0.39         0.47         0.206           91284         mg/kg         0/7         0         0.39         0.47         0.206           95578         mg/kg         0/7         0         0.39         0.47         0.206           95487         mg/kg         0/7         0         0.39         0.47         0.206           9141         mg/kg         0/7         0         0.39         0.47         0.206           95487         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           10553         mg/kg         0/7         0         0.39         0.47	92224         Ing/kg         0/7         0         0.39         0.47         0.206           88062         mg/kg         0/7         0         0.39         0.47         0.206           120832         mg/kg         0/7         0         0.39         0.47         0.206           120852         mg/kg         0/7         0         0.39         0.47         0.206           120857         mg/kg         0/7         0         0.39         0.47         0.206           91287         mg/kg         0/7         0         0.39         0.47         0.206           91587         mg/kg         0/7         0         0.39         0.47         0.206           91578         mg/kg         0/7         0         0.39         0.47         0.206           91576         mg/kg         0/7         0         0.39         0.47         0.206           91579         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         <	mma-Chlordane	5103742	mg/kg		0	6100.0	0.0024	0.00103			00100	0.00100	
92254         mg/kg         0/7         0         039         047         0.206           88062         mg/kg         0/7         0         039         047         0.206           88062         mg/kg         0/7         0         039         047         0.206           120832         mg/kg         0/7         0         039         047         0.206           121885         mg/kg         0/7         0         039         047         0.206           91587         mg/kg         0/7         0         039         047         0.206           91587         mg/kg         0/7         0         0.39         0.47         0.206           91587         mg/kg         0/7         0         0.39         0.47         0.206           91576         mg/kg         0/7         0         0.39         0.47         0.206           91547         mg/kg         0/7         0         0.39         0.47         0.206           91548         mg/kg         0/7         0         0.39         0.47         0.206           91541         mg/kg         0/7         0         0.39         0.47         0.206	92524         mg/kg         0/7         0         039         047         0.206           88052         mg/kg         0/7         0         039         0,47         0.206           88052         mg/kg         0/7         0         039         0,47         0.206           120832         mg/kg         0/7         0         039         0,47         0.206           112837         mg/kg         0/7         0         039         0,47         0.206           91587         mg/kg         0/7         0         039         0,47         0.206           91587         mg/kg         0/7         0         0.39         0,47         0.206           91587         mg/kg         0/7         0         0.39         0,47         0.206           91587         mg/kg         0/7         0         0.39         0,47         0.206           91576         mg/kg         0/7         0         0.39         0,47         0.206           91587         mg/kg         0/7         0         0.39         0,47         0.206           91588         0/7         0         0         0         0         0         <	rganics-Semivolatile										0.00100	0.00103	
95554   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     121285   mg/kg   0/7   0   0.39   0.47   0.206     21285   mg/kg   0/7   0   0.39   0.47   0.206     21285   mg/kg   0/7   0   0.39   0.47   0.206     21285   mg/kg   0/7   0   0.39   0.47   0.206     21287   mg/kg   0/7   0   0.39   0.47   0.206     21288   mg/kg   0/7   0   0.39   0.47   0.206     21287   mg/kg   0/7   0   0.39   0.47   0.206     21288   mg/kg   0/7   0   0.39   0.47   0.206     21289   mg/kg   0/7   0   0.39   0.47   0.206     21389   mg/kg   0/7   0   0.39   0.47   0.206     21399   mg/kg   0/7   0   0.39   0.47	108524   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     120832   mg/kg   0/7   0   0.39   0.47   0.206     151835   mg/kg   0/7   0   0.39   0.47   0.206     15184   mg/kg   0/7   0   0.39   0.47   0.206     15185   mg/kg   0/7   0   0.39   0.47   0.206     15186   mg/kg   0/7   0   0.39   0.47   0.206     15187   mg/kg   0/7   0   0.39   0.47   0.206     15187   mg/kg   0/7   0   0.39   0.47   0.206     15187   mg/kg   0/7   0   0.39   0.47   0.206     15188   mg/kg   0/7   0   0.39   0.47   0.206     15183   mg/kg   0/7   0   0.39   0.47   0.206     15183   mg/kg   0/7   0   0.39   0.47   0.206     15183   mg/kg   0/7   0   0.39   0.47   0.206     15184   mg/kg   0/7   0   0.39   0.47	I-Biphenyl	92524	mg/kg		0	0.39	0.47	0.206			0.217	0.217	
120832   mg/kg   0/7   0   0   0   0   0   0   0   0   0	88062         mg/kg         0/7         0         039         047         0.206           105832         mg/kg         0/7         0         039         047         0.206           105832         mg/kg         0/7         0         0         039         047         0.206           51285         mg/kg         0/7         0         0         0         0         0           91587         mg/kg         0/7         0         0         0         0         0         0           95576         mg/kg         0/7         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td< td=""><td>1,5-Inchlorophenol</td><td>95954</td><td>mg/kg</td><td>- 1</td><td>0</td><td>0.39</td><td>0.47</td><td>0.206</td><td></td><td></td><td>0.217</td><td>0.017</td><td></td></td<>	1,5-Inchlorophenol	95954	mg/kg	- 1	0	0.39	0.47	0.206			0.217	0.017	
120832   mg/kg   0/7   0   0.39   0.47   0.206     105679   mg/kg   0/7   0   0.39   0.47   0.206     112837   mg/kg   0/7   0   0.39   0.47   0.206     12587   mg/kg   0/7   0   0.39   0.47   0.206     12588   mg/kg   0/7   0   0.39   0.47   0.206     12589   mg/kg   0/7   0   0.39   0.47   0.206     126478   mg/kg   0/7   0   0.39   0.47   0.206     126479   mg/kg   0/7   0   0.39   0.47   0.206     12648   mg/kg   0/7   0   0.39   0.47   0.206     12649   mg/kg   0/7   0   0.39   0.47   0.206     12640   0/7   0   0.39   0.47   0.206     12640   0/7   0   0.39   0.47   0.206     12640   0/7   0   0.39   0.47   0.206     12640   0	120832   mg/kg   0/7   0   0.39   0.47   0.206     105679   mg/kg   0/7   0   0   0.39   0.47   0.206     11287   mg/kg   0/7   0   0.39   0.47   0.206     21287   mg/kg   0/7   0   0.39   0.47   0.206     21428   mg/kg   0/7   0   0.39   0.47   0.206     21421   mg/kg   0/7   0   0.39   0.47   0.206     21422   mg/kg   0/7   0   0.39   0.47   0.206     21437   mg/kg   0/7   0   0.39   0.47   0.206     21441   mg/kg   0/7   0   0.39   0.47   0.206     21597   mg/kg   0/7   0   0.39   0.47   0.206     21598   mg/kg   0/7   0   0.39   0.47   0.206     21591   mg/kg   0/7   0   0.39   0.47   0.206     21041   mg/kg   0/7   0   0.39   0.47   0.206     21042   mg/kg   0/7   0   0.39   0.47   0.206     21043   mg/kg   0/7   0   0.39   0.47   0.206     21054   mg/kg   0/7   0   0.39   0.47   0.206     210645   mg/kg   0/7   0   0.39   0.47   0.206     210856   mg/kg   0/7   0   0.39   0.47   0.206     210856   mg/kg   0/7   0   0.39   0.47   0.206     210856   mg/kg   0/7   0   0.39   0.47   0.206     210857   mg/kg   0/7   0   0.39   0.47   0.206     210858   mg/kg   0/7   0   0.39   0.47   0.206     210859   mg/kg	4,6-Trichlorophenol	88062	mg/kg	2.11	0	0.39	0.47	0.206			0.217	0.217	
105679   mg/kg   0/7   0   0.39   0.47   0.206	105679   mg/kg   0/7   0   0   0   0   0   0   0   0   0	-Dichlorophenol	120832	mg/kg	0/ 7	0	0.39	0.47	0.206			0.217	0.217	
51285         mg/kg         0/1         0         078         0.94         0.4           91587         mg/kg         0/7         0         0.39         0.47         0.206           95578         mg/kg         0/7         0         0.39         0.47         0.206           95476         mg/kg         0/7         0         0.39         0.47         0.206           91576         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           88754         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           88754         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           101553         mg/kg         0/7         0         0.39         0.47         0.206           101543         mg/kg         0/7         0         0.39         0.47         0.	\$11285	+-Dimethylphenol	105679	mg/kg		0	0.39	0.47	0.206			0.217	0.217	
91587         mg/kg         0/7         0         0.39         0.47         0.206           95578         mg/kg         0/7         0         0.39         0.47         0.206           95478         mg/kg         0/7         0         0.39         0.47         0.206           91576         mg/kg         0/7         0         0.39         0.47         0.206           95487         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           101553         mg/kg         0/7         0         0.39         0.47         0.206           101543         mg/kg         0/7         0         0.39         0.47	91587         mg/kg         0/7         0         039         0.47         0.206           95378         mg/kg         0/7         0         0.39         0.47         0.206           534521         mg/kg         0/7         0         0.39         0.47         0.206           91576         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         0.206           91942         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         0.206           91942         mg/kg         0/7         0         0.39         0.47         0.206           101543         mg/kg         0/7         0         0.39         0.47         0.206           106478         mg/kg         0/7         0         0.39         0.47 <td< td=""><td></td><td>51285</td><td>mg/kg</td><td>0/ 1</td><td>0</td><td>0.78</td><td>0.94</td><td>0.4</td><td></td><td></td><td>1770</td><td>0.4</td><td></td></td<>		51285	mg/kg	0/ 1	0	0.78	0.94	0.4			1770	0.4	
95578         mg/kg         0/7         0         0.39         0.47         0.206           134321         mg/kg         0/7         0         0.78         0.94         0.413           91576         mg/kg         0/7         0         0.39         0.47         0.206           95487         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           99092         mg/kg         0/7         0         0.39         0.47         0.206           101553         mg/kg         0/7         0         0.39         0.47         0.206           101055         mg/kg         0/7         0         0.39         0.47	95578         mg/kg         0/7         0         039         0.47         0.206           91576         mg/kg         0/7         0         0.78         0.94         0.413           91576         mg/kg         0/7         0         0.39         0.47         0.206           95487         mg/kg         0/7         0         0.39         0.47         0.206           88754         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           99092         mg/kg         0/7         0         0.39         0.47         0.206           101553         mg/kg         0/7         0         0.39         0.47         0.206           101541         mg/kg         0/7         0         0.39         0.47         0.206           101553         mg/kg         0/7         0         0.39         0.47         0.206           101541         mg/kg         0/7         0         0.39         0.47         0.206           100016         mg/kg         0/7         0         0.39         0.47         <		91587	mg/kg		0	0.39	0.47	0.206			0217	0.217	
534321         mg/kg         0/7         0         078         0.94         0.413           91576         mg/kg         0/7         0         0.39         0.47         0.206           954874         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         0.206           101523         mg/kg         0/7         0         0.39         0.47         0.206           106478         mg/kg         0/7         0         0.39         0.47         0.206           106479         mg/kg         0/7         0         0.39         0.47	534321         mg/kg         0/7         0         078         0.94         0.413           91576         mg/kg         0/7         0         0.39         0.47         0.206           954874         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           88757         mg/kg         0/7         0         0.39         0.47         0.206           101533         mg/kg         0/7         0         0.39         0.47         0.206           10534         0/7         0         0.39         0.47         0.206           106478         mg/kg         0/7         0         0.39         0.47         0.206           106016         mg/kg         0/7         0         0.39         0.47         0.206           106027         mg/kg         0/7         0         0.39         0.47         0.206 <td></td> <td>95578</td> <td>mg/kg</td> <td>0/ 7</td> <td>0</td> <td>0.39</td> <td>0.47</td> <td>0.206</td> <td></td> <td></td> <td>0217</td> <td>0.217</td> <td></td>		95578	mg/kg	0/ 7	0	0.39	0.47	0.206			0217	0.217	
91576         mg/kg         0/7         0         0.39         0.47         0.206           95487         mg/kg         0/7         0         0.39         0.47         0.206           88744         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         0.206           91942         mg/kg         0/7         0         0.39         0.47         0.206           101553         mg/kg         0/7         0         0.39         0.47         0.206           106478         mg/kg         0/7         0         0.39         0.47         0.206           106475         mg/kg         0/7         0         0.39         0.47         0.206           106475         mg/kg         0/7         0         0.39         0.47         0.206           100016         mg/kg         0/7         0         0.39         0.47	91576         mg/kg         0/7         0         0.39         0.47         0.206           88754         mg/kg         0/7         0         0.39         0.47         0.206           88755         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         0.206           91941         mg/kg         0/7         0         0.39         0.47         0.206           91942         mg/kg         0/7         0         0.39         0.47         0.206           9092         mg/kg         0/7         0         0.39         0.47         0.206           101553         mg/kg         0/7         0         0.39         0.47         0.206           1005723         mg/kg         0/7         0         0.39         0.47         0.206           106418         mg/kg         0/7         0         0.39         0.47         0.206           100016         mg/kg         0/7         0         0.39         0.47         0.206           100217         mg/kg         0/7         0         0.39         0.47		534521	mg/kg	21	0	0.78	0.94	0.413			0.433	0.433	
857487         mig/kg         0/7         0         0.39         0.47         0.206           88775         mig/kg         0/7         0         0.39         0.47         0.206           91941         mig/kg         0/7         0         0.39         0.47         0.206           91941         mig/kg         0/7         0         0.39         0.47         0.206           101553         mig/kg         0/7         0         0.39         0.47         0.206           101553         mig/kg         0/7         0         0.39         0.47         0.206           101553         mig/kg         0/7         0         0.39         0.47         0.206           106478         mig/kg         0/7         0         0.39         0.47         0.206           106415         mig/kg         0/7         0         0.39         0.47         0.206           100016         mig/kg         0/7         0         0.39         0.47         0.206           100017         mig/kg         0/7         0         0.39         0.47         0.206           100016         mig/kg         0/7         0         0.39         0.	83744         mig/kg         0/7         0         0.39         0.47         0.206           88754         mig/kg         0/7         0         0.39         0.47         0.206           88754         mig/kg         0/7         0         0.39         0.47         0.206           91941         mig/kg         0/7         0         0.39         0.47         0.206           91941         mig/kg         0/7         0         0.39         0.47         0.206           101553         mig/kg         0/7         0         0.39         0.47         0.206           106478         mig/kg         0/7         0         0.39         0.47         0.206           106445         mig/kg         0/7         0         0.39         0.47	alene	91576	mg/kg	9.1	0	0.39	0.47	0.206			0.217	0.217	
88755   mg/kg   0/7   0   0.39   0.47   0.206     88755   mg/kg   0/7   0   0.39   0.47   0.206     91941   mg/kg   0/7   0   0.39   0.47   0.206     101553   mg/kg   0/7   0   0.39   0.47   0.206     1016478   mg/kg   0/7   0   0.39   0.47   0.206     106415   mg/kg   0/7   0   0.39   0.47   0.206     100016   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     100028   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     100028   mg/kg   0/7   0   0.39   0.47   0.206     101024   mg/kg   0/7   0   0.39   0.47   0.206     101025   mg/kg   0/7   0   0.39   0.47   0.206     101027   mg/kg   0/7   0   0.39   0.47   0.206     101028   mg/kg   0/7   0   0.39   0.47   0.206     101029   mg/kg   0/7   0   0.39   0.47   0.206     101021   mg/kg   0/7   0   0.39   0.47   0.206     101022   mg/kg   0/7   0   0.39   0.47   0.206     101024   mg/kg   0/7   0   0.39   0.47   0.206     101025   mg/kg   0/7   0   0.39   0.47   0.206     101024   mg/kg   0/7   0   0.39   0.47   0.206     101025   mg/kg   0/7   0   0.39   0.47   0.206     111011   mg/kg   0/7   0   0.39   0.47   0.206     111011   mg/kg   0/7   0   0.39   0.47   0.206     1111011   mg/kg   0/7   0   0.39   0.47   0.206     111101   0.00   0.39   0.47   0.206     111101   0.00   0.39   0.47   0.206     11101   0.00   0.39   0.47   0.206     11101   0.00   0.39   0.47   0.206     11101   0.00   0.39   0.47   0.206     11101   0	88755   mg/kg   0/7   0   0.39   0.47   0.206     88755   mg/kg   0/7   0   0.39   0.47   0.206     91941   mg/kg   0/7   0   0.39   0.47   0.206     91942   mg/kg   0/7   0   0.39   0.47   0.206     101553   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     100016   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     10017   mg/kg   0/7   0   0.39   0.47   0.206     120127   mg/kg   0/7   0   0.39   0.47   0.206     1501249   mg/kg   0/7   0   0.39   0.47   0.206     1501249   mg/kg   0/7   0   0.39   0.47   0.206     160527   mg/kg   0/7   0   0.39   0.47   0.206     160528   mg/kg   0/7   0   0.39   0.47   0.206     160529   mg/kg   0/7   0   0.39   0.47   0.206     160530   mg/kg   0/7   0   0.39   0.47   0.206     160540	- initial	93487	mg/kg		0	0.39	0.47	0.206			0.217	0.217	
100016   mg/kg   0/7   0   0.39   0.47   0.206     200921   mg/kg   0/7   0   0.39   0.47   0.206     200922   mg/kg   0/7   0   0.39   0.47   0.206     2016478   mg/kg   0/7   0   0.39   0.47   0.206     20165868   mg/kg   0/7   0   0.39   0.47   0.206     2016592   mg/kg   0/7   0   0.39   0.47   0.206     2016592   mg/kg   0/7   0   0.39   0.47   0.206     2016592   mg/kg   0/7   0   0.39   0.47   0.206     2016992   mg/kg   0/7   0   0.39   0.47   0.206     2016993   mg/kg   0/7   0   0.39   0.47   0.206     2016994   mg/kg   0/7   0   0.39   0.47   0.206     2016995   mg/kg   0/7   0   0.39   0.47   0.206     2016997   mg/kg   0/7   0   0.39   0.47   0.206     20169997   mg/kg   0/7   0   0.39   0.47   0.206     20169997   mg/kg   0/7   0   0.39   0.47   0.206     20169997   mg/kg   0/7   0   0.39   0.47   0.206     201699997   0.47   0.206     2016999997   0.47   0.206     201699997   0.47   0.206     201699997   0.47   0.206     201699997   0.47   0.206     201699997   0.47   0.206     2016999997   0.47   0.206     20169999997   0.47   0.206     2016999999999999999999999999999999999999	101553   mg/kg   0/7   0   0.39   0.47   0.206     99092   mg/kg   0/7   0   0.39   0.47   0.206     101553   mg/kg   0/7   0   0.39   0.47   0.206     101553   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     106016   mg/kg   0/7   0   0.39   0.47   0.206     100016   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     120127   mg/kg   0/7   0   0.39   0.47   0.206     1201249   mg/kg   0/7   0   0.39   0.47   0.206     1201240   mg/kg   0/7   0   0.39   0.47   0.206     1501241   mg/kg   0/7   0   0.39   0.47   0.206     1501242   mg/kg   0/7   0   0.39   0.47   0.206     1501242   mg/kg   0/7   0   0.39   0.47   0.206     160527   mg/kg   0/7   0   0.39   0.47   0.206     160528   mg/kg   0/7   0   0.39   0.47   0.206     160549   mg/kg   0/7   0   0.39   0.47   0.206     160540   mg/kg   0/7   0   0.39   0.47   0.206	Ammino	11/00	mg/kg		0	0.39	0.47	0.206			0.217	0.217	
101553 mg/kg 0/7 0 0.78 0.94 0.4   0.4   0.4   0.4   0.4   0.4   0.4   0.4   0.206   0.39 0.47 0.206   0.39 0.47 0.206   0.47 0.206   0.39 0.47 0.206   0.47 0.206   0.39 0.47 0.206   0.407 0.206   0.39 0.47 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.206   0.407 0.2	101553 mg/kg 0/7 0 0.78 0.94 0.4   0.44   0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206   0.395 0.47 0.206	amondina.	00/33	mg/kg		0	0.39	0.47	0.206			0.217	0.217	
101553	101553	2	00000	mg/kg	- 1	0	0.78	0.94	0.4				0.4	
106478   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     106445   mg/kg   0/7   0   0.39   0.47   0.206     106016   mg/kg   0/7   0   0.39   0.47   0.206     100016   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     208968   mg/kg   0/7   0   0.39   0.47   0.206     120127   mg/kg   0/7   0   0.39   0.47   0.206     1912249   mg/kg   0/7   0   0.39   0.47   0.206     20592   mg/kg   0/7   0   0.39   0.47   0.206     100227   mg/kg   0/7   0   0.39   0.47   0.206     20592   mg/kg   0/7   0   0.39   0.47   0.206     191242   mg/kg   0/7   0   0.39   0.47   0.206     100227   mg/kg   0/7   0   0.39   0.47   0.206     100227   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     111944   mg/kg   0/7   0   0.39   0.47   0.206     111144   mg/kg   0/7   0   0.39   0.47   0.206     11114	106478   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     106478   mg/kg   0/7   0   0.39   0.47   0.206     10645   mg/kg   0/7   0   0.39   0.47   0.206     106016   mg/kg   0/7   0   0.39   0.47   0.206     100017   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     102027   mg/kg   0/7   0   0.39   0.47   0.206     120127   mg/kg   0/7   0   0.39   0.47   0.206     1912249   mg/kg   0/7   0   0.39   0.47   0.206     191242   mg/kg   0/7   0   0.39   0.47   0.206     191444   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     108661   mg/kg   0/7   0   0.39   0.47   0.206     1086	I	101553	mg/kg	- 1	0	0.39	0.47	0.206			0.217	0.217	
106478   mg/kg   u	106478   mg/kg   w 7   0   0.39   0.47   0.206     106478   mg/kg   w 7   0   0.39   0.47   0.206     106445   mg/kg   0/7   0   0.39   0.47   0.206     106027   mg/kg   0/7   0   0.39   0.47   0.206     100016   mg/kg   0/7   0   0.39   0.47   0.206     100027   mg/kg   0/7   0   0.39   0.47   0.206     10028668   mg/kg   0/7   0   0.39   0.47   0.206     120127   mg/kg   0/7   0   0.39   0.47   0.206     120128   mg/kg   0/7   0   0.39   0.47   0.206     120127   mg/kg   0/7   0   0.39   0.47   0.206     100527   mg/kg   0/7   0   0.39   0.47   0.206     101242   mg/kg   0/7   0   0.39   0.47   0.206     101242   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     100661   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     100661   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     111844   mg/kg   0/7   0   0.39   0.47   0.206     11184	T	50507	mg/kg		0 0	0.39	0.47	0.206			0.217	0.217	
100415   1106445   107   0   0.39   0.47   0.206   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0.205   0	100016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   110016   1		106478	SAM	- 10	0 0	0.39	0.47	0.206			0.217	0.217	
106445   mg/kg   0/7   0   0.39   0.47   0.206   0.00016   mg/kg   0/7   0   0.39   0.47   0.206   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.00027   0.000	106445   mg/kg   0/7   0   0.39   0.47   0.206   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005   0.0005	Thlorophenyl phenyl ether	7005773	mo/kg	11.	000	0.39	0.47	0.206			0.217	0.217	
100016   mg/kg   0/7   0   0.339   0.47   0.206   0.00027   mg/kg   0/7   0   0.39   0.47   0.206   0.00027   mg/kg   0/7   0   0.78   0.94   0.413   0.006   0.005   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.007   0.006   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005	100016   mg/kg   0/7   0   0.39   0.47   0.206   0.00027   mg/kg   0/7   0   0.78   0.47   0.206   0.00027   mg/kg   0/7   0   0.78   0.94   0.413   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006   0.006	Methylphenol	106445	moleo			0.39	14.0	0.206			0.217	0.217	
100027   mg/kg   0/7   0   0.39   0.44   0.120     83329   mg/kg   0/7   0   0.39   0.47   0.206     208968   mg/kg   0/7   0   0.39   0.47   0.206     208862   mg/kg   0/7   0   0.39   0.47   0.206     20120127   mg/kg   0/7   0   0.39   0.47   0.206     201223   mg/kg   0/7   0   0.39   0.47   0.206     201224   mg/kg   0/7   0   0.39   0.47   0.206     201225   mg/kg   0/7   0   0.39   0.47   0.206     201226   mg/kg   0/7   0   0.39   0.47   0.206     201229   mg/kg   0/7   0   0.39   0.47   0.206     201229   mg/kg   0/7   0   0.39   0.47   0.206     201242   mg/kg   0/7   0   0.39   0.47   0.206     201244   mg/kg   0/7   0   0.39   0.47   0.206     201444   mg/kg   0/7   0   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0.206     20144   0.39   0.47   0	100027   mg/kg   0/ 7   0   0.39   0.41   0.200   0.39   0.47   0.200   0.39   0.47   0.200   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47   0.206   0.39   0.47	Vitrobenzenamine	10001	mo/ko	11.0	00	0.39	0.47	0.200			0.217	0.217	
83329         mg/kg         0/7         0         0.39         0.77         0.206           208968         mg/kg         0/1         0         0.39         0.47         0.206           208962         mg/kg         0/1         0         0.39         0.47         0.206           120127         mg/kg         0/7         0         0.39         0.47         0.206           1912249         mg/kg         0/7         0         0.39         0.47         0.206           100527         mg/kg         0/7         0         0.39         0.47         0.206           20592         mg/kg         0/7         0         0.39         0.47         0.206           191242         mg/kg         0/7         0         0.39         0.47         0.206           207089         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206	83329         mg/kg         0/7         0         0.39         0.77         0.71           208868         mg/kg         0/1         0         0.39         0.47         0.206           120127         mg/kg         0/7         0         0.39         0.47         0.206           120127         mg/kg         0/7         0         0.39         0.47         0.206           191224         mg/kg         0/7         0         0.39         0.47         0.206           56533         mg/kg         0/7         0         0.39         0.47         0.206           100227         mg/kg         0/7         0         0.39         0.47         0.206           20592         mg/kg         0/7         0         0.39         0.47         0.206           191242         mg/kg         0/7         0         0.39         0.47         0.206           207089         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111944         mg/kg         0/7         0         0.39         0.47	Vitrophenol	100027	me/kg		0	0.78	0.04	0.200			0.217	0.217	
208968         mg/kg         0/1         0         0.39         0.47         0.200           98862         mg/kg         0/7         0         0.39         0.47         0.206           120127         mg/kg         0/7         0         0.39         0.47         0.206           1912249         mg/kg         0/7         0         0.39         0.47         0.206           56533         mg/kg         0/7         0         0.39         0.47         0.206           50328         mg/kg         0/7         0         0.39         0.47         0.206           20592         mg/kg         0/7         0         0.39         0.47         0.206           191242         mg/kg         0/7         0         0.39         0.47         0.206           191242         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206	208968         mg/kg         0/1         0         0.39         0.47         0.200           98862         mg/kg         0/7         0         0.39         0.47         0.20           120127         mg/kg         0/7         0         0.39         0.47         0.206           1912249         mg/kg         0/7         0         0.39         0.47         0.206           56535         mg/kg         0/7         0         0.39         0.47         0.206           100527         mg/kg         0/7         0         0.39         0.47         0.206           205992         mg/kg         0/7         0         0.39         0.47         0.206           207089         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111944         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206           108601         mg/kg         0/7         0         0.39         0.47		83329	mg/kg	101	0	0.30	0.47	0.413			0.433	0.433	
98862         mg/kg         0/7         0         0.39         0.37         0.25           120127         mg/kg         0/7         0         0.39         0.47         0.206           1912249         mg/kg         0/7         0         0.39         0.47         0.206           56533         mg/kg         0/7         0         0.39         0.47         0.206           100227         mg/kg         0/7         0         0.39         0.47         0.206           50328         mg/kg         0/7         0         0.39         0.47         0.206           191242         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206	98862         mg/kg         0/7         0         0.39         0.37         0.25           120127         mg/kg         0/7         0         0.39         0.47         0.206           1912249         mg/kg         0/7         0         0.39         0.47         0.206           1912249         mg/kg         0/7         0         0.39         0.47         0.206           100527         mg/kg         0/7         0         0.39         0.47         0.206           20592         mg/kg         0/7         0         0.39         0.47         0.206           207089         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111944         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206           108661         ms/ks         0/7         0         0.39         0.47         0.206		208968	mg/kg	0/ 1	0	0.30	0.47	0.200			0.217	0.217	
120127   mg/kg   0/ 7   0   0.39   0.47   0.206     1912249   mg/kg   0/ 7   0   0.39   0.47   0.206     26553   mg/kg   0/ 7   0   0.39   0.47   0.206     26553   mg/kg   0/ 7   0   0.39   0.47   0.206     20592   mg/kg   0/ 7   0   0.39   0.47   0.206     191242   mg/kg   0/ 7   0   0.39   0.47   0.206     191244   mg/kg   0/ 7   0   0.39   0.47   0.206     111911   mg/kg   0/ 7   0   0.39   0.47   0.206     111944   mg/kg   0/ 7   0   0.39   0.47   0.206     111144   mg/kg   0/ 7   0   0.39   0.47   0.206	120127   mg/kg   0/7   0   0.39   0.47   0.206     1912249   mg/kg   0/7   0   0.39   0.47   0.206     1902249   mg/kg   0/7   0   0.39   0.47   0.206     100527   mg/kg   0/7   0   0.39   0.47   0.206     20328   mg/kg   0/7   0   0.39   0.47   0.206     191242   mg/kg   0/7   0   0.39   0.47   0.206     207089   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     108601   mg/kg   0/7   0   0.39   0.47   0.206		98862	mg/kg		0	0.39	0.47	0.00				0.2	
1912249   mg/kg   0/7   0   0.39   0.47   0.205     56553   mg/kg   0/7   0   0.39   0.47   0.205     100527   mg/kg   0/7   0   0.39   0.47   0.205     20328   mg/kg   0/7   0   0.39   0.47   0.205     205992   mg/kg   0/7   0   0.39   0.47   0.205     191242   mg/kg   0/7   0   0.39   0.47   0.205     207089   mg/kg   0/7   0   0.39   0.47   0.205     111911   mg/kg   0/7   0   0.39   0.47   0.205     11144   mg/kg   0/7   0   0.39   0.47   0.205	1912249   mg/kg   0/7   0   0.39   0.47   0.205     56553   mg/kg   0/7   0   0.39   0.47   0.205     100527   mg/kg   0/7   0   0.39   0.47   0.205     203928   mg/kg   0/7   0   0.39   0.47   0.205     205992   mg/kg   0/7   0   0.39   0.47   0.205     191242   mg/kg   0/7   0   0.39   0.47   0.205     207089   mg/kg   0/7   0   0.39   0.47   0.205     111911   mg/kg   0/7   0   0.39   0.47   0.205     111444   mg/kg   0/7   0   0.39   0.47   0.205     108601   mg/kg   0/7   0   0   0.39   0.47   0.205     108601   mg/kg   0/7   0   0   0.39   0.47   0.205	ne	120127	mg/kg	100	0	0.39	0.47	0.200			0.217	0.217	
56553         mg/kg         0/7         0         0.39         0.47         0.206           100527         mg/kg         0/1         0         0.39         0.47         0.206           50328         mg/kg         0/7         0         0.39         0.47         0.206           205992         mg/kg         0/7         0         0.39         0.47         0.206           191242         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206	56553   mg/kg   0/7   0   0.39   0.47   0.205     100527   mg/kg   0/7   0   0.39   0.47   0.205     20328   mg/kg   0/7   0   0.39   0.47   0.205     205592   mg/kg   0/7   0   0.39   0.47   0.205     191242   mg/kg   0/7   0   0.39   0.47   0.205     207089   mg/kg   0/7   0   0.39   0.47   0.205     111911   mg/kg   0/7   0   0.39   0.47   0.205     111444   mg/kg   0/7   0   0.39   0.47   0.205     108601   mg/kg   0/7   0   0.39   0.47   0.205	azine	1912249	mg/kg	2 /0	0	0.39	0.47	0 206			0.217	0.217	
100527   mg/kg   0/ 1   0   0.39   0.47   0.2     50328   mg/kg   0/ 7   0   0.39   0.47   0.206     205992   mg/kg   0/ 7   0   0.39   0.47   0.206     191242   mg/kg   0/ 7   0   0.39   0.47   0.206     111911   mg/kg   0/ 7   0   0.39   0.47   0.206     111444   mg/kg   0/ 7   0   0.39   0.47   0.206	100527   mg/kg   0/ 1   0   0.39   0.47   0.2     50328   mg/kg   0/ 7   0   0.39   0.47   0.206     205992   mg/kg   0/ 7   0   0.39   0.47   0.206     191242   mg/kg   0/ 7   0   0.39   0.47   0.206     207089   mg/kg   0/ 7   0   0.39   0.47   0.206     111911   mg/kg   0/ 7   0   0.39   0.47   0.206     111444   mg/kg   0/ 1   0   0.39   0.47   0.206     108601   ms/kg   0/ 1   0   0.39   0.47   0.206     108601   ms/kg   0/ 1   0   0.39   0.47   0.206     108601   ms/kg   0/ 1   0   0.39   0.47   0.2		56553	mg/kg	120	0	0.39	0.47	0.206			0.217	0.217	
50328         mg/kg         0/7         0         0.39         0.47         0.206           205992         mg/kg         0/7         0         0.39         0.47         0.206           191242         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           111444         mg/kg         0/7         0         0.39         0.47         0.206	50328         mg/kg         0/7         0         0.39         0.47         0,206           205992         mg/kg         0/7         0         0.39         0.47         0,206           191242         mg/kg         0/7         0         0.39         0.47         0.206           207089         mg/kg         0/7         0         0.39         0.47         0.206           111911         mg/kg         0/7         0         0.39         0.47         0.206           11844         mg/kg         0/1         0         0.39         0.47         0.206           108661         ms/ks         0/7         0         0.39         0.47         0.2		100527	mg/kg	0/ 1	0	0,39	0.47	0.2			0.217	0.217	
205992   mg/kg   0/7   0   0.39   0.47   0.206     191242   mg/kg   0/7   0   0.39   0.47   0.206     1207089   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206	205992   mg/kg   0/7   0   0.39   0.47   0.206     191242   mg/kg   0/7   0   0.39   0.47   0.206     207089   mg/kg   0/7   0   0.39   0.47   0.206     111911   mg/kg   0/7   0   0.39   0.47   0.206     111444   mg/kg   0/7   0   0.39   0.47   0.206     108601   ms/kc   0/7   0   0.39   0.47   0.206     108601   ms/kc   0/7   0   0.39   0.47   0.2		50328	mg/kg		0	0.39	0.47	0.206			0.217	0.07	
191242   mg/kg   0/7   0   0.39   0.47   0.206     0.206     0.39   0.47   0.206     0.39   0.41   0.206     0.39   0.41   0.206     0.39   0.41   0.206     0.39   0.39   0.41   0.306     0.39   0.39   0.306     0.39   0.39   0.306     0.39   0.39   0.306     0.39   0.39   0.306     0.39   0.39   0.306     0.39   0.39   0.39   0.39   0.39   0.39     0.39   0.39   0.39     0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.39   0.3	191242   mg/kg   0/7   0   0.39   0.47   0.206     207089   mg/kg   0/7   0   0.39   0.47   0.206       111911   mg/kg   0/7   0   0.39   0.47   0.206       111444   mg/kg   0/7   0   0.39   0.47   0.206		205992	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	0.217	
207089 mg/kg 0/7 0 0.39 0.47 0.206 111911 mg/kg 0/7 0 0.39 0.47 0.206 111444 mg/kg 0/1 0 0.39 0.47 0.20	207089 mg/kg 0/7 0 0.39 0.47 0.206   111911 mg/kg 0/7 0 0.39 0.47 0.206   111941 mg/kg 0/1 0 0.39 0.47 0.20   111444 mg/kg 0/1 0 0.39 0.47 0.2		191242	mg/kg	7.1	0	0.39	0.47	0.206			0.217	0.217	
111911 mg/kg 0/ 7 0 0.39 0.47 0.206 111444 mg/kg 0/ 1 0 0.39 0.47 0.2	111911 mg/kg 0/7 0 0.39 0.47 0.206   111911 mg/kg 0/7 0 0.39 0.47 0.2   118494 mg/kg 0/7 0 0.39 0.47 0.2	-	207089	mg/kg	0/ 7	0	0.39	0.47	0.206			0.217	0.217	
111444 mg/kg 0/ 1 0 039 047 02	111444 mg/kg 0/ 1 0 0.39 0.47 0.2		116111	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	0.217	
100001	100001 100001	T	100601	пд/кд	1 /0	0	0.39	0.47	0.2				0.2	



	CAS Registry		Soil FSV	Max Exceeds	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC"?	Dist
Analyte	Number	Justification	3011 E.3 V	L'ACA	Compound	Mes DDT		Vac	N	0
Endrin ketone	53494705	No Background Data Available	No ESV	NOESV	MONOM	MOLEDI		Vac	Vec	1
	76448	No Background Data Available	3.98E-03	INO	yes	No		Vec	No	0
Heptachlor epoxide	1024573	No Detects	1.52E-01	ON	yes	Ver		Vec	Vec	6
	58899	No Background Data Available	5.00E-03	ON	yes	ICS		Vee	No	C
Methoxychlor	72435	No Detects	1.99E-02	No	yes	Me		Vac	No	0
	12674112	No Detects	No ESV	No ESV	yes	No		103	N	
	11104282	No Detects	No ESV	No ESV	yes	oN ;		Yes	No	0
PCB-1232	11141165	No Detects	No ESV	No ESV	yes	No		Yes	ON	
	53469219	No Detects	No ESV	No ESV	yes	oN.		Yes	ON	0
	12672296	No Detects	No ESV	No ESV	yes	No		Yes	oN	
	11097691	No Detects	No ESV	No ESV	yes	No		Yes	oN	0
	11096825	No Detects	No ESV	No ESV	yes	oN .		Yes	No	0
Toxanhene	8001352	No Detects	1.19E-01	No	yes	No		Yes	No	0
	319846	No Detects	No ESV	No ESV	yes	No		Yes	No	0
rdane	5103719	No Detects	2.24E-01	No	No Kow	Not PBT		Yes	No	0
	319857	No Detects	3.98E-03	No	yes	No		Yes	No	0
	319868	No Detects	No ESV	No ESV	yes	No		Yes	No	0
lordane	5103742	No Detects	2.24E-01	No	No Kow	Not PBT		Yes	No	0
latile						7				9
1.1-Biphenyl	92524	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	oN :	
.4.5-Trichlorophenol	95954	No Detects	9.00E+00	No	No Kow	Not PBT		Yes	ON :	0
2,4,6-Trichlorophenol	88062	No Detects	4.00E+00	No	yes	No		Yes	ON	0
,4-Dichlorophenol	120832	No Detects	2.00E+01	No	yes	No		Yes	No	
.4-Dimethylphenol	105679	No Detects	1.00E-02	Yes	no	Not PBT		No.	No	
2,4-Dinitrophenol	51285	No Detects	2.00E+01	No	ОП	Not PBT	1	Yes	No	
2-Chloronaphthalene	91587	No Detects	1.22E-02	Yes	yes	No		No	No	0
2-Chlorophenol	95578	No Detects	6.00E+01	No	ou	Not PBI		Yes	No	0
2-Methyl-4,6-dinitrophenol	534521	No Detects	No ESV	No ESV	No Kow	Not PB1		Yes	No	
2-Methylnaphthalene	91576	No Detects	3.24E+00	No	no	Not PB1		No.	No	
2-Methylphenol	95487	No Detects	No ESV	No ESV	00	Not PB1		No.	No	0
2-Nitrobenzenamine	88744	No Detects	No ESV	NOESV	NO NOW	Not PDT		Vac	No	
2-Nitrophenol	88755	No Detects	1.60E+00	ON	no	Not PB1		Vas V	Voc	
3,3'-Dichlorobenzidine	91941	No Detects	0.40E-01	No Devi	No Vow	Not DRT		Vec	N	0
3-Nitrobenzenamme	76066	No Detects	No ESV	No ESV	No Kow	Not PRT	-	Yes	No	0
4-Bromophenyi pnenyi emer	50507	No Detects	No FSV	No ESV	ves	No		Yes	No	0
4-Chlorobanzanomina	106478	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
4-Chlorophenyl phenyl ether	7005723	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
4-Methylphenol	106445	No Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
4-Nitrobenzenamine	100016	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
4-Nitrophenol	A00027	No Detects	5.12E+00	No	ou	Not PBT		Yes	oN :	
Acenaphthene	83329	No Detects	2.00E+01	No	yes	No		Yes	oN :	9
Acenaphthylene	208968	No Detects	6.82E+02	No	yes	No		Yes	ON .	
Acetophenone	29886	No Detects	No ESV	No ESV	No Kow	Not PB1		Yes	No	
Anthracene	120127	No Detects	1.48E+03	No	yes	No	-	Yes	No	
Atrazine	1912249	No Detects	No ESV	NO ESV	N. V.	Not PDT	-	Vec	No.	0
Benz(a)anthracene	56553	No Detects	NO ESV	NOESV	NO NOW	Not PBT		Yes	No.	0
Benzaldenyde	100327	No Defects	1 575+00	N	Ves	No	-	No	No	0
Benzo(a)pyrene	205000	No Detects	5 98E+01	No	ves	No		Yes	No	0
Benzo(b)Huoranthene	101242	No Defects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
Denzo(Bill)perylene	207089	No Detects	1.48E+02	No	ves	No		Yes	No	0
Bis(2-chloroethoxy)methane	1119111	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
Bis(2-chloroethyl) ether	111444	No Detects	2.37E+01	No	No Kow	Not PBT		Yes	No	0
Bie(2-chloroiconron	108601	No Detects	No ESV	No ESV	No Kow	2		Yes	No	0



Appendix Table C-5. Soil Screening in Deep Surface Soil (0-3 ft) at 40 mm Range at RVAAP

Analyte	Registry	Units	>Detection Limit	>Detection	Minimum	Maximum	Average	Minimum	Maximum	95% UCL	Exposure	Background
Bis(2-ethylhexyl)phthalate	117817	mg/kg	1/7	14.3	0.39	0.47	0 100	Delect	Detect	OI Mean	Concentration	Criteria
Butyl benzyl phthalate	85687	mg/kg	1 /0	0	0.39	0.47	0.206	0.10	0.13	0.217	0.17	
Caprolactam	105602	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	0.217	
Carbazole	86748	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	7100	
Chrysene	218019	mg/kg	311	0	0.39	0.47	0.206			0.217	0217	
Di-n-butyl phthalate	84742	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	0.217	
Di-n-octylphthalate	117840	mg/kg	0/ 1	0	0.39	0.47	0.2				0.3	
Dibenz(a,h)anthracene	53703	mg/kg	31	0	0.39	0.47	0.206			0.217	0.217	
Dibenzofuran	132649	mg/kg	0/ 7	0	0.39	0.47	0.206			0.217	0.217	
Diethyl phthalate	84662	mg/kg	1/7	14.3	0.39	0.47	776.0	5.6	5.6	2.47	2.47	
Dimethyl phthalate	131113	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	0.217	
Fluoranthene	206440	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	0.217	
Fluorene	86737	mg/kg	0/ 7	0	0.39	0.47	0.206			0.217	0.217	
Hexachlorobenzene	118741	mg/kg	2 /0	0	0.39	0.47	0.206			0.217	0.217	
Hexachlorobutadiene	87683	mg/kg	0/ 1	0	0.39	0.47	0.2				0.0	
Hexachlorocyclopentadiene	77474	mg/kg	7 /0	0	0.39	0.47	0.206			0.217	2100	
Hexachloroethane	67721	mg/kg	2 /0	0	0.39	0.47	0 206			0.217	0.217	
Indeno(1,2,3-cd)pyrene	193395	mg/kg	2 /0	0	0.30	0.47	9000			0.217	0.21/	
sophorone	78591	me/ke	2 /0	0	0.30	0.47	002.0			0.217	0.217	
N-Nitroso-di-n-propylamine	621647	me/kg	10	0	0.30	0.47	0.200			0.217	0.217	
N-Nitrosodiphenylamine	86306	mo/ko	7 /0		0.20	0.47	0.200			0.217	0.217	
Naphthalene	91203	mo/ko	7 /0	0	0.00	0.47	0.200			0.217	0.217	
Pentachlorophenol	87865	and the	10		0.39	0.47	0.200			0.217	0.217	
Phenanthrene	85018	ma/lea			0.70	0.94	0.413			0.433	0.433	
Phenol	108952	Salar Sun	0/ 10		0.39	0.47	0.206			0.217	0.217	
Pyrene	129000	and Very			0.09	0.47	0.200			0.217	0.217	
Organics-Volatile	Therease	Qu'A			0.37	0.47	0.200			0.217	0.217	
1,1-Trichloroethane	71556	mg/kg	1/ 7	14.3	0.0058	69000	0.00453	0.013	0.013	00000	0 00000	
1,1,2,2-Tetrachloroethane	79345	mg/kg		0	0.0058	69000	0.00311	210.0	0,010	0.00728	0.00728	
1,1,2-Trichloro-1,2,2-trifluoroetha	na 76131	mg/kg	0/ 3	0	0.0058	09000	0.0000			0.00323	0.00323	
1,2-Trichloroethane	79005	mg/kg	10	0	0.0058	0 00 0	0.00211			0.0031	0.00303	
,1-Dichloroethane	75343	mg/kg		0	0.0058	0,0069	0.00311			0.00323	0.00323	
, I-Dichloroethene	75354	mg/kg	1/5	20	0.0058	0 00069	0.00408	0.0074	0.0074	0.00523	0.00323	
2,4-Trichlorobenzene	120821	me/kg	0/ 3	0	0.0058	0.0069	0,0000	0,0074	0.0074	0.00384	0.00384	
,2-Dibromo-3-chloropropane	96128	mg/kg		0	0.0058	0,000	0.0000			0.0031	0.00303	
,2-Dibromoethane	106934	mg/kg		0	0.0058	0 0000	0.00311			1500.0	0.00303	
2-Dichlorobenzene	95501	mg/kg	12	0	0.0058	0 0000	0.00311			0.00323	0.00323	
,2-Dichloroethane	107062	mg/kg	2 /0	0	0.0058	69000	0.00311			0.00325	0.00323	
,2-Dichloropropane	78875	mg/kg	2 /0	0	0.0058	69000	0.00311			0.00323	0.00323	
,2-Dimethylbenzene	95476	mg/kg	1/7	14.3	0.0059	69000	0.00098	0000	0000	0.00323	0.00223	
1,3-Dichlorobenzene	541731	mg/kg	2 /0	0	0.0058	69000	0.00311	****	700.0	0.00332	0.002	
1,4-Dichlorobenzene	106467	mg/kg	2 /0	0	0.0058	6900.0	0.00311			0.00325	0.00325	
2-Butanone	78933	mg/kg	0/ 3	0	0.012	0.014	900.0			9000	9000	
2-Hexanone	591786	mg/kg	0/3	0	0.012	0.014	900.0			9000	0.006	
2-Methoxy-2-methylpropane	1634044	mg/kg	2 /0	0	0,0058	6900'0	0.00311			0.00325	0.00325	
4-Methyl-2-pentanone	108101	mg/kg	2 /0	0	0.012	0.014	0.00621			0.0065	0.0065	
Acetone	67641	mg/kg	0/3	0	9900'0	0.015	0.00513			0.00724	0.0065	
Benzene	71432	mg/kg	2 /0	0	0.0058	6900.0	0.00311			0.00325	0.00325	
Bromodichloromethane	75274	mg/kg		0	0.0058	6900.0	0.00311			0.00325	0.00325	
Bromomethane	74839	mg/kg	0/ 3	0	0.012	0.014	900.0			900.0	900'0	
Carbon distillinge	75150	mg/kg	2/ 7	28.6	0.0059	6900.0	0.00498	0.0031	910'0	0.00855	0.00855	
Carbon letrachionde	100007	mg/kg	1 /0	0	0.0058	6900'0	0.00311			0.00325	0.00325	
Chloroethane	75003	mg/kg	7 /0	0	0.0058	6900.0	0.00311			0.00325	0.00325	
Chloroform	67663	mg/kg	1 /0	0	0.012	0.014	0.00621			0.0065	0.0065	
TOURT	0,000	mg/kg	/ /0	0	0.0058	6900'0	0.00311			0.00325	0.00325	

Operation of State of Sta	Analyte	CAS Registry	Justification	Soil ESV	Max Exceeds ESV?	PBT Compound?	Detected?	Max.> Bkg.?	SRC?	COPEC"?	Dist
(5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)         (5)(5)(5)(1)<	The Part of the	117017	Me Dealersund Date Available	0.76F_01	No	ves	Yes		Yes	Yes	D
1992   No. Description   No.	-11	11/81/	No Dackground Data Available	No FeV	No FSV	No Kow	Not PBT		Yes	No	0
17.0024   No. Denetes		105001	No Detects	No FSV	No FSV	No Kow	Not PBT		Yes	No	0
17540   No Detects		700001	N. D.	No ECV	No FSV	Ves	No		Yes	No	0
1750   No Detects   100   No Escape   No		210010	No Detects	4 735+00	No	ves	No		Yes	No	0
1770   No Detects		210012	No Defects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
117840   No Detects		24/47	No Detects	400000	N.		No		Vec	No	C
135713   No Detects   No ESCY   No		117840	No Detects	1.09E+02	INO.	yes	TOO TO		No	No	0
1375469   No Decests   No Escy   N		53703	No Detects	NO ESV	NO ESV	NO NOW	NOLFBI		ON T	N.	0
13113   No Detects		132649	No Detects	No ESV	No ESV	yes	No		res	ON	
131113   10 Detects   1.27E+72   No ESV   No Kow   No PBPT   Vest   No Detects   1.27E+72   No ESV   No Kow   No PBPT   Vest   No Detects   1.27E+72   No Detects   1.00E+03   No Detects   1.00E+03		84662	No Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	a
18744   No Detects   100E+01   No   No   No   No   No   No   No   N		131113	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
18741   No Detects   3.00E-01   No   Yes   No   Yes   No   No   No   No   No   No   No   N		206440	No Detecto	1 22E+02	No	ves	No		Yes	No	0
1871   No Detects   100E-101   No Detects   100E-101		05232	No Detecto	3 00E+01	No	ves	No		Yes	No	0
118741         No Detects         1,000-101         No         Yes         No         Per         Pro           6 77474         No Detects         1,000-101         No         yes         Yes         No         Yes <td< td=""><td></td><td>10100</td><td>No Detects</td><td>1 000</td><td>Mo</td><td>2000</td><td>No</td><td></td><td>Yes</td><td>No</td><td>o</td></td<>		10100	No Detects	1 000	Mo	2000	No		Yes	No	o
87683         No Detects         3.98E-02         1958         No         Yes         No           67721         No Detects         1.00E-01         No         yes         No         Yes         No           18731         No Detects         1.00E-01         No         yes         No         Yes         No           189395         No Detects         1.00E-01         No         yes         No         Yes         No           189395         No Detects         1.00E-01         No         yes         No         Yes         No           80206         No Detects         1.00E-01         No         yes         No         Yes         No           8708         No Detects         1.00E-01         No         yes         No         Yes         No           8708         No Detects         1.00E-01         No         yes         No         Yes         No           102000         No Detects         1.00E-01         No         yes         No         Yes         No           108973         No Detects         1.00E-01         No         yes         No         Yes         No           1080574         No Detects         1.00E-0		118/41	No Detects	2000000	ONT	300	No		No	No	c
prof. 193395         No Detects         1,00E+01         No         yess         No         Yes           193395         No Detects         1,00E+01         No         yess         No         Yes         No           193395         No Detects         1,00E+01         No         yess         No         Yes         No           183096         No Detects         1,00E+01         No         yess         No         Yes         No           19020         No Detects         2,00E+01         No         yess         No         Yes         No           19030         No Detects         3,00E+01         No         yess         No         Yes         No           19030         No Detects         3,00E+01         No         yess         No         Yes         No           1129000         No Detects         3,00E+01         No         yess         No         Yes         No           1129000         No Detects         3,00E+01         No         yess         No         Yes         No           1129000         No Detects         2,0EE+01         No         yes         No         Yes         No           1129000         No Detects <td></td> <td>87683</td> <td>No Detects</td> <td>3.98E-02</td> <td>res</td> <td>yes</td> <td>ONI</td> <td></td> <td>ON T</td> <td>N.</td> <td>0</td>		87683	No Detects	3.98E-02	res	yes	ONI		ON T	N.	0
(87721         No Detects         5,96E-01         No         yess         No         Yess         No           (87321         No Detects         1,39E-02         No         no         No         Yess         No           (8234)         No Detects         1,00E-01         No         yess         No         Yes         No           85.366         No Detects         1,00E-01         No         yess         No         Yes         No           87.865         No Detects         1,00E-01         No         yess         No         Yes         No           87.865         No Detects         1,00E-01         No         yess         No         Yes         No           110895.2         No Detects         1,00E-01         No         yess         No         Yes         No           11290.0         No Detects         1,00E-01         No         yess         No         Yes         No           11290.0         No Detects         1,00E-01         No         yess         No         Yes         No           11290.0         No Detects         1,00E-01         No         yess         No         Yes         Yes           10x0.1		77474	No Detects	1.00E+01	No	yes	No		res	ON	0
193395   No Detects   1,09E+02   No   No   Not   PBT   Yes   No     86306   No Detects   1,09E+02   No   No   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No   No     87365   No Detects   1,00E+01   No   No   No   No     87361   No Detects   1,00E+01   No   No   No   No     87361   No Detects   1,00E+01   No   No   No   No     87361   No Detects   1,00E+01   No		67721	No Detects	5.96E-01	No	yes	No		Yes	No	0
139517   No Detects   139E-02   No Detects   No Detects		193395	No Detects	1.09E+02	No	yes	No		Yes	No	0
Moderets   No Detects   No De	1	78501	No Detects	1 39E+02	No	no	Not PBT		Yes	No	0
85306   No Detects   2,00E-01   No Peres   No Detects   1,00E-01   No Detect	one	10031	N. D.	Mo Dev	No FCV	No Kow	Not PRT		Yes	No	0
863906         No Detects         2,00E-01         No         yes         No         Yes           878855         No Detects         3,00E-01         No         yes         No         Yes           1108952         No Detects         3,00E-01         No         yes         No         Yes           1108952         No Detects         3,00E-01         No         no         Not PBT         Yes           1108952         No Detects         7,82E-01         No         no         Not PBT         Yes           1108952         No Detects         1,785E-01         No         no         Not PBT         Yes           1108952         No Detects         1,785E-01         No         no         Not PBT         Yes           1108954         No Detects         1,785E-01         No         no         Not PBT         Yes           100765         No Detects         1,785E-01         No         no         No PBT         Yes           17534         No Detects         2,86E-01         No         no         No PBT         Yes           17534         No Detects         2,86E-01         No         no         no         No           17534 <td< td=""><td>111</td><td>051047</td><td>No Defects</td><td>2000</td><td>No</td><td>364</td><td>No</td><td></td><td>Yes</td><td>No</td><td>0</td></td<>	111	051047	No Defects	2000	No	364	No		Yes	No	0
19793   No Detects	1	86306	No Detects	2,005-01	ONT	700	Mo		Vac	No	c
87865   No Detects   3.00E+01   No   Nos   No   No   Yes   No   Yes   No   No   Yes   No   No   Yes   No   Yes   No   Yes   No   No   Yes   N		91203	No Detects	1.00E+01	ON	yes	ON		103	N.	
85018   No Detects   3.0E+01   No   Not PBT   Yes   1.25000   No Detects   3.8E+01   No   Not PBT   Yes   1.25000   No Detects   7.85E+01   No   Not PBT   Yes   1.25000   No Detects   1.27E-01   No   Not PBT   Yes   1.27		87865	No Detects	3.00E+00	No	yes	ON		Yes	ON	0
108952   No Detects   3.00E+01   No   Not PBT   Yes   No Detects   1.85E+01   No   Not PBT   Yes   No Detects   1.27E-01   No Detects   1.27E-01   No   Not PBT   Yes   No Detects   1.27E-01   No   No		85018	No Detects	4.57E+01	No	yes	No		Yes	No	0
129000   No Detects   785E+01   No   Not PBT   Yes   No Ethins   79345   No Detects   1.27E-01   No Detects   No Detects		108952	No Detects	3.00E+01	No	ou	Not PBT		Yes	No	0
Part		129000	No Detects	7.85E+01	No	yes	No		Yes	No	0
1536   No Detects											
79345         No Detects         1.27E-01         No         no         Not PBT         Yes           79131         No Detects         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes           75343         No Detects         2.38E+01         No         yes         No         Yes           75344         No Background Data Available         8.28E+00         No         no         Not PBT         Yes           120821         No Detects         2.00E+01         No         yes         No         Yes           120824         No Detects         3.52E-02         No         no         Not PBT         Yes           96128         No Detects         3.52E-02         No         yes         No         Yes           106934         No Detects         3.52E-02         No         yes         No         Yes           96128         No Detects         2.06E+01         No         yes         No         Yes           107062         No Detects         2.0E+01         No         yes         Yes         Yes           107064         No Detects         2.0E+01         No         yes         No         Yes	ichloroethane	71556	No Background Data Available	2.98E+01	No	ou	Not PBT		Yes	No	D
76131         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes           79005         No Detects         2.86E+01         No         no         Not PBT         Yes           79005         No Detects         2.0EE+01         No         no         Not PBT         Yes           73534         No Detects         2.0EE+01         No         no         Not PBT         Yes           120821         No Detects         2.0EE+01         No         yes         No         Yes           96128         No Detects         3.52E-02         No         no         No RPBT         Yes           106934         No Detects         2.0EE+01         No         no         No RPBT         Yes           1107052         No Detects         2.0EE+01         No         no         No RPBT         Yes           1107062         No Detects         2.0EE+01         No         No         No         Yes           107062         No Detects         2.0EE+01         No         No         Yes         Yes           341731         No Detects         2.0EE+01         No         No         Yes         Yes           341731	Tetrachloroethane	70345	No Detects	1.27E-01	No	00	Not PBT		Yes	No	0
790151         No Detects         2,86E+01         No.         no.         Not PBT         Yes           75343         No Detects         2,01E+01         No         yes         No         Yes           75344         No Detects         2,01E+01         No         no         No PBT         Yes           75354         No Detects         2,00E+01         No         no         Not PBT         Yes           96128         No Detects         3,25E-02         No         no         Not PBT         Yes           95501         No Detects         2,96E+00         No         yes         No         Yes           95501         No Detects         2,96E+00         No         yes         No         Yes           95501         No Detects         2,96E+00         No         yes         Yes         Yes           95476         No Detects         2,96E+00         No         yes         Yes         Yes           541731         No Detects         3,77E+01         No         yes         No         Yes           541731         No Detects         1,26E+01         No         yes         No         Yes           541731         No Detects	Truadino Comano	76131	No Detacts	No FSV	No FSV	No Kow	Not PBT		Yes	No	0
79303         No Detects         2.00E-01         No         yes         No         Yes           75343         No Detects         2.00E+01         No         yes         No         Yes           75344         No Detects         2.00E+01         No         yes         No         Yes           120821         No Detects         3.52E-02         No         no         No Per         Yes           96128         No Detects         2.00E+01         No         yes         No         Yes           106934         No Detects         2.29E+02         No         No         Yes         Yes           107062         No Detects         2.29E+01         No         no         No         Yes           107062         No Detects         2.29E+01         No         No         Yes         Yes           59476         No Background Data Available         3.77E+01         No         yes         Yes           591786         No Detects         2.00E+01         No         yes         No         Yes           591786         No Detects         2.56E+01         No         no         No Kow         Not PBT         Yes           591786         No Dete	ichioro-1,2,2-unituoi	20005	NO Defects	107201	No	04	Not PRT		Yes	No	0
75343         No Detects         2.01E-01         No         yes         No         Yes           75344         No Detects         2.01E-01         No         yes         No         Yes           75345         No Detects         2.02E+00         No         yes         No         Yes           96128         No Detects         3.52E-02         No         no         No         Yes           106934         No Detects         2.9E+00         No         yes         No         Yes           95501         No Detects         2.9E+00         No         yes         No         Yes           107062         No Detects         2.2E+01         No         No         No         Yes           107062         No Detects         2.2E+01         No         No         Yes         Yes           107064         No Detects         2.20E+01         No         No         Yes         Yes           541731         No Detects         2.20E+01         No         No         Yes         Yes           541734         No Detects         2.26E+01         No         No         No         Yes           591786         No Detects         2.26E+01	chloroethane	(2002)	No Defects	2012101	NE	Carr	No		Vec	N.	0
75354         No Background Data Available         8.28E+00         No         no         Not PBT         Yes           120821         No Detects         2.00E+01         No         yes         Not PBT         Yes           120824         No Detects         3.52E-0         No         no         Not PBT         Yes           96128         No Detects         2.96E+00         No         yes         No         Yes           107062         No Detects         2.12E+01         No         no         Not PBT         Yes           107062         No Detects         2.12E+01         No         no         Not PBT         Yes           107062         No Detects         2.12E+01         No         no         Not PBT         Yes           107062         No Detects         2.0E+01         No         yes         No         Yes           106467         No Detects         2.0E+01         No         yes         No         Yes           106467         No Detects         2.0E+01         No         yes         No         Yes           106467         No Detects         2.0E+01         No         yes         No         Yes           108404	hloroethane	/3545	No Detects	2.015.01	ONI	300	T. D. T.		N.	Me	-
120821         No Detects         2.00E+01         No         yes         No         Yes           96128         No Detects         3.52E-02         No         No         Yes         Yes           96128         No Detects         No ESV         No ESV         No ESV         Yes         Yes           95501         No Detects         2.96E+00         No         yes         No         Yes           107062         No Detects         7.00E+02         No         No ESV         Yes         Yes           107062         No Detects         7.00E+02         No         No         Yes         Yes           107062         No Detects         2.0E+01         No         Yes         Yes         Yes           95476         No Detects         2.0E+01         No         Yes         No         Yes           10647         No Detects         1.2E+01         No         No         Yes         Yes           106404         No Detects         1.2E+01         No         No         Yes         Yes           591786         No Detects         1.2E+01         No         No         No         Yes           108101         No Detects         1.	hloroethene	75354	No Background Data Available	8.28E+00	No	ou	NOLFBI		103	INO	9
96128         No Detects         3.52E-02         No         no         Not PBT         Yes           106934         No Detects         No Esv         No Esv         No Kow         Not PBT         Yes           95501         No Detects         2.96E+00         No         yes         No         Yes           107062         No Detects         7.00E+01         No         No Kow         Not PBT         Yes           107062         No Detects         7.00E+01         No         yes         Yes         Yes           541731         No Detects         3.77E+01         No         yes         No         Yes           541731         No Detects         2.00E+01         No         yes         No         Yes           541731         No Detects         2.00E+01         No         yes         No         Yes           541731         No Detects         1.26E+01         No         no         Not PBT         Yes           78333         No Detects         1.26E+01         No         no         Not PBT         Yes           7641         No Detects         2.56E+01         No         no         Not PBT         Yes           74839         N	richlorobenzene	120821	No Detects	2.00E+01	No	yes	No		Yes	No	
106934         No Detects         No ESV         No Kow         Not PBT         Yes           95501         No Detects         2.96E+00         No         yes         No         Yes           107062         No Detects         2.12E+01         No         no         No PBT         Yes           78875         No Detects         2.12E+01         No         No         Yes         Yes           78875         No Detects         3.77E+01         No         yes         Yes         Yes           541731         No Detects         3.77E+01         No         yes         No         Yes           541731         No Detects         2.00E+01         No         yes         No         Yes           106467         No Detects         2.00E+01         No         yes         No         Yes           106467         No Detects         2.00E+01         No         No         Yes         Yes           106467         No Detects         1.26E+01         No         No         No         Yes           108404         No Detects         2.56E+01         No         No         No         Yes           108411         No Detects         2.55E-01	romo-3-chloropropar	96128	No Detects	3.52E-02	No	ou	Not PBT		Yes	No	0
95501         No Detects         2.96E+00         No         yes         No         Yes           107062         No Detects         2.12E+01         No         no         No Kow         Not PBT         Yes           78875         No Detects         7.00E+02         No         No         Yes         Yes           95476         No Background Data Available         7.00E+01         No         Yes         Yes           106467         No Detects         2.00E+01         No         Yes         No           78933         No Detects         2.00E+01         No         Yes         Yes           78934         No Detects         1.26E+01         No         No         Yes           7891786         No Detects         1.26E+01         No         No         Yes           108101         No Detects         4.43E+02         No         No         No         Yes           11432         No Detects         2.56E+01         No         No         No         Yes           7433         No Detects         2.56E+01         No         No         No         Yes           7434         No Detects         2.56E+01         No         No         No <td>romoethane</td> <td>106934</td> <td>No Detects</td> <td>No ESV</td> <td>No ESV</td> <td>No Kow</td> <td>Not PBT</td> <td></td> <td>Yes</td> <td>No</td> <td>0</td>	romoethane	106934	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
197051         NO Detects         2.12E+01         No         no         Nof PBT         Yes           78875         No Detects         7.00E+02         No         No ESV         yes         Yes           95476         No Background Data Available         7.00E+02         No         yes         Yes           95476         No Detects         2.77E+01         No         yes         No           95476         No Detects         2.00E+01         No         yes         No           78933         No Detects         8.96E+01         No         no         Not PBT         Yes           591786         No Detects         1.26E+01         No         no         Not PBT         Yes           168101         No Detects         2.50E+01         No         no         Not PBT         Yes           168104         No Detects         2.50E+01         No         no         Not PBT         Yes           168101         No Detects         2.50E+01         No         no         Not PBT         Yes           75274         No Detects         2.50E+01         No         no         Not PBT         Yes           7535         No Detects         3.40E-01	Llambanan	06501	No Detecto	2 96F+00	No	ves	No		Yes	No	0
107062         NO Detects         2.12.0.0.0         NO ESV         Ves         Yes         Yes           38.75         No Detects         3.77E+01         No ESV         yes         Yes         Yes           541731         No Detects         3.77E+01         No         yes         No         Yes           541731         No Detects         2.00E+01         No         yes         No         Yes           106467         No Detects         2.00E+01         No         yes         No         Yes           106467         No Detects         1.26E+01         No         no         Not PBT         Yes           591786         No Detects         1.26E+01         No         no         Not PBT         Yes           591786         No Detects         2.56E+01         No         no         Not PBT         Yes           7641         No Detects         2.56E+01         No         no         Not PBT         Yes           71432         No Detects         2.56E+01         No         no         Not PBT         Yes           74839         No Detects         2.56E+01         No         no         Not PBT         Yes           75155	morobenzene	10000	N. D. L.	2 125401	No	00	Not PRT		Yes	No	0
78875         No Detects         7.00E+02         No         No <td>hloroethane</td> <td>790/01</td> <td>No Detects</td> <td>2.125.01</td> <td>ON .</td> <td>N. V.</td> <td>Not DDT</td> <td></td> <td>Vac</td> <td>No</td> <td>0</td>	hloroethane	790/01	No Detects	2.125.01	ON .	N. V.	Not DDT		Vac	No	0
95476         No Background Data Available         No ESV         No ESV         Yes         Yes           541731         No Detects         3.77E+01         No         yes         No         Yes           541731         No Detects         2.00E+01         No         yes         No         Yes           78933         No Detects         8.96E+01         No         no         Not PBT         Yes           591786         No Detects         1.26E+01         No         no         Not PBT         Yes           1654044         No Detects         1.26E+01         No         no         Not PBT         Yes           168101         No Detects         2.56E+01         No         no         Not PBT         Yes           16320         No Detects         2.56E+01         No         no         Not PBT         Yes           75274         No Detects         2.56E-01         No         no         Not PBT         Yes           75150         No Detects         No Esv         No Kow         Not PBT         Yes           75150         No Detects         1.00E+01         No         no         Not PBT         Yes           76237         No Detects	hloropropane	78875	No Detects	7.00E+02	ON	NO DON	MOLEDI		201		1
541731         No Detects         3.77E+01         No         yes         No         Yes           106467         No Detects         2.00E+01         No         yes         No         Yes           78933         No Detects         1.26E+01         No         no         Not PBT         Yes           78934         No Detects         1.26E+01         No         no         Not PBT         Yes           163404         No Detects         1.26E+01         No         no         Not PBT         Yes           168101         No Detects         2.50E+00         No         no         Not PBT         Yes           71432         No Detects         2.50E+00         No         no         Not PBT         Yes           7574         No Detects         5.40E-01         No         no         Not PBT         Yes           74839         No Detects         No Esy         No Esy         No Esy         No HPBT         Yes           67515         No Detects         1.00E+03         No         no         Not PBT         Yes           7535         No Detects         1.00E+03         No         no         Not PBT         Yes           7503 <td< td=""><td>nethylbenzene</td><td>95476</td><td>No Background Data Available</td><td>No ESV</td><td>No ESV</td><td>yes</td><td>Yes</td><td></td><td>res</td><td>Ics</td><td>1</td></td<>	nethylbenzene	95476	No Background Data Available	No ESV	No ESV	yes	Yes		res	Ics	1
106467         No Detects         2.00E+01         No         yes         No         Yes           78933         No Detects         8.96E+01         No         no         Not PBT         Yes           591786         No Detects         1.26E+01         No         no         Not PBT         Yes           1634044         No Detects         No Eccs         No Eccs         No PBT         Yes           108101         No Detects         2.56E+00         No         no         Not PBT         Yes           77432         No Detects         2.55E-01         No         no         Not PBT         Yes           74839         No Detects         3.46E-01         No         no         Not PBT         Yes           75150         No Background Data Available         9.41E-02         No         no         Not PBT         Yes           75150         No Detects         1.00E+03         No         no         Not PBT         Yes           7500         No Detects         1.00E+03         No         no         Not PBT         Yes           7500         No Detects         1.00E+03         No         no         Not PBT         Yes           75003 <t< td=""><td>hlorobenzene</td><td>541731</td><td>No Detects</td><td>3.77E+01</td><td>No</td><td>yes</td><td>No</td><td></td><td>Yes</td><td>No</td><td>0</td></t<>	hlorobenzene	541731	No Detects	3.77E+01	No	yes	No		Yes	No	0
78933         No Detects         8.96E+01         No         no         Not PBT         Yes           591786         No Detects         1.26E+01         No         no         No PBT         Yes           1634044         No Detects         4.05E+01         No ESV         No ESV         No ESV         No Fow         No PBT         Yes           108101         No Detects         2.50E+00         No         no         Not PBT         Yes           71432         No Detects         2.55E-01         No         no         Not PBT         Yes           75274         No Detects         3.40E-01         No         no         Not PBT         Yes           74839         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes           75150         No Detects         1.00E+01         No         no         Not PBT         Yes           76235         No Detects         4.00E+01         No         no         Not PBT         Yes           76235         No Detects         4.00E+01         No         no         Not PBT         Yes           76031         No Detects         4.00E+01         No         No         No         No	hlorobenzene	106467	No Detects	2.00E+01	No	yes	No		Yes	No	0
591786         No Detects         1.26E+01         No         no         Not PBT         Yes           1634044         No Detects         No ESV         No Kow         Not PBT         Yes           108101         No Detects         4.43E+02         No         No         No         Yes           67641         No Detects         2.50E+00         No         no         Not PBT         Yes           71432         No Detects         2.55E-01         No         no         Not PBT         Yes           74839         No Detects         No Detects         No Detects         No         no         Not PBT         Yes           74839         No Detects         1.00E+03         No         no         Not PBT         Yes           66235         No Detects         1.00E+03         No         no         Not PBT         Yes           108907         No Detects         4.00E+01         No         no         Not PBT         Yes           75003         No Detects         No ESV         No ESV         no         Not PBT         Yes	one	78933	No Detects	8.96E+01	No	ou	Not PBT		Yes	No	0
163404         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes           168101         No Detects         4.43E+02         No         No         No         Not PBT         Yes           67641         No Detects         2.50E+00         No         no         Not PBT         Yes           71432         No Detects         2.55E-01         No         no         Not PBT         Yes           7574         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes           7635         No Detects         1.00E+03         No         no         Not PBT         Yes           6635         No Detects         1.00E+03         No         no         Not PBT         Yes           108907         No Detects         4.00E+01         No         no         Not PBT         Yes           75033         No Detects         A.00E+01         No         no         Not PBT         Yes           75033         No Detects         No ESV         no         Not PBT         Yes	and a	501786	No Defects	1 26F±01	No	ou	Not PBT		Yes	No	0
108101         No Detects         4,3E+02         No Source         No Fow         Not PBT         Yes           67641         No Detects         2.56E+00         No         no         Not PBT         Yes           71432         No Detects         2.55E-01         No         no         Not PBT         Yes           7274         No Detects         5.40E-01         No         no         Not PBT         Yes           74839         No Detects         No Esc         No Esc         No Esc         No FBT         Yes           5.535         No Background Data Available         9.41E-02         No         no         Not PBT         Yes           6897         No Detects         1.00E+03         No         no         Not PBT         Yes           7503         No Detects         4.00E+01         No         no         Not PBT         Yes           7503         No Detects         No Esc         No Esc         No Esc         Yes         Yes	The state of the s	1604044	Mc Detects	No FCV	NAFEV	No Kow	Not PBT		Yes	No	0
100101   No Detects   2.50E+00   No   Not PBT   Yes     11432   No Detects   2.55E+01   No   No   Not PBT   Yes     11433   No Detects   2.40E+01   No   No   Not PBT   Yes     14839   No Detects   No Background Data Available   9.41E+02   No   No   Not PBT   Yes     108907   No Detects   1.00E+01   No   No   Not PBT   Yes     108907   No Detects   No ESV   No	oxy-z-memyipropan		N. D. Leiter	A 43E+02	No	No Kow	Not PRT		Yes	No	0
67641         No Detects         2.50E+00         No         no         Not PBT         Tes           71432         No Detects         2.55E-01         No         no         Not PBT         Yes           75274         No Detects         5.40E-01         No         No PSV         No PBT         Yes           74150         No Detects         No Background Data Available         9.41E-02         No         no         Not PBT         Yes           56235         No Detects         1.00E+03         No         no         Not PBT         Yes           75003         No Detects         No ESV         No ESV         no         Not PBT         Yes	yl-2-pentanone	108101	No Detects	4.43ETU2	ON	NO WOW	Tun	-	V	No	0
71432         No Detects         2.55E-01         No         no         Not PBT         Yes           75274         No Detects         5.40E-01         No         no         no         PBT         Yes           74839         No Detects         No Background Data Available         9.0E-03         No         no         Not PBT         Yes           56235         No Detects         1.00E-03         No         no         Not PBT         Yes           108907         No Detects         4.00E+01         No         No         No         Yes           75003         No Detects         No ESV         No ESV         no         Not PBT         Yes	9	67641	No Detects	2.50E+00	No	no	Not PB1		I CS	ONI	
75274         No Detects         5.40E-01         No         no         Not PBT         Yes           74839         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes           75150         No Background Data Available         9.41E-02         No         no         Not PBT         Yes           56235         No Detects         1.00E-01         No         no         Not PBT         Yes           108907         No Detects         4.00E-01         No         No         No         Yes           75003         No Detects         No ESV         No ESV         No         No         Yes	e	71432	No Detects	2.55E-01	No	ou	Not PBT		Yes	No	0
74839         No Detects         No ESV         No ESV         No Kow         Not PBT         Yes           75150         No Background Data Available         9.41E-02         No         no         Not PBT         Yes           56235         No Detects         1.00E+03         No         no         Not PBT         Yes           108907         No Detects         4.00E+01         No         No         No         Yes           75003         No Detects         No ESV         No ESV         No         No         Yes	dichloromethane	75274	No Detects	5.40E-01	No	ОП	Not PBT		Yes	No	0
75150   No Background Data Available   9.41E-02   No   no   Not PBT   Yes     56235   No Detects   1.00E+03   No   no   Not PBT   Yes     108907   No Detects   4.00E+01   No   no   Not PBT   Yes     75003   No Detects   No ESV   No ESV   no   Not PBT   Yes	mathana	74839	No Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
56335         No Detects         1.00E+03         No         no         Not PBT         Yes           108907         No Detects         4.00E+01         No         no         Not PBT         Yes           75003         No Detects         No ESV         No ESV         no         Not PBT         Yes	dimited.	75150	No Background Data Available	941F-02	No	ou	Not PBT		Yes	No	Ω
108907   No Detects	distillac	56735	No Detects	1 00F+03	No	ou	Not PBT		Yes	No	0
75003 No Detects No ESV No ESV no Not PBT Yes	tetracinoride	100007	No Detects	4 00E+01	No.	ou	Not PBT		Yes	No	0
75003 No Defects	penzene	100507	NO Defects	MACEOU	No Dev	-	Not DBT		Vec	No	0
N	ethane	75003	No Detects	NOESV	NO ESA		INDITION		2001	211	1



Appendix Table C-5. Soil Screening in Deep Surface Soil (0-3 ft) at 40 mm Range at RVAAP

Analyte	CAS Registry Number	Units	Results % Results >Detection >Detection Limit Limit	% Results >Detection Limit	Minimum	Maximum Nondetect	Average	Minimum Detect	Maximum Detect	95% UCL	95% UCL Exposure	Background
Chloromethane	74873	mg/kg	2 /0	0	0.012	0.014	0.00621			0.0065	0.0065	
Cumene	98828	mg/kg	2 /0	0	0.0058	6900.0	0.00311			0.00325	0.00325	
Cyclohexane	110827	mg/kg	0/ 3	0	0.0058	6900'0	0.00297			0.0031	0.00305	
Dibromochloromethane	124481	mg/kg	2 /0	0	0,0058	6900'0	0.00311			0.00325	0.00325	
Dichlorodifluoromethane	75718	mg/kg	0/ 7	0	0.0058	6900'0	0.00311			0.00325	0.00325	
Ethylbenzene	100414	mg/kg	2 /0	0	0.0058	6900.0	0.00311			0.00325	0.00325	
M + P Xylene	136777612	mg/kg	1/7	14,3	0.0059	6900.0	0.00342	0.0051	0.0051	0.00398	0.00398	
Methylcyclohexane	108872	mg/kg	0/ 7	0	0.0058	6900'0	0.00311			0.00325	0.00325	
Methylene chloride	75092	mg/kg	0/3	0	0.007	0.014	0.00517			92000	900'0	
Styrene	100425	mg/kg	0/ 7	0	0.0058	6900'0	0.00311			0.00325	0.00325	
Tetrachloroethene	127184	mg/kg	0/ 7	0	0.0058	6900'0	0.00311			0.00325	0.00325	
Toluene	108883	mg/kg	2/ 7	28.6	0.0059	6900'0	0.00306	0.002	0.0036	0.00344	0.00344	
Trichloroethene		mg/kg	2 /0	0	0.0058	6900'0	0.00311			0.00325	0.00325	
Trichlorofluoromethane		mg/kg	0/ 7	0	0.0058	6900'0	0.00311			0.00325	0.00325	
Vinyl chloride	75014	mg/kg	0/ 7	0	0.012	0.014	0.00621			0.0065	0.0065	
cis-1,2-Dichloroethene	156592	mg/kg	0/ 7	0	0.0058	6900'0	0.00311			0.00325	0.00325	
cis-1,3-Dichloropropene	10061015	mg/kg	2 /0	0	0.0058	6900'0	0.00311			0.00325	0.00325	
trans-1,2-Dichloroethene	156605	mg/kg	2 /0	0	0.0058	6900.0	0.00311			0.00325	0.00325	

RVAAP = Ravenna Army Ammunition Plant

CAS = Chemical Abstract Service

UCL = upper confidence limit

ESV = ecological screening value

Max = maximum concentration (maximum detect if at least one detect, otherwise maximum non detect)

PBT = persistant, bioaccumulative, and toxic compound (inorganics include cadmium, lead, merucy, and zinc; organics are chemicals with log Kow >= 3)

Bkg = background concentration
SRC = Site related chemical (from Army's usage records)
Non-SRCs based on knowledge of the historical processes at the 40 mm range are; metals -- iron; organics-semivolatiles -- 2,4-Dimethylphenol, 2-Chloronaphthalene, Benzo(a)pyrene,

\*COPEC = chemical of potential ecological concern ["Ves" = 1) maximum concentration (detect if at least one detection, or, non detect if no detections) > ESV, or if detected and below ESV or "No ESV and is a PBT compound, and 2) maximum concentration is above background (inorganics) or there is no background data (inorganics and organics), and 3) analyte is a SRC; else, "No" Dist = data distribution (X = neither normal nor lognormal; O = no detected concentrations; L = lognormal; N = normal; D = fewer than 50% detected or fewer than 8 detected - distribution not determined)

PCBs = polychlorinated biphenyls

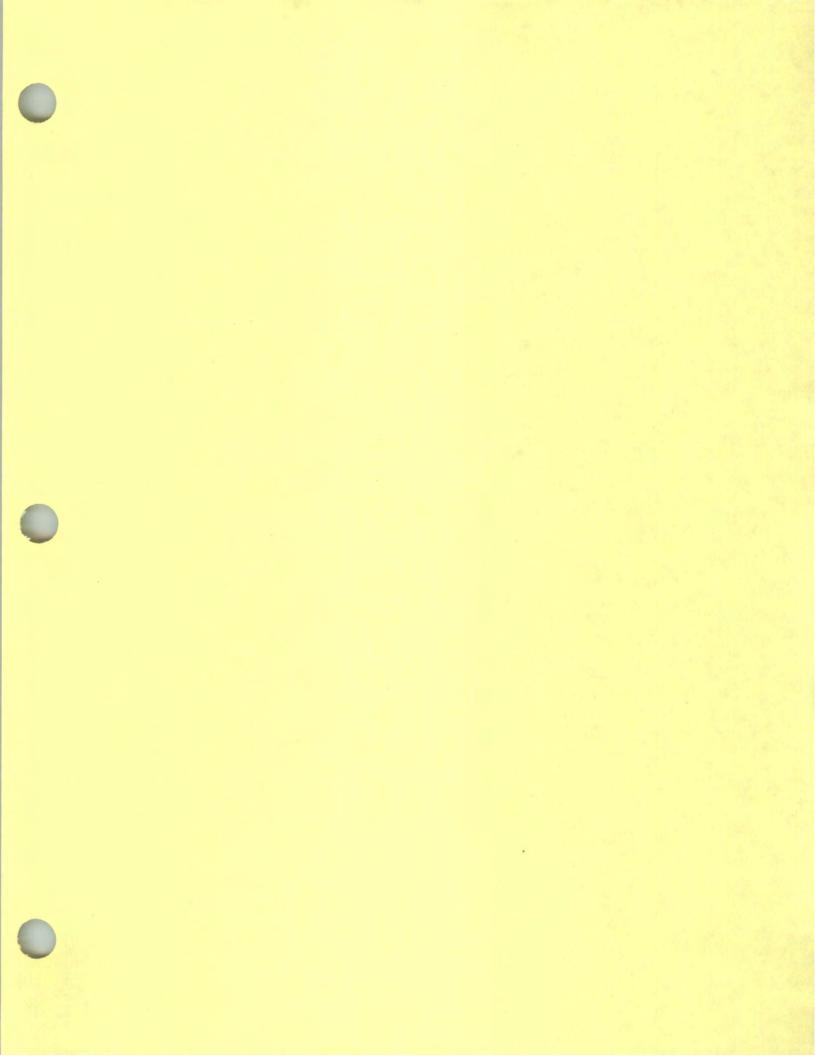
Note that 3 analytes were eliminated per 0/0 detects, including bromoform; methyl acetate; and trans-1,3-dichloropropene;

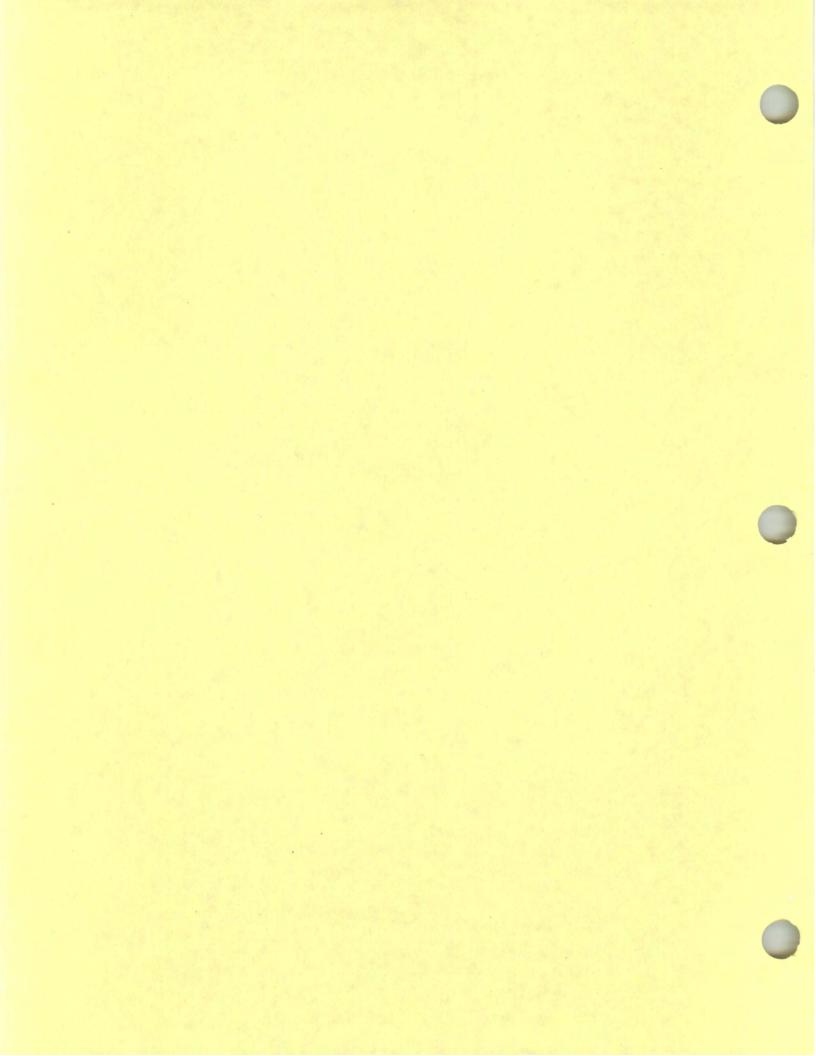
CAS Registry           Analyte         Number         Justification           Chloromethane         74873         No Detects           Cumene         982.8         No Detects           Cycloherme         110827         No Detects           Dichomochloromethane         12481         No Detects           Dichlorodifluoromethane         75718         No Detects           M+ P. Xylene         106414         No Detects           Methylcyclohexane         136777612         No Detects           Methylchochloromethane         106882         No Detects           Methylene chloride         106882         No Detects           Trichloroethene         127184         No Detects           Trichloroethene         108833         No Background Data Available           Trichloroethene         108833         No Background Data Available           Trichloroethene         75694         No Detects           Trichloroethene         75694         No Detects           Trichloroethene         75694         No Detects									
e 74873  98828  110827  omethane 110827  bronnethane 7518  100414  100414  100414  100414  100416  100425  tene 127184  100428  tene 127184  100425  tene 75092  tene 75092		Soil ESV	Max Exceeds ESV?	PBT Compound?	Detected?	Max. > Bkg.?	SRC?	COPEC"?	Dist
omethane 124481  romethane 124481  romethane 124481  100414  13677612  136777612  136777612  10872  101425  Inne 127184  100425  Inne 17804  Inne 75694  Inne 75694	Detects	No ESV	No ESV	ou	Not PBT		Yes	No	0
omethane 124481  rounethane 124481  rounethane 15418  100414  1100414  1100425  rounethane 127184  1100425  rounethane 75694  75014	Detects	No ESV	No ESV	yes	No		Yes	No	0
omethane 124481  oromethane 75718  100414  100414  100416  oride 75092  oride 127184  lone 127184  omethane 75694  75094	Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
romethane 75718 100414 100414 136777612 exane 136777612 foride 75092 100425 nene 127184 108883 nene 175096 108883 nene 75694 75016	Detects	2.05E+00	No	ou	Not PBT		Yes	No	0
tonethane (75094)	Detects	No ESV	No ESV	No Kow	Not PBT		Yes	oN .	0
exane 136777612 loride 75092 loride 75092 loride 100425 loride 100425 loride 127184 108883 ne 79016 75094 75094	Detects	5.16E+00	No	yes	No		Yes	No	0
yelohexane 108872 ne chloride 75092 oroethene 127184 108883 oethene 79016 Oldoromethane 75694 loride	Background Data Available	No ESV	No ESV	No Kow	Not PBT		Yes	No	۵
ne chloride 75092 oroethene 127184 108833 ochene 75016 108831 108831 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108811 108	Detects	No ESV	No ESV	yes	No		Yes	No	0
100425 oroethene 127184 10883 ochlene 75916 ofluoromethane 75694 loride 75014	Detects	1.05E+00	No	ou	Not PBT		Yes	No	0
oroethene 127184 108883 oethene 79016 75694 1loride 75694	Detects	3.00E+02	No	ou	Not PBT		Yes	No	0
108883 e 79016 methane 75694 75014	Detects	1.00E+01	No	ОП	Not PBT		Yes	No	0
e 79016 omethane 75694 75014	Background Data Available	2.00E+02	No	ou	Not PBT		Yes	No	D
75694 75014	Detects	1.00E+02	No	ОП	Not PBT		Yes	No	0
75014	Detects	1.64E+01	No	ou	Not PBT		Yes	No	0
	Detects	6.46E-01	No	ou	Not PBT		Yes	No	0
ris-12-Dichlorouthene 156592 No Detects	Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0
10061015	Detects	3.98E-01	No	ou	Not PBT		Yes	No	0
156605	Detects	No ESV	No ESV	No Kow	Not PBT		Yes	No	0

Appendix Table C-5. Soil Screening in Deep Surface Soil (0-3 ft) at 40 mm Range at RVAAP (cont'd)

S 10 %



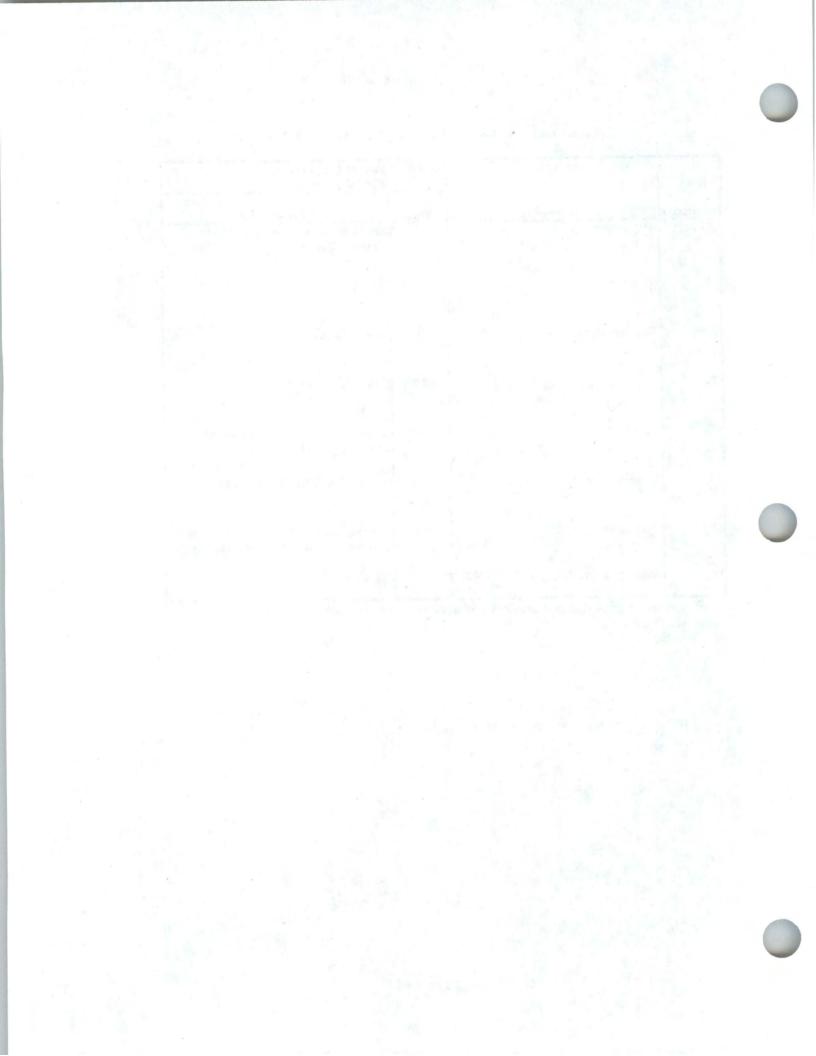


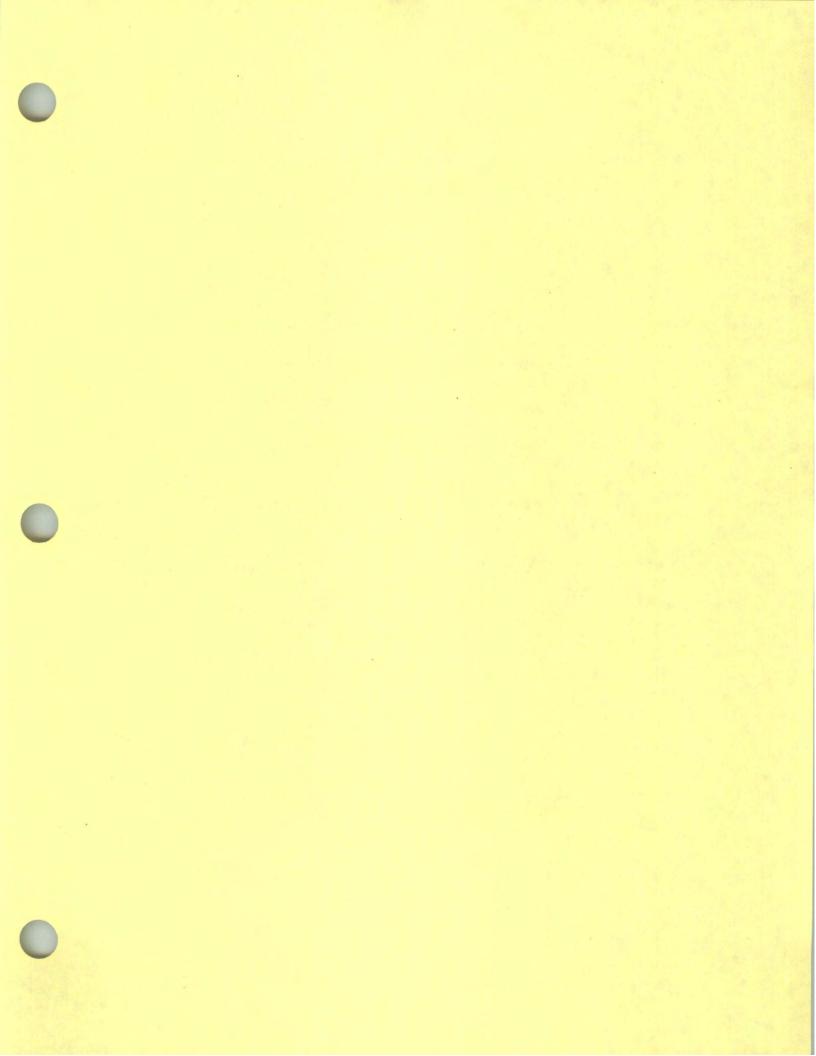


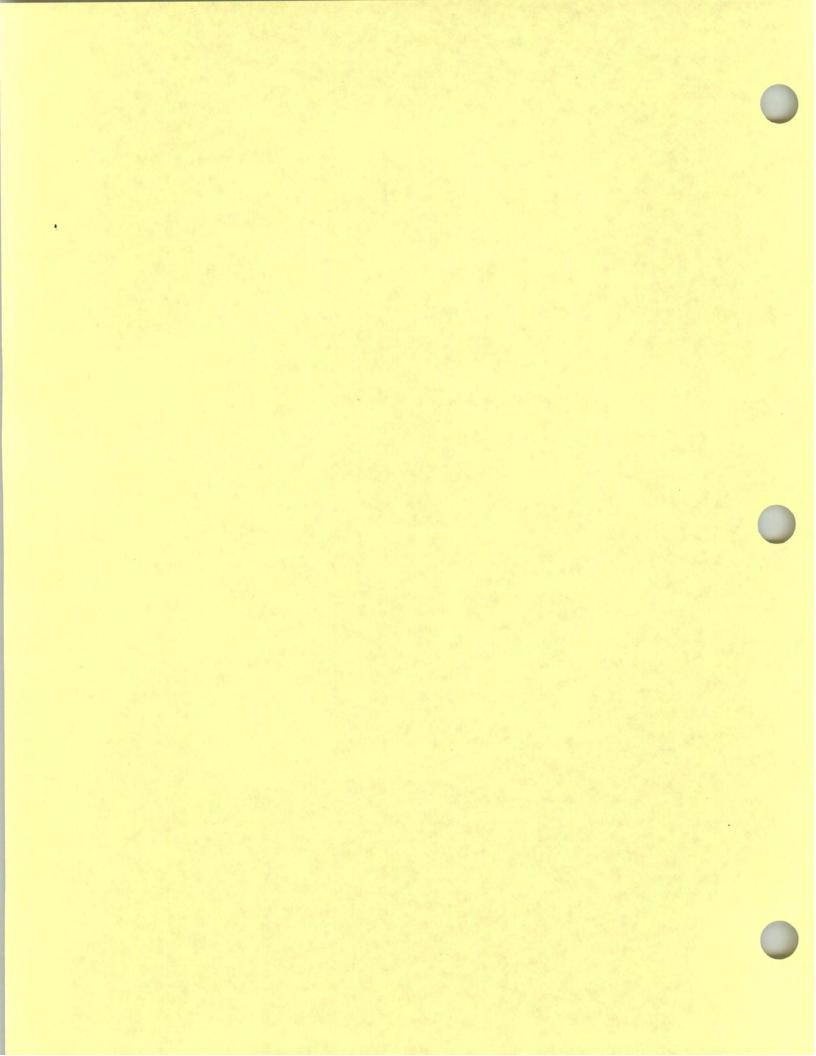
Appendix Table C-6. Receptor Parameters for Cottontail Rabbits

I		Receptor	Eastern Cottontail (Sylvilagus floridanus)
Parameter	Definition	Value	Reference / Notes
BW	Body weight (kg)	1.22	Arithmetic mean of means, both sexes, all seasons (EPA 1993)
HR	Home range (ha)	3.1	(EPA 1993)
TUF	Temporal use factor	1	Will be 1 unless a specific value exists for a receptor
$IR_F$	Food ingestion rate $(g/g-d = kg/kgBW/d)^a$	0.2	Dalke and Slime (1941)
PF	Plant fraction	0.94	Exclusively herbivorous, assumed to be vegetative parts (EPA 1993)
AF	Animal fraction	0	Not stated in EPA (1993), assumed to be 0
SF	Soil fraction	0.063	Assumed comparable to that for black-tailed jackrabbit (6.3%) (Arthur and Gates 1988)
R <sub>w</sub>	Water ingestion rate (g/g-d = L/kgBW/d)	0.097	(EPA 1993)

<sup>&</sup>lt;sup>a</sup> Food ingestion rate (g/g-d) reexpressed as kg/kgBW/d is assumed not to include ingested soil; therefore, PF+AF = 1.0



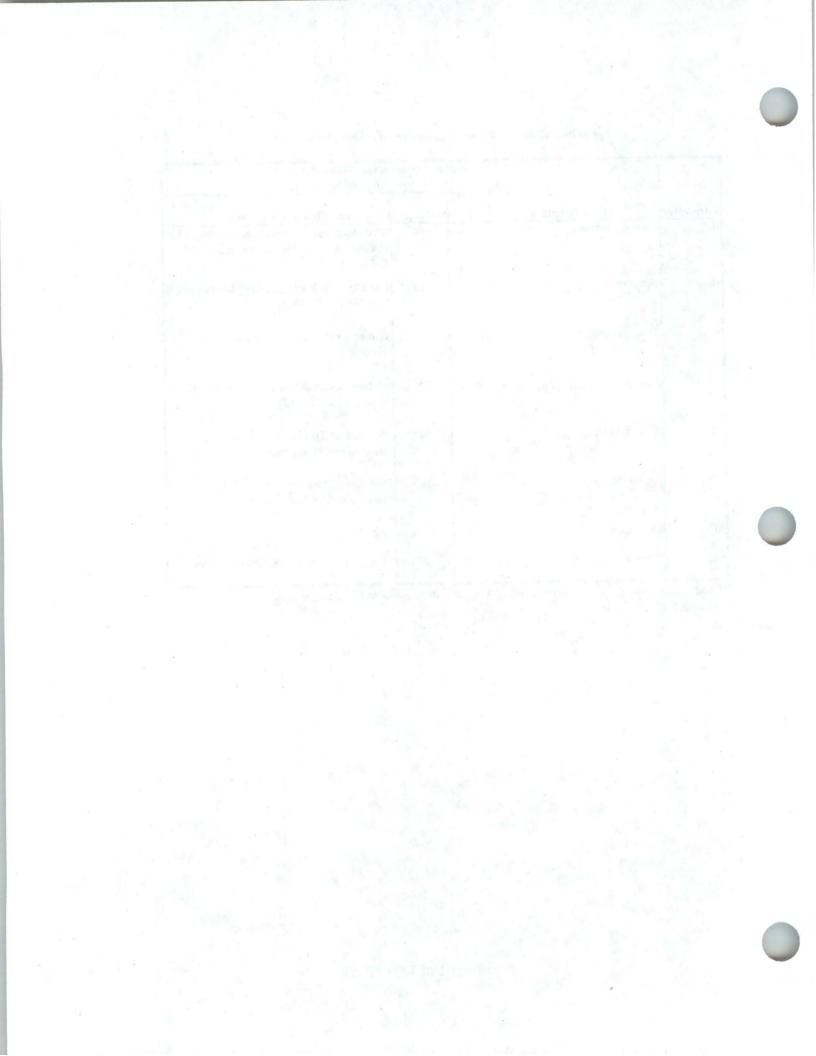


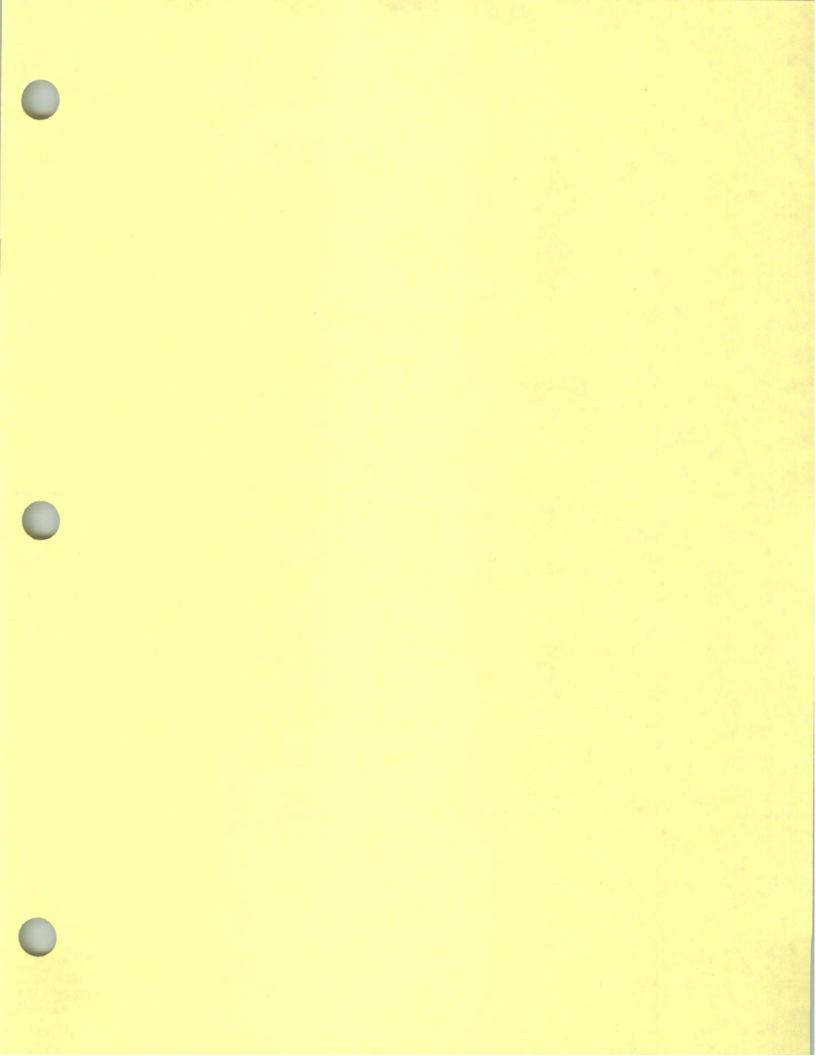


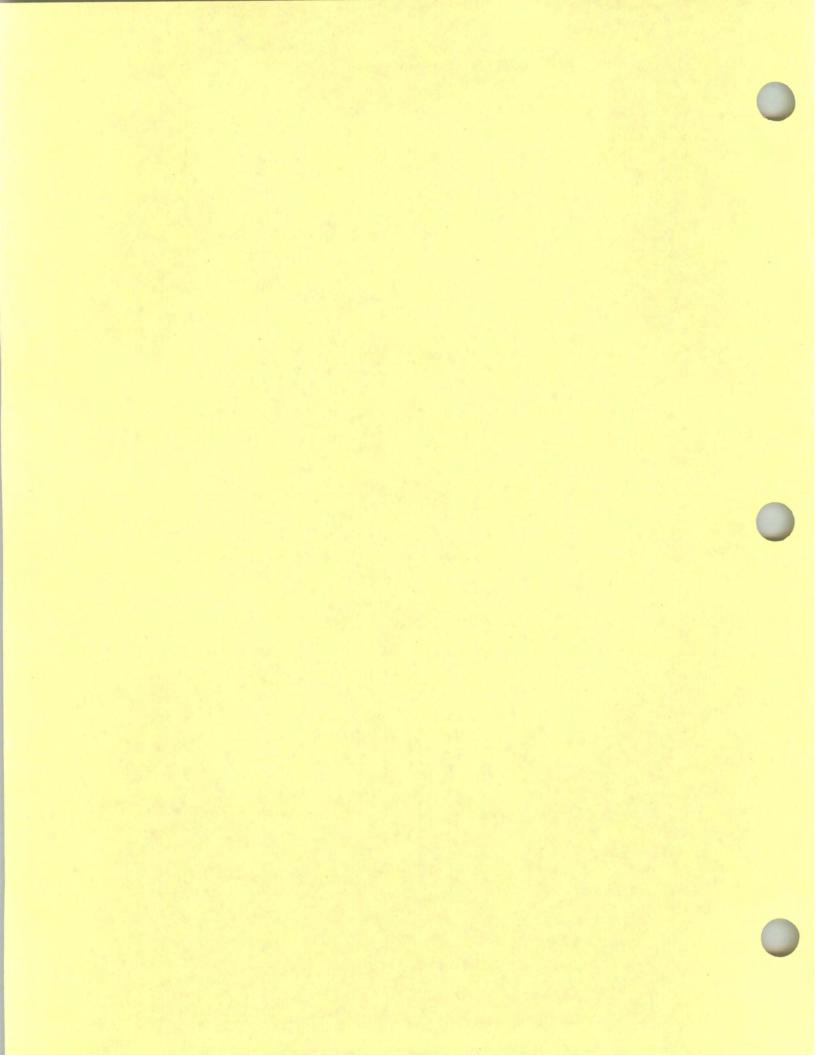
Appendix Table C-7. Receptor Parameters for Short-tailed shrew

		Receptor	r: Short-tailed shrew (Blarina brevicauda)
Parameter	= - IIIIIIIII	Value	Reference / Notes
BW	Body weight (kg)	0.017	Arithmetic mean of means, both sexes, fall and summer, western Pennsylvania (EPA 1993)
HR -	Home range (ha)	0.1	Minimum, adult and juveniles, Michigan and New York (EPA 1993)
TUF	Temporal use factor	1	Will be 1 unless a specific value exists for a receptor
$\mathbb{R}_{\mathrm{F}}$	Food ingestion rate (g/g-d = kg/kgBW/d) <sup>a</sup>	0.56	Arithmetic mean of adults, both sexes, 25oC, Wisconsin (EPA 1993)
PF	Plant fraction	0.13	June through October, New York (EPA 1993); assuming vegetative parts and fungi
AF	Animal fraction	0.87	June through October, New York (EPA 1993); assuming 100% earthworms
SF	Soil fraction	0.06	EPA (1999)
R <sub>w</sub>	Water ingestion rate (g/g-d = L/kgBW/d)	0.223	Adult, both sexes, Illinois, lab (EPA 1993)

 $<sup>^{</sup>a}$  Food ingestion rate (g/g-d) reexpressed as kg/kgBW/d is assumed not to include ingested soil; therefore, PF+AF = 1.0



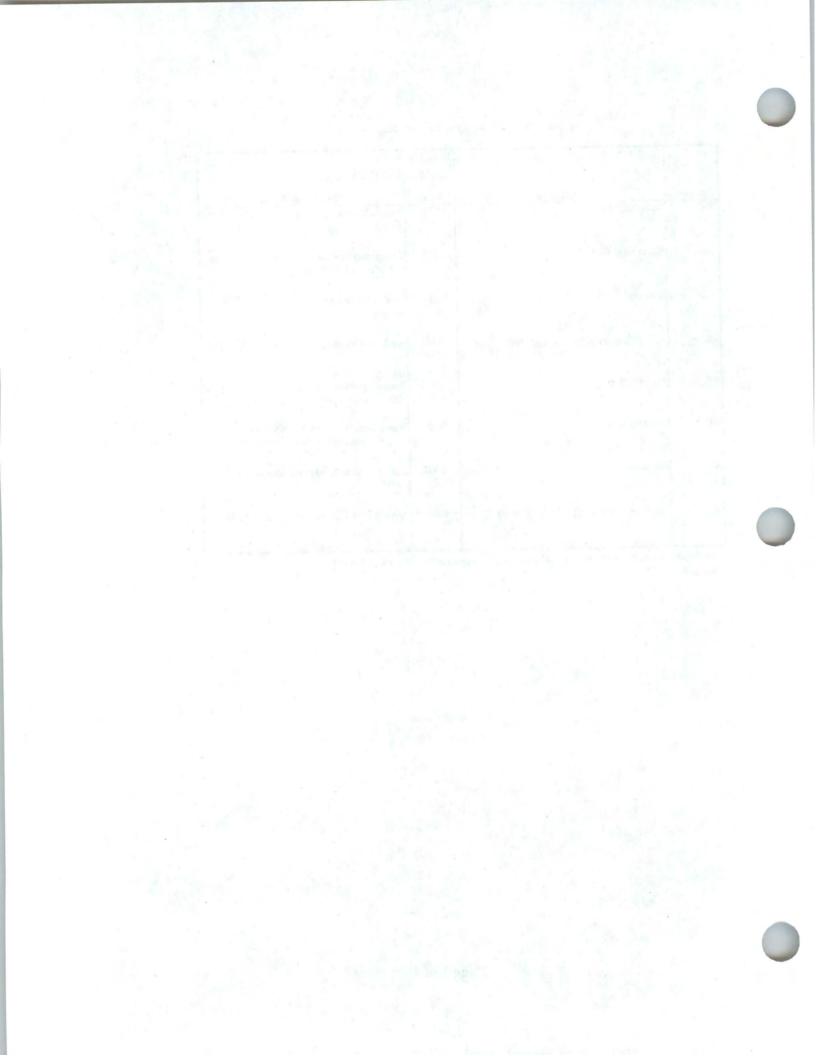


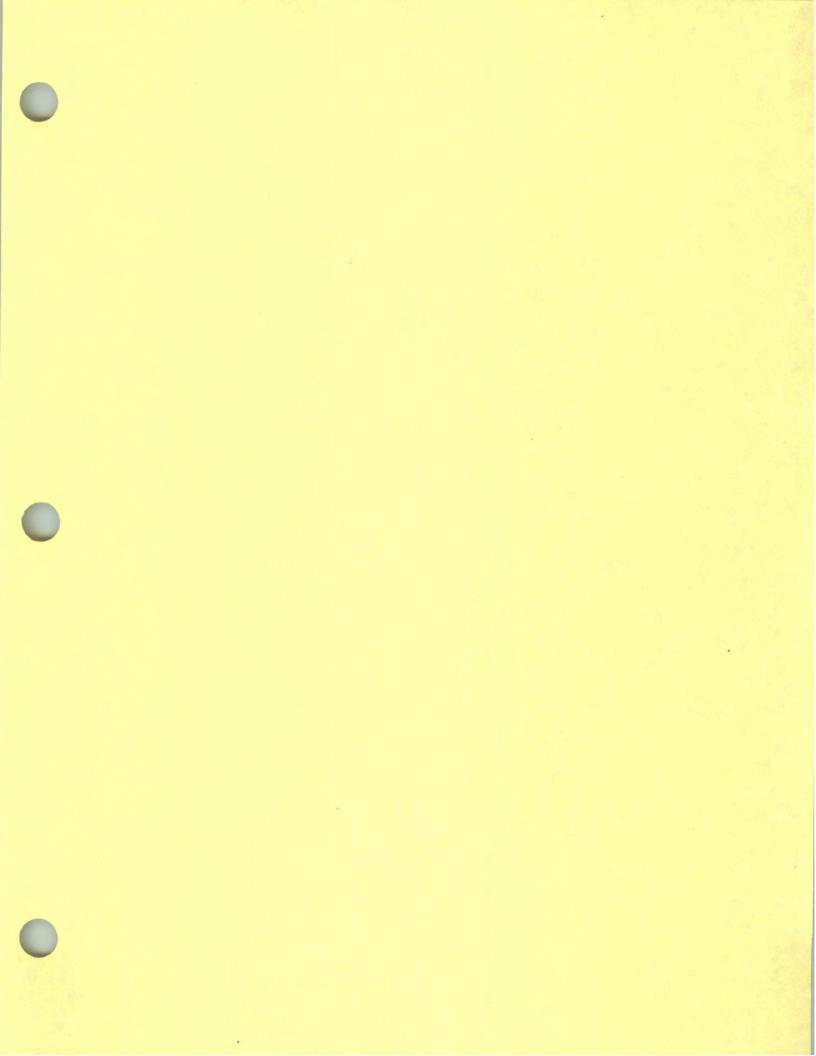


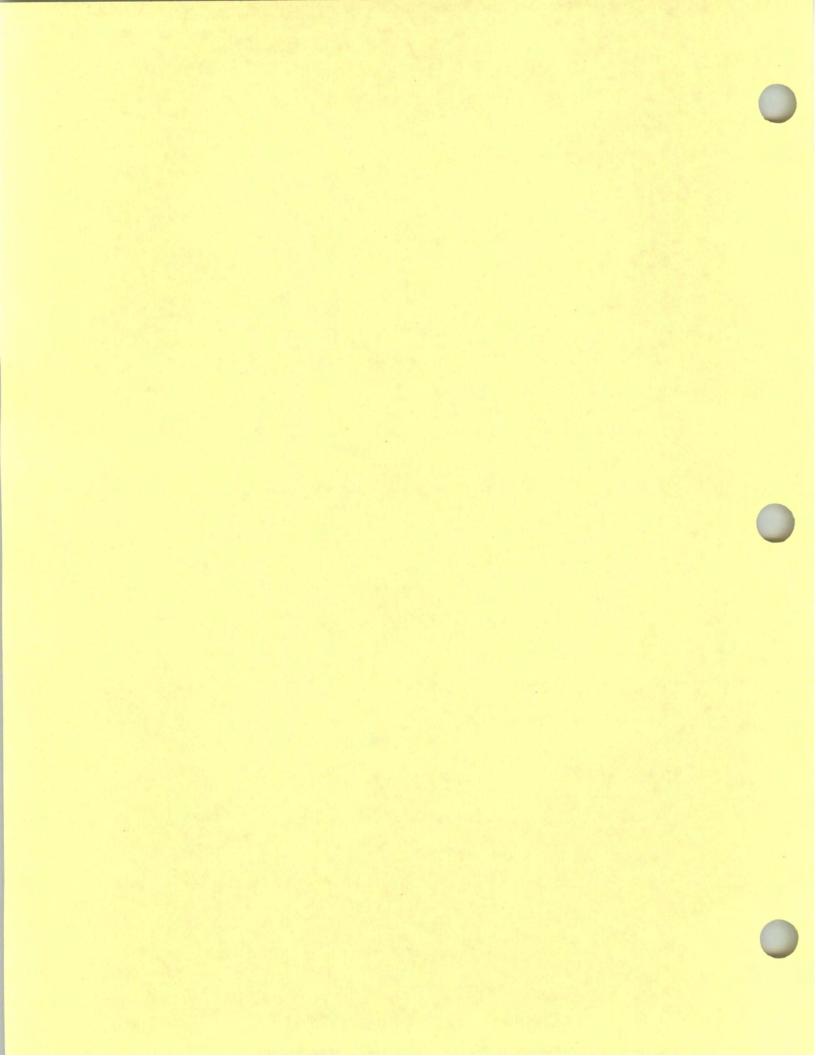
## Appendix Table C-8 Receptor Parameters for Red Fox

		Receptor	r: Red fox
			(Vulpes vulpes)
Parameter	Demition	Value	Reference / Notes
BW	Body weight (kg)	4.535	Arithmetic average of means, both sexes, (EPA 1993)
HR	Home range (ha)	504	Arithmetic mean, adult, both sexes, Minnesota and Wisconsin (EPA 1993)
TUF	Temporal use factor	1	Will be 1 unless a specific value exists for a receptor
$R_{\rm F}$	Food ingestion rate $(g/g-d = kg/kgBW/d)^a$	0.095	Adult, non-breeding, North Dakota (EPA 1993)
PF	Plant fraction	0.046	Illinois farm/woods, spring, % wet weight (EPA 1993); assumed to be reproductive parts
AF	Animal fraction	0.954	Illinois farm/woods, spring, % wet weight, including unspecified/other (EPA 1993)
F	Soil fraction	0.028	Estimated percent soil in diet, dry weight (EPA 1993)
R <sub>w</sub>	Water ingestion rate (g/g-d = L/kgBW/d)	0.085	Arithmetic mean, adult, both sexes (EPA 1993)

 $<sup>^{\</sup>rm a}$  Food ingestion rate (g/g-d) reexpressed as kg/kgBW/d is assumed not to include ingested soil; therefore, PF+AF = 1.0



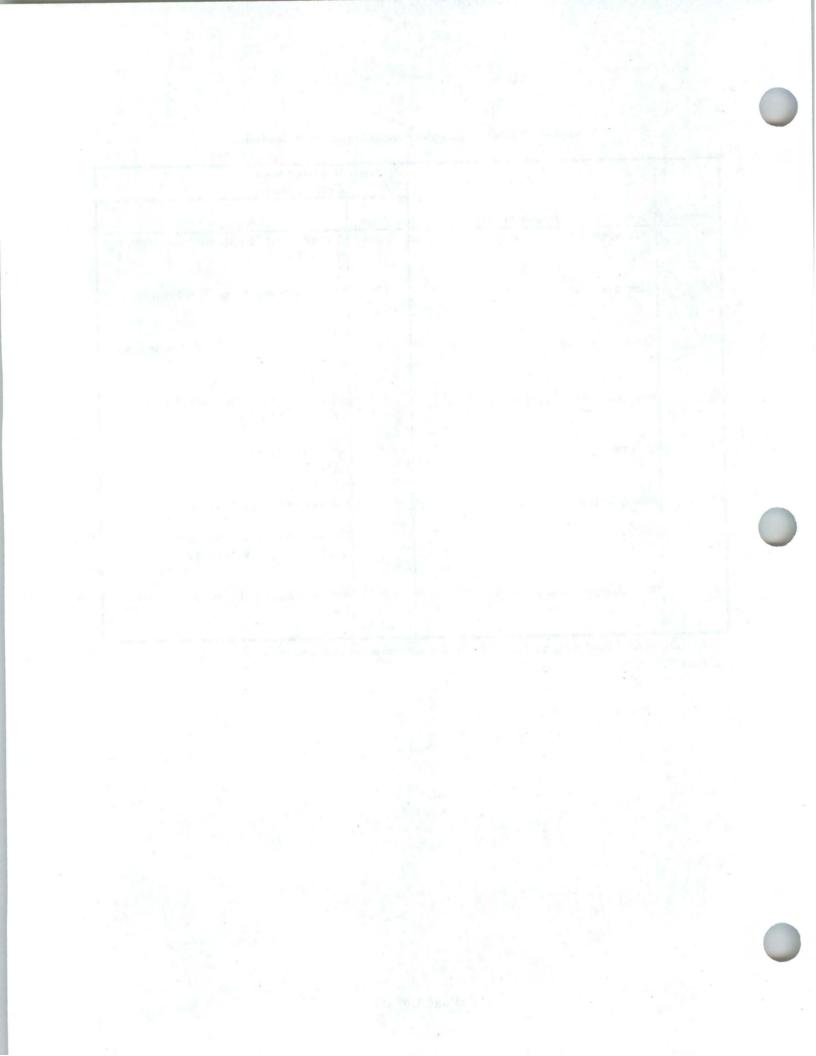


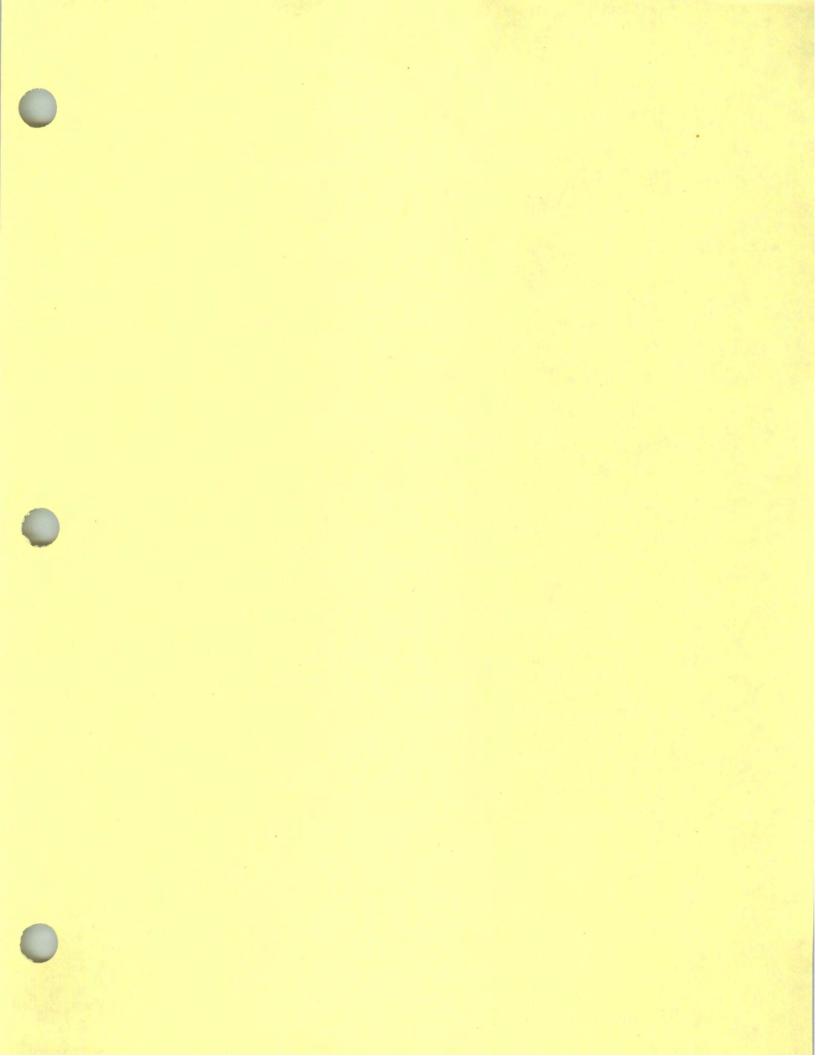


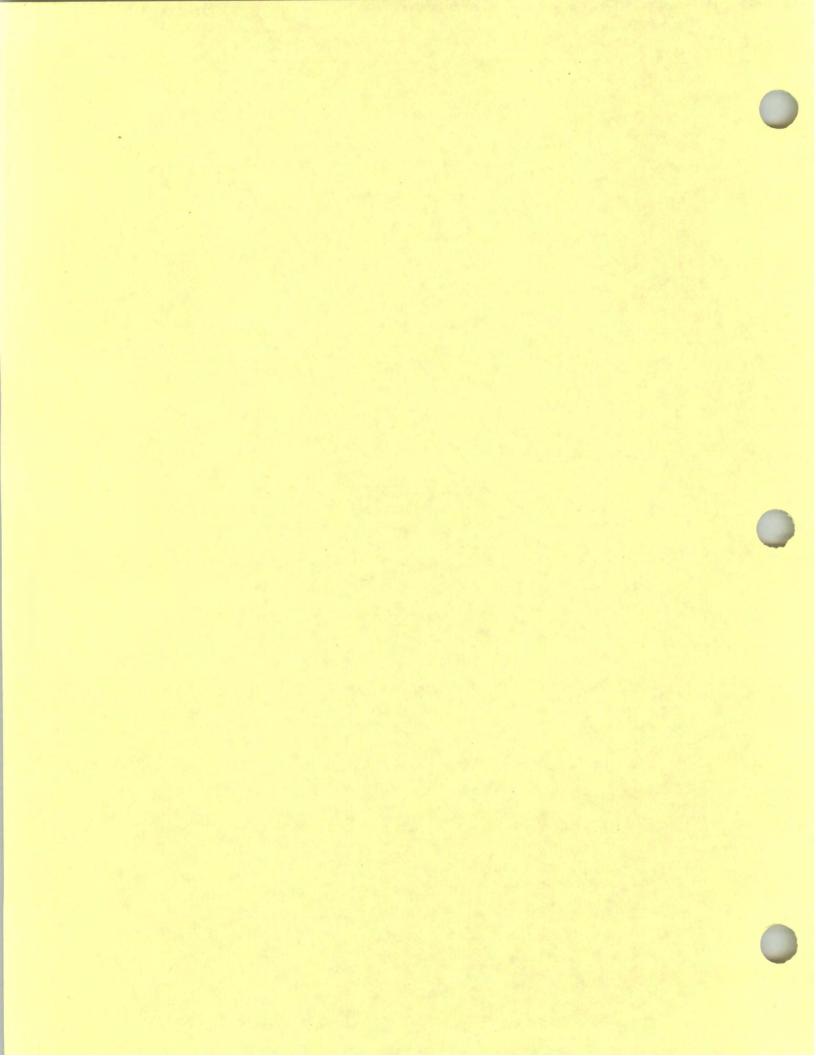
## Appendix Table C-9. Receptor Parameters for Red-tailed Hawk

		Receptor	r: Red-tailed hawk (Buteo jamaicensis)
Parameter	Definition	Value	Reference / Notes
BW	Body weight (kg)	1.134	Arithmetic mean, female and male, Michigan (EPA 1993)
HR	Home range (ha)	876	Mean, adults, both sexes, (EPA 1993)
TUF	Temporal use factor	1	Will be 1 unless a specific value exists for a receptor
$R_{\mathrm{F}}$	Food ingestion rate $(g/g-d = kg/kgBW/d)^a$	0.11	Adult female, winter, Michigan, captive outdoors (EPA 1993)
PF	Plant fraction	0	Not stated in EPA (1993); assumed to be negligible
AF .	Animal fraction	1	Prey brought to nests (EPA 1993)
SF S	Soil fraction	0	Not stated in EPA (1993) and Beyer et al. (1994); assumed to be negligible.
R <sub>w</sub>	Water ingestion rate $(g/g-d = L/kgBW/d)$	0.057	Arithmetic mean, both sexes, estimated (EPA 1993)

 $<sup>^{\</sup>rm a}$  Food ingestion rate (g/g/-d) reexpressed as kg/kgBW/d is assumed not to include ingested soil; therefore, PF+AF = 1.0







Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kaw	Log Ko.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Organic Compounds							
	Aromatic Halogenated Hydrocarbons	genated Hydi	rocarbons				
2,3,4,6-Tetrachlorophenol	58-90-2	4.30	2.40	1.26E-01	Equation 1	3.0E-04	Equation 2 <sup>b</sup>
4-Chloro-3-methylphenol	59-50-7	3.10	2.57	6.25E-01	Equation 1	2.5E-04	Equation 2
	Aromatic Nonhalogenated Hydrocarbons	alogenated F	lydrocarbon	SI			
2-Nitrotoluene	88-72-2	2.30	2.63	1.81E+00	Equation 1	2.2E-04	Equation 2
4-Nitrobiphenyl	92-93-3	3.77	3.09	2.56E-01	Equation 1	2.8E-04	Equation 2
Benzaldehyde	100-52-7	1.48	1.30	5.42E+00	Equation 1	1.9E-04	Equation 2
Benzene	71-43-2	2.14	1.79	2.25E+00	Equation 1	2.1E-04	Equation 2
Benzyl alcohol	100-51-6	1.10	1.01	8.95E+00	Equation 1	1.8E-04	Equation 2
Ethyl benzene	100-41-4	3.12	2.31	6.06E-01	Equation 1	2.5E-04	Equation 2
m-Xylene	108-38-3	3.20	2.29	5.47E-01	Equation 1	2.5E-04	Equation 2
o-Xylene	95-47-6	3.13	2.38	6.01E-01	Equation 1	2.5E-04	Equation 2
1,2-Dimethylbenzene	95-47-6	3.13	2.38	6.01E-01	Equation 1	2.5E-04	Equation 2
p-Xylene	106-42-3	3.17	2.49	5.70E-01	Equation 1	2.5E-04	Equation 2
Styrene	100-42-5	2.93	2.96	7.85E-01	Equation 1	2.4E-04	Equation 2
Toluene	108-88-3	2.67	2.15	1.11E+00	Equation 1	2.3E-04	Equation 2
	Non-aromatic Nonhalogenated Hydrocarbons	Nonhalogenai	ed Hydroca	rbons			
1,2-Epoxybutane	106-88-7	0.86	0.65	1.23E+01	Equation 1	1.7E-04	Equation 2
1,3-Butadiene	0-66-901	1.99	1.64	2.74E+00	Equation 1	2.1E-04	Equation 2
1,4-Dioxane	123-91-1	-0.27	90.0-	5.53E+01	EPA (1999a)	1.5E-04	EPA (1999a)
1-Methylpropyl alcohol	78-92-2	0.61	0.63	1.72E+01	Equation 1	1.7E-04	Equation 2
1-Nitropropane	108-03-2	0.87	0.83	1.22E+01	Equation 1	1.7E-04	Equation 2
2,2,4-Trimethylpentane	540-84-1	5.02	4.07	4.86E-02	Equation 1	3.4E-04	Equation 2
2-Butanone	78-93-3	0.28	0.37	2.66E+01	Equation 1	1.6E-04	Equation 2
2-Butenaldehyde (2-Butenal)	4170-30-3	0.55	0.58	1.86E+01	EPA (1999a)	1.7E-04	EPA (1999a)

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
Organic Compounds	Aromatic H.	Aromatic Halogenated Hydrocarbons	rocarbons				
2 3 4 6-Tetrachloronhenol	58-90-2	5.02E-04	Equation 3	2.38E+02	Equation 2	1.26E-01	Equation 1
4-Chloro-3-methylphenol	59-50-7	3.16E-05	Equation 3	2.47E+01	Equation 2	6.25E-01	Equation 1
	Aromatic N	Aromatic Nonhalogenated Hydrocarbons	Hydrocarbons				
2-Nitrotoluene	88-72-2	5.01E-06	Equation 3	5.47E+00	Equation 2	1.81E+00	Equation 1
4-Nitrobiphenyl	92-93-3	1.48E-04	Equation 3	8.74E+01	Equation 2	2.56E-01	Equation 1
Benzaldehyde	100-52-7	7.54E-07	Equation 3	1.16E+00	Equation 2	5.42E+00	Equation 1
Benzene	71-43-2	3.44E-06	Equation 3	4.02E+00	Equation 2	2.25E+00	Equation 1
Benzyl alcohol	100-51-6	3.16E-07	Equation 3	5.69E-01	Equation 2	8.95E+00	Equation 1
Ethyl benzene	100-41-4	3.34E-05	Equation 3	2.58E+01	Equation 2	6.06E-01	Equation 1
m-Xylene	108-38-3	3.99E-05	Equation 3	2.99E+01	Equation 2	5.47E-01	Equation 1
o-Xylene	95-47-6	3.39E-05	Equation 3	2.62E+01	Equation 2	6.01E-01	Equation 1
1.2-Dimethylbenzene	95-47-6	3.39E-05	Equation 3	2.62E+01	Equation 2	6.01E-01	Equation 1
p-Xylene	106-42-3	3.72E-05	Equation 3	2.82E+01	Equation 2	5.70E-01	Equation 1
Styrene	100-42-5	2.13E-05	Equation 3	1.79E+01	Equation 2	7.85E-01	Equation 1
Toluene	108-88-3	1.17E-05	Equation 3	1.09E+01	Equation 2	1.11E+00	Equation 1
	Non-aroma	ic Nonhalogen	Non-aromatic Nonhalogenated Hydrocarbons	IS SI			
1,2-Epoxybutane	106-88-7	1.82E-07	Equation 3	1.74E-04	Equation 2	1.23E+01	Equation 1
1,3-Butadiene	106-99-0	2.45E-06	Equation 3	2.09E-04	Equation 2	2.74E+00	Equation 1
1,4-Dioxane	123-91-1	1.36E-08	Equation 3	4.00E-02	EPA (1999a)	5.53E+01	EPA (1999a)
1-Methylpropyl alcohol	78-92-2	1.02E-07	Equation 3	2.26E-01	Equation 2	1.72E+01	Equation 1
1-Nitropropane	108-03-2	1.86E-07	Equation 3	3.69E-01	Equation 2	1.22E+01	Equation 1
2,2,4-Trimethylpentane	540-84-1	2.63E-03	Equation 3	9.23E+02	Equation 2	4.86E-02	Equation 1
2-Butanone	78-93-3	4.80E-08	Equation 3	1.21E-01	Equation 2	2.66E+01	Equation 1
2-Butenaldehyde (2-Butenal)	4170-30-3	8.91E-08	EPA (1999a)	2.00E-01	EPA (1999a)	1.86E+01	EPA (1999a)

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kon	Log K."	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
2-Ethoxyethanol	110-80-5	-0.10	1.32	4.42E+01	Equation 1	1 SF-04	Fanation
2-Heptanone	110-43-0	1.98	1.70	2.78E+00	Equation 1	2.1E-04	Fountion 2
2-Hexanone	591-78-6	1.38	2.13	6.17E+00	Equation 1	1.9E-04	Fountion 2
2-Methoxyethanol	109-86-4	-0.77	0.00	1.08E+02	Equation 1	1.3E-04	Equation 2
2-Methyl-2-propanol	75-65-0	0.35	1.57	2.43E+01	Equation 1	1.6E-04	Equation 2
2-Methyl-2-propenenitrile	126-98-7	0.54	0.57	1.89E+01	Equation 1	1.7E-04	Equation 2
2-Methylaziridine	75-55-8	-0.60	-0.32	8.61E+01	Equation 1	1.4E-04	Equation 2
2-Methylpropyl alcohol	78-83-1	92.0	0.74	1.41E+01	Equation 1	1.7E-04	Equation 2
2-Pentanone	107-87-9	0.91	1.87	1.15E+01	Equation 1	1.8E-04	Equation 2
2-Propanone (Acetone)	67-64-1	-0.22	-0.02	5.20E+01	EPA (1999a)	1.5E-04	EPA (1999a)
2-Propene-1-ol	107-18-6	0.17	0.28	3.09E+01	Equation 1	1.6E-04	Equation 2
2-Propyl alcohol	67-63-0	0.05	0.19	3.62E+01	Equation 1	1.5E-04	Equation 2
3-Heptanone	106-35-4	NA	NA	No data	No data	No data	No data
3-Methyl-1-butanol	123-51-3	NA	NA	No data	No data	No data	No data
3-Methyl-2-butanone	563-80-4	NA	NA	No data	No data	No data	No data
3-Pentanone	96-22-0	66.0	1.08	1.04E+01	Equation 1	1.8E-04	Equation 2
4-Heptanone	123-19-3	NA	NA	No data	No data	No data	No data
4-Methyl-2-pentanone	108-10-1	1.19	1.08	7.94E+00	Equation 1	1.8E-04	Equation 2
4-Methyl-3-penten-2-one	141-79-7	NA	NA	No data	No data	No data	No data
5-Methyl-2-hexanone	110-12-3	1.72	1.59	3.93E+00	Equation 1	2.0E-04	Equation 2
Acetaldehyde	75-07-0	-0.22	-0.02	5.19E+01	Equation 1	1.5E-04	Equation 2
Acetamide	60-35-5	-1.26	-1.55	2.07E+02	Equation 1	1.2E-04	Equation 2
Acetic acid	64-19-7	-0.17	0.00	4.86E+01	Equation 1	1.5E-04	Equation 2
Acetic acid ethyl ester	141-78-6	0.73	0.36	1.47E+01	Equation 1	1.7E-04	Equation 2
Acetic acid n-butyl ester	123-86-4	1.73	1.50	3.87E+00	Equation 1	2.0E-04	Equation 2
Acetonitrile	75-05-8	-0.34	-0.11	6.09F+01	Fanation 1	1 4E-04	Famation 2

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
2-Ethovvethanol	110-80-5	2.00E-08	Equation 3	5.92E-02	Equation 2	4.42E+01	Equation 1
2-EuroAyeumon	110-43-0	2.40E-06	Equation 3	2.99E+00	Equation 2	2.78E+00	Equation 1
2-Hevanone	591-78-6	6.03E-07	Equation 3	9.64E-01	Equation 2	6.17E+00	Equation 1
2-Methoxyethanol	109-86-4	4.27E-09	Equation 3	1.34E-04	Equation 2	1.08E+02	Equation 1
2-Methyl-2-propagol	75-65-0	5.62E-08	Equation 3	1.38E-01	Equation 2	2.43E+01	Equation 1
2-Methyl-2-propenentrile	126-98-7	8.72E-08	Equation 3	1.98E-01	Equation 2	1.89E+01	Equation 1
2-Methylaziridine	75-55-8	6.31E-09	Equation 3	2.30E-02	Equation 2	8.61E+01	Equation 1
2-Methylnronyl alcohol	78-83-1	1.45E-07	Equation 3	3.00E-01	Equation 2	1.41E+01	Equation 1
2-Pentanone	107-87-9	2.04E-07	Equation 3	3.97E-01	Equation 2	1.15E+01	Equation 1
2-Pronanone (Acetone)	67-64-1	1.51E-08	Equation 3	5.00E-02	EPA (1999a)	5.20E+01	EPA (1999a)
2-Pronene-1-ol	107-18-6	3.72E-08	Equation 3	9.85E-02	Equation 2	3.09E+01	Equation 1
2-Propyl alcohol	67-63-0	2.82E-08	Equation 3	7.85E-02	Equation 2	3.62E+01	Equation 1
3-Hentanone	106-35-4	No data	No data	No data	No data	No data	No data
3-Methyl-1-hutanol	123-51-3	No data	No data	No data	No data	No data	No data
3-Methyl-2-butanone	563-80-4	No data	No data	No data	No data	No data	No data
3-Pentanone	96-22-0	2.45E-07	Equation 3	4.62E-01	Equation 2	1.04E+01	Equation
4-Hentanone	123-19-3	No data	No data	No data	No data	No data	No data
4-Methyl-2-pentanone	108-10-1	3.89E-07	Equation 3	6.74E-01	Equation 2	7.94E+00	Equation 1
4-Methyl-3-penten-2-one	141-79-7	No data	No data	No data	No data	No data	No data
5-Methyl-2-hexanone	110-12-3	1.32E-06	Equation 3	2.00E-04	Equation 2	3.93E+00	Equation 1
Acetaldehyde	75-07-0	1.51E-08	Equation 3	4.72E-02	Equation 2	5.19E+01	Equation
Acetamide	60-35-5	1.38E-09	Equation 3	6.64E-03	Equation 2	2.07E+02	Equation
Acetic acid	64-19-7	1.70E-08	Equation 3	5.19E-02	Equation 2	4.86E+01	Equation
Acetic acid ethyl ester	141-78-6	1.35E-07	Equation 3	2.83E-01	Equation 2	1.47E+01	Equation
Acetic acid n-butyl ester	123-86-4	1.35E-06	Equation 3	1.87E+00	Equation 2	3.87E+00	Equation 1
Acetonitrile	75-05-8	1.15E-08	Equation 3	3.76E-02	Equation 2	6.09E+01	Equation

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Koc	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Acrolein	107-02-8	-0.01	0.14	3.92E+01	Equation 1	1.5E-04	Equation 2
Acrylonitrile	107-13-1	0.25	0.35	2.78E+01	EPA (1999a)	1.6E-04	EPA (1999a)
Bis(isopropyl)ether	108-20-3	1.56	2.23	4.86E+00	Equation 1	1.9E-04	Equation 2
Butane	8-26-901	2.89	2.41	8.27E-01	Equation 1	2.4E-04	Equation 2
Carbon disulfide	75-15-0	2.00	1.71	2.70E+00	Equation 1	2.1E-04	Equation 2
Cyanogen	460-19-5	0.07	0.92	3.53E+01	Equation 1	1.5E-04	Equation 2
Cyclohexane	110-82-7	3.44	2.68	3.98E-01	Equation 1	2.6E-04	Equation 2
Cyclohexanone	108-94-1	0.81	0.78	1.32E+01	Equation 1	1.7E-04	Equation 2
Cyclohexene	110-83-8	2.86	2.38	8.61E-01	Equation 1	2.4E-04	Equation 2
Cyclopentane	287-92-3	3.00	2.49	7.14E-01	Equation 1	2.5E-04	Equation 2
Ethyl alcohol	64-17-5	-0.31	-0.09	5.85E+01	Equation 1	1.4E-04	Equation 2
Ethyl ether	60-29-7	0.89	0.85	1.18E+01	Equation 1	1.7E-04	Equation 2
Ethyl methacrylate	97-63-2	1.59	1.39	4.67E+00	Equation 1	2.0E-04	Equation 2
Formaldehyde	20-00-0	0.34	0.42	2.46E+01	EPA (1999a)	1.6E-04	EPA (1999a)
Formamide	75-12-7	-1.51	-1.03	2.89E+02	Equation 1	1.2E-04	Equation 2
Formic acid	64-18-6	-0.54	-0.27	7.92E+01	Equation 1	1.4E-04	Equation 2
Formic acid, methyl ester	107-31-3	-0.26	-0.05	5.50E+01	Equation 1	1.5E-04	Equation 2
Glycidylaldehyde	765-34-4	-0.12	0.00	4.54E+01	Equation 1	1.5E-04	Equation 2
Methyl acetate	79-20-9	0.46	0.51	2.10E+01	Equation 1	1.6E-04	Equation 2
Methyl alcohol	67-56-1	-0.71	-0.40	9.96E+01	Equation 1	1.4E-04	Equation 2
Methyl isocyanate	624-83-9	NA	NA	No data	No data	No data	No data
Methyl methacrylate	80-62-6	0.79	1.80	1.35E+01	Equation 1	1.7E-04	Equation 2
Methyl tert-butyl ether	1634-04-4	0.94	0.88	1.11E+01	Equation 1	1.8E-04	Equation 2
Methylacetylene	74-99-7	0.94	0.88	1.11E+01	Equation 1	1.8E-04	Equation 2
Methylcyclohexane	108-87-2	4.10	3.35	1.65E-01	Equation 1	2.9E-04	Equation 2
N,N-Dimethylacetamide	127-19-5	NA	NA	No data	No data	No data	No data

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue]/[mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
Acrolein	107-02-8	2.46E-08	Equation 3	7.03E-02	Equation 2	3.92E+01	Equation 1
Acrylonitrile	107-13-1	4.47E-08	Equation 3	1.10E-01	EPA (1999a)	2.78E+01	EPA (1999a)
Bis(isopropyl)ether	108-20-3	9.12E-07	Equation 3	1.95E-04	Equation 2	4.86E+00	Equation 1
Butane	8-26-901	1.95E-05	Equation 3	1.66E+01	Equation 2	8.27E-01	Equation 1
Carbon disulfide	75-15-0	2.51E-06	Equation 3	3.10E+00	Equation 2	2.70E+00	Equation 1
Cyanogen	460-19-5	2.95E-08	Equation 3	1.53E-04	Equation 2	3.53E+01	Equation 1
Cyclohexane	110-82-7	6.92E-05	Equation 3	4.69E+01	Equation 2	3.98E-01	Equation 1
Cyclohexanone	108-94-1	1.62E-07	Equation 3	3.29E-01	Equation 2	1.32E+01	Equation 1
Cyclohexene	110-83-8	1.82E-05	Equation 3	1.57E+01	Equation 2	8.61E-01	Equation 1
Cyclopentane	287-92-3	2.51E-05	Equation 3	2.05E+01	Equation 2	7.14E-01	Equation 1
Ethyl alcohol	64-17-5	1.23E-08	Equation 3	3.98E-02	Equation 2	5.85E+01	Equation 1
Ethyl ether	60-29-7	1.95E-07	Equation 3	3.83E-01	Equation 2	1.18E+01	Equation 1
Ethyl methacrylate	97-63-2	9.77E-07	Equation 3	1.43E+00	Equation 2	4.67E+00	Equation 1
Formaldehyde	20-00-0	5.56E-08	Equation 3	1.40E-01	EPA (1999a)	2.46E+01	EPA (1999a)
Formamide	75-12-7	7.76E-10	Equation 3	4.14E-03	Equation 2	2.89E+02	Equation 1
Formic acid	64-18-6	7.28E-09	Equation 3	2.59E-02	Equation 2	7.92E+01	Equation 1
Formic acid, methyl ester	107-31-3	1.37E-08	Equation 3	4.34E-02	Equation 2	5.50E+01	Equation 1
Glycidylaldehyde	765-34-4	1.91E-08	Equation 3	1.49E-04	Equation 2	4.54E+01	Equation 1
Methyl acetate	79-20-9	7.24E-08	Equation 3	1.70E-01	Equation 2	2.10E+01	Equation 1
Methyl alcohol	67-56-1	4.90E-09	Equation 3	1.87E-02	Equation 2	9.96E+01	Equation 1
Methyl isocyanate	624-83-9	No data .	No data	No data	No data	No data	No data
Methyl methacrylate	80-62-6	1.55E-07	Equation 3	3.17E-01	Equation 2	1.35E+01	Equation 1
Methyl tert-butyl ether	1634-04-4	2.19E-07	Equation 3	4.21E-01	Equation 2	1.11E+01	Equation 1
Methylacetylene	74-99-7	2.19E-07	Equation 3	4.21E-01	Equation 2	1.11E+01	Equation 1
Methylcyclohexane	108-87-2	3.16E-04	Equation 3	1.63E+02	Equation 2	1.65E-01	Equation 1
N,N-Dimethylacetamide	127-19-5	No data	No data	No data	No data	No data	No data

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ko.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
n-Butyl alcohol	71-36-3	0.88	0.84	1.20E+01	Equation 1	1.7E-04	Equation 2
n-Heptane	142-82-5	4.66	3.79	7.84E-02	Equation 1	3.2E-04	Equation 2
n-Hexane	110-54-3	4.11	3.36	1.63E-01	Equation 1	2.9E-04	Equation 2
Nitromethane	75-52-5	-0.35	-0.12	6.17E+01	Equation 1	1.4E-04	Equation 2
n-Nonane	111-84-2	5.65	4.56	2.10E-02	Equation 1	3.8E-04	Equation 2
n-Octane	111-65-9	4.00	3.27	1.89E-01	Equation 1	2.9E-04	Equation 2
n-Pentane	109-66-0	3.21	2.65	5.40E-01	Equation 1	2.5E-04	Equation 2
n-Propionaldehyde	123-38-6	0.59	0.61	1.77E+01	Equation 1	1.7E-04	Equation 2
n-Propyl alcohol	71-23-8	0.25	0.35	2.78E+01	Equation 1	1.6E-04	Equation 2
n-Valeraldehyde	110-62-3	NA	NA	No data	No data	No data	No data
Oxirane	75-21-8	-0.30	-0.08	5.77E+01	Equation 1	1.4E-04	Equation 2
p-Cymene	9-28-66	4.10	3.35	1.65E-01	Equation 1	2.9E-04	Equation 2
Phosgene	75-44-5	NA	NA	No data	No data	No data	No data
Propargyl alcohol	107-19-7	-0.38	0.12	6.42E+01	Equation 1	1.4E-04	Equation 2
Propionic acid	79-09-4	0.33	0.41	2.50E+01	Equation 1	1.6E-04	Equation 2
Propionitrile	107-12-0	0.16	0.28	3.13E+01	Equation 1	1.6E-04	Equation 2
Propylene glycol monomethyl ether	107-98-2	-0.49	0.00	7.43E+01	Equation 1	1.4E-04	Equation 2
p-tert-Butyltoluene	98-51-1	NA	NA	No data	No data	No data	No data
Triethylamine	121-44-8	1.45	2.03	5.62E+00	Equation 1	1.9E-04	Equation 2
Trimethylamine	75-50-3	0.16	09.0	3.13E+01	Equation 1	1.6E-04	Equation 2
Vinyl acetate	108-05-4	0.70	0.70	1.53E+01	Equation 1	1.7E-04	Equation 2
	Non-aromatic Halogenated Hydrocarbons	Halogenated 1	Aydrocarbo				
1,1,1,2-Tetrachloro-2,2-difluoroethane	6-11-9	3.41	2.54	4.14E-01	Equation 1	2.6E-04	Equation 2
1,1,1,2-Tetrachloroethane	630-20-6	2.63	2.20	1.17E+00	Equation 1	2.3E-04	Equation 2
1,1,1-Trichloroethane	71-55-6	2.42	5.13	1.54E+00	Equation 1	2.2E-04	Equation 2
1,1,2,2-Tetrachloro-1,2-difluoroethane	76-12-0	3.73	250	2 70F-01	Faustion 1	2 8E-04	Fanation 2

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

	CAS	Mammal Ba ([mg/kg tissue] / [mg		WP (I.Akg		SP (kg dry sediment/ kg dry	
Constituent of Potential Concern	Number	/day])	Source	tissue)	Source	tissue)	Source
n-Butyl alcohol	71-36-3	1.91E-07	Equation 3	3.76E-01	Equation 2	1.20E+01	Equation 1
n-Hentane	142-82-5	1.15E-03	Equation 3	4.68E+02	Equation 2	7.84E-02	Equation 1
n-Hexane	110-54-3	3.24E-04	Equation 3	1.66E+02	Equation 2	1.63E-01	Equation 1
Nitromethane	75-52-5	1.12E-08	Equation 3	3.69E-02	Equation 2	6.17E+01	Equation 1
n-Nonane	111-84-2	1.12E-02	Equation 3	3.03E+03	Equation 2	2.10E-02	Equation 1
n-Octane	111-65-9	2.51E-04	Equation 3	1.35E+02	Equation 2	1.89E-01	Equation 1
n-Pentane	109-66-0	4.07E-05	Equation 3	3.04E+01	Equation 2	5.40E-01	Equation 1
n-Pronionaldehyde	123-38-6	9.77E-08	Equation 3	2.17E-01	Equation 2	1.77E+01	Equation 1
n-Propyl alcohol	71-23-8	4.47E-08	Equation 3	1.14E-01	Equation 2	2.78E+01	Equation
n-Valeraldehyde	110-62-3	No data	No data	No data	No data	No data	No data
Oxirane	75-21-8	1.26E-08	Equation 3	4.06E-02	Equation 2	5.77E+01	Equation 1
n-Cymene	9-28-66	3.16E-04	Equation 3	1.63E+02	Equation 2	1.65E-01	Equation 1
Phosene	75-44-5	No data	No data	No data	No data	No data	No data
Proparevi alcohol	107-19-7	1.05E-08	Equation 3	1.43E-04	Equation 2	6.42E+01	Equation 1
Propionic acid	79-09-4	5.37E-08	Equation 3	1.33E-01	Equation 2	2.50E+01	Equation 1
Probionitrile	107-12-0	3.63E-08	Equation 3	9.66E-02	Equation 2	3.13E+01	Equation
Propylene glycol monomethyl ether	107-98-2	8.13E-09	Equation 3	1.40E-04	Equation 2	7.43E+01	Equation
p-tert-ButyItoluene	98-51-1	No data	No data	No data	No data	No data	No data
Triethylamine	121-44-8	7.08E-07	Equation 3	1.91E-04	Equation 2	5.62E+00	Equation 1
Trimethylamine	75-50-3	3.63E-08	Equation 3	9.66E-02	Equation 2	3.13E+01	Equation 1
Vinyl acetate	108-05-4	1.26E-07	Equation 3	2.67E-01	Equation 2	1.53E+01	Equation
	Non-aroma	tic Halogenated	Non-aromatic Halogenated Hydrocarbons				
1.1.1.2-Tetrachloro-2,2-difluoroethane	76-11-9	6.46E-05	Equation 3	2.63E-04	Equation 2	4.14E-01	Equation
1,1,1,2-Tetrachloroethane	630-20-6	1.07E-05	Equation 3	1.02E+01	Equation 2	1.17E+00	Equation
1,1,1-Trichloroethane	71-55-6	6.63E-06	Equation 3	6.88E+00	Equation 2	1.54E+00	Equation
1 1 2 2-Tetrachloro-1.2-difluoroethane	76-12-0	1.35E-04	Equation 3	8.11E+01	Equation 2	2.70E-01	Equation 1

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Ko."	Log Ko.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
1,1,2,2-Tetrachloroethane	79-34-5	4.64	1.90	8.02E-02	Equation 1	3.2E-04	Equation 2
1,1,2,2-Tetrachloroethene	127-18-4	2.55	2.42	1.31E+00	Equation 1	2.3E-04	Equation 2
1,1,2-Trichloroethane	79-00-5	2.10	1.88	2.38E+00	Equation 1	2.1E-04	Equation 2
1,1,2-Trichloroethylene	9-10-62	2.43	1.97	1.52E+00	Equation 1	2.2E-04	Equation 2
1,1-Dichloroethane	75-34-3	1.79	1.72	3.56E+00	Equation 1	2.0E-04	Equation 2
1,1-Dichloroethene	75-35-4	2.12	1.81	2.30E+00	Equation 1	2.1E-04	Equation 2
1,2,2-Trichloro-1,1,2-trifluoroethane	76-13-1	3.16	2.41	5.77E-01	Equation 1	2.5E-04	Equation 2
1,2,3-1 richloropropane	96-18-4	2.25	1.91	1.94E+00	Equation 1	2.2E-04	Equation 2
1,2-Dibromo-3-chloropropane	96-12-8	2.34	1.98	1.72E+00	Equation 1	2.2E-04	Equation 2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	2.82	2.35	9.08E-01	Equation 1	2.4E-04	Equation 2
1,2-Dichloroethane	107-06-2	1.46	1.29	5.53E+00	Equation 1	1.9E-04	Equation 2
1,2-Dichloroethylene	540-59-0	2.09	1.64	2.40E+00	Equation 1	2.1E-04	Equation 2
1,2-Dichloropropane	78-87-5	2.25	1.67	1.94E+00	Equation 1	2.2E-04	Equation 2
1,3-Dichloropropene	542-75-6	1.75	1.43	3.78E+00	Equation 1	2.0E-04	Equation 2
1,4-Dichloro-2-butene	764-41-0	2.60	2.17	1.21E+01	Equation 1	2.3E-04	Equation 2
1-Chloroethene	75-01-4	1.15	1.05	8.43E+00	EPA (1999a)	1.8E-04	EPA (1999a)
2,2-Dichloropropionic acid	75-99-0	1.68	0.44	4.14E+00	Equation 1	2.0E-04	Equation 2
2-Chloropropane	75-29-6	1.90	1.63	3.09E+00	Equation 1	2.1E-04	Equation 2
3-Chloropropene (Allyl chloride)	107-05-1	1.93	1.64	2.97E+00	Equation 1	2.1E-04	Equation 2
Bromochloromethane	74-97-5	1.41	1.25	5.93E+00	Equation 1	1.9E-04	Equation 2
Bromodichloromethane	75-27-4	2.03	1.73	2.61E+00	Equation 1	2.1E-04	Equation 2
Bromoethene	593-60-2	1.57	1.38	9.37E+00	Equation 1	2.0E-04	Equation 2
Bromotorm	75-25-2	2.35	2.10	1.70E+00	Equation 1	2.2E-04	Equation 2
Bromomethane	74-83-9	1.11	0.95	8.79E+00	Equation 1	1.8E-04	Equation 2
Carbon tetrachloride	56-23-5	2.72	2.18	1.04E+00	EPA (1999a)	2.3E-04	EPA (1999a)
Chlorodibromomethane	124-48-1	2.18	1.85	2.14E+00	Equation 1	2 2F-04	Fanation 2

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
1 1 2 2 Tatmohlamathana	79-34-5	1.11E-03	Equation 3	4.54E+02	Equation 2	8.02E-02	Equation 1
1,1,2,2-1 eu acinioroculane	127-18-4	8.82E-06	Equation 3	8.68E+00	Equation 2	1.31E+00	Equation 1
1,1,2,2-1 cu acmotocurcio 1 1 2_Trichloroethane	79-00-5	3.14E-06	Equation 3	3.73E+00	Equation 2	2.38E+00	Equation 1
1.1.2-Trichloroethylene	79-01-6	6.81E-06	Equation 3	7.02E+00	Equation 2	1.52E+00	Equation 1
1.1.2 Hicklornethane	75-34-3	1.56E-06	Equation 3	2.10E+00	Equation 2	3.56E+00	Equation 1
1,1-Dichloroethene	75-35-4	3.32E-06	Equation 3	3.90E+00	Equation 2	2.30E+00	Equation 1
1.2.2-Trichloro-1.1.2-trifluoroethane	76-13-1	3.63E-05	Equation 3	2.77E+01	Equation 2	5.77E-01	Equation 1
1.2.3-Trichloropropane	96-18-4	4.47E-06	Equation 3	4.98E+00	Equation 2	1.94E+00	Equation 1
1 2-Dibromo-3-chloropropane	96-12-8	5.50E-06	Equation 3	5.90E+00	Equation 2	1.72E+00	Equation 1
1.2-Dichloro-1.1.2.2-tetrafluoroethane	76-14-2	1.66E-05	Equation 3	1.46E+01	Equation 2	9.08E-01	Equation 1
1.2-Dichloroethane	107-06-2	7.28E-07	Equation 3	1.13E+00	Equation 2	5.53E+00	Equation 1
1.2-Dichloroethylene	540-59-0	3.09E-06	Equation 3	2.12E-04	Equation 2	2.40E+00	Equation 1
1.2-Dichloropropane	78-87-5	4.47E-06	Equation 3	4.98E+00	Equation 2	1.94E+00	Equation 1
1.3-Dichloropropene	542-75-6	1.41E-06	Equation 3	1.93E+00	Equation 2	3.78E+00	Equation 1
1.4-Dichloro-2-butene	764-41-0	1.87E-07	Equation 3	3.70E-01	Equation 2	1.21E+01	Equation 1
1-Chloroethene	75-01-4	3.52E-07	Equation 3	6.20E-01	EPA (1999a)	8.43E+00	EPA (1999a)
2.2-Dichloropropionic acid	75-99-0	1.20E-06	Equation 3	1.99E-04	Equation 2	4.14E+00	Equation 1
2-Chloropropane	75-29-6	2.00E-06	Equation 3	2.06E-04	Equation 2	3.09E+00	Equation 1
3-Chloropropene (Allyl chloride)	107-05-1	2.14E-06	Equation 3	2.07E-04	Equation 2	2.97E+00	Equation 1
Bromochloromethane	74-97-5	6.46E-07	Equation 3	1.02E+00	Equation 2	5.93E+00	Equation 1
Bromodichloromethane	75-27-4	2.66E-06	Equation 3	3.26E+00	Equation 2	2.61E+00	Equation 1
Bromoethene	593-60-2	2.93E-07	Equation 3	5.34E-01	Equation 2	9.37E+00	Equation 1
Bromoform	75-25-2	5.63E-06	Equation 3	6.01E+00	Equation 2	1.70E+00	Equation 1
Bromomethane	74-83-9	3.27E-07	Equation 3	5.84E-01	Equation 2	8.79E+00	Equation 1
Carbon tetrachloride	56-23-5	1.31E-05	Equation 3	3.00E+02	EPA (1999a)	1.04E+00	EPA (1999a)
Chlorodibromomethane	124-48-1	3.77E-06	Equation 3	4.33E+00	Equation 2	2.14E+00	Equation 1



Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ku.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Chlorodifluoromethane	75-45-6	1.08	0.99	9.21E+00	Equation 1	1.8E-04	Equation 2
Chloroethane	75-00-3	3.10	2.57	6.25E-01	Equation 1	2.5E-04	Equation 2
Chloroform	67-66-3	1.95	1.72	2.90E+00	EPA (1999a)	2.1E-04	EPA (1999a)
Chloromethane	74-87-3	06.0	0.78	1.16E+01	Equation 1	1.8E-04	Equation 2
Chloropentafluoroethane	76-15-3	2.10	2.85	2.37E+00	Equation 1	2.1E-04	Equation 2
cis-1,2-Dichloroethene	156-59-2	1.98	1.70	2.77E+00	Equation 1	2.1E-04	Equation 2
cis-1,3-Dichloropropene	10061-01-5	NA	NA	No data	No data	No data	No data
Cyanogen bromide	506-68-3	-0.29	-0.08	5.70E+01	Equation 1	1.4E-04	Equation 2
Cyanogen chloride	506-77-4	-0.38	0.65	6.42E+01	Equation 1	1.4E-04	Equation 2
Dichlorodifluoromethane	75-71-8	2.16	0.84	2.19E+00	Equation 1	2.1E-04	Equation 2
Dichlorofluoromethane	75-43-4	1.55	1.54	4.92E+00	Equation 1	1.9E-04	Equation 2
Dichloromethane	75-09-2	1.26	1.00	7.29E+00	Equation 1	1.9E-04	Equation 2
Difluorodibromomethane	75-61-6	NA	NA	No data	No data	No data	No data
Hexafluoroacetone	684-16-2	NA	NA	No data	No data	No data	No data
Iodomethane	74-88-4	1.69	1.47	4.08E+00	Equation 1	2.0E-04	Equation 2
Methylene bromide	74-95-3	1.62	1.41	4.48E+00	Equation 1	2.0E-04	Equation 2
Pentachloroethane	2-10-92	3.05	2.53	6.68E-01	Equation 1	2.5E-04	Equation 2
trans-1,2-Dichloroethylene	156-60-5	1.98	1.58	2.77E+00	Equation 1	2.1E-04	Equation 2
trans-1,3-Dichloropropene	10061-02-6	2.06	1.76	2.50E+00	Equation 1	2.1E-04	Equation 2
Trichloroacetic acid	76-03-9	1.33	1.19	6.60E+00	Equation 1	1.9E-04	Equation 2
Trichlorofluoroethane	27154-33-2	NA	NA	No data	No data	No data	No data
Trichlorofluoromethane	75-69-4	2.53	2.13	1.33E+00	Equation 1	2.3E-04	Equation 2
Trifluorobromomethane	75-63-8	1.86	1.60	3.26E+00	Equation 1	2.0E-04	Equation 2
	Dioxin and Furan Compounds (PCDDs/PCDFs)	an Compour	ds (PCDDs/	PCDFs)			
1,2,3,4,6,7,8-Heptachlorodibenzo(p)dioxin	35822-46-9	8.20	7.99	2.90E-04	EPA (1999a)	8.10E-02	EPA (1999a)
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	7.92	7.71	6.20E-05	EPA (1999a)	1 70F-02	FPA (1999a)

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

	CAS	Mammal Ba ([mg/kg tissue] / [mg		WP		SP (kg dry sediment/	
Constituent of Potential Concern	Number	/day])	Source	tissue)	Source	rissue)	Source
Chlorodifluoromethane	75-45-6	3.01E-07	Equation 3	5.47E-01	Equation 2	9.21E+00	Equation 1
Chloroethane	75-00-3	3.16E-05	Equation 3	2.47E+01	Equation 2	6.25E-01	Equation 1
Chloroform	67-66-3	2.24E-06	Equation 3	2.82E+00	EPA (1999a)	2.90E+00	EPA (1999a)
Chloromethane	74-87-3	2.01E-07	Equation 3	3.92E-01	Equation 2	1.16E+01	Equation 1
Chloropentafluoroethane	76-15-3	3.16E-06	Equation 3	2.13E-04	Equation 2	2.37E+00	Equation 1
cis-1,2-Dichloroethene	156-59-2	2.41E-06	Equation 3	2.09E-04	Equation 2	2.77E+00	Equation 1
cis-1,3-Dichloropropene	10061-01-5	No data	No data	No data	No data	No data	No data
Cyanogen bromide	506-68-3	1.29E-08	Equation 3	1.45E-04	Equation 2	5.70E+01	Equation 1
Cyanogen chloride	506-77-4	1.05E-08	Equation 3	1.43E-04	Equation 2	6.42E+01	Equation 1
Dichlorodifluoromethane	75-71-8	3.62E-06	Equation 3	2.15E-04	Equation 2	2.19E+00	Equation 1
Dichlorofluoromethane	75-43-4	8.91E-07	Equation 3	1.95E-04	Equation 2	4.92E+00	Equation 1
Dichloromethane	75-09-2	4.52E-07	Equation 3	7.62E-01	Equation 2	7.29E+00	Equation 1
Difluorodibromomethane	75-61-6	No data	No data	No data	No data	No data	No data
Hexafluoroacetone	684-16-2	No data	No data	No data	No data	No data	No data
Iodomethane	74-88-4	1.23E-06	Equation 3	1.73E+00	Equation 2	4.08E+00	Equation 1
Methylene bromide	74-95-3	1.05E-06	Equation 3	1.52E+00	Equation 2	4.48E+00	Equation 1
Pentachloroethane	76-01-7	2.82E-05	Equation 3	2.25E+01	Equation 2	6.68E-01	Equation 1
trans-1,2-Dichloroethylene	156-60-5	2.41E-06	Equation 3	3.00E+00	Equation 2	2.77E+00	Equation 1
trans-1,3-Dichloropropene	10061-02-6	2.88E-06	Equation 3	3.48E+00	Equation 2	2.50E+00	Equation 1
Trichloroacetic acid	76-03-9	5.37E-07	Equation 3	8.78E-01	Equation 2	6.60E+00	Equation 1
Trichlorofluoroethane	27154-33-2	No data	No data	No data	No data	No data	No data
Trichlorofluoromethane	75-69-4	8.54E-06	Equation 3	8.46E+00	Equation 2	1.33E+00	Equation 1
Trifluorobromomethane	75-63-8	1.82E-06	Equation 3	2.38E+00	Equation 2	3.26E+00	Equation 1
	Dioxin and I	uran Compou	Dioxin and Furan Compounds (PCDDs/PCDFs)	Fs)			
1,2,3,4,6,7,8-Heptachlorodibenzo(p)dioxin	35822-46-9	2.77E-03	TCDD x BEF	1.68E+02	EPA (1999a)	2.90E-04	EPA (1999a)
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	5.98E-04	TCDD x BEF	3.63E+01	EPA (1999a)	6.20E-05	EPA (1999a)

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ko."	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	7.92	7.71	2.20E-03	EPA (1999a)	6.20E-01	EPA (1999a)
1,2,3,4,7,8-Hexachlorodibenzo(p)dioxin	39227-28-6	7.79	7.58	1.70E-03	EPA (1999a)	4.90E-01	EPA (1999a)
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	7.25	7.04	4.30E-04	EPA (1999a)	1.21E-01	EPA (1999a)
1,2,3,6,7,8-Hexachlorodibenzo(p)dioxin	57653-85-7	7.25	7.04	6.70E-04	EPA (1999a)	1.90E-01	EPA (1999a)
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	7.25	7.04	1.10E-03	EPA (1999a)	3.00E-01	EPA (1999a)
1,2,3,7,8,9-Hexachlorodibenzo(p)dioxin	19408-74-3	7.25	7.04	7.80E-04	EPA (1999a)	2.20E-01	EPA (1999a)
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	7.25	7.04	3.50E-03	EPA (1999a)	1.00E+00	EPA (1999a)
1,2,3,7,8-Pentachlorodibenzo(p)dioxin	40321-76-4	6.64	6.43	5.20E-03	EPA (1999a)	1.46E+00	EPA (1999a)
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	6.79	6.58	1.10E-03	EPA (1999a)	3.20E-01	EPA (1999a)
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	7.25	7.04	3.80E-03	EPA (1999a)	1.07E+00	EPA (1999a)
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	6.92	6.71	9.00E-03	EPA (1999a)	2.54E+00	EPA (1999a)
2,3,7,8-Tetrachlorodibenzo(p)dioxin	1746-01-6	6.64	6.43	5.60E-03	EPA (1999a)	1.17E+01	Sample et al. 1999
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	6.53	6.32	4.50E-03	EPA (1999a)	1.27E+00	EPA (1999a)
Dibenzofuran	132-64-9	4.33	4.12	1.22E-01	Equation 1	3.0E-04	Equation 2
Octachlorodibenzo(p)dioxin	3268-87-9	7.59	7.38	6.70E-05	EPA (1999a)	1.90E-02	EPA (1999a)
Octachlorodibenzofuran	39001-02-0	8.78	8.57	9.00E-05	EPA (1999a)	2.50E-02	EPA (1999a)
Total dioxins and dibenzofurans	No CAS#	NA	NA	No data	No data	No data	No data
	Polychlorinated Biphenyls (PCBs)	Biphenyls (	PCBs)				
2,2',3,3',4,4',5-Heptachlorobiphenyl	35065-30-6	7.08	6.85	3.13E-03	Equation 1	4.7E-04	Mass-limited
2,2',3,4,4',5,5'-Heptachlorobiphenyl	35065-29-3	7.12	6.92	2.97E-03	Equation 1	4.8E-04	Mass-limited
2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	NA	NA	No data	No data	No data	No data
2,3,3',4,4',5'-Hexachlorobiphenyl	69782-90-7	NA	NA	No data	No data	No data	No data
2,3,3',4,4',5-Hexachlorobiphenyl	38380-08-4	NA	NA	No data	No data	No data	No data
2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	NA	NA	No data	No data	No data	No data
2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	NA	NA	No data	No data	No data	No data
2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	NA	NA	No data	No data	No data	No data

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
1 2 3 4 7 8 9-Hentachlorodibenzofitran	55673-89-7	2.12E-02	TCDD x BEF	1.29E+03	EPA (1999a)	2.20E-03	EPA (1999a)
1.2.3.4.7.8-Hexachlorodibenzo(p)dioxin	39227-28-6	1.68E-02	TCDD x BEF	1.02E+03	EPA (1999a)	1.70E-03	EPA (1999a)
1.2.3.4.7.8-Hexachlorodibenzofuran	70648-26-9	4.13E-03	TCDD x BEF	2.51E+02	EPA (1999a)	4.30E-04	EPA (1999a)
1,2,3,6,7,8-Hexachlorodibenzo(p)dioxin	57653-85-7	6.52E-03	TCDD x BEF	3.96E+02	EPA (1999a)	6.70E-04	EPA (1999a)
1.2.3.6.7.8-Hexachlorodibenzofuran	57117-44-9	1.03E-02	TCDD x BEF	6.27E+02	EPA (1999a)	1.10E-03	EPA (1999a)
1,2,3,7,8,9-Hexachlorodibenzo(p)dioxin	19408-74-3	7.61E-03	TCDD x BEF	4.62E+02	EPA (1999a)	7.80E-04	EPA (1999a)
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	3.42E-02	TCDD x BEF	2.08E+03	EPA (1999a)	3.50E-03	EPA (1999a)
1,2,3,7,8-Pentachlorodibenzo(p)dioxin	40321-76-4	5.00E-02	TCDD x BEF	3.04E+03	EPA (1999a)	5.20E-03	EPA (1999a)
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	1.20E-02	TCDD x BEF	7.26E+02	EPA (1999a)	1.10E-03	EPA (1999a)
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	3.64E-02	TCDD x BEF	2.21E+03	EPA (1999a)	3.80E-03	EPA (1999a)
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	8.70E-02	TCDD x BEF	5.28E+03	EPA (1999a)	9.00E-03	EPA (1999a)
2,3,7,8-Tetrachlorodibenzo(p)dioxin	1746-01-6	5.43E-02	EPA (1999a)	3.30E+03	EPA (1999a)	5.60E-03	EPA (1999a)
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	4.34E-02	TCDD x BEF	2.64E+03	EPA (1999a)	4.50E-03	EPA (1999a)
Dibenzofuran	132-64-9	5.37E-04	Equation 3	2.51E+02	Equation 2	1.22E-01	Equation 1
Octachlorodibenzo(p)dioxin	3268-87-9	6.52E-04	TCDD x BEF	3.96E+01	EPA (1999a)	6.70E-05	EPA (1999a)
Octachlorodibenzofuran	39001-02-0	8.70E-04	TCDD x BEF	5.28E+01	EPA (1999a)	9.00E-05	EPA (1999a)
Total dioxins and dibenzofurans	No CAS#	No data	No data	No data	No data	No data	No data
	Polychlorina	Polychlorinated Biphenyls (PCBs)	(PCBs)				
2,2',3,3',4,4',5-Heptachlorobiphenyl	35065-30-6	3.02E-01	Equation 3	4.49E+04	Equation 2	3.13E-03	Equation 1
2,2',3,4,4',5,5'-Heptachlorobiphenyl	35065-29-3	3.31E-01	Equation 3	4.84E+04	Equation 2	2.97E-03	Equation 1
2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	No data	No data	No data	No data	No data	No data
2,3,3',4,4',5'-Hexachlorobiphenyl	69782-90-7	No data	No data	No data	No data	No data	No data
2,3,3',4,4',5-Hexachlorobiphenyl	38380-08-4	No data	No data	No data	No data	No data	No data
2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	No data	No data	No data	No data	No data	No data
2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	No data	No data	No data	No data	No data	No data
2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	No data	No data	No data	No data	No data	No data

Page C2-14 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ko."	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
2,3,4,4',5-Pentachlorobiphenyl	65510-44-3	NA	NA	No data	No data	No data	No data
2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	7.12	7.00	2.97E-03	Equation 1	4.8E-04	Mass-limited
3,3',4,4',5,5'-Hexachlorobiphenyl	32774-16-6	7.41	09'9	2.02E-03	Equation 1	5.0E-04	Mass-limited
3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	NA	NA	No data	No data	No data	No data
3,3',4,4'-Tetrachlorobiphenyl	32598-13-3	NA	NA	No data	No data	No data	No data
Aroclor-1254		6.29	4.65	8.96E-03	Equation 1	8.91E+00	Sample et al. 1999
3,4,4',5-Tetrachlorobiphenyl	70362-50-4	NA	NA	No data	No data	No data	No data
Polychlorinated biphenyls (PCBs) <sup>c</sup>	1336-36-3	6.29	4.65	8.96E-03	Equation 1	1.13E+00	EPA (1999a)
	Phthalates						
Bis(2-ethylhexyl)phthalate	117-81-7	5.20	5.05	3.80E-02	EPA (1999a)	3.5E-04	EPA (1999a)
Butylbenzyl phthalate	85-68-7	4.41	4.14	1.09E-01	Equation 1	3.1E-04	Equation 2
Dibutyl phthalate	84-74-2	4.72	3.20	7.24E-02	Equation 1	3.2E-04	Equation 2
Diethyl phthalate	84-66-2	4.44	1.91	1.06E-01	Equation 1	3.1E-04	Equation 2
Dimethyl phthalate	131-11-3	1.63	1.49	4.40E+00	Equation 1	2.0E-04	Equation 2
n-Dioctyl phthalate	117-84-0	9.33	8.96	1.57E-04	EPA (1999a)	6.8E-04	Mass-limited
	Light Polycyclic	Aromatic I	Iydrocarbon	s (molecular w	Light Polycyclic Aromatic Hydrocarbons (molecular weight <200 g/mole)		
2-Chloronaphthalene	91-58-7	4.07	3.85	1.72E-01	Equation 1	2.9E-04	Equation 2
2-Methyl naphthalene	91-57-6	3.86	3.65	2.27E-01	Equation 1	2.8E-04	Equation 2
5-Nitroacenaphthene	602-87-9	NA	NA	No data	No data	No data	No data
Acenaphthene	83-32-9	3.96	3.69	1.98E-01	Equation 1	2.9E-04	Equation 2
Acenaphthylene	208-96-8	4.07	3.83	1.72E-01	Equation 1	2.9E-04	Equation 2
Anthracene	120-12-7	4.47	4.37	1.01E-01	Equation 1	3.1E-04	Equation 2
Fluorene	86-73-7	4.17	3.89	1.51E-01	Equation 1	3.0E-04	Equation 2
Indene	95-13-6	NA	NA	No data	No data	No data	No data
Naphthalene	91-20-3	3.37	3.08	4.35E-01	Equation 1	2.6E-04	Equation 2
Phenanthrene	85-01-8	4.55	4.32	9 08F-02	Fanation 1	3 DE 04	Fanation 2

Page C2-15 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
2.3.4.4'.5-Pentachlorobiphenyl	65510-44-3	No data	No data	No data	No data	No data	No data
2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	3.31E-01	Equation 3	4.84E+04	Equation 2	2.97E-03	Equation 1
3,3',4,4',5,5'-Hexachlorobiphenyl	32774-16-6	6.43E-01	Equation 3	8.34E+04	Equation 2	2.02E-03	Equation 1
3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	No data	No data	No data	No data	No data	No data
3,3',4,4'-Tetrachlorobiphenyl	32598-13-3	No data	No data	No data	No data	No data	No data
Aroclor-1254		4.90E-02	Equation 3	8.91E+00	Sample et al. 1999	8.96E-03	Equation
3,4,4',5-Tetrachlorobiphenyl	70362-50-4	No data	No data	No data	No data	No data	No data
Polychlorinated biphenyls (PCBs) <sup>b</sup>	1336-36-3	4.90E-02	Equation 3	1.13E+00	EPA (1999a)	8.96E-03	Equation 1
	Phthalates						
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	4.02E-03	Equation 3	9.93E+03	EPA (1999a)	3.80E-02	EPA (1999a)
Butylbenzyl phthalate	85-68-7	6.51E-04	Equation 3	2.94E+02	Equation 2	1.09E-01	Equation
Dibutyl phthalate	84-74-2	1.32E-03	Equation 3	5.25E+02	Equation 2	7.24E-02	Equation
Diethyl phthalate	84-66-2	6.86E-04	Equation 3	3.07E+02	Equation 2	1.06E-01	Equation
Dimethyl phthalate	131-11-3	1.08E-06	Equation 3	1.56E+00	Equation 2	4.40E+00	Equation 1
n-Dioctyl phthalate	117-84-0	5.37E+01	Equation 3	2.85E+04	EPA (1999a)	1.57E-04	EPA (1999a)
	Light Polycy	clic Aromatic	Light Polycyclic Aromatic Hydrocarbons (molecular weight <200 g/mole)	olecular weigh	t <200 g/mole)		
2-Chloronaphthalene	91-58-7	2.94E-04	Equation 3	1.53E+02	Equation 2	1.72E-01	Equation 1
2-Methyl naphthalene	91-57-6	1.82E-04	Equation 3	1.04E+02	Equation 2	2.27E-01	Equation
5-Nitroacenaphthene	602-87-9	No data	No data	No data	No data	No data	No data
Acenaphthene	83-32-9	2.32E-04	Equation 3	1.26E+02	Equation 2	1.98E-01	Equation
Acenaphthylene	208-96-8	2.95E-04	Equation 3	1.54E+02	Equation 2	1.72E-01	Equation 1
Anthracene	120-12-7	7.41E-04	Equation 3	3.27E+02	Equation 2	1.01E-01	Equation 1
Fluorene	86-73-7	3.72E-04	Equation 3	1.86E+02	Equation 2	1.51E-01	Equation 1
Indene	95-13-6	No data	No data	No data	No data	No data	No data
Naphthalene	91-20-3	5.93E-05	Equation 3	4.13E+01	Equation 2	4.35E-01	Equation 1
Phenanthrene	85-01-8	8.92E-04	Equation 3	3.81E+02	Equation 2	9.08E-02	Equation 1

Page C2-16 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ko.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Pyrene	129-00-0	5.00	4.83	4.99E-02	Equation 1	3,4E-04	Equation 2
	Heavy Polycyc	ic Aromatic	Hydrocarbo	ns (molecular w	Heavy Polycyclic Aromatic Hydrocarbons (molecular weight >200 g/mole)	(	
3-Methylcholanthrene	56-49-5	7.11	6.18	3.01E-03	Equation 1	4.8E-04	Mass-limited
5-Methylchrysene	3697-24-3	NA	NA	No data	No data	No data	No data
Benzofalanthracene	56-55-3	5.68	5.41	2.02E-02	EPA (1999a)	3.00E-02	EPA (1999a)
Benzo(a)pyrene	50-32-8	6.13	5.99	1.11E-02	EPA (1999a)	7.00E-02	EPA (1999a)
Benzofa.jpyrene	191-30-0	NA	NA	No data	No data	No data	No data
Benzo[b]fluoranthene	205-99-2	6.20	5.92	1.01E-02	EPA (1999a)	7.00E-02	EPA (1999a)
Benzofelpyrene	192-97-2	7.40	7.20	2.05E-03	Equation 1	5.0E-04	Mass-limited
Benzofg,h,i]perylene	191-24-2	7.10	6.26	3.05E-03	Equation 1	4.8E-04	Mass-limited
Benzofilfluoranthene	205-82-3	6.44	6.15	7.34E-03	Equation 1	4.3E-04	Mass-limited
Benzo[k]fluoranthene	207-08-9	6.19	5.92	1.01E-02	EPA (1999a)	8.00E-02	EPA (1999a)
Chrysene	218-01-9	5.74	5.47	1.87E-02	EPA (1999a)	4.00E-02	EPA (1999a)
Dibenz[a,h]acridine	226-36-8	NA	NA	No data	No data	No data	No data
Dibenzo[a,h]anthracene	53-70-3	6.55	6.25	6.40E-03	EPA (1999a)	7.00E-02	EPA (1999a)
Dibenz[a,j]acridine	224-42-0	NA	NA	No data	No data	No data	No data
Dibenzo[a,e]fluoranthene	5385-75-1	NA	NA	No data	No data	No data	No data
Dibenzo[a,e]pyrene	192-65-4	NA	NA	No data	No data	No data	No data
Dibenzo[a,h]fluoranthene	No CAS#	NA	NA	No data	No data	No data	No data
Dibenzofa,hlpyrene	189-64-0	NA	NA	No data	No data	No data	No data
Dibenzofa,i]pyrene	189-55-9	7.29	86.9	2.37E-03	Equation 1	4.9E-04	Mass-limited
Fluoranthene	206-44-0	5.08	4.69	4.47E-02	Equation 1	3.4E-04	Equation 2
Hexachloronaphthalene	1335-87-1	7.59	7.27	1.59E-03	Equation 1	5.1E-04	Mass-limited
Indeno[1,2,3-cd]pyrene	193-39-5	6.91	19.9	3.90E-03	EPA (1999a)	8.00E-02	EPA (1999a)
Octachloronaphthalene	2234-13-1	6.42	6.13	7.54E-03	Equation 1	4.3E-04	Mass-limited
Pentachloronaphthalene	1321-64-8	NA	NA	No data	No data	No data	No data

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

		Mammal Ba				SP	
Constituent of Potential Concern	CAS Registry Number	([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	(kg dry sediment/ kg dry tissue)	Source
Pyrene	129-00-0	2.51E-03	Equation 3	8.89E+02	Equation 2	4.99E-02	Equation 1
	Heavy Polyc	yelic Aromatic	Heavy Polycyclic Aromatic Hydrocarbons (molecular weight >200 g/mole)	nolecular weigh	t >200 g/mole)		
3-Methylcholanthrene	56-49-5	3.24E-01	Equation 3	4.75E+04	Equation 2	3.01E-03	Equation 1
5-Methylchrysene	3697-24-3	No data	No data	No data	No data	No data	No data
Benzo[a]anthracene	56-55-3	1.20E-02	Equation 3	5.26E+03	EPA (1999a)	2.02E-02	EPA (1999a)
Benzo[a]pyrene	50-32-8	2.74E-02	EPA (1999a)	5.26E+03	EPA (1999a)	1.11E-02	EPA (1999a)
Benzo[a,i]pyrene	191-30-0	No data	No data	No data	No data	No data	No data
Benzo[b]fluoranthene	205-99-2	4.00E-02	Equation 3	5.26E+03	EPA (1999a)	1.01E-02	EPA (1999a)
Benzo[e]pyrene	192-97-2	6.31E-01	Equation 3	8.21E+04	Equation 2	2.05E-03	Equation 1
Benzo[g,h,i]perylene	191-24-2	3.16E-01	Equation 3	4.67E+04	Equation 2	3.05E-03	Equation 1
Benzo[j]fluoranthene	205-82-3	6.92E-02	Equation 3	1.34E+04	Equation 2	7.34E-03	Equation 1
Benzo[k]fluoranthene	207-08-9	3.98E-02	Equation 3	5.26E+03	EPA (1999a)	1.01E-02	EPA (1999a)
Chrysene	218-01-9	1.38E-02	Equation 3	5.26E+03	EPA (1999a)	1.87E-02	EPA (1999a)
Dibenz[a,h]acridine	226-36-8	No data	No data	No data	No data	No data	No data
Dibenz[a,h]anthracene	53-70-3	8.86E-02	Equation 3	5.26E+03	EPA (1999a)	6.40E-03	EPA (1999a)
Dibenz[a,j]acridine	224-42-0	No data	No data	No data	No data	No data	No data
Dibenzo[a,e]fluoranthene	5385-75-1	No data	No data	No data	No data	No data	No data
Dibenzo[a,e]pyrene	192-65-4	No data	No data	No data	No data	No data	No data
Dibenzo[a,h]fluoranthene	No CAS#	No data	No data	No data	No data	No data	No data
Dibenzo[a,h]pyrene	189-64-0	No data	No data	No data	No data	No data	No data
Dibenzo[a,i]pyrene	189-55-9	4.90E-01	Equation 3	6.68E+04	Equation 2	2.37E-03	Equation 1
Fluoranthene	206-44-0	3.04E-03	Equation 3	1.04E+03	Equation 2	4.47E-02	Equation 1
Hexachloronaphthalene	1335-87-1	9.77E-01	Equation 3	1.18E+05	Equation 2	1.59E-03	Equation 1
Indeno[1,2,3-cd]pyrene	193-39-5	2.07E-01	Equation 3	5.26E+03	EPA (1999a)	3.90E-03	EPA (1999a)
Octachloronaphthalene	2234-13-1	6.61E-02	Equation 3	1.29E+04	Equation 2	7.54E-03	Equation 1
Pentachloronaphthalene	1321-64-8	No data	No data	No data	No data	No data	No data

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Obio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	LogK	Low K.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Tetrachloronaphthalene	1335-88-2	NA	NA	No data	No data	No data	No data
Trichloronaphthalene	1321-65-9	NA	NA	No data	No data	No data	No data
	Light Substitut	ed Benzene C	ompounds (	molecular weig	Light Substituted Benzene Compounds (molecular weight <200 g/mole)		
1,2,3-Trichlorobenzene	87-61-6	4.05	3.31	1.78E-01	Equation 1	2.9E-04	Equation 2
1,2,4-Trichlorobenzene	120-82-1	3.99	3.22	1.92E-01	Equation 1	2.9E-04	Equation 2
1,2,4-Trimethyl benzene	95-63-6	3,65	3.00	3.01E-01	Equation 1	2.7E-04	Equation 2
1,2-Dichlorobenzene	95-50-1	3.45	2.58	3.95E-01	Equation 1	2.6E-04	Equation 2
1,3,5-Trimethyl benzene	108-67-8	3.42	3.22	4.09E-01	Equation 1	2.6E-04	Equation 2
1,3-Dichlorobenzene	541-73-1	3.53	2.90	3.53E-01	Equation 1	2.7E-04	Equation 2
1,3-Dinitrobenzene	0-69-66	1.49	1.31	5.32E+00	EPA (1999a)	1.9E-04	EPA (1999a)
1,4-Dichlorobenzene	106-46-7	3.41	2.79	4.13E-01	Equation 1	2.6E-04	Equation 2
1,4-Dinitrobenzene	100-25-4	1.50	2.34	5.26E+00	Equation 1	1.9E-04	Equation 2
2,4,5-Trichlorophenol	95-95-4	3.87	3.05	2.25E-01	Equation 1	2.8E-04	Equation 2
2,4,6-Trichlorophenol	88-06-2	3.71	2.35	2.77E-01	Equation 1	2.8E-04	Equation 2
2,4-Dichlorophenol	120-83-2	3.04	2.14	6.80E-01	Equation 1	2.5E-04	Equation 2
2,4-Dimethylphenol	105-67-9	2.36	2.10	1.68E+00	Equation 1	2.2E-04	Equation 2
2,4-Dinitrophenol	51-28-5	1.52	-2.00	5.13E+00	Equation 1	1.9E-04	Equation 2
2,4-Dinitrotoluene	121-14-2	2.00	1.71	2.72E+00	EPA (1999a)	2.1E-04	EPA (1999a)
2,6-Dinitrotoluene	606-20-2	1.89	1.62	3.15E+00	EPA (1999a)	2.1E-04	EPA (1999a)
2-Chlorophenol	95-57-8	2.16	2.59	2.18E+00	Equation 1	2.1E-04	Equation 2
2-Chlorotoluene	95-49-8	3.42	2.65	3.50E-01	Equation 1	2.6E-04	Equation 2
2-Nitrophenol	88-75-5	1.79	1.55	3.57E+00	Equation 1	2.0E-04	Equation 2
4,6-Dinitro-o-cresol	534-52-1	2.12	2.78	2.30E+00	Equation 1	2.1E-04	Equation 2
4-Chlorotoluene	106-43-4	3.33	2.75	4.61E-01	Equation I	2.6E-04	Equation 2
4-Nitrophenol	100-02-7	1.91	1.64	3.05E+00	Equation 1	2.1E-04	Equation 2
alnha-Methylstyrene	00 03 0	2 10	100	3 065 01	The state of	20000	

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

	CAS	Mammal Ba ([mg/kg tissue] / [mg ingested		WP (L/kg		SP (kg dry sediment/ kg dry	
Constituent of Potential Concern	Number	/day])	Source	tissue)	Source	tissue)	Source
Tetrachloronaphthalene	1335-88-2	No data	No data	No data	No data	No data	No data
Trichloronaphthalene	1321-65-9	No data	No data	No data	No data	No data	No data
	Light Substi	tuted Benzene	Light Substituted Benzene Compounds (molecular weight <200 g/mole)	ecular weight <	200 g/mole)		
1,2,3-Trichlorobenzene	87-61-6	2.79E-04	Equation 3	1.47E+02	Equation 2	1.78E-01	Equation 1
1,2,4-Trichlorobenzene	120-82-1	2.44E-04	Equation 3	1.32E+02	Equation 2	1.92E-01	Equation 1
1,2,4-Trimethyl benzene	95-63-6	1.12E-04	Equation 3	6.97E+01	Equation 2	3.01E-01	Equation 1
1,2-Dichlorobenzene	95-50-1	7.01E-05	Equation 3	4.74E+01	Equation 2	3.95E-01	Equation 1
1,3,5-Trimethyl benzene	108-67-8	6.61E-05	Equation 3	4.52E+01	Equation 2	4.09E-01	Equation 1
1,3-Dichlorobenzene	541-73-1	8.52E-05	Equation 3	5.56E+01	Equation 2	3.53E-01	Equation 1
1,3-Dinitrobenzene	99-62-0	7.79E-07	Equation 3	2.51E+03	EPA (1999a)	5.32E+00	EPA (1999a)
1,4-Dichlorobenzene	106-46-7	6.48E-05	Equation 3	4.45E+01	Equation 2	4.13E-01	Equation 1
1,4-Dinitrobenzene	100-25-4	7.94E-07	Equation 3	1.21E+00	Equation 2	5.26E+00	Equation 1
2,4,5-Trichlorophenol	95-95-4	1.86E-04	Equation 3	1.06E+02	Equation 2	2.25E-01	Equation
2,4,6-Trichlorophenol	88-06-2	1.29E-04	Equation 3	7.83E+01	Equation 2	2.77E-01	Equation 1
2,4-Dichlorophenol	120-83-2	2.74E-05	Equation 3	2.20E+01	Equation 2	6.80E-01	Equation 1
2,4-Dimethylphenol	105-67-9	5.75E-06	Equation 3	6.12E+00	Equation 2	1.68E+00	Equation 1
2,4-Dinitrophenol	51-28-5	8.29E-07	Equation 3	1.25E+00	Equation 2	5.13E+00	Equation 1
2,4-Dinitrotoluene	121-14-2	2.49E-06	Equation 3	2.51E+03	EPA (1999a)	2.72E+00	EPA (1999a)
2,6-Dinitrotoluene	606-20-2	1.93E-06	Equation 3	2.51E+03	EPA (1999a)	3.15E+00	EPA (1999a)
2-Chlorophenol	95-57-8	3.64E-06	Equation 3	4.21E+00	Equation 2	2.18E+00	Equation 1
2-Chlorotoluene	95-49-8	8.64E-05	Equation 3	5.63E+01	Equation 2	3.50E-01	Equation 1
2-Nitrophenol	88-75-5	1.55E-06	Equation 3	2.09E+00	Equation 2	3.57E+00	Equation 1
4,6-Dinitro-o-cresol	534-52-1	3.31E-06	Equation 3	2.13E-04	Equation 2	2.30E+00	Equation 1
4-Chlorotoluene	106-43-4	5.37E-05	Equation 3	3.81E+01	Equation 2	4.61E-01	Equation 1
4-Nitrophenol	100-02-7	2.04E-06	Equation 3	2.62E+00	Equation 2	3.05E+00	Equation 1
alpha-Methylstyrene	98-83-9	7.30E-05	Equation 3	4.90E+01	Equation 2	3.86E-01	Equation 1

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

	CAS			SPv (kg dry soil/kg dry		BAF-S (kg dry soil/	
Constituent of Potential Concern	Number	Log Kow"	Log Koc	tissue)	Source	kg tissue)	Source
Aniline	62-53-3	86.0	0.92	1.05E+01	Equation 1	1.8E-04	Equation 2
Benzotrichloride	7-20-86	2.92	3.07	7.95E-01	Equation 1	2.4E-04	Equation 2
Benzyl chloride	100-44-7	2.30	1.95	1.81E+00	Equation 1	2.2E-04	Equation 2
Bromobenzene	108-86-1	2.99	2.65	7.24E-01	Equation 1	2.5E-04	Equation 2
Chlorobenzene	108-90-7	2.79	2.35	9.45E-01	Equation 1	2.4E-04	Equation 2
Cumene	98-82-8	3.61	2.97	3.16E-01	Equation 1	2.7E-04	Equation 2
m-Cresol	108-39-4	1.96	1.68	2.86E+00	Equation 1	2.1E-04	Equation 2
n-Butyl benzene	104-51-8	4.28	3.40	1.30E-01	Equation 1	3.0E-04	Equation 2
Nitrobenzene	98-95-3	1.83	2.08	3.38E+00	EPA (1999a)	2.0E-04	EPA (1999a)
n-Propyl benzene	103-65-1	3.69	2.86	2.85E-01	Equation 1	2.7E-04	Equation 2
o-Cresol	95-48-7	2.02	1.73	2.63E+00	Equation 1	2.1E-04	Equation 2
o-Dinitrobenzene	528-29-0	1.69	2.35	4.08E+00	Equation 1	2.0E-04	Equation 2
o-Nitroaniline	88-74-4	1.85	1.59	3.30E+00	Equation 1	2.0E-04	Equation 2
o-Toluidine	95-53-4	1.34	1.20	6.50E+00	Equation 1	1.9E-04	Equation 2
p-Chloroaniline	106-47-8	1.87	1.61	3.22E+00	Equation 1	2.0E-04	Equation 2
p-Cresol	106-44-5	1.94	1.66	2.93E+00	Equation 1	2.1E-04	Equation 2
Phenol	108-95-2	1.48	1.34	5.42E+00	Equation 1	1.9E-04	Equation 2
p-Nitrochlorobenzene	100-00-5	2.39	2.02	1.61E+00	Equation 1	2.2E-04	Equation 2
p-Toluidine	106-49-0	1.40	1.24	6.01E+00	Equation 1	1.9E-04	Equation 2
sec-Butyl benzene	135-98-8	NA	NA	No data	No data	No data	No data
tert-Butyl benzene	9-90-86	4.11	3.36	1.63E-01	Equation 1	2.9E-04	Equation 2
Toluene-2,6-diamine	823-40-5	0.16	2.09	3.13E+01	Equation 1	1.6E-04	Equation 2
Trimethyl benzene	25551-13-7	3.42	2.85	4.09E-01	Equation 1	2.6E-04	Equation 2
	Other Light Se	mivolatile C	a) spunoduo	nolecular weig	Other Light Semivolatile Compounds (molecular weight <200 g/mole)		
1,1'-Biphenyl	92-52-4	3.90	3.40	2.16E-01	Equation 1	2.8E-04	Equation 2
1.1-Dimethylhydrazine	57-14-7	-1.19	1.30	1.89E+02	Equation 1	1.3E-04	Equation 2

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
Aniline	62-53-3	2.40E-07	Equation 3	4.54E-01	Equation 2	1.05E+01	Equation 1
Benzotrichloride	7-20-86	2.09E-05	Equation 3	1.76E+01	Equation 2	7.95E-01	Equation 1
Benzyl chloride	100-44-7	5.01E-06	Equation 3	5.47E+00	Equation 2	1.81E+00	Equation 1
Bromobenzene	108-86-1	2.45E-05	Equation 3	2.01E+01	Equation 2	7.24E-01	Equation 1
Chlorobenzene	108-90-7	1.55E-05	Equation 3	1.38E+01	Equation 2	9.45E-01	Equation 1
Cumene	98-82-8	1.03E-04	Equation 3	6.50E+01	Equation 2	3.16E-01	Equation 1
m-Cresol	108-39-4	2.29E-06	Equation 3	2.87E+00	Equation 2	2.86E+00	Equation 1
n-Butyl benzene	104-51-8	4.79E-04	Equation 3	2.29E+02	Equation 2	1.30E-01	Equation 1
Nitrobenzene	98-95-3	1.71E-06	Equation 3	2.40E+01	EPA (1999a)	3.38E+00	EPA (1999a)
n-Propyl benzene	103-65-1	1.23E-04	Equation 3	7.52E+01	Equation 2	2.85E-01	Equation 1
o-Cresol	95-48-7	2.64E-06	Equation 3	3.23E+00	Equation 2	2.63E+00	Equation 1
o-Dinitrobenzene	528-29-0	1.23E-06	Equation 3	1.99E-04	Equation 2	4.08E+00	Equation 1
o-Nitroaniline	88-74-4	1.78E-06	Equation 3	2.34E+00	Equation 2	3.30E+00	Equation 1
o-Toluidine	95-53-4	5.50E-07	Equation 3	8.95E-01	Equation 2	6.50E+00	Equation 1
p-Chloroaniline	106-47-8	1.86E-06	Equation 3	2.43E+00	Equation 2	3.22E+00	Equation 1
p-Cresol	106-44-5	2.19E-06	Equation 3	2.77E+00	Equation 2	2.93E+00	Equation 1
Phenol	108-95-2	7.54E-07	Equation 3	1.16E+00	Equation 2	5.42E+00	Equation 1
p-Nitrochlorobenzene	100-00-5	6.17E-06	Equation 3	6.48E+00	Equation 2	1.61E+00	Equation 1
p-Toluidine	106-49-0	6.31E-07	Equation 3	1.00E+00	Equation 2	6.01E+00	Equation 1
sec-Butyl benzene	135-98-8	No data	No data	No data	No data	No data	No data
tert-Butyl benzene	9-90-86	3.24E-04	Equation 3	1.66E+02	Equation 2	1.63E-01	Equation 1
Toluene-2,6-diamine	823-40-5	3.63E-08	Equation 3	1.55E-04	Equation 2	3.13E+01	Equation 1
Trimethyl benzene	25551-13-7	6.61E-05	Equation 3	2.63E-04	Equation 2	4.09E-01	Equation 1
	Other Light	Semivolatile C	Other Light Semivolatile Compounds (molecular weight <200 g/mole)	ular weight <20	00 g/mole)		
1,1'-Biphenyl	92-52-4	2.00E-04	Equation 3	1.12E+02	Equation 2	2.16E-01	Equation 1
1,1-Dimethylhydrazine	57-14-7	1.62E-09	Equation 3	1.25E-04	Equation 2	1.89E+02	Equation 1

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Koc	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
,2-Dimethylhydrazine	540-73-8	-1.37	-0.92	2.39E+02	Equation 1	1.2E-04	Equation 2
,2-Diphenylhydrazine	122-66-7	2.94	2.44	7.74E-01	Equation 1	2.4E-04	Equation 2
,3-Propane sultone	1120-71-4	-0.52	-0.26	7.77E+01	Equation 1	1.4E-04	Equation 2
2,4-Toluene diisocyanate	584-84-9	NA	NA	No data	No data	No data	No data
2-Chloroacetophenone	532-27-4	1.93	1.95	2.97E+00	Equation 1	2.1E-04	Equation 2
2-Propenoic acid	7-01-67	0.43	0.49	2.19E+01	Equation 1	1.6E-04	Equation 2
4,4'-Methylenedianiline	101-77-9	1.59	3.69	4.67E+00	Equation 1	2.0E-04	Equation 2
Acetophenone	88-86-2	1.64	1.43	4.36E+00	Equation 1	2.0E-04	Equation 2
Benzoic acid	0-82-0	1.87	-0.26	3.21E+00	Equation 1	2.0E-04	Equation 2
bis(2-Chloroethoxy)methane	111-91-1	1.30	0.44	6.86E+00	Equation 1	1.9E-04	Equation 2
bis(2-Chloroethy1) ether	111-44-4	1.30	1.88	6.85E+00	Equation 1	1.9E-04	Equation 2
Chlorocyclopentadiene	41851-50-7	2.43	2.16	1.53E+00	Equation 1	2.2E-04	Equation 2
Cyclohexanol	108-93-0	1.23	1.11	7.53E+00	Equation 1	1.8E-04	Equation 2
Dichloroisopropyl ether	108-60-1	2.58	1.78	1.25E+00	Equation 1	2.3E-04	Equation 2
Dichloromethyl ether	542-88-1	0.58	0.64	1.79E+01	Equation 1	1.7E-04	Equation 2
Dichloropentadiene	61626-71-9	NA	NA	No data	No data	No data	No data
Dimethyl sulfate	77-78-1	0.16	1.38	3.13E+01	Equation 1	1.6E-04	Equation 2
Dimethylaniline	121-69-7	2.31	1.89	1.79E+00	Equation 1	2.2E-04	Equation 2
Di-n-propylnitrosamine	621-64-7	1.38	1.23	6.17E+00	Equation 1	1.9E-04	Equation 2
Diphenyl ether	101-84-8	4.21	3.43	1.43E-01	Equation 1	3.0E-04	Equation 2
Epichlorohydrin	106-89-8	0.25	0.35	2.77E+01	Equation 1	1.6E-04	Equation 2
Ethyl carbamate (Urethane)	51-79-6	-0.15	0.03	4.73E+01	Equation 1	1.5E-04	Equation 2
Ethyl methanesulfonate	62-50-0	0.05	0.19	3.63E+01	Equation 1	1.5E-04	Equation 2
Ethylene dibromide	106-93-4	1.75	1.52	3.77E+00	Equation 1	2.0E-04	Equation 2
Ethylene glycol	107-21-1	-1.36	0.00	2.37E+02	Equation 1	1.2E-04	Equation 2
Ethylene glycol monobutyl ether	6-92-111	0.83	000	1 28E±01	Fonotion 1	1.75.04	Fanation 7

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

	SAS	Mammal Ba ([mg/kg		W		SP (kg dry	
Constituent of Potential Concern	Registry	ingested /day])	Source	(L/kg tissue)	Source	kg dry tissue)	Source
1.2-Dimethylhydrazine	540-73-8	1.08E-09	Equation 3	5.42E-03	Equation 2	2.39E+02	Equation 1
1,2-Diphenylhydrazine	122-66-7	2.19E-05	Equation 3	1.83E+01	Equation 2	7.74E-01	Equation 1
1,3-Propane sultone	1120-71-4	7.53E-09	Equation 3	2.66E-02	Equation 2	7.77E+01	Equation 1
2,4-Toluene diisocyanate	584-84-9	No data	No data	No data	No data	No data	No data
2-Chloroacetophenone	532-27-4	2.14E-06	Equation 3	2.07E-04	Equation 2	2.97E+00	Equation 1
2-Propenoic acid	79-10-7	6.76E-08	Equation 3	1.62E-04	Equation 2	2.19E+01	Equation 1
4,4'-Methylenedianiline	101-77-9	9.77E-07	Equation 3	1.96E-04	Equation 2	4.67E+00	Equation 1
Acetophenone	98-86-2	1.10E-06	Equation 3	1.97E-04	Equation 2	4.36E+00	Equation
Benzoic acid	65-85-0	1.86E-06	Equation 3	2.05E-04	Equation 2	3.21E+00	Equation
bis(2-Chloroethoxy)methane	111-91-1	5.01E-07	Equation 3	1.87E-04	Equation 2	6.86E+00	Equation 1
bis(2-Chloroethyl) ether	111-44-4	5.02E-07	Equation 3	1.87E-04	Equation 2	6.85E+00	Equation 1
Chlorocyclopentadiene	41851-50-7	6.76E-06	Equation 3	2.24E-04	Equation 2	1.53E+00	Equation 1
Cyclohexanol	108-93-0	4.27E-07	Equation 3	1.85E-04	Equation 2	7.53E+00	Equation 1
Dichloroisopropyl ether	108-60-1	9.55E-06	Equation 3	2.30E-04	Equation 2	1.25E+00	Equation 1
Dichloromethyl ether	542-88-1	9.55E-08	Equation 3	1.66E-04	Equation 2	1.79E+01	Equation 1
Dichloropentadiene	61626-71-9	No data	No data	No data	No data	No data	No data
Dimethyl sulfate	77-78-1	3.63E-08	Equation 3	1.55E-04	Equation 2	3.13E+01	Equation
Dimethylaniline	121-69-7	5.13E-06	Equation 3	2.20E-04	Equation 2	1.79E+00	Equation 1
Di-n-propylnitrosamine	621-64-7	6.03E-07	Equation 3	9.65E-01	Equation 2	6.17E+00	Equation 1
Diphenyl ether	101-84-8	4.07E-04	Equation 3	2.00E+02	Equation 2	1.43E-01	Equation 1
Epichlorohydrin	106-89-8	4.47E-08	Equation 3	1.15E-01	Equation 2	2.77E+01	Equation 1
Ethyl carbamate (Urethane)	51-79-6	1.78E-08	Equation 3	5.38E-02	Equation 2	4.73E+01	Equation
Ethyl methanesulfonate	62-50-0	2.81E-08	Equation 3	7.84E-02	Equation 2	3.63E+01	Equation
Ethylene dibromide	106-93-4	1.41E-06	Equation 3	1.94E+00	Equation 2	3.77E+00	Equation
Ethylene glycol	107-21-1	1.10E-09	Equation 3	1.22E-04	Equation 2	2.37E+02	Equation 1
Ethylene glycol monobutyl ether	111-76-2	1.70E-07	Equation 3	1.73E-04	Equation 2	1.28E+01	Equation 1

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow"	Log Ko.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Ethylene glycol monoethyl ether acetate	111-15-9	0.59	0.32	1.77E+01	Equation 1	1.7E-04	Equation 2
Ethylene thiourea	96-45-7	-0.66	0.81	9.32E+01	Equation 1	1.4E-04	Equation 2
Furfural	98-01-1	96.0	06.0	1.08E+01	Equation 1	1.8E-04	Equation 2
Maleic hydrazide	123-33-1	-0.84	1.01	1.18E+02	Equation 1	1.3E-04	Equation 2
Malononitrile	109-77-3	-0.60	1.18	8.61E+01	Equation 1	1.4E-04	Equation 2
Methyl styrene (mixed isomers)	25013-15-4	3.48	2.91	3.77E-01	Equation 1	2.7E-04	Equation 2
Methylhydrazine	60-34-4	-1.05	-0.67	1.57E+02	Equation 1	1.3E-04	Equation 2
N,N-Diphenylamine	122-39-4	3.50	2.54	3.67E-01	Equation 1	2.7E-04	Equation 2
Nitric acid, propyl ester	627-13-4	NA	NA	No data	No data	No data	No data
N-Nitrosodi-n-butylamine	924-16-3	2.41	2.03	1.57E+00	Equation 1	2.2E-04	Equation 2
N-Nitrosomorpholine	59-89-2	86.0	0.92	1.05E+01	Equation 1	1.8E-04	Equation 2
N-Nitroso-N,N-dimethylamine	62-75-9	-0.57	1.58	8.27E+01	Equation 1	1.4E-04	Equation 2
o-Anisidine	90-04-0	1.18	1.07	8.05E+00	Equation 1	1.8E-04	Equation 2
Oxalic acid	144-62-7	NA	NA	No data	No data	No data	No data
Phthalic anhydride	85-44-9	-0.60	-0.68	8.63E+01	Equation 1	1.4E-04	Equation 2
p-Phthalic acid	100-21-0	2.00	1.85	2.70E+00	Equation 1	2.1E-04	Equation 2
Pyridine	110-86-1	19.0	19.0	1.59E+01	Equation 1	1.7E-04	Equation 2
Quinoline	91-22-5	2.03	3.26	2.60E+00	Equation 1	2.1E-04	Equation 2
Quinone	106-51-4	0.20	0.31	2.97E+01	Equation 1	1.6E-04	Equation 2
Safrole	94-59-7	2.66	2.23	1.12E+00	Equation 1	2.3E-04	Equation 2
Tetrahydrofuran	6-66-601	0.45	0.50	2.14E+01	Equation 1	1.6E-04	Equation 2
	Other Heavy Semivolatile Compounds (molecular weight >200 g/mole	mivolatile C	ı) spunoduo	nolecular weig	ht >200 g/mole)		
1,2,4,5-Tetrachlorobenzene	95-94-3	4,64	3.77	8.06E-02	Equation 1	3.2E-04	Equation 2
1,3,5-Trinitrobenzene	99-35-4	1.18	1.07	8.06E+00	Equation 1	1.8E-04	Equation 2
2,6-Bis(tert-butyl)-4-methylphenol	128-37-0	4.17	3.40	1.51E-01	Equation 1	3.0E-04	Equation 2
2-Cyclohexyl-4,6-dinitrophenol	131-89-5	4.54	3 69	9.20F-02	Equation 1	3 1F-04	Fanation 2

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
Ethylene glycol monoethyl ether acetate	111-15-9	9.77E-08	Equation 3	1.67E-04	Equation 2	1.77E+01	Equation 1
Ethylene thiourea	96-45-7	5.50E-09	Equation 3	1.36E-04	Equation 2	9.32E+01	Equation 1
Furfiral	98-01-1	2.29E-07	Equation 3	1.77E-04	Equation 2	1.08E+01	Equation 1
Maleic hydrazide	123-33-1	3.63E-09	Equation 3	1.32E-04	Equation 2	1.18E+02	Equation 1
Malononitrile	109-77-3	6.31E-09	Equation 3	1.38E-04	Equation 2	8.61E+01	Equation 1
Methyl styrene (mixed isomers)	25013-15-4	7.59E-05	Equation 3	2.65E-04	Equation 2	3.77E-01	Equation
Methylhydrazine	60-34-4	2.24E-09	Equation 3	9.86E-03	Equation 2	1.57E+02	Equation 1
N.N-Diphenylamine	122-39-4	7.94E-05	Equation 3	5.25E+01	Equation 2	3.67E-01	Equation 1
Nitric acid. propyl ester	627-13-4	No data	No data	No data	No data	No data	No data
N-Nitrosodi-n-butylamine	924-16-3	6.46E-06	Equation 3	6.73E+00	Equation 2	1.57E+00	Equation 1
N-Nitrosomorpholine	59-89-2	2.40E-07	Equation 3	4.54E-01	Equation 2	1.05E+01	Equation 1
N-Nitroso-N.N-dimethylamine	62-75-9	6.76E-09	Equation 3	1.38E-04	Equation 2	8.27E+01	Equation 1
o-Anisidine	90-04-0	3.80E-07	Equation 3	6.61E-01	Equation 2	8.05E+00	Equation
Oxalic acid	144-62-7	No data	No data	No data	No data	No data	No data
Phthalic anhydride	85-44-9	6.28E-09	Equation 3	2.30E-02	Equation 2	8.63E+01	Equation
p-Phthalic acid	100-21-0	2.51E-06	Equation 3	2.09E-04	Equation 2	2.70E+00	Equation 1
Pyridine	110-86-1	1.18E-07	Equation 3	2.53E-01	Equation 2	1.59E+01	Equation 1
Quinoline	91-22-5	2.69E-06	Equation 3	3.29E+00	Equation 2	2.60E+00	Equation
Quinone	106-51-4	3.98E-08	Equation 3	1.04E-01	Equation 2	2.97E+01	Equation
Safrole	94-59-7	1.15E-05	Equation 3	1.08E+01	Equation 2	1.12E+00	Equation
Tetrahydrofuran	109-99-9	7.03E-08	Equation 3	1.66E-01	Equation 2	2.14E+01	Equation
	Other Heav	y Semivolatile	Other Heavy Semivolatile Compounds (molecular weight >200 g/mole)	ecular weight >2	(00 g/mole)		
1,2,4,5-Tetrachlorobenzene	95-94-3	1.10E-03	Equation 3	4.51E+02	Equation 2	8.06E-02	Equation 1
1,3,5-Trinitrobenzene	99-35-4	3.79E-07	Equation 3	6.60E-01	Equation 2	8.06E+00	Equation
2,6-Bis(tert-butyl)-4-methylphenol	128-37-0	3.72E-04	Equation 3	1.86E+02	Equation 2	1.51E-01	Equation 1
2-Cyclohexyl-4.6-dinitrophenol	131-89-5	8.71E-04	Equation 3	3.73E+02	Equation 2	9.20E-02	Equation

Page C2-26 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ko.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
2-sec-Butyl-4,6-dinitrophenol	88-85-7	3.56	3.55	3.39E-01	Equation 1	2.7E-04	Equation 2
3,3'-Dichlorobenzidine	91-94-1	3.58	2.94	3.30E-01	Equation 1	2.7F-04	Fountion 2
3,3'-Dimethoxybenzidine	119-90-4	1.81	1.56	3.48E+00	Equation 1	2.0E-04	Fanation 2
4-Bromophenylphenyl ether	101-55-3	5.04	4.08	4.72E-02	Equation 1	3.4E-04	Equation 2
Ammonium perfluorooctanoate	3825-26-1	NA	NA	No data	No data	No data	No data
Azobenzene	103-33-3	3.82	3.29	2.40E-01	Equation 1	2.8E-04	Equation 2
B18(3-tert-butyl-4-hydroxy-6-methyl-phenyl)sulfide	96-69-5	NA	NA	No data	No data	No data	No data
aptan	133-06-2	2.35	2.30	1.70E+00	Equation 1	2.2E-04	Equation 2
Chlorobenzilate	510-15-6	4.38	3.57	1.14E-01	Equation 1	3.1E-04	Equation 2
Dibutylphosphate	107-66-4	NA	NA	No data	No data	No data	No data
Dimethyl aminoazobenzene	60-11-7	4.58	3.72	8.72E-02	Equation 1	3.2E-04	Equation 2
Hexachlorobenzene	118-74-1	5.50	4.90	2.55E-02	EPA (1999a)	3.7E-04	EPA (1999a)
Hexachlorobutadiene	87-68-3	4.73	3.84	7.14E-02	EPA (1999a)	3.2E-04	EPA (1999a)
Hexachlorocyclopentadiene	77-47-4	4.91	3.98	5.65E-02	EPA (1999a)	3.3E-04	EPA (1999a)
Hexachloroethane	67-72-1	3.98	3.26	1.93E-01	Equation 1	2.9E-04	Equation 2
Hexachlorophene	70-30-4	7.54	6.03	1.70E-03	EPA (1999a)	5.1E-04	Mass-limited
Hexamethylene-1,5-diisocyanate	822-06-0	3.20	3.77	5.48E-01	Equation 1	2.5E-04	Equation 2
Mirex	2385-85-5	68.9	00'9	4.03E-03	Equation 1	4.6E-04	Mass-limited
Nitrofen	1836-75-5	5.53	4.46	2.46E-02	Equation 1	3.7E-04	Equation 2
Pentachlorobenzene	608-93-5	5.09	4.51	4.40E-02	EPA (1999a)	3.4E-04	EPA (1999a)
Pentachloronitrobenzene	82-68-8	4.64	3.77	8.00E-02	EPA (1999a)	3.2E-04	EPA (1999a)
Pentachlorophenol	87-86-5	5.08	2.70	4.49E-02	EPA (1999a)	3.4E-04	EPA (1999a)
Picric acid	88-89-1	2.03	1.73	2.60E+00	Equation 1	2.1E-04	Equation 2
Pronamide	23950-58-5	3.51	2.89	3.62E-01	Equation 1	2.7E-04	Equation 2
Suyennine	57-24-9	1.93	1.66	2.97E+00	Equation 1	2.1E-04	Equation 2
Terpnenyls	26140-60-3	NA	No data	No data	No doto	11. 11.	11.

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
2 con Dutyl A & dinitronhanol	88-85-7	9.12E-05	Equation 3	2.69E-04	Equation 2	3.39E-01	Equation 1
2-sec-butyl-4,0-dimuophenoi	91-94-1	9.44E-05	Equation 3	6.11E+01	Equation 2	3.30E-01	Equation 1
2,5 -Dienotopenzidine	119-90-4	1.62E-06	Equation 3	2.17E+00	Equation 2	3.48E+00	Equation 1
4. Bromonhenvinhenvi ether	101-55-3	2.76E-03	Equation 3	9.59E+02	Equation 2	4.72E-02	Equation 1
Ammonium nerfluorooctanoate	3825-26-1	No data	No data	No data	No data	No data	No data
Ammonium permanence	103-33-3	1.66E-04	Equation 3	9.61E+01	Equation 2	2.40E-01	Equation 1
Bis/3-tert-hityl-4-hydroxv-6-methyl-nhenyl)sulfide	9-69-96	No data	No data	No data	No data	No data	No data
Captan	133-06-2	5.62E-06	Equation 3	6.01E+00	Equation 2	1.70E+00	Equation 1
Chlorobenzilate	510-15-6	6.03E-04	Equation 3	2.76E+02	Equation 2	1.14E-01	Equation 1
DibutyInhosnhate	107-66-4	No data	No data	No data	No data	No data	No data
Dimethyl aminoazobenzene	60-11-7	9.55E-04	Equation 3	4.03E+02	Equation 2	8.72E-02	Equation 1
Hexachlorobenzene	118-74-1	7.99E-03	Equation 3	1.11E+04	EPA (1999a)	2.55E-02	EPA (1999a)
Hexachlorobutadiene	87-68-3	1.35E-03	Equation 3	1.60E+02	EPA (1999a)	7.14E-02	EPA (1999a)
Hexachlorocyclopentadiene	77-47-4	2.03E-03	EPA (1999a)	6.10E+02	EPA (1999a)	5.65E-02	EPA (1999a)
Hexachloroethane	67-72-1	2.43E-04	Equation 3	1.31E+02	Equation 2	1.93E-01	Equation 1
Hexachlorophene	70-30-4	8.72E-01	Equation 3	1.50E+03	EPA (1999a)	1.70E-03	EPA (1999a)
Hexamethylene-1,5-diisocyanate	822-06-0	3.98E-05	Equation 3	2.54E-04	Equation 2	5.48E-01	Equation 1
Mirex	2385-85-5	1.95E-01	Equation 3	3.14E+04	Equation 2	4.03E-03	Equation 1
Nitrofen	1836-75-5	8.51E-03	Equation 3	2.42E+03	Equation 2	2.46E-02	Equation 1
Pentachlorobenzene	608-93-5	3.08E-03	Equation 3	4.00E+03	EPA (1999a)	4.40E-02	EPA (1999a)
Pentachloronitrobenzene	82-68-8	1.10E-03	Equation 3	4.74E+03	EPA (1999a)	8.00E-02	EPA (1999a)
Pentachlorophenol	87-86-5	3.01E-03	EPA (1999a)	1.71E+03	EPA (1999a)	4.49E-02	EPA (1999a)
Picric acid	88-89-1	2.69E-06	Equation 3	3.29E+00	Equation 2	2.60E+00	Equation 1
Pronamide	23950-58-5	8.14E-05	Equation 3	5.36E+01	Equation 2	3.62E-01	Equation 1
Strychnine	57-24-9	2.14E-06	Equation 3	2.72E+00	Equation 2	2.97E+00	Equation 1
Tambanule	26140-60-3	No data	No data	No data	No data	No data	No data

Page C2-28 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ko."	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Tributyl phosphate	126-73-8	4.00	3.27	1.89E-01	Equation 1	2.9E-04	Equation 2
Trifluralin	1582-09-8	5.34	3.78	3.17E-02	Equation 1	3.6E-04	Equation 2
Triphenylamine	603-34-9	NA	No data	No data	No data	No data	No data
	Herbicides and Organochlorinated Pesticides	Organochlor	inated Pestic	cides			
2,4,5-T	93-76-5	3.36	1.72	4.43E-01	Equation 1	2.6E-04	Equation 2
2,4-D and esters	94-75-7	2.81	1.30	9.20E-01	Equation 1	2.4E-04	Equation 2
4,4'-DDD	72-54-8	6.12	4.66	1.12E-02	Equation 1	4.1E-04	Mass-limited
4,4'-DDE	72-55-9	6.26	4.94	9.37E-03	EPA (1999a)	1.26E+00	EPA (1999a)
4,4'-DDT	50-29-3	6.07	5.83	1.20E-02	Equation 1	1.26E+00	Mass-limited
Aldrin	309-00-2	6.18	4.69	1.04E-02	Equation 1	4.1E-04	Mass-limited
alpha-BHC	319-84-6	3.80	3.25	2.47E-01	Equation 1	2.8E-04	Equation 2
beta-BHC	319-85-7	3.83	3,33	2.36E-01	Equation 1	2.8E-04	Equation 2
Chlordane	57-74-9	5.94	4.71	1.43E-02	Equation 1	3.9E-04	Equation 2
Delta-BHC	319-86-8	4.14	2.82	1.57E-01	Equation 1	3.0E-04	Equation 2
Dieldrin	60-57-1	5.27	4.41	3.49E-02	Equation 1	3.5E-04	Equation 2
Endothall	145-73-3	-0.87	-0.53	1.23E+02	Equation 1	1.3E-04	Equation 2
Endrin	72-20-8	4.89	4.03	5.76E-02	Equation 1	3.3E-04	Equation 2
Endrin aldehyde	7421-93-4	4.80	4.03	6.51E-02	Equation 1	3.3E-04	Equation 2
gamma-BHC (Lindane)	6-68-85	3.72	3.03	2.74E-01	Equation 1	2.8E-04	Equation 2
Lindane	6-68-85	3.72	3.03	2.74E-01	Equation 1	2.8E-04	Equation 2
Heptachlor	76-44-8	5.02	3.98	4.89E-02	EPA (1999a)	1.40E+00	EPA (1999a)
Isodrin	465-73-6	No data	No data	No data	No data	No data	No data
Methoxychlor	72-43-5	4.53	4.90	9.37E-02	Equation 1	3.1E-04	Equation 2
Silvex (2,4,5-TP)	93-72-1	3.80	1.91	2.46E-01	Equation 1	2.8E-04	Equation 2
Toxaphene	8001-35-2	5.50	2.00	2 56F-02	Equation 1	3.7E-04	Equation 2

Page C2-29 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue]/[mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
Tributyl phosphate	126-73-8	2.51E-04	Equation 3	1.35E+02	Equation 2	1.89E-01	Equation 1
Trifluralin	1582-09-8	5.50E-03	Equation 3	1.69E+03	Equation 2	3.17E-02	Equation 1
Triphenylamine	603-34-9	No data	No data	No data	No data	No data	No data
	Herbicides a	nd Organochlo	Herbicides and Organochlorinated Pesticides	S			
2,4,5-T	93-76-5	5.75E-05	Equation 3	4.03E+01	Equation 2	4.43E-01	Equation 1
2,4-D and esters	94-75-7	1.62E-05	Equation 3	1.43E+01	Equation 2	9.20E-01	Equation 1
4,4'-DDD	72-54-8	3.32E-02	Equation 3	7.35E+03	Equation 2	1.12E-02	Equation 1
4,4'-DDE	72-55-9	4.54E-02	Equation 3	1.13E+04	EPA (1999a)	9.37E-03	EPA (1999a)
4,4'-DDT	50-29-3	2.95E-02	Equation 3	6.69E+03	Equation 2	1.20E-02	Equation 1
Aldrin	309-00-2	3.79E-02	Equation 3	8.21E+03	Equation 2	1.04E-02	Equation 1
alpha-BHC	319-84-6	1.58E-04	Equation 3	9.24E+01	Equation 2	2.47E-01	Equation 1
beta-BHC	319-85-7	1.71E-04	Equation 3	9.85E+01	Equation 2	2.36E-01	Equation 1
Chlordane	57-74-9	2.18E-02	Equation 3	5.21E+03	Equation 2	1.43E-02	Equation
Delta-BHC	319-86-8	3.47E-04	Equation 3	1.76E+02	Equation 2	1.57E-01	Equation 1
Dieldrin	60-57-1	4.67E-03	Equation 3	1.48E+03	Equation 2	3.49E-02	Equation 1
Endothall	145-73-3	3.39E-09	Equation 3	1.39E-02	Equation 2	1.23E+02	Equation 1
Endrin	72-20-8	1.96E-03	Equation 3	7.25E+02	Equation 2	5.76E-02	Equation 1
Endrin aldehyde	7421-93-4	1.58E-03	Equation 3	6.84E+02	Equation 2	6.51E-02	Equation 1
gamma-BHC (Lindane)	6-68-85	1.32E-04	Equation 3	7.96E+01	Equation 2	2.74E-01	Equation
Lindane	58-89-9	1.32E-04	Equation 3	7.96E+01	Equation 2	2.74E-01	Equation
Heptachlor	76-44-8	2.60E-03	Equation 3	2.10E+04	EPA (1999a)	4.89E-02	EPA (1999a)
Isodrin	465-73-6	No data	No data	No data	No data	No data	No data
Methoxychlor	72-43-5	8.44E-04	Equation 3	3.64E+02	Equation 2	9.37E-02	Equation 1
Silvex (2,4,5-TP)	93-72-1	1.58E-04	Equation 3	2.80E-04	Equation 2	2.46E-01	Equation 1
Toxaphene	8001-35-2	7.94E-03	Equation 3	2.28E+03	Equation 2	2.56E-02	Equation 1

Page C2-30 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Ko.	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
	Metals						
Aluminum	7429-90-5	NA	NA	4.00E-03	Baes et al. (1984)	2.20E-01	EPA (1999a)
Antimony	7440-36-0	NA	NA	2.00E-01	Baes et al. (1984)	2.20E-01	EPA (1999a)
Arsenic	7440-38-2	NA	NA	4.00E-02	Baes et al. (1984)	2.58E-01	Sample et al. 1999
Barium	7440-39-3	NA	NA	1.50E-01	Baes et al. (1984)	2.20E-01	EPA (1999a)
Beryllium	7440-41-7	NA	NA	1.00E-02	Baes et al. (1984)	2.20E-01	EPA (1999a)
Bismuth	7440-69-9	NA	NA	3.50E-02	Baes et al. (1984)	3.21E-01	Averaged
Boron	7440-42-8	NA	NA	4.00E+00	Baes et al. (1984)	3.21E-01	Averaged
Cadmium	7440-43-9	NA	NA	5.50E-01	Baes et al. (1984)	1.71E+01	Sample et al. 1999
Calcium	7440-70-2	NA	NA	3.50E+00	Baes et al. (1984)	3.21E-01	Averaged
Chromium	18540-29-9	NA	NA	7.50E-03	Baes et al. (1984)	1.10E+00	Sample et al. 1999
Cobalt	7440-48-4	NA	NA	2.00E-02	Baes et al. (1984)	3.21E-01	Averaged
Copper	7440-50-8	NA	NA	4.00E-01	Baes et al. (1984)	4.00E-02	EPA (1999a)
Iron	7439-89-6	NA	NA	4.00E-03	Baes et al. (1984)	3.21E-01	Averaged
Lead	7439-92-1	NA	NA	4.50E-02	Baes et al. (1984)	3.34E+00	Sample et al. 1999
Lithium	7439-93-2	NA	NA	2.50E-02	Baes et al. (1984)	3.21E-01	Averaged
Magnesium	7439-95-4	NA	NA	1.00E+00	Baes et al. (1984)	3.21E-01	Average <sup>d</sup>
Manganese	7439-96-5	NA	NA	2.50E-01	Baes et al. (1984)	6.40E-02	Sample et al. 1999
Mercury	7439-97-6	NA	NA	9.00E-01	Baes et al. (1984)	5.23E+00	Sample et al. 1999
Mercury - Hg+2	7487-94-7	NA	NA	3.75E-02	EPA (1999a)	4.00E-02	EPA (1999a)
Methylmercury	22967-92-6	NA	NA	1.37E-01	EPA (1999a)	8.50E+00	EPA (1999a)
Molybdenum	7439-98-7	NA	NA	2.50E-01	Baes et al. (1984)	3.21E-01	Averaged
Nickel	7440-02-0	NA	NA	6.00E-02	Baes et al. (1984)	1.66E+00	Sample et al. 1999
Potassium	7440-09-7	NA	NA	1.00E+00	Baes et al. (1984)	3.21E-01	Averaged

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
	Metals						
Aluminum	7429-90-5	1.50E-03	Baes et al. (1984)	8.33E+02	EPA (1999a)	4.00E-03	Baes et al. (1984)
Antimony	7440-36-0	1.00E-03	Baes et al. (1984)	1.48E+03	EPA (1999a)	2.00E-01	Baes et al. (1984)
Arsenic	7440-38-2	2.00E-03	Baes et al. (1984)	2.93E+02	EPA (1999a)	4.00E-02	Baes et al. (1984)
Barium	7440-39-3	1.50E-04	Baes et al. (1984)	2.60E+02	EPA (1999a)	1.50E-01	Baes et al. (1984)
Beryllium	7440-41-7	1.00E-03	Baes et al. (1984)	1.41E+02	EPA (1999a)	1.00E-02	Baes et al. (1984)
Bismuth	7440-69-9	4.00E-04	Baes et al. (1984)	4.06E+03	Averaged	3.50E-02	Baes et al. (1984)
Boron	7440-42-8	8.00E-04	Baes et al. (1984)	4.06E+03	Averaged	4.00E+00	Baes et al. (1984)
Cadmium	7440-43-9	3.40E-03	Baes et al. (1984)	7.82E+02	EPA (1999a)	5.50E-01	Baes et al. (1984)
Calcium	7440-70-2	7.00E-04	Baes et al. (1984)	4.06E+03	Averaged	3.50E+00	Baes et al. (1984)
Chromium	18540-29-9	5.51E-03	Baes et al. (1984)	4.41E+03	EPA (1999a)	7.50E-03	Baes et al. (1984)
Cobalt	7440-48-4	2.00E-02	Baes et al. (1984)	4.06E+03	Averaged	2.00E-02	Baes et al. (1984)
Copper	7440-50-8	1.00E-02	Baes et al. (1984)	5.41E+02	EPA (1999a)	4.00E-01	Baes et al. (1984)
Iron	7439-89-6	2.00E-02	Baes et al. (1984)	4.06E+03	Averaged	4.00E-03	Baes et al. (1984)
Lead	7439-92-1	3.00E-04	Baes et al. (1984)	1.71E+03	EPA (1999a)	4.50E-02	Baes et al. (1984)
Lithium	7439-93-2	1.00E-02	Baes et al. (1984)	4.06E+03	Average <sup>d</sup>	2.50E-02	Baes et al. (1984)
Magnesium	7439-95-4	5.00E-03	Baes et al. (1984)	4.06E+03	Averaged	1.00E+00	Baes et al. (1984)
Manganese	7439-96-5	4.00E-04	Baes et al. (1984)	4.06E+03	Averaged	2.50E-01	Baes et al. (1984)
Mercury	7439-97-6	5.21E-03	EPA (1999a)	NA	NA	9.00E-01	Baes et al. (1984)
Mercury - Hg+2	7487-94-7	5.21E-03	EPA (1999a)	2.48E+04	EPA (1999a)	3.75E-02	EPA (1999a)
Methylmercury	22967-92-6	7.81E-04	EPA (1999a)	8.00E+04	EPA (1999a)	1.37E-01	EPA (1999a)
Molybdenum	7439-98-7	6.00E-03	Baes et al. (1984)	4.06E+03	Average	2.50E-01	Baes et al. (1984)
Nickel	7440-02-0	6.00E-03	Baes et al. (1984)	6.10E+01	EPA (1999a)	6.00E-02	Baes et al. (1984)
Potassium	7440-09-7	2.00E-02	Baes et al. (1984)	4.06E+03	Averaged	1.00E+00	Baes et al. (1984)

Page C2-32 June 3, 2003

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow"	Log Ko."	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Rhodium	7440-16-6	NA	NA	1.50E-01	Baes et al. (1984)	3.21E-01	Averaged
Selenium	7782-49-2	NA	NA	2.50E-02	Baes et al. (1984)	2.20E-01	EPA (1999a)
Silicon	7440-21-3	NA	NA	3.50E-01	Baes et al. (1984)	3.21E-01	Averaged
Silver	7440-22-4	NA	NA	4.00E-01	Baes et al. (1984)	2.20E-01	EPA (1999a)
Sodium	7440-23-5	NA	NA	7.50E-02	Baes et al. (1984)	3.21E-01	Averaged
Strontium	7440-24-6	NA	NA	2.50E+00	Baes et al. (1984)	3.21E-01	Averaged
Tantalum	7440-25-7	NA	NA	1.00E-02	Baes et al. (1984)	3.21E-01	Average
Thallium	7440-28-0	NA	NA	4.00E-03	Baes et al. (1984)	2.20E-01	EPA (1999a)
Tin	7440-31-5	NA	NA	3.00E-02	Baes et al. (1984)	3.21E-01	Averaged
fungsten	7440-33-7	NA	NA	4.50E-02	Baes et al. (1984)	3.21E-01	Averaged
Uranium	7440-61-1	NA	NA	8.50E-03	Baes et al. (1984)	3.21E-01	Averaged
Vanadium	7440-62-2	NA	NA	5.50E-03	Baes et al. (1984)	3.21E-01	Averaged
Yttrium	7440-65-5	NA	NA	1.50E-02	Baes et al. (1984)	3.21E-01	Averaged
Zinc	7440-66-6	NA	NA	1.50E+00	Baes et al. (1984)	5.77E+00	Sample et al. 1999
Zirconium	7440-67-7	NA	NA	2.00E-03	Baes et al. (1984)	3.21E-01	Averaged
	Non-metals and Anions	d Anions					
Ammonia/Ammonium	7664-41-7	NA	NA	1.72E+00	Averaged	3.21E-01	Average <sup>d</sup>
Bromide	24959-67-9	NA	NA	1.50E+00	Baes et al. (1984)	3.21E-01	Average <sup>d</sup>
Chloride	16887-00-6	NA	NA	7.00E+01	Baes et al. (1984)	3.21E-01	Averaged
Cyanide	57-12-5	NA	NA	1.72E+00	Averaged	1.12E+00	EPA (1999a)
Fluoride	16984-48-8	NA	NA	6.00E-02	Baes et al. (1984)	3.21E-01	Averaged
Hydroxide	14280-30-9	NA	NA	NA	NA	NA	NA

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

	CAS	Mammal Ba ([mg/kg tissue] / [mg		WP		SP (kg dry sediment/	
Constituent of Potential Concern	Registry	ingested /day])	Source	(L/kg tissue)	Source	kg dry tissue)	Source
Rhodium	7440-16-6	2.00E-03	Baes et al. (1984)	4.06E+03	Averaged	1.50E-01	Baes et al. (1984)
Selenium	7782-49-2	1.90E-03	Baes et al. (1984)	1.85E+03	EPA (1999a)	2.50E-02	Baes et al. (1984)
Silicon	7440-21-3	4.00E-05	Baes et al. (1984)	4.06E+03	Averaged	3.50E-01	Baes et al. (1984)
Silver	7440-22-4	3.00E-03	Baes et al. (1984)	1.07E+04	EPA (1999a)	4.00E-01	Baes et al. (1984)
Sodium	7440-23-5	5.50E-02	Baes et al. (1984)	4.06E+03	Averaged	7.50E-02	Baes et al. (1984)
Strontium	7440-24-6	3.00E-04	Baes et al. (1984)	4.06E+03	Averaged	2.50E+00	Baes et al. (1984)
Tantalum	7440-25-7	6.00E-04	Baes et al. (1984)	4.06E+03	Averaged	1.00E-02	Baes et al. (1984)
Thallium	7440-28-0	4.00E-02	Baes et al. (1984)	1.50E+04	EPA (1999a)	4.00E-03	Baes et al. (1984)
Tin	7440-31-5	8.00E-02	Baes et al. (1984)	4.06E+03	Averaged	3.00E-02	Baes et al. (1984)
Tungsten	7440-33-7	4.50E-02	Baes et al. (1984)	4.06E+03	Averaged	4.50E-02	Baes et al. (1984)
Uranium	7440-61-1	2.00E-04	Baes et al. (1984)	4.06E+03	Averaged	8.50E-03	Baes et al. (1984)
Vanadium	7440-62-2	2.50E-03	Baes et al. (1984)	4.06E+03	Averaged	5.50E-03	Baes et al. (1984)
Yttrium	7440-65-5	3.00E-04	Baes et al. (1984)	4.06E+03	Average <sup>d</sup>	1.50E-02	Baes et al. (1984)
Zinc	7440-66-6	1.00E-01	Baes et al. (1984)	2.18E+03	EPA (1999a)	1.50E+00	Baes et al. (1984)
Zirconium	7440-67-7	5.50E-03	Baes et al. (1984)	4.06E+03	Averaged	2.00E-03	Baes et al. (1984)
	Non-metals and Anions	and Anions					
Ammonia/Ammonium	7664-41-7	1.95E-02	Average <sup>d</sup>	4.06E+03	Averaged	1.72E+00	Averaged
Bromide	24959-67-9	2.50E-02	Baes et al. (1984)	4.06E+03	Averaged	1.50E+00	Baes et al. (1984)
Chloride	9-00-2	8.00E-02	Baes et al. (1984)	4.06E+03	Averaged	7.00E+01	Baes et al. (1984)
Cyanide	57-12-5	1.95E-02	Average <sup>d</sup>	2.20E+01	EPA (1999a)	1.72E+00	Averaged
Fluoride	16984-48-8	1.50E-01	Baes et al. (1984)	4.06E+03	Averaged	6.00E-02	Baes et al. (1984)
Hydroxide	14280-30-9	NA	NA	NA	NA	NA	NA

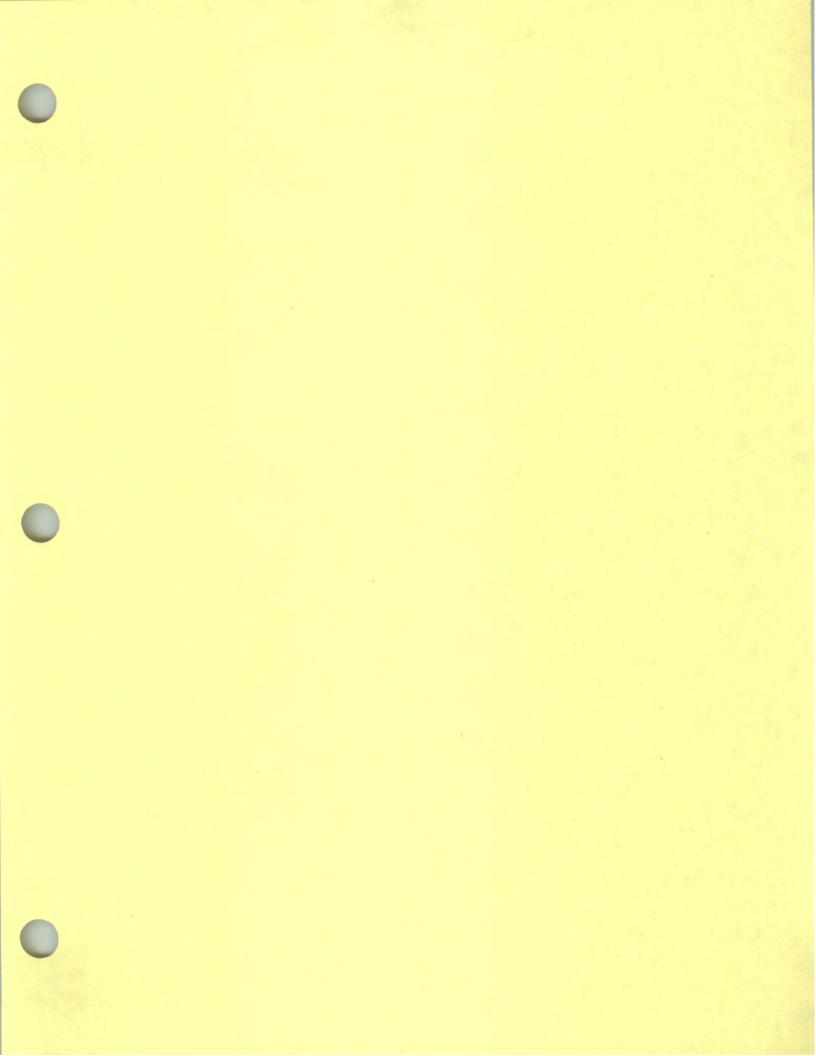
Page C2-34 June 3, 2003

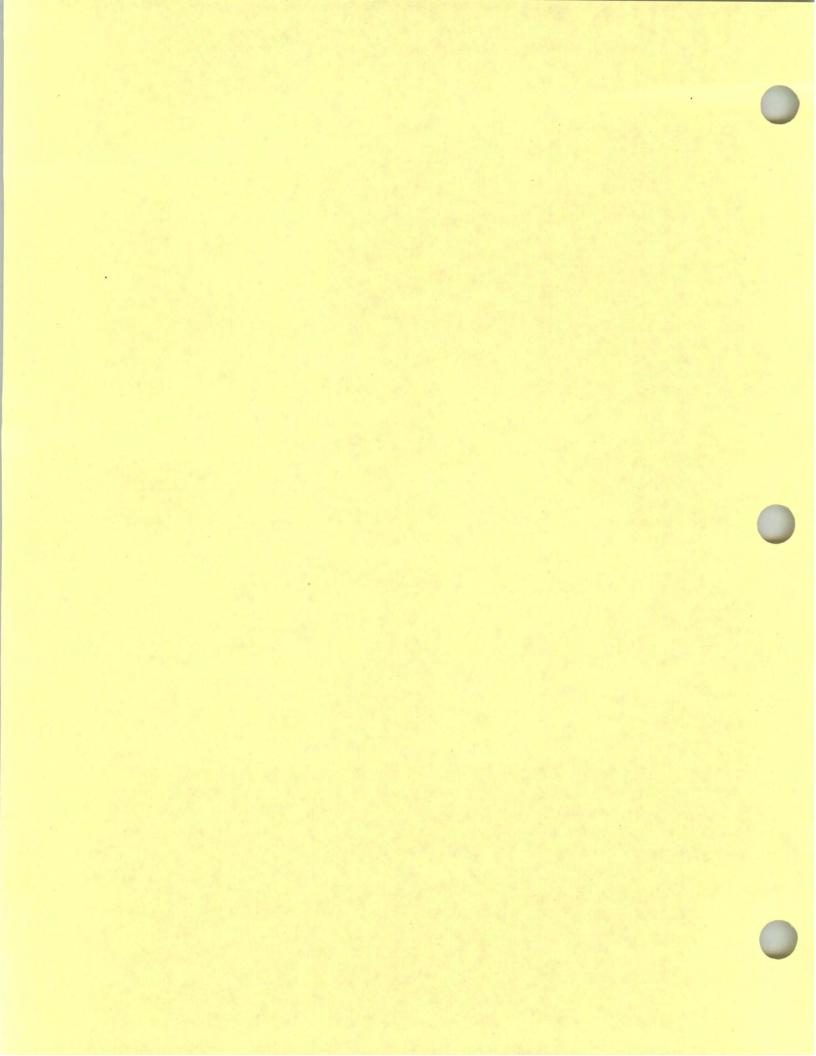
Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Log Kow	Log Koc	SPv (kg dry soil/kg dry tissue)	Source	BAF-S (kg dry soil/ kg tissue)	Source
Iodine	7553-56-2	NA	NA	1.50E-01	Baes et al. (1984)	3.21E-01	Average
Nitrate	14797-55-8	NA	NA	1.72E+00	Average <sup>d</sup>	3.21E-01	Average
Nitrite	14797-65-0	NA	NA	1.72E+00	Averaged	3.21E-01	Average <sup>d</sup>
Phosphate	14265-44-2	NA	NA	3.50E+00	Baes et al. (1984)	3.21E-01	Averaged
Phosphorus	7723-14-0	NA	NA	3.50E+00	Baes et al. (1984)	3.21E-01	Averaged
Sulfate	14808-79-8	NA	NA	1.50E+00	Baes et al. (1984)	3.21E-01	Averaged
Total Sulfur	63705-05-5	NA	NA	1.50E+00	Baes et al. (1984)	3.21E-01	Averaged

Appendix Table C-10. Ecological Transfer Factors for COPCs for the 40 mm Range, Ravenna, Ohio Ecological Risk Assessment

Constituent of Potential Concern	CAS Registry Number	Mammal Ba ([mg/kg tissue] / [mg ingested /day])	Source	WP (L/kg tissue)	Source	SP (kg dry sediment/ kg dry tissue)	Source
Iodine	7553-56-2	7.00E-03	Baes et al. (1984)	4.06E+03	Averaged	1.50E-01	Baes et al. (1984)
Nitrate	14797-55-8	7.50E-02	Baes et al. (1984)	4.06E+03	Averaged	1.72E+00	Averaged
Nitrite	14797-65-0	7.50E-02	Baes et al. (1984)	4.06E+03	Averaged	1.72E+00	Averaged
Phosphate	14265-44-2	5.50E-02	Baes et al. (1984)	4.06E+03	Averaged	3.50E+00	Baes et al. (1984)
Phosphorus	7723-14-0	5.50E-02	Baes et al. (1984)	4.06E+03	Averaged	3.50E+00	Baes et al. (1984)
Sulfate	14808-79-8	1.00E-01	Baes et al. (1984)	4.06E+03	Averaged	1.50E+00	Baes et al. (1984)
Total Sulfur	63705-05-5	1.00E-01	Baes et al. (1984)	4.06E+03	Averaged	1.50E+00	1.50E+00 Baes et al. (1984)





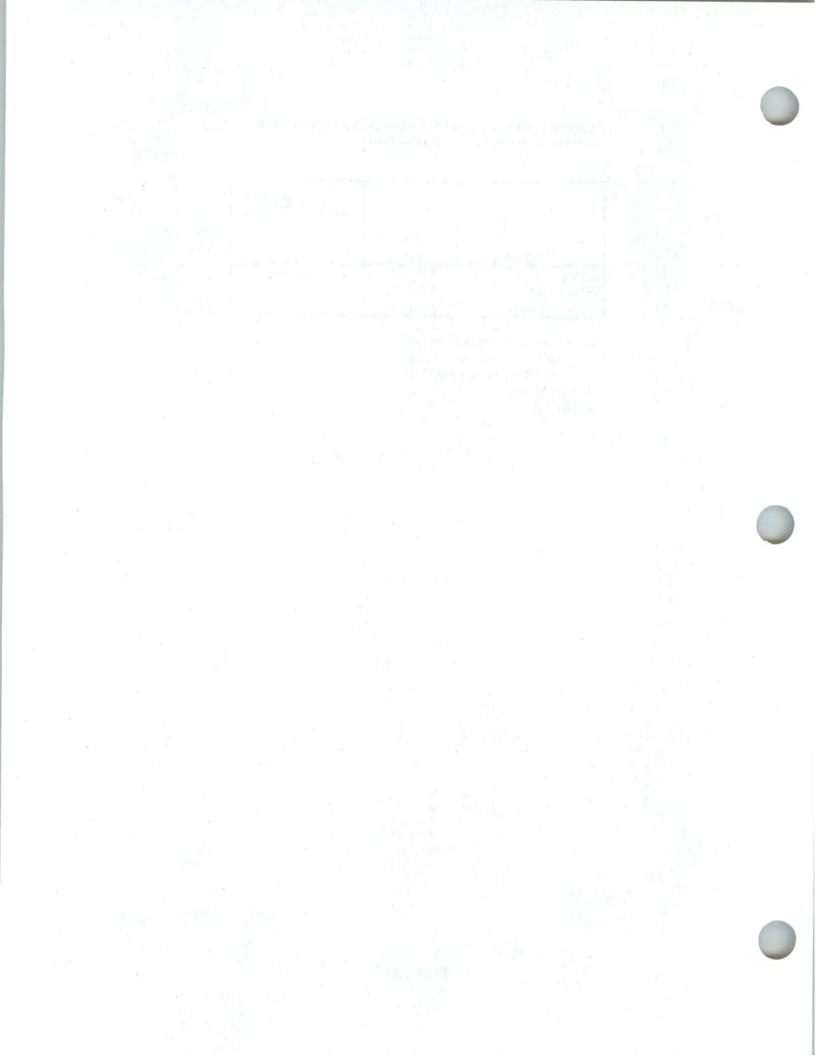
## Appendix Table C-11. Area Use Factors (AUFs) for Terrestrial Receptors at 40 mm Range, Ravenna, Ohio

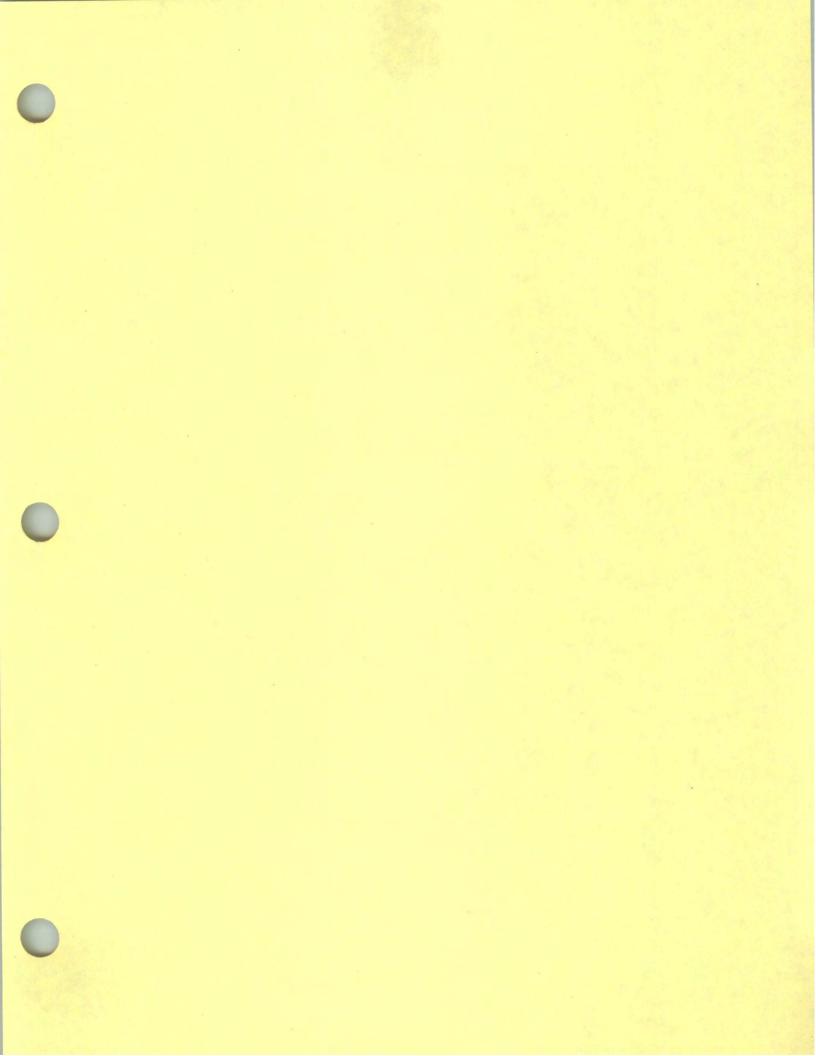
Receptor	HR ha	AUF 40 mm Range Area ha = 0.81 (2 ac)
Red fox	5.04E+02	1.61E-03
Red-tailed hawk	8.76E+02	9.24E-04
Eastern Cottontail	3.10E+00	2.61E-01

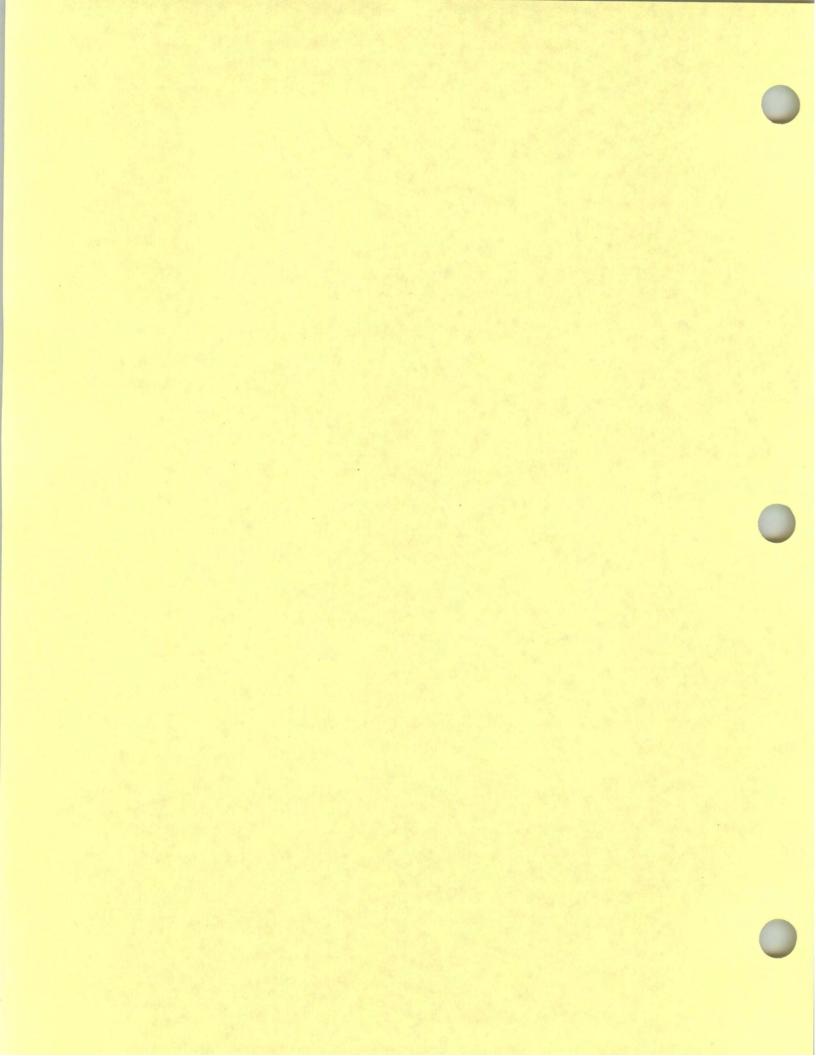
AUF = Fraction of receptor exposure from the unit = area of unit/ area of HR; AUF = 1 when area of unit exceeds area of HR

HR = Home range

ha = hectares







## Appendix Table C-12. Ingestion rates of animal, plant, and soil for wildlife receptors at 40 mm Range, Ravenna, Ohio

Receptor	IR <sub>F</sub> (kg/kg/d)	I <sub>P</sub> (kg/kg/d)	I <sub>A</sub> (kg/kg/d)	I <sub>S</sub> (kg/kg/d)	IR <sub>W</sub> (kg/kg/d)
Terrestrial					
Cottontail rabbit	2.00E-01	1.88E-01	0.00E+00	1.26E-02	9.70E-02
Short-tailed shrew	5.60E-01	7.28E-02	4.87E-01	3.36E-02	2.23E-01
Red Fox	9.50E-02	4.37E-03	9.06E-02	2.66E-03	8.50E-02
Red-tailed hawk	1.10E-01	0.00E+00	1.10E-01	0.00E+00	5.70E-02

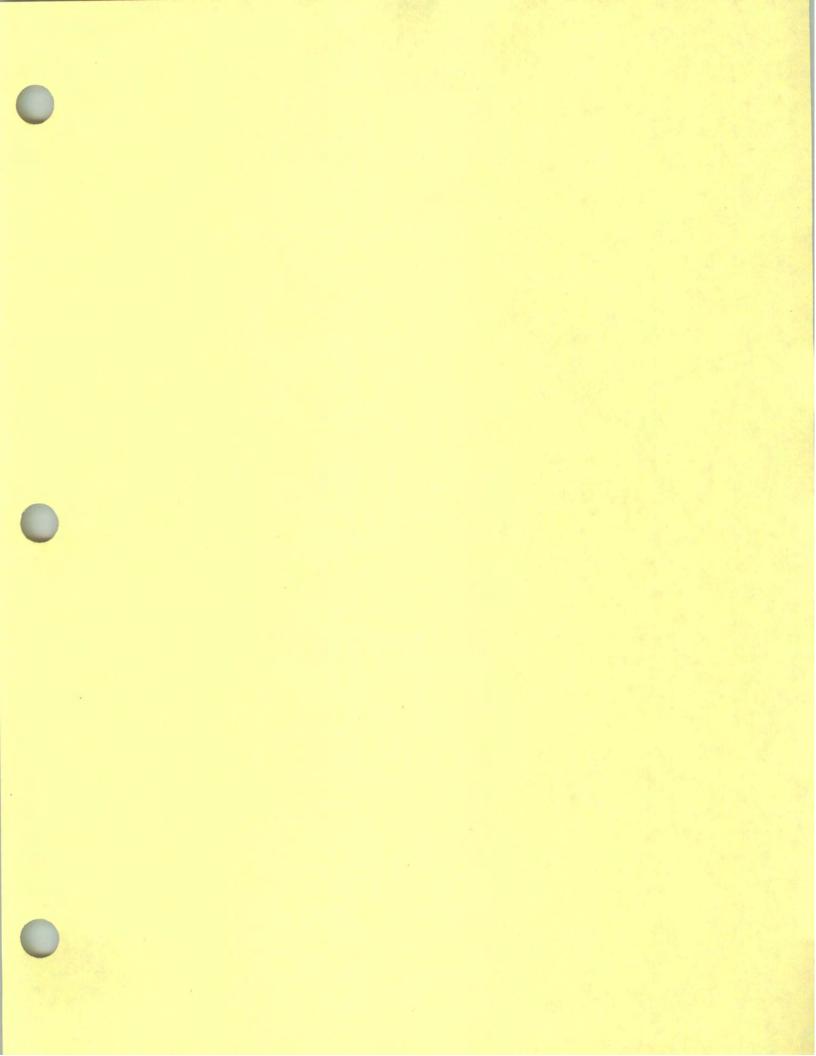
 $IR_F = ingestion rate of food (kg/kg body wt/d)$ 

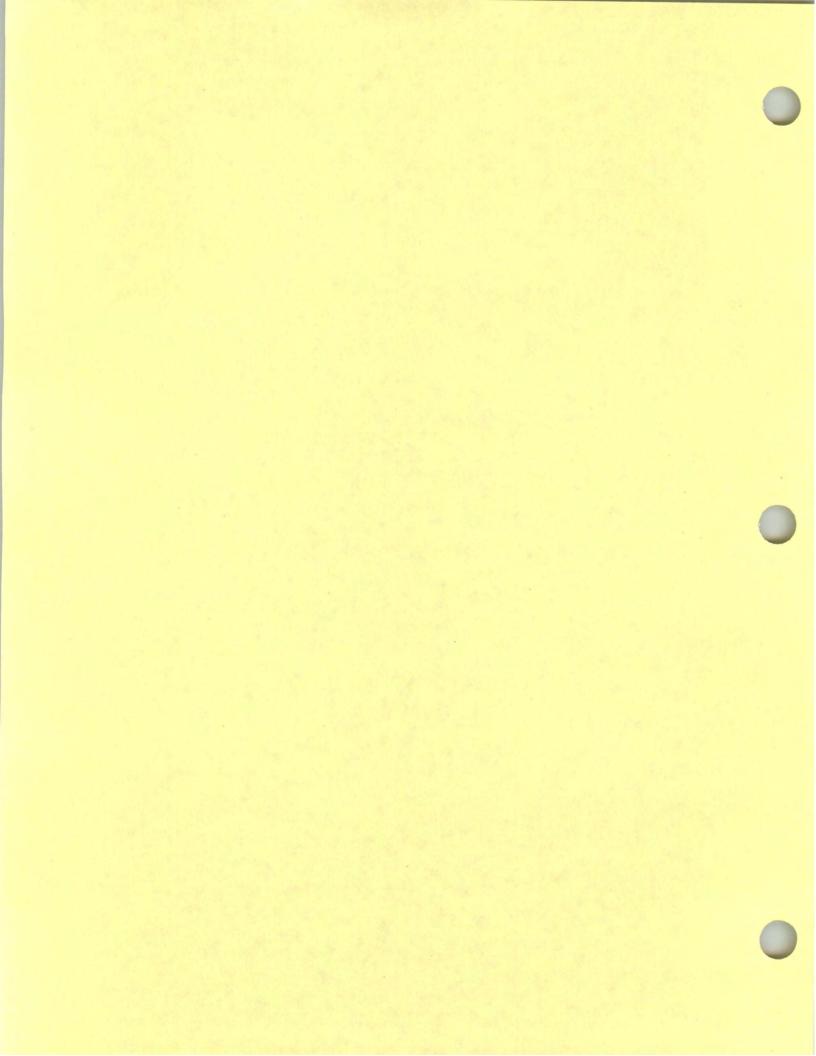
 $I_p$  = ingestion rate of plant material (kg/kg body wt/d)

 $I_A$  = ingestion rate of plant material (kg/kg body wt/d)

 $I_S$  = ingestion rate of plant material (kg/kg body wt/d)

IR<sub>w</sub> = ingestion rate of water (kg/kg body wt/d)





Appendix Table C-13. Toxicity Reference Values (TRVs) for Plants Exposed to Soil (1997)

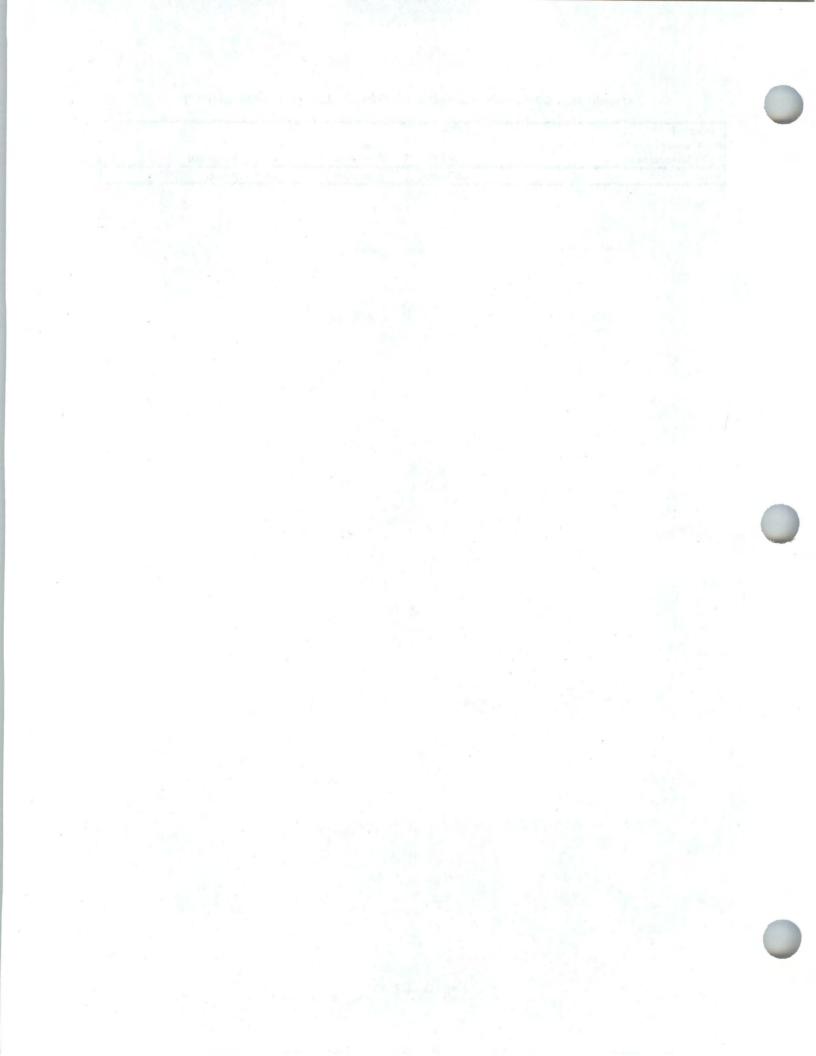
Ecological	Plant TRV	Type of	
constituent of		Media	Reference
potential concern	(mg/kg)	Micuia	Reference
Inorganics	5.000.01	Call	Efroymson et al. (1997a)
Aluminum	5.00E+01	Soil	Efroymson et al. (1997a)
Antimony	5.00E+00	Soil	Efroymson et al. (1997a)
Arsenic	1.00E+01	Soil	Efroymson et al. (1997a)
Barium	5.00E+02	Soil	Efroymson et al. (1997a)
Beryllium	1.00E+01	Soil	
Bismuth	2.00E+01	Soil Solution	Efroymson et al. (1997a)
Boron	5.00E-01	Soil	Efroymson et al. (1997a)
Bromine	1.00E+01	Soil	Efroymson et al. (1997a)
Cadmium	4.00E+00	Soil	Efroymson et al. (1997a)
Chromium	1.00E+00	Soil	Efroymson et al. (1997a)
Cobalt	2.00E+01	Soil	Efroymson et al. (1997a)
Copper	1.00E+02	Soil	Efroymson et al. (1997a)
Cyanide	No TRV	None	None
Fluorine	2.00E+02	Soil	Efroymson et al. (1997a)
Iodine	4.00E+00	Soil	Efroymson et al. (1997a)
Iron	1.00E+01	Soil Solution	Efroymson et al. (1997a)
Lead	5.00E+01	Soil	Efroymson et al. (1997a)
Lithium	2.00E+00	Soil	Efroymson et al. (1997a)
Magnesium	No TRV	None	None
Manganese	5.00E+02	Soil	Efroymson et al. (1997a)
Mercury	3.00E-01	Soil	Efroymson et al. (1997a)
Methyl mercury	2.00E-04	Soil Solution	Efroymson et al. (1997a)
Molybdenum	2.00E+00	Soil	Efroymson et al. (1997a)
Nickel	3.00E+01	Soil	Efroymson et al. (1997a)
Selenium	1.00E+00	Soil	Efroymson et al. (1997a)
	2.00E+00	Soil	Efroymson et al. (1997a)
Silver	No TRV	None	None
Sodium	2.00E-01	Soil	Efroymson et al. (1997a)
Technetium	2.00E+00	Soil Solution	Efroymson et al. (1997a)
Tellurium	1.00E+00	Soil	Efroymson et al. (1997a)
Thallium	5.00E+01	Soil	Efroymson et al. (1997a)
Tin	6.00E-02	Soil Solution	Efroymson et al. (1997a)
Titanium		Soil	Efroymson et al. (1997a)
Uranium	5.00E+00	Soil	Efroymson et al. (1997a)
Vanadium	2.00E+00	Soil	Efroymson et al. (1997a)
Zinc	5.00E+01	Son	Enoymson et al. (1997a)
Organics	AL MDA	None	None
2-Amino-4,6-Dinitrotoluene	No TRV		None
4-Amino-2,6-Dinitrotoluene	No TRV	None	None
2,4,6-Trinitrotoluene	No TRV	None	None
4,4'-DDE	No TRV	None	Efroymson et al. (1997a)
Acenaphthene	2.00E+01	Soil	None
Aldrin	No TRV	None	
Aroclor-1254	4.00E+01	Soil	Efroymson et al. (1997a)
Aniline	2.00E+02	Soil Solution	Efroymson et al. (1997a)
Anthracene	No TRV	None	None
Benzo(a)anthracene	No TRV	None	None
Benzo(a)pyrene	No TRV	None	None
Benzo(b)fluoranthene	No TRV	None	None
Benzo(g,h,i)perylene	No TRV	None	None
Benzoic acid	No TRV	None	None
Benzo(k)fluoranthene	No TRV	None	None
Biphenyl	6.00E+01	Soil	Efroymson et al. (1997a)

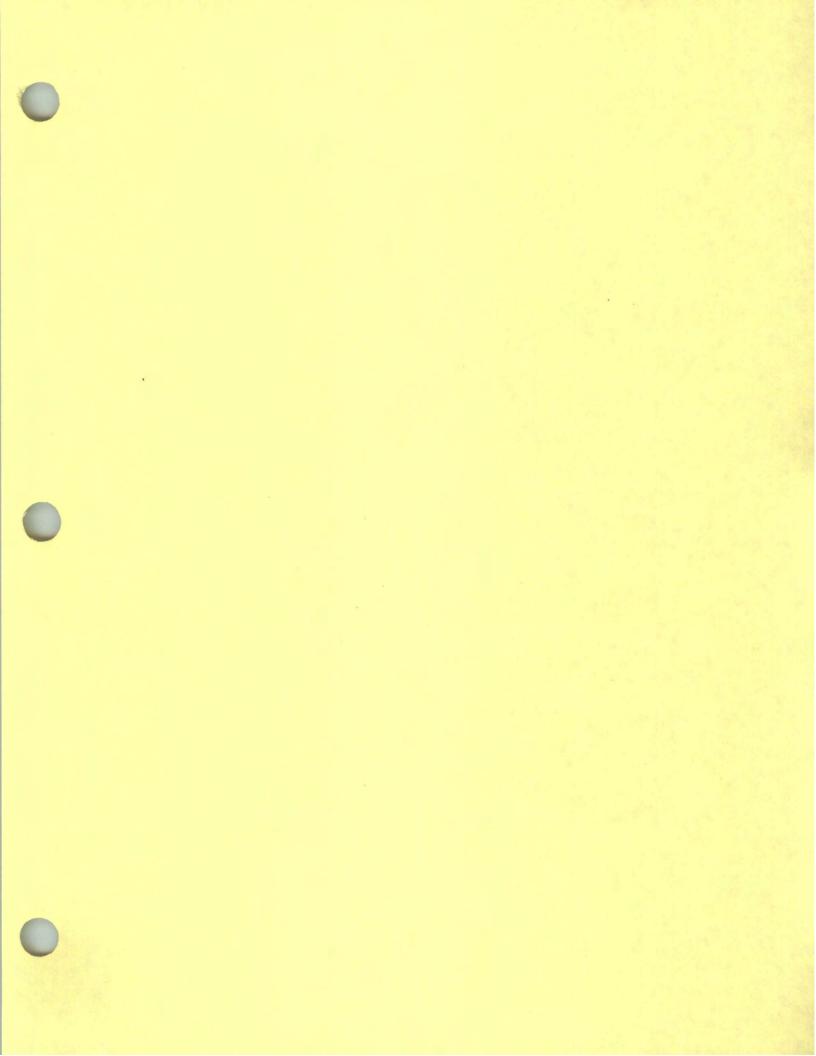
## Appendix Table C-13. Toxicity Reference Values (TRVs) for Plants Exposed to Soil (1997)

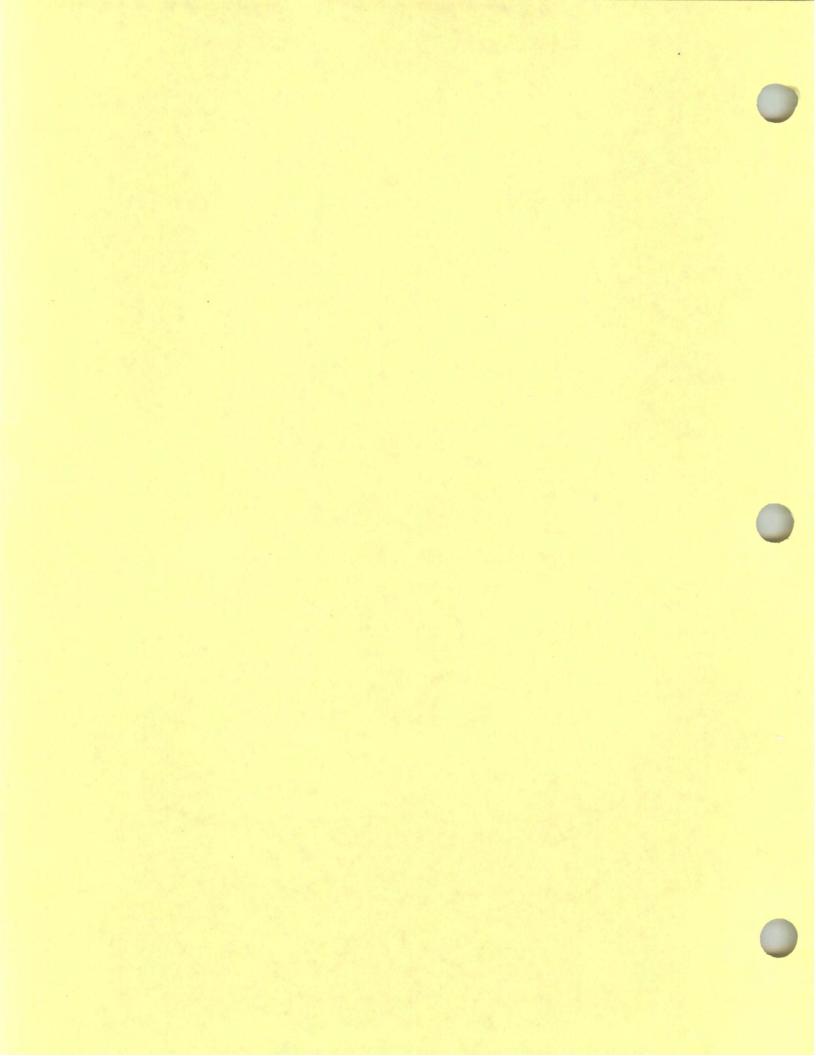
Ecological	Plant		
constituent of	TRV	Type of	
potential concern	(mg/kg)	Media	Reference
Bis(2-ethylhexyl)phthalate	No TRV	None	None
4-Bromoaniline	1.00E+02	Soil Solution	Efroymson et al. (1997a)
Carbazole	No TRV	None	None
3-Chloroaniline	2.00E+01	Soil	Efroymson et al. (1997a)
4-Chloroaniline	4.00E+01	Soil Solution	Efroymson et al. (1997a)
2-Chlorophenol	6.00E+01	Soil Solution	Efroymson et al. (1997a)
3-Chlorophenol	7.00E+00	Soil	Efroymson et al. (1997a)
4-Chlorophenol	5.00E+01	Soil Solution	Efroymson et al. (1997a)
2-Cresol	5.00E+01	Soil Solution	Efroymson et al. (1997a)
Chrysene	No TRV	None	None
4,4'-DDT	No TRV	None	None
Dibenzo(a,h)anthracene	No TRV	None	None
3,4-dichloroaniline	1.00E+01	Soil Solution	Efroymson et al. (1997a)
2,4-Dichlorophenol	2.00E+01	Soil Solution	Efroymson et al. (1997a)
3,4-Dichlorophenol	2.00E+01	Soil	Efroymson et al. (1997a)
2,6-Dinitrotoluene	No TRV	None	None
Dieldrin	No TRV	None	None
2,4-Dinitrophenol	2.00E+01	Soil	Efroymson et al. (1997a)
Dibenzofuran	No TRV	None	None
Dimethylphthalate	No TRV	None	None
Di-n-butyl phthalate	2.00E+02	Soil	Efroymson et al. (1997a)
Diethylphthalate	1.00E+02	Soil	Efroymson et al. (1997a)
Endrin aldehyde	No TRV	None	None
Fluoranthene	No TRV	None	None
Fluorene	No TRV	None	None
Furan	6.00E+02	Soil	Efroymson et al. (1997a)
Heptachlor	No TRV	None	None
Heptane	1.00E+00	Soil Solution	Efroymson et al. (1997a)
Hexachlorocyclopentadiene	1.00E+01	Soil	Efroymson et al. (1997a)
indeno(1,2,3-cd)pyrene	No TRV	None	None
Lindane	No TRV	None	None
Naphthalene	1.00E+01	Soil Solution	Efroymson et al. (1997a)
3-Nitroaniline	7.00E+01	Soil Solution	Efroymson et al. (1997a)
4-Nitroaniline	4.00E+01	Soil Solution	Efroymson et al. (1997a)
Vitrobenzene	8.00E+00	Soil Solution	Efroymson et al. (1997a)
Vitrocellulose	No TRV	None	None None
I-Nitrophenol	1.00E+01	Soil Solution	Efroymson et al. (1997a)
-Nitrotoluene	No TRV	None	None None
Pentachlorophenol	3.00E+00	Soil	Efroymson et al. (1997a)
henanthrene	No TRV	None	None None
Phenol	7.00E+01	Soil	Efroymson et al. (1997a)
Pyrene	No TRV	None	None None
CBs	4.00E+01	Soil	Efroymson et al. (1997a)
CB-1254	4.00E+01	COIL	Enoymson et al. (1997a)
tyrene	3.00E+02	Soil	Efroymson et al. (1997a)
,3,5,6-Tetrachloroaniline	2.00E+01	Soil	Efroymson et al. (1997a)
etrachloroethene	1.00E+01	Soil Solution	Efroymson et al. (1997a)
oluene	2.00E+02	Soil	Efroymson et al. (1997a)
-Toluidine	1.00E+02	Soil Solution	Efroymson et al. (1997a) Efroymson et al. (1997a)
,4,5-Trichloroaniline	2.00E+01	Soil	Efroymson et al. (1997a) Efroymson et al. (1997a)
richloroethene	1.00E+02	Soil Solution	Efroymson et al. (1997a) Efroymson et al. (1997a)
,4,5-Trichlorophenol	4.00E+02	Soil	Efroymson et al. (1997a) Efroymson et al. (1997a)
4,5-Trichlorophenol	1.00E+01	Soil Solution	Efroymson et al. (1997a) Efroymson et al. (1997a)
Ortho-xylene	1.00E+00	Soil Solution	Efroymson et al. (1997a) Efroymson et al. (1997a)

## Appendix Table C-13. Toxicity Reference Values (TRVs) for Plants Exposed to Soil (1997)

Ecological	Plant		
constituent of potential concern	TRV (mg/kg)	Type of Media	Reference
		3,000,000,000	
Xylene	1.00E+02	Soil Solution	Efroymson et al. (1997a)







Ecological	Earthworm	
constituent of	$TRV^{a}$	
potential concern	(mg/kg)	Reference
Inorganics		
Aluminum	No TRV	None
Antimony	No TRV	None
Arsenic	6.00E+01	Efroymson et al. (1997b)
Barium	No TRV	None
Beryllium	No TRV	None
Cadmium	2.00E+01	Efroymson et al. (1997b)
Calcium	No TRV	None
Chromium	4.00E-01	Efroymson et al. (1997b)
Chromium VI	No TRV	None
Cobalt	No TRV	None
Copper	6.00E+01	Efroymson et al. (1997b)
Cyanide	No TRV	None
Iron	No TRV	None
Lead	5.00E+02	Efroymson et al. (1997b)
Magnesium	No TRV	None
Manganese	No TRV	None
Mercury	1.00E-01	Efroymson et al. (1997b)
Nickel	2.00E+02	Efroymson et al. (1997b)
Potassium	No TRV	None
Selenium	7.00E+01	Efroymson et al. (1997b)
	No TRV	None
Silver	No TRV	None
Sodium	No TRV	None
Thallium	No TRV	None
Vanadium	2.00E+02	Efroymson et al. (1997b)
Zinc	2.00E+02	Endymson et al. (19976)
Organics		
2,2,5-Trimethylhexane	No TRV	None
2-Amino-4,6-Dinitrotoluene	No TRV	None
4-Amino-2,6-Dinitrotoluene	No TRV	None
2,6-Dinitrotoluene	No TRV	None
Acenaphthene	No TRV	None
Acenaphthylene	No TRV	None
Acetone	No TRV	None
Aldrin	No TRV	None
alpha-Chlordane	No TRV	None
Anthracene	No TRV	None
Aroclor-1254	No TRV	None
Aroclor-1260	No TRV	None
Benzo(a)anthracene	No TRV	None
Benzo(a)pyrene	No TRV	None
Benzo(b)fluoranthene	No TRV	None
Benzo(g,h,i)perylene	No TRV	None
Benzo(k)fluoranthene	No TRV	None

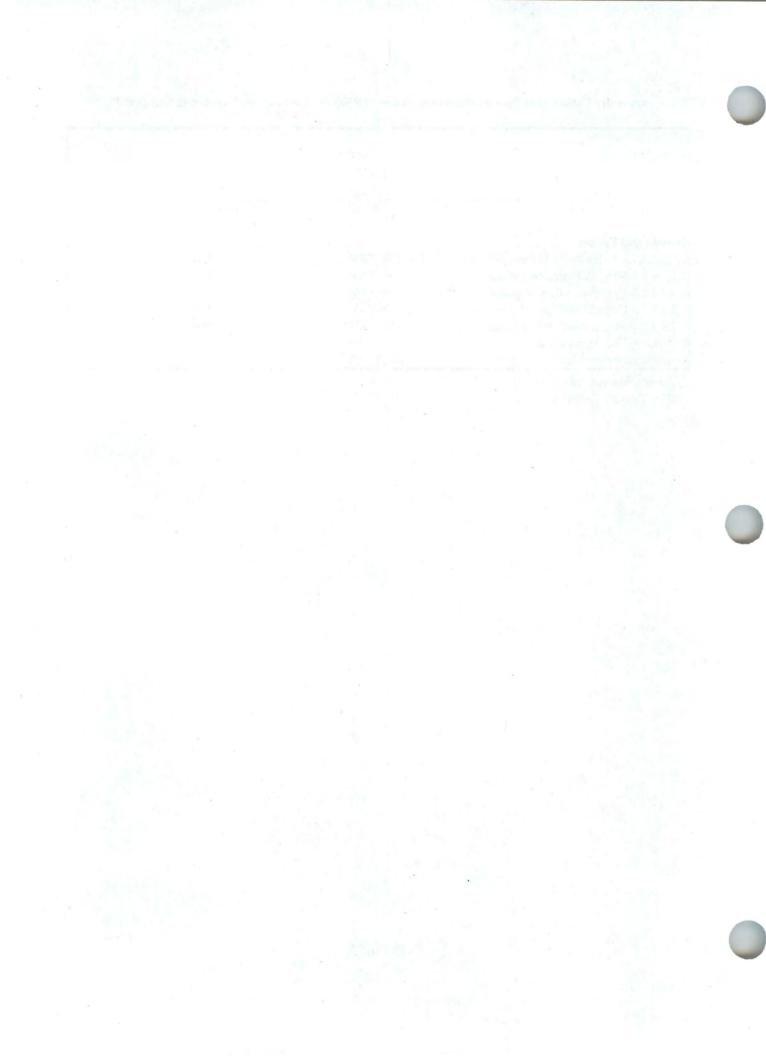
## Appendix Table C-14. Toxicity Reference Values (TRVs) for Earthworms Exposed to Soil (1997)

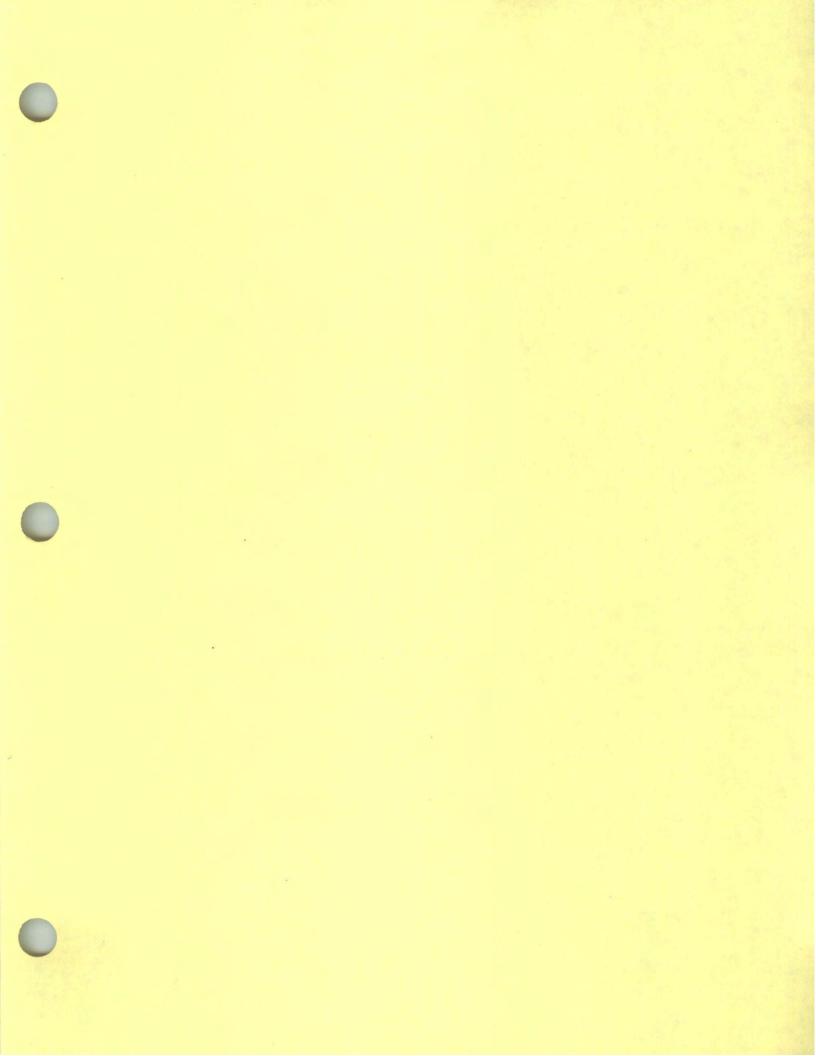
Ecological	Earthworm	
constituent of	$TRV^{a}$	
potential concern	(mg/kg)	Reference
Benzoic Acid	No TRV	None
Bis(2-ethylhexyl)phthalate	No TRV	None
Butylbenzylphthalate	No TRV	None
Carbazole	No TRV	None
Chrysene	No TRV	None
delta-BHC	No TRV	None
1,2-Dichlorobenzene	No TRV	None
1,2-Dichloroethene	No TRV	None
1,3-Dichlorobenzene	No TRV	None
1,4-Dichlorobenzene	2.00E+01	Efroymson et al. (1997b)
2,4-Dimethylphenol	No TRV	None
4,4'-DDD	No TRV	None
4,4'-DDE	No TRV	None
4,4'-DDT	No TRV	None
Dibenzo(a,h)anthracene	No TRV	None
Dibenzofuran	No TRV	None
Diethylphthalate	No TRV	None
Dieldrin	No TRV	None
Di-n-butylphthalate	No TRV	None
Endosulfan	No TRV	None
Endosulfan sulfate	No TRV	None
Endrin aldehyde	No TRV	None
Endrin ketone	No TRV	None
Fluoranthene	No TRV	None
Fluorene	No TRV	None
gamma-BHC (Lindane)	No TRV	None
Lindane	No TRV	None
gamma-Chlordane	No TRV	None
Heptachlor	No TRV	None
Heptachlor epoxide	No TRV	None
ndeno(1,2,3-cd)pyrene	No TRV	None
2-Methylnaphthalene	No TRV	None
2-Methylphenol	No TRV	None
l-Methylphenol	No TRV	None
Methoxychlor	No TRV	None
Methylene chloride	No TRV	None
Naphthalene	No TRV	None
Vitrocellulose	No TRV	None
Pentachlorophenol	6.00E+00	Efroymson et al. (1997b)
Phenanthrene	No TRV	None
Phenol	3.00E+01	Efroymson et al. (1997b)
Pyrene	No TRV	None
Coluene	No TRV	None
Trichloroethene	No TRV	None
,2,4-Trichlorobenzene	2.00E+01	Efroymson et al. (1997b)

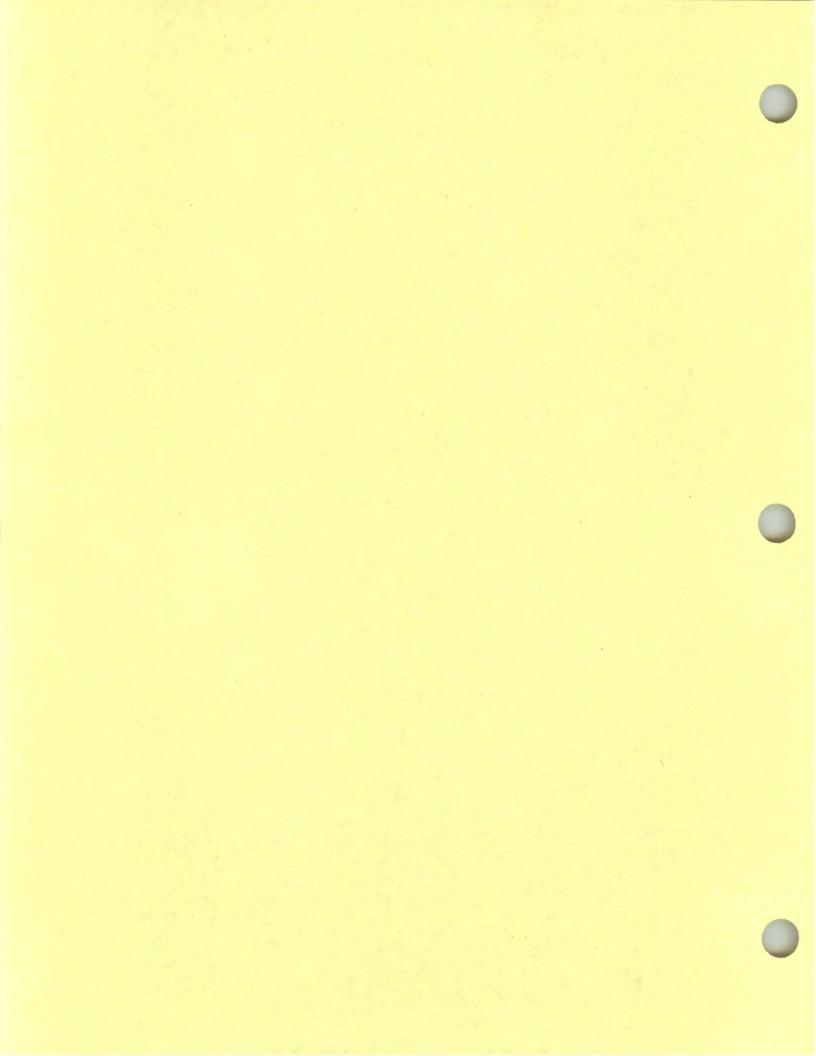
## Appendix Table C-14. Toxicity Reference Values (TRVs) for Earthworms Exposed to Soil (1997)

Ecological constituent of	Earthworm TRV <sup>a</sup>	
potential concern	(mg/kg)	Reference
2,4,5-Trichlorophenol	9.00E+00	Efroymson et al. (1997b)
Dioxins and Furans		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	No TRV	None
1,2,3,4,6,7,8-Heptachlorodibenzofuran	No TRV	None
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	No TRV	None
1,2,3,4,7,8-Hexachlorodibenzofuran	No TRV	None
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	No TRV	None
Octachlorodibenzo-p-dioxin	1.00E-03	TEF
Octachlorodibenzofuran	1.00E-03	TEF

<sup>&</sup>lt;sup>a</sup> Lowest Observed Adverse Effect Level TRV = Toxicity Reference Values







Page 1 of 5

(mg/kgBW/d) No TRV 1,25E-01 benchmarkx No TRV No TRV DCF x ECF 1.26E-01 1.00E+00 No TRV No TRV 8.00E+00 8.00E+00 .01E+00 2.58E-01 No TRV No TRV 7.40E-03 1.00E+03 No TRV 1.26E-01 S.06E+00 5.06E+00 1,00E+00 2.74E+03 1.31E+00 5.87E+01 3.14E+01 8.80E+01 4.00E+01 4.00E+01 No TRV 6.60E-01 6.60E-01 2.80E+01 1.17E+01 1.17E+01 No TRV No TRV 2.00E-01 No TRV 1.00E-01 conversion none factor 1.0 none 1.0 none 1.0 none 01001001 Duration factor 1.0 1.0 1.0 1.0 1.0 none 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 none none none none none none 0.1 0.1 1.0 Ivankovic and Preussmann (1975) in [1] Steven et al. (1976) cited in Eisler 1986 Perry et al. (1983) in [1] Schroeder and Mitchner (1975) in [1] Schroeder and Mitchner (1975) in [1] Schroeder et al. (1968b) in [1] Schroeder and Mitchner (1971) in [1] Schroeder and Mitchner (1971) in [1] Schroeder and Mitchner (1971) in [1] Aulerich et al. (1982) in [1]
Tewe and Maner (1981) in [1]
Bleavinss et Aulerich (1981) in [1] Rosenfeld and Beath (1954) in [1] Schlicker and Cox (1968) in [1] Weir and Fisher (1972) in [1] Ondreicka et al. (1966) in [1] Underhill et al. (1931) in [2] Aulerich et al. (1982) in [1] Domingo et al. (1986) in [1] Ambrose et al. (1976) in [1] Ambrose et al. (1976) in [1] Formigli et al. (1986) in [1] Aulerich et al. (1974) in [1] Sutou et al. (1980b) in [1] Sutou et al. (1980b) in [1] Laskey et al. (1982) in [1] Perry et al. (1983) in [1] Azar et al. (1973) in [1] Azar et al. (1973) in [1] Lane et al. (1982) in [1] Source in [1] none Longevity Reproduction Reproduction Mortality Reproduction Longevity Longevity Mortality Growth none none Endpoint Effect none anou none none NOAEL LOAEL LOAEL LOAEL NOAEL LOAEL LOAEL NOAEL LOAEL NOAEL none none none none none none none subchronic subchronic subchronic (mg/kgBW/d) duration chronic none none none none anon Benchmark Test 1.25E+00 1.26E+00 1.26E+00 1.00E+00 1.00E+00 1.00E+03 58E+00 2.74E+03 8.00E+00 1.93E+01 5.06E+00 5.06E+00 1,31E+01 1.00E+00 1.17E+01 6.87E+01 3.14E+01 8.00E+00 8.80E+01 01E+00 7.40E-01 6.60E-01 6.60E-01 2.80E+01 1.17E+01 1.00E+01 4.00E+01 2.00E-01 none none none попе none none none none none none none none 00E+00 00E+00 .00E+00 00E+00 3.00E-02 50E-01 50E-01 3.50E-02 73E-01 50E-01 .00E-02 weight (kg) BW, .00E-02 1.00E-02 1.35E-01 1.35E-01 3.03E-01 3.50E-01 50E-01 3.03E-01 3.50E-01 3.50E-01 Test species body none none none none none none none none Test species Rat Mink Mink Mink Mink Mink None Rat None Mink Mouse Rat none Mouse none none none none none none none none none Rat Rat 1,1,2,2-Tetrachloroethane Chromium, hexavalent I. I. 1-Trichloroethane Beryllium (dissolved) Cadmium (dissolved) Copper (dissolved) Arsenic (dissolved) 3arium (dissolved) Vickel (dissolved) otential concern (dissolved) Mercury constituent of Aagnesium hosphorus fanganese Scological norganics otassium anadium Beryllium Cadmium Ammonia Antimony Selenium Organics Chloride noride hallium opper Vickel Nitrate Cobalt

Appendix Table C-15. Derivation of No Observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Mammal Test Species

Appendix Table C-15. Derivation of No Observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Mammal Test Species

Ecological		species						Duration	Endpoint	TRV (mg/kgBW/d)
constituent of		weight	Benchmark Test	Test				factor		benchmarkx
potential concern	Test species	(kg) BW,	(mg/kgBW/d) duration	duration	Endpoint Effect	Effect	Source	DCF	ECF	DCF x ECF
, 1,2-Trichloroethane	none	none	none	none	none	none	none	none	none	No TRV
,1-Dichloroethane	none	none	none	none	none	none	none	none	none	No TRV
,1-Dichloroethene	Rat	3.50E-01	3.00E+01	chronic	NOAEL	Mortality	Quast et al. (1983) in [1]	1.0	1.0	3.00E+01
,1-Dichloroethene	none	none	none	none	none	попе	none	none	none	No TRV
,2,3,4,6,7,8-HpCDF	none	none	none	none	none	none	none	none	none	No TRV
,2,4-trichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
,2-cis-Dichloroethene	Mouse	3.00E-02	4.52E+01	subchronic	NOAEL	Hepatotoxicity	Palmer et al. (1979) in [1]	0.1	1.0	4.52E+00
2-Dichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
,2-Dichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
,2-Dichloroethane	Mouse	3.50E-02	5.00E+01	chronic	NOAEL	Reproduction	Lane et al. (1982) in [1]	1.0	1.0	5.00E+01
,2-Dichloroethane	Mouse	3.50E-02	5.00E+01	chronic	NOAEL	Reproduction	Lane et al. (1982) in [1]	1.0	1.0	5.00E+01
2-Dichloroethene	Mouse	3.00E-02	4.52E+02	subchronic	NOAEL	Blood chemistry	Palmer et al. (1979) in [1]	0.1	1.0	4.52E+01
,2-Dichloroethene	Mouse	3.00E-02	4.52E+01	subchronic	NOAEL	Hepatotoxicity	Palmer et al. (1979) in [1]	0.1	1.0	4.52E+00
,2-Dichloropropane	none	none	none	none	none	none	none	none	none	No TRV
,2-trans-Dichloroethene	Mouse	3.00E-02	4.52E+01	subchronic	NOAEL	Hepatotoxicity	Palmer et al. (1979) in [1]	0.1	1.0	4.52E+00
,3-Dichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
,4-Dichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
2,2,5-Trimethylhexane	none	none	none	none	none	none	none	none	none	No TRV
2,4,5-trichlorophenol	none	none	none	none	none	попе	none	none	none	No TRV
2,4-D	none	none	none	none	none	none	none	none	none	No TRV
2,4-Dimethylphenol	none	none	none	none	none	none	none	none	none	No TRV
2-Chlorophenol	none	none	none	none	none	none	none	none	none	No TRV
2-Hexanone	none	none	none	none	none	none	none	none	none	No TRV
2-Methylnaphthalene	none	none	none	none	none	none	none	none	none	No TRV
2-Methylnaphthalene	none	none	none	none	none	none	none	none	none	No TRV
2-Methylphenol	none	none	none	none	none	none	none	none	none	No TRV
4,4-DDD	none	none	none	none	none	none	none	none	none	No TRV
4,4'-DDE	Rat	3.50E-01	1.00E+01	subchronic	NOAEL	none	Komburst et al. (1986) in EPA (1999)	0.1	1.0	1.00E+00
4,4'-DDT	Rat	3.50E-01	8.00E-01	chronic	NOAEL	Reproduction	Fitzhugh (1948) in [1]	1.0	1.0	8.00E-01
+Chloro-3-methylphenol	none	none	none	none	none	none	none	-	none	No TRV
4-Methyl-2-pentanone	Rat	3.50E-01	2.50E+02	subchronic	NOAEL	Liver/Kidney	Microbiological Associates (1986) in [1	0.1	1.0	2.50E+01
4-Methylphenol	none	none	none	none	none	none	none	none	none	No TRV
4-Methylphenol	none	none	none	none	none	none	none	none	none	No TRV
4-Nitrophenol	none	none	none	none	none	none	none	none	none	No TRV
Acenaphthene	none	none	none	none	none	none	none	none	none	No TRV
Acenaphthylene	none	none	none	none	none	none	none	none	none	No TRV
Acetone	Rat	3.50E-01	1.00E+02	subchronic	NOAEL	Reproduction	EPA (1986c) in [1]	0.1	1.0	1.00E+01
Aldrin	Rat	3.50E-01	2.00E-01	chronic	NOAEL	Reproduction	EPA (1988a) in [1]	1.0	1.0	2.00E-01
Alkalinity	none	none	none	none	none	none	none	none	none	No TRV
alpha-Chlordane	Mouse	3.00E-02	4.58E+00	chronic	NOAEL	Reproduction	Keplinger et al. (1968) in [1]	1.0	1.0	4.58E+00
Anthracene	none	none	none	none	none	none	none	none	none	No TRV
Aroclor-1242	Mink	1.00E+00	6.85E-01	chronic	LOAEL	Reproduction	Bleavins et al. (1980) in [1]	1.0	0.1	6.85E-02
Aroclor-1248	Rhesus monkey	5.00E+00	1.00E-01	chronic	LOAEL	Reproduction	Barsotti et al. (1976) in [1]	1.0	0.1	1.00E-02
Aroclor-1254	Oldfield mouse	1.40E-02	6.80E-01	chronic	LOAEL	Reproduction	McCoy et al. (1995) in [1]	1.0	0.1	6.80E-02
Aroclor-1260	none	none	none	none	none	none	none	none	none	No TRV
Benzene	Mouse	3.00E-02	2.64E+02	chronic	LOAEL	Reproduction	Nawrot and Staples (1979) in [1]	1.0	0.1	2.64E+01
Denzo(a)anthracena	none	none	none	none	none	none	none	none	none	Val CN



Page 3 of 5

(mg/kgBW/d) DCF x ECF 3.20E-02 5.85E+00 4.00E+00 .00E+00 No TRV 1.50E+01 No TRV No TRV No TRV 4.00E+00 No TRV No TRV 4.58E+00 No TRV 4.58E+00 No TRV No TRV 1.77E+03 No TRV 1.83E+01 No TRV 2.00E-02 4.58E+03 5.50E+02 9.20E-02 8.00E+00 8.00E+00 No TRV 1.50E-01 No TRV No TRV 1.00E-01 none 1.0 1.0 1.0 0.1 0.0 conversion Duration factor none 0.1 0.1 1.0 1.0 Mackenzie and Angevine (1981) in [1] Shtenberg and Ignat'ev (1970) in [3] reon and Cleveland (1955) in [1] Verschuuren et al. (1976) in [1] NCA (1982) in [1] Gray et al. (1988) in [1] Good and Ware (1969) in [1] Keplinger et al. (1968) in [1] Keplinger et al. (1968) in [1] Palmer et al. (1978) in [1] Palmer et al. (1978) in [1] Crumet al. (1993) in [1] Dikshith et al. (1984) in [1] Palmer et al. (1979) in [1] Lamb et al. (1987) in [1] Lamb et al. (1987) in [1] Lamb et al. (1987) in [1] Cox et al. (1975) in [1] Reproduction Liver histology Gonad atrophy Reproduction Endpoint Effect none попе none NOAEL NOAEL NOAEL NOAEL NOAEL NOAEL NOAEL NOAEL NOAEL LOAEL VOAEL NOAEL NOAEL LOAEL COAFL none none none none none subchronic subchronic (mg/kgBW/d) duration chronic none none none 1.50E+00 1.00E+00 4.00E+00 1.83E+01 4.58E+00 1.50E+02 5.50E+02 4.58E+00 8.00E+00 8.00E+00 1.77E+03 5.85E+00 4,58E+03 9.20E-01 3.20E-02 2.00E-01 none 40 .00E-02 .00E+00 3.00E-02 3.00E-02 3.50E-01 3.00E-02 3.00E-02 3.50E-01 3.50E-01 none none none none none 0.03 none none none rest species Mouse none none Rat Mouse Mouse none Rat none Mouse Mouse Mouse Mouse Rat none none none anon none none Mink none none none lone none onor none none Bis(2-chloroisopropyl)ether 3is(2-ethylhexyl)phthalate Fluorene gamma-Chlordane gamma-BHC (Lindane) Methyl mercury chloride Jibenzo(a,h)anthracene ideno(1,2,3-cd)pyrene 3enzo(b)fluoranthene 3enzo(k)fluoranthene 3utylbenzylphthalate 3enzo(g,h,i)perylene Diethylphthalate Di-n-butylphthalate Di-n-octylphthalate Methyl ethyl ketone otential concern leptachlor epoxide Methylene chloride Endosulfan sulfate arbon disulfide Senzo(a)pyrene dethyl bromide 3enzyl alcohol onstituent of Chlorobenzene Indrin ketone Dibenzofuran ichloroprop Methoxychlor Ethylbenzene Senzoic acid Chloroethane luoranthene Chloroform feptachlor Chlordane Indosulfan Ecological Jelta-BHC arbazole n,p-cresol campa ieldrin Endrin MCPA

Appendix Table C-15. Derivation of No Observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Mammal Test Species

Appendix Table C-15. Derivation of No Observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Mammal Test Species

Ecological		species body						Duration	Endpoint	TRV (mg/kgBW/d)
constituent of		weight	Benchmark Test	Test				factor	factor	benchmarkx
potential concern	Test species	(kg) BW,	(mg/kgBW/d) duration	duration	Endpoint Effect	Effect	Source	DCF	ECF	DCF x ECF
Naphthalene	none	none	none	none	none	none	none	none	none	No TRV
N-Nitroso-di-N-propylamine	none	none	none	none	none	none	none	none	none	No TRV
N-Nitrosodiphenylamine	none	none	none	none	none	none	none	none	none	No TRV
Pentachlorophenol	Rat	3.50E-01	2.40E-01	chronic	NOAEL	Reproduction	Schwetz et al. (1978) in [1]	1.0	1.0	2.40E-01
Phenanthrene	none	none	none	none	none	none	none	none	none	No TRV
Phenol	none	none	none	none	none	none	none	none	none	No TRV
Pyrene	none	none	none	none	none	none	none	none	none	No TRV
Styrene	Dog	1.00E+01	2.00E+02	chronic	NOAEL	unknown	Ouast et al. (1979)	1.0	1.0	2.00E+02
Tetrachloroethene	Mouse	3.00E-02	1.40E+01	subchronic	NOAEL	Hepatotoxicity	Buben and O'Flaherty (1985) in [1]	0.1	1.0	1.40E+00
Toluene	Mouse	3.00E-02	2.60E+02	chronic	LOAEL	Reproduction	Nawrot and Staples (1979) in [1]	1.0	0.1	2.60E+01
Trichloroethene	Mouse	3.00E-02	7.00E+01	subchronic	LOAEL	Hepatotoxicity	Buben and O'Flaherty (1985) in [1]	0.1	0.1	7.00E-01
Vinyl chloride	Rat	3.50E-01	1.70E+00	chronic	LOAEL	Mortality	Feron et al. (1981) in [1]	1.0	0.1	1,70E-01
Xvlenes total	Mouse	3.00E-02	2.06E+00	chronic	NOAEL	Reproduction	Marks et al. (1982) in [1]	1.0	1.0	2.06E+00
1,2-Dimethylbenzene	Mouse	3.00E-02	2.06E+00	chronic	NOAEL	Reproduction	Marks et al. (1982) in [1]	1.0	1.0	2.06E+00
Dioxins and Furans										
1.2.3, 4.6, 7, 8-Heptachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1.2.3,4,6,7,8-Heptachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,4,7,8,9-Heptachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,4,7,8-Hexachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,6,7,8-Hexachlorodibenzofuran	Rat	3.50E-01	1.60E-03	subchronic	NOAEL	Organ weight	Poiger et al. (1989) in [1]	0.1	1.0	1.60E-04
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,7,8,9-Hexachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,7,8-Pentachlorodibenzofuran	Rat	3.50E-01	1.60E-03	subchronic	NOAEL	Organ weight	Poiger et al. (1989) in [1]	0.1	1.0	1.60E-04
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
2,3,4,6,7,8-Hexachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
2,3,4,7,8-Pentachlorodibenzofuran	Rat	3.50E-01	1.60E-04	subchronic	NOAEL	Organ weight	Poiger et al. (1989) in [1]	0.1	1.0	1.60E-05
2,3,7,8-Tetrachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
2,3,7,8-Tetrachlorodibenzo-p-dioxin	Rat	3.50E-01	1.00E-06	chronic	NOAEL	Reproduction	Murray et al. (1979) in [1]	1.0	1.0	1.00E-06
Octachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
Octachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
Explosives										
1,3,5-Trinitrobenzene	none	none	none	none	none	none	none	none	none	No TRV
1,3-Dinitrobenzene	none	none	none	none	none	none	none	none	none	No TRV
2,4,6-Trinitrotoluene	Rat	3.50E-01	1.60E+02	subchronic	LOAEL	Reproduction	Dilley et al. (1982)	0.1	0.1	1.60E+00
2,4-Dinitrotoluene	Mouse	3.00E-02	1,35E+01	chronic	NOAEL	Reproduction	Ellis et al. (1979)	1.0	1.0	1.35E+01
2,6-Dinitrotoluene	Rat	3.50E-01	7.00E+00	subchronic	NOAEL	Reproduction	ATSDR (1989)	0.1	1.0	7.00E-01
2-Amino-4,6-dinitrotoluene	none	none	none	none	none	none	none	none	none	No TRV
4-Amino-2,6-dinitrotoluene	none	none	none	none	none	none	none	none	none	No TRV
Nitrobenzene	none	none	none	none	none	none	none	none	none	No TRV
1-4-1	none	none	none	none	none	none	none	none	none	No IRV

TRV = toxicity reference value DCF = Duration conversion factor; 1 if chronic, 0.1 if subchronic (Sample et al. 1996)

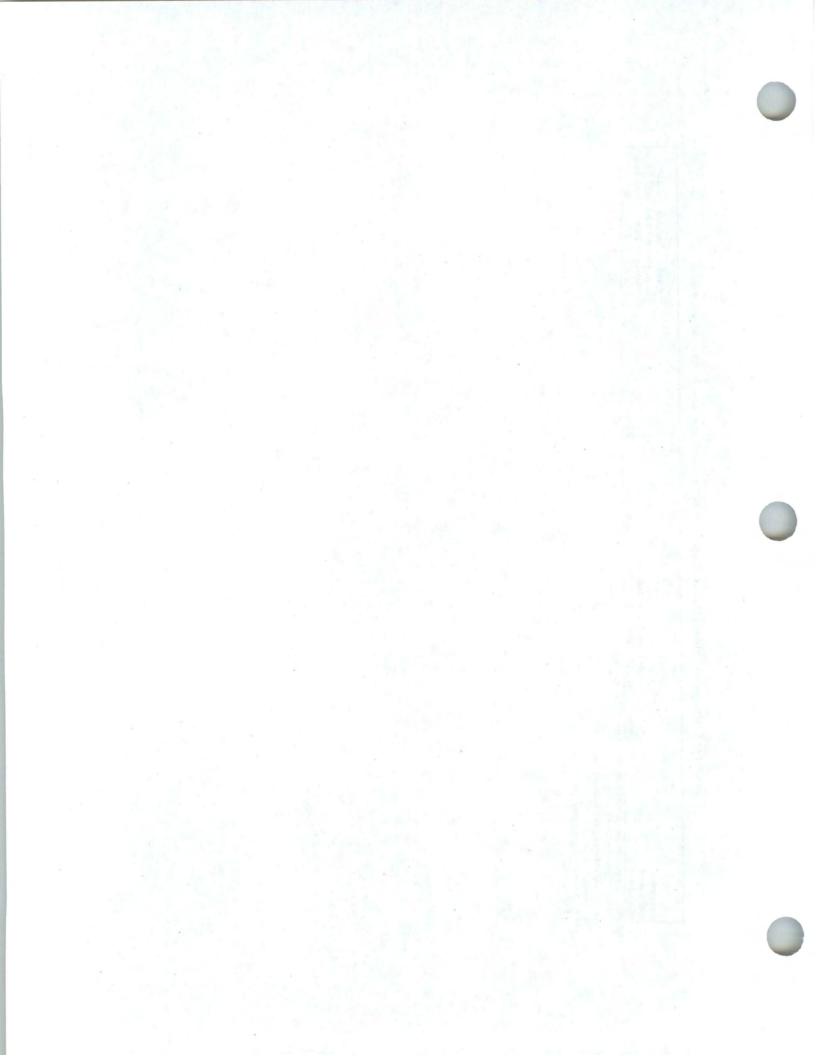


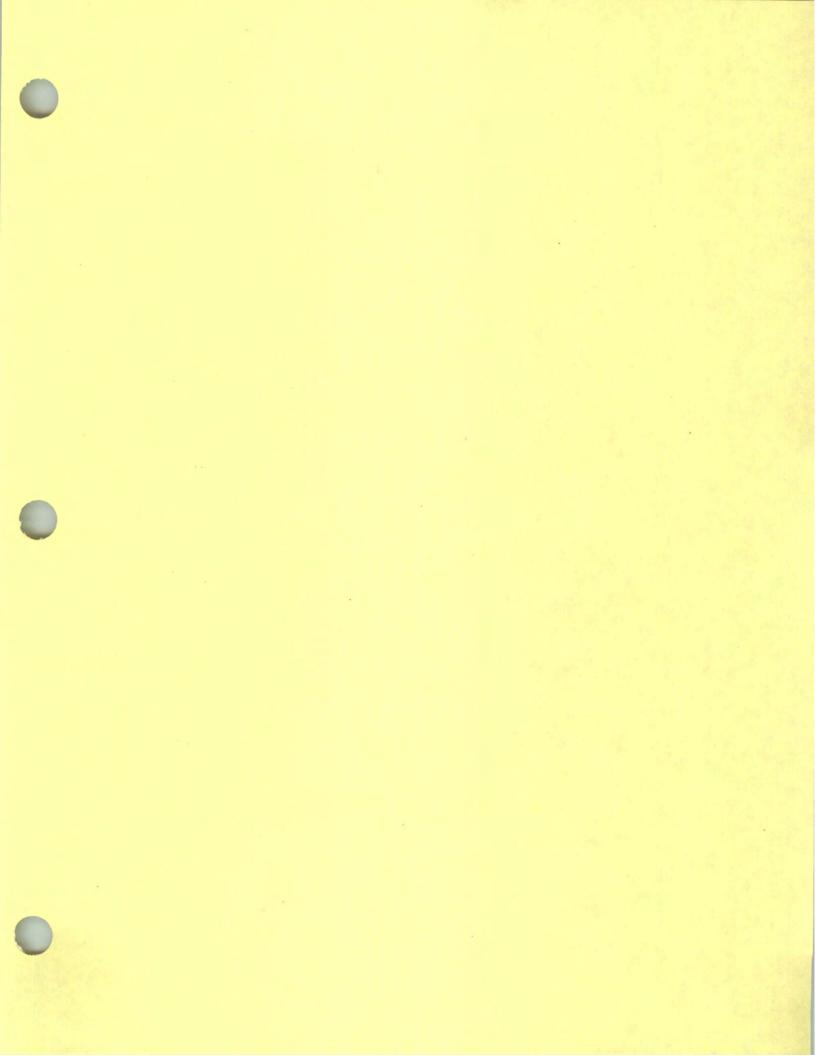
Page 5 of 5

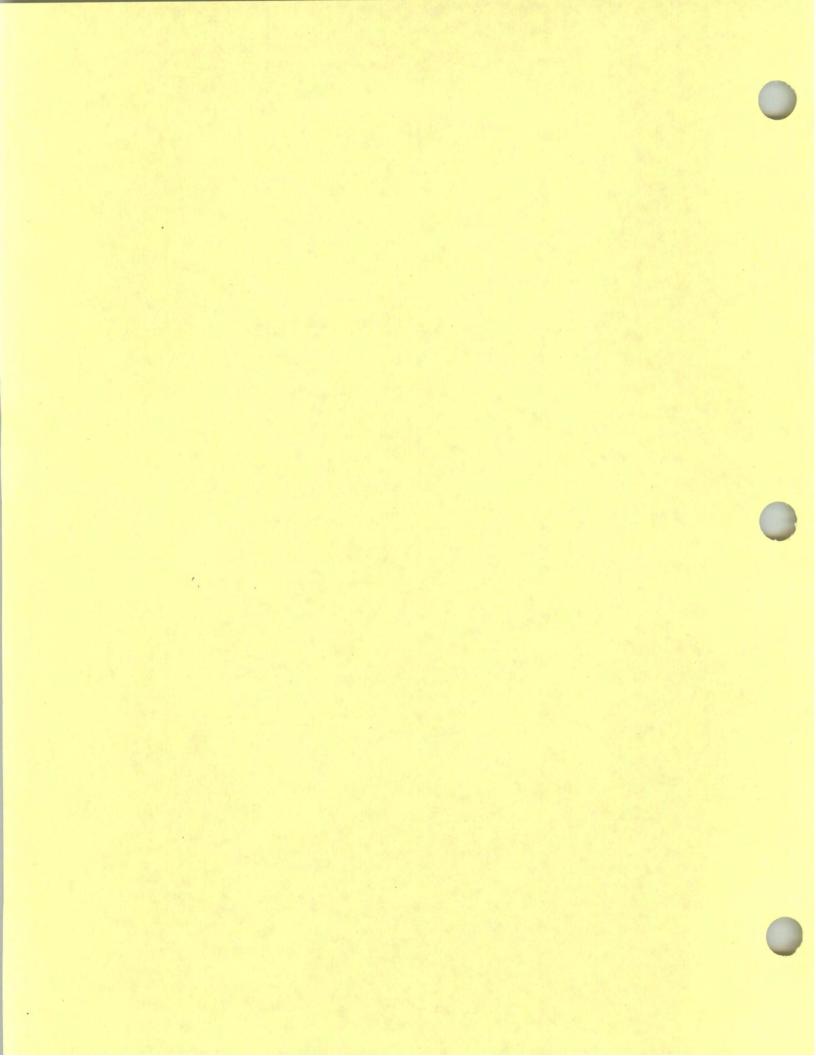
Appendix Table C-15. Derivation of No Observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Mammal Test Species

		Test						
		species				Duration	Endpoint	TRV
Ecological		body				conversion co	n conversion	_
constituent of		weight	Benchmark Test			factor		benchmarkx
potential concern	Test species	(kg) BW,	(mg/kgBW/d) duration	Endpoint Effect	Source	DCF	ECF	DCF r FCF

ECF = Endpoint conversion factor; 1 if NOAEL, 0.1 if LOAEL (Sample et al. 1996)
NOAEL = No observed adverse effect level
LOAEL = Lowest observed adverse effect level
[1] = Sample et al. (1996)
[2] = Clayton and Clayton (1981)
[3] = IRIS (1996)







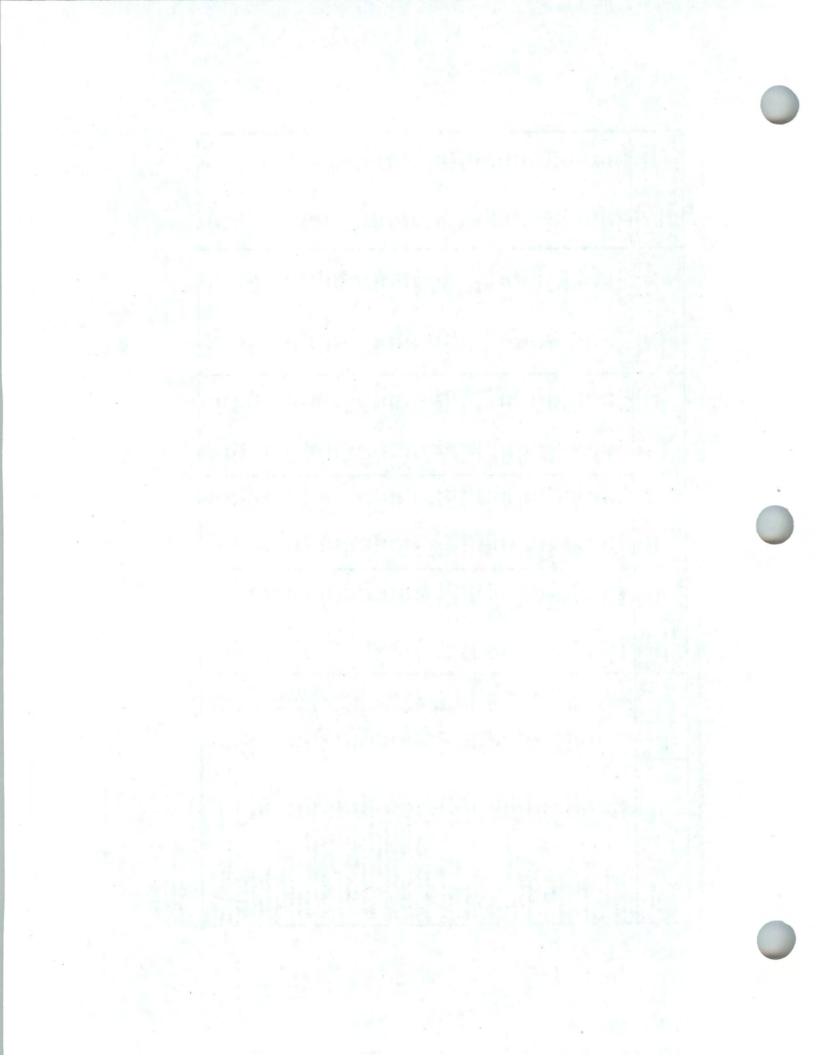
Appendit Table C.16. Bady-Weight-Adjusted NOAEL Taticity Reference Values (TRVt) for Mammal Receptors

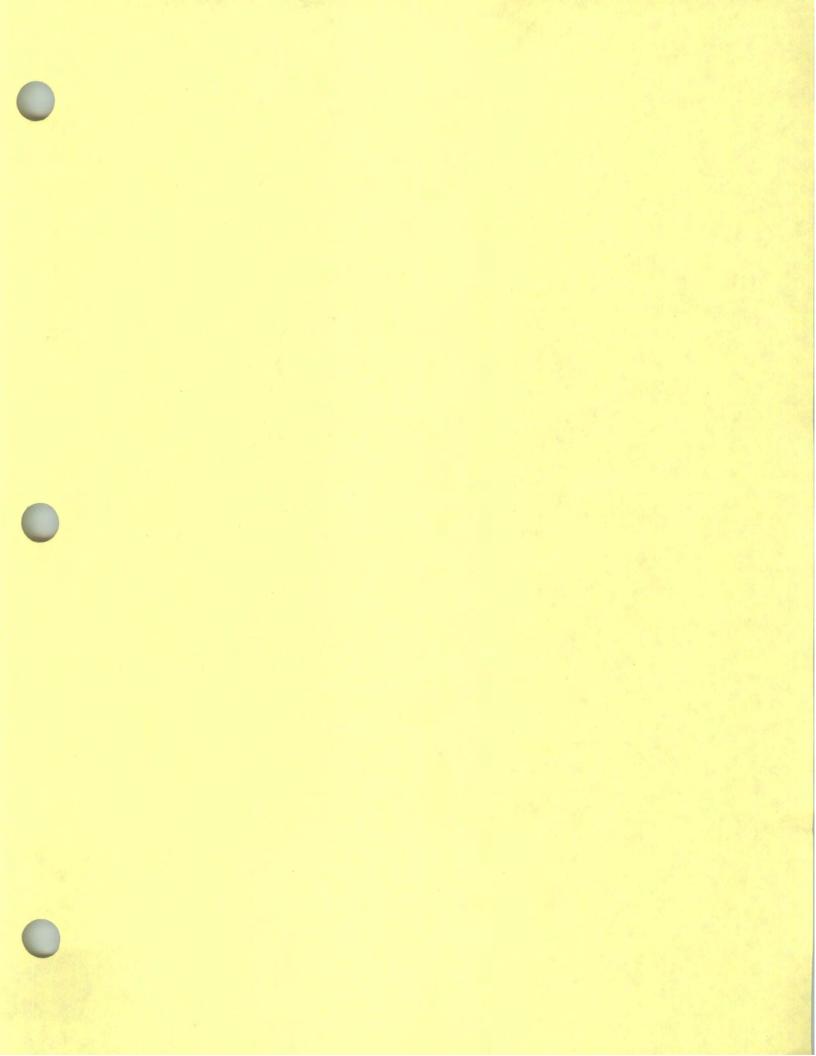
						The About spin Lands of							
		Total Control		Body-weight		Body-Weight		Body-weight		Body-weight		Body-weight	
Ecological		species		factor	TRV	factor	TRV	factor	TRV	factor	TRV	Conversion	TRV
ntential concern	Test species	weight (kg)	TRV, (mg/kgBW/d)	(BW./BW) <sup>23</sup>	(mg/kgBW/d)	BW. Pawith	(mg/gBW/d)	BW.mm	(mg/kgBW/d)	BW.	(mg/kgBW/d)	BW.	(mg/kgBW/d)
faurganics					-	Anna di ana	See of the see	(out) (out)	The state of the s	(Maylan)	IRVIE DWass	(BW(/BW)	TRV, x BW <sub>com</sub>
Aluminum	Moune	3 00E-02	1,938+00	1.15E+00	2,228+00	3.96E-01	7,648-01	4.148-01	7.99E-01	4.00E.01	7.72E-01	2.858-01	5 S0B-01
Artimony	Mante	3 00G-01	No TRV	none	none	DONE OF	none	none	none	FLUTA	Botte	none	goog
Visenic	Mouse	3 DOE-02	1.268-01	1.15E+00	1.458-01	3 967-01	4 000 00	4 148-01	5 18E-02	4 00E-01	S.00E-02	2.85E-01	3.56E-02
Arsenic (dissolved)	Mouse	3 DOE-02	1.26E-01	1.15E+00	1.45E-01	3.96E-01	4 99E-02	4 14E-01	5.22E-02	4.00B-01	5.04E-07	10-202-01	3 595-02
Baritm	Rat	435E-01	5,06E+00	2.25E+00	1.14E+01	7,73E-01	3.91E+00	8.08E-01	4 09E+00	7818-01	3.95E+00	5.57E-01	2.82E+00
Sartium (dissolved)	Rat	4 35E-01	5.06E+00	2.25E+00	1.14B+01	7.73E-01	3.91E+00	8 08E-01	4 09E+00	7 RIE-01	3.95E+00	5.57E-01	2.82E+00
Seryllium (dienolynd)	Rat	3,50E-01	10-309'9	2.13E+00	1.41E+00	7.32E-01	4.83E-01	7.65E-01	S.05B-01	7,39E-01	4.88E-01	5.27E-01	3.48E-01
Soron	77	3 50E-01	2 80E+01	2.138400	5 968+01	7 372-01	2 050401	7 655-01	S.05E-01	7.39E-01	4.88E-01	5.27E-01	3.48E-01
Cadmium	Rat	3.03E-01	1.005+00	2.05E+00	2.058+00	7.068-01	7.068-01	7 18F.01	7 185-01	7 138-01	207E+01	5.27E-01	I.48B401
admium (dissolved)	Rat	3 03E-01	1.00E+00	2.05E+00	2.05E+00	7,062-01	7.06E-01	7.38E-01	7.38E-01	7 13E-01	7 115-01	5.08E-01	5.08E-01
Alcium	DODG	None	No TRV	Done	pone	none	none	Done	none	hohe	nene	Done	none
Mornde	none	none	No TRV	none	none	none	pope	none	none	none	none	none	none
Chondan, hevavalent	Rai	3 508-01	1 115400	2.138-00	5 838+03	7,328-01	2.00E+03	7 65E-01	2.09E+03	7.39E-01	2,02E+03	5.27E-01	1.44E+03
Cobalt	Rat	Done	1.005-01	Dome	2. SUE+00	1.3225-01	9.6ZE-01	7.65E-01	1.01E+00	7.39E-01	9.72E-01	5 27E-01	6 93E-01
opper	Mink	1.00E+00	1.17E+01	2.77E+00	3.24E+01	9.528-01	11111111	O GSE-DI	1 175401	o GIE o	TODE TOTAL	Done	none
Copper (dissolves)	Mink	1.00E+00	1.17E+01	2.77E+00	3.24E+01	9.52E-01	1.11E+01	9 95E-01	1.17E+01	9618-01	1.138+01	6 85E-01	8 02F+00
Cyanide	Rat	2.73E-01	6 87E+01	2 00E+00	1.38E+02	6.88E-01	4.73E+01	7.19E-01	4.94E+01	6 95E-01	4.778+01	4.95E-01	3.40E+01
UII.	none	1.00E+00	No TRV	2.77E+00	8.69E+01	9.52E-01	2.98E+01	9.95E-01	3.12E+01	9618-01	3 02B+01	6 855-01	2.15E+01
cad	Rat	3 50E-01	8.00E+00	2.13E+00	1.70E+01	7.32F-01	5 RSE+00	7.658-01	6 17E460	7 355 01	5000	none s	DATE
end (dissolved)	Rat	3.50E-01	8.00E+00	2.13E+00	1.70E+01	7.32E-01	5.85E+00	7.65E-01	6 12E+00	7.39E-01	5.92E+00	5.27E-01	4.278+00
Magnesium	DON'S	None .	No TRV	DODG	2000	none	none	none	BODE	rione	none	Done	none
CIRY	Mink	1.00E+00	1.018+00	2.138400	2 8/E+02	7.328-01	6 44E+01	7.65E-01	6.74E+01	7.398-01	6 51E+01	5,27E-01	4.64E+01
Moly bdenum	Mouse	3 00E-02	2,58E-01	1.15E+00	2.988-01	3.968-01	1.02E-01	4.14E-01	1.07E-01	4 00E-01	1035-01	2 8572-01	7 175-01
Nickel (dissolved)	Rai	3 50E-01	4,00E+01	2.13E+00	8.52E+01	7,32E-01	2.93E+01	7.65E-01	1.06E+01	7.39E-01	2,96E+01	5.27E-01	2.118+01
Vitrate	thone	3.50E-01	No TRV	2 (35:400	8 52H +01	7,32E-01	2.93E+01	7.65E-01	3 06E+01	7.39E-01	Z 96E+01	\$27E-01	2.118+01
Phosphenus	Done	none	NoTRV	Bone	none	Signe	aciona	2000	pope	none	2000	2000	none
Paritan.	none	Denne	No TRV	none	None	2000	pape	none	pote	none	DODG	note	hone
Silver	Kal	3 508-01	1,00E-01	2.13E+00	4.26E-01	733E-01	1,462-01	7.65E-01	1.53E-01	7.39E-01	1,48E-01	5.27E-01	1.05E-01
Silicon	TIODE	none	No TRV	pope	none	none	none	none	DODE	none	none	notice	none
Sodium	none	none	No TRV	pone	none	none	pone	DODE	none	Bone	none	0000	none
Sulfate	none	neme	No TRV	none	none	Spine	BOTHE	none	none	none	NON	none	DOCIE
Variation	Rai	3,65E-01	7,40E-03	2.15E+00	1.59E-02	7.40E-01	5.47E-03	7.73E-01	5.72E-03	7.47E-01	5,538-03	5.33E-01	3.94E-03
line	Rat	3 50E-01	1.60E+02	Z.13E+00	3.41E+02	7.32E-01	1.17E+02	7,658-01	1,22E+02	7.398-01	1.44E-01	5.27E-01	8.43E+01
Organics 1,1,1-Trichloroethane	Mouse	3.50E-02	1.00E+03	1.20E+00	1.20E+03	4.12E-01	4 12E+02	4.30E-01	4.30E+07	4 168-01	4 168+02	7 9611.01	3 06/2403
.1.2,2-Tetrachloroethane	Hone.	pope	No TRV	none	none	note	PIODE	none	none	none	none	2000	none
. I-Dichloroethane	none	DODE	No TRV	none	none	none	DODE	DODE	none	none	none	DISIDE	none
1.1-Dichlomethene	Rat	3.50E-01	3,00E+01	2.13E+00	6.39E+01	7.32E-01	2 20E+01	7.65R-01	2 30P+01	7.1017.01	2 275401	5 278.01	1 CETTAGE
I.1-Dichloroethene	DODE	notice	No TRV	SHORE	agou	pone	none	none	none	none	none	none	none
2,3,4,6,7,8-HpCDF	Bone	none	No TRV	none	none	pope	picine	none	none	BODE	none	District	nane
2.cis-Dichloroethene	Monte	1 OOF 02	A SUBLOO	none	2000	1 0.65 01	none .	none	hone	none	9000	pose	hone
2-Dichlorobenzene	Done	pope	No TRV	BOOK	pour	3,985-01	1.796+00	4.14E-01	1.87E+00	4.00E-01	1.81E+00	2.85E-01	1.29E+00
,2-Dichlorobenzene	COUNT	none	No TRV	none	none	DODE	DODG	19000	BISHC	none	none	none	none
2-Dichlomethane	Mouse	3.50E-02	5.008+01	1.20E+00	5.99E+01	4.12E-01	2.06E+01	4,30E-01	2.152+01	4 16E-01	2.08E+01	2.96E-01	1.48E+01
2-Dichlomethere	Mouse	3 SOE-02	5.00E+01	1.20E+00	5.99E+01	4.12E-01	2.05E+01	4.30E-01	2.15E+01	4.16E-01	2 08B+01	1.96E-01	1.48E+01
2-Dichlotoethene	Mouse	3.00E-02	4.52E+00	1.15E+00	5.21E+00	3.96E-01	1.798+00	4.148-01	1.87E+01	4 00E-01	1.812+01	2.85E-01	1.29E+01
2-Dichloroproprise	Distric	none	No TRV	none	none	none	none	none	DODE	DODE	HORK	note	Dotte
2-trans-Dichloroethene	Mentse	3 00E-02	4.52E+00	1.15E+00	5.21E+00	3.96E-01	1.79E+00	4.148-01	1.875.400	4.008-01	1.81E+00	2.85E-01	1.29E+00
4-Dichlombenzene	DODGE DE LA COMPANION DE LA CO	none	NO LKV	DODE	DODE	District	none	none	none	none	FIGURE	DHIDE	pound
	2000	DODG	No TRV	CANOR	- DODGE	rivine	Milne	- Paris	-	-	-	-	-

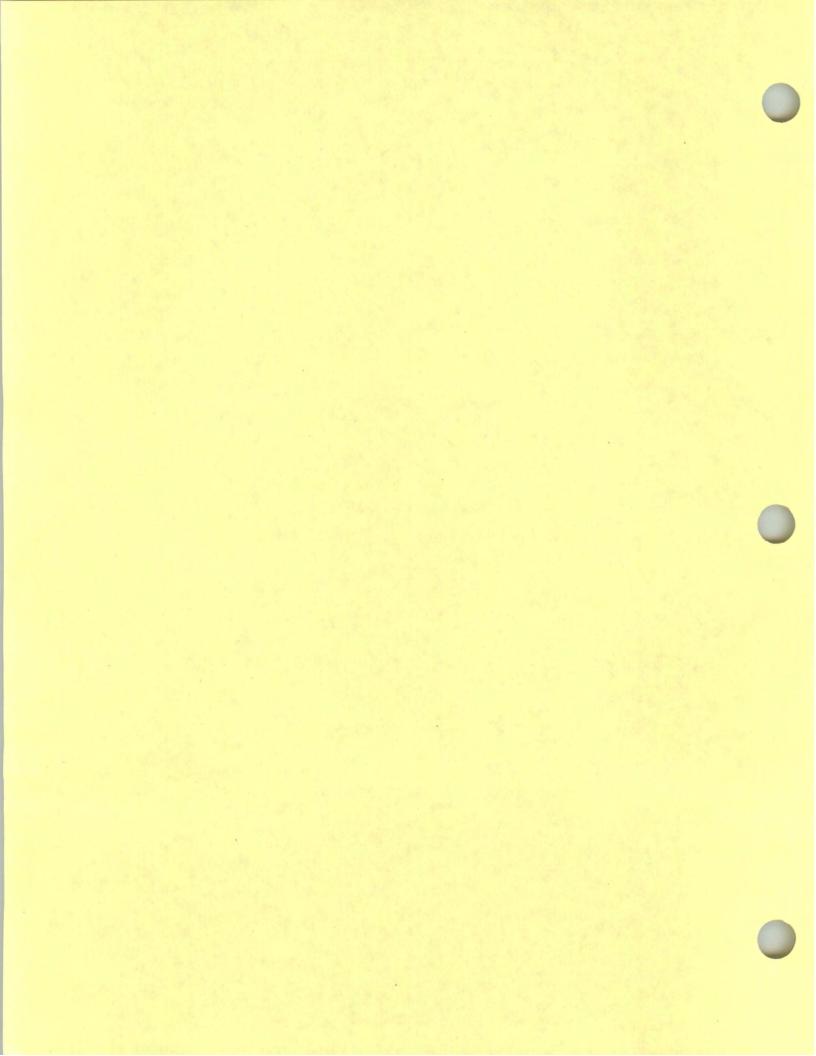
		-		1	Short-tailed shrew		Cottontail		Mink		Muskrat		Red Fox
			TRV,		TRV (mg/kgBW/d)	Body-weight conversion factor BW <sub>com</sub>	TRV (mg/kgBW/d)	Body-weight conversion factor BW-com	TRV (mg/kgBW/d)	Body-weight conversion factor BW <sub>conv</sub>	TRV (mg/kgBW/d)	Body-weight conversion factor BW <sub>cont</sub>	TRV (mg/kgBW/d)
	-	+	(mg/kgBw/d)	(BW,/BW)	IKV, x BWcose	(BW, / BW)	1KV <sub>1</sub> X BW <sub>tiner</sub>	(BW,/BW)	IKV, X DWann	(BW <sub>1</sub> /BW)	I KV, X El Wessey	(way)	IKVIX DWes
2,4,5-uncherophenoi none none	a a	none	No TRV	none	none	pone	non	DODE	none	none	pope	none	none
2,4-Dimethylphenol	a	onor	No TRV	none	none	none	none	none	none	none	none	none	none
-Chlorophenol none		hone	No TRV	none	none	none	none	none	none	DODE	Done	none	anon
2. Methylnanhthalene		none	No TRV	none	none	none	anou	none	none	DODE	pope	none	none
-Methylnaphthalene none		none	No TRV	none	none	none	none	none	none	none	none	none	none
2-Methylphenol	a	попе	No TRV	none	none	none	виои	none	none	none	none	none	none
A-DDD	=	none	No TRV	none	none	none	none	none	none	none	none	none	none
A-DDE Rat	3.5	3.50E-01	1.00E+00	2.13E+00	2.13E+00	7.32E-01	7.32E-01	7.65E-01	7.65E-01	7.39E-01	7.398-01	5.27E-01	5.278-01
Colons 2 methodological	6.5	SOE-OI	No TeV	2.135+00	1.705400	1.32E-01	3.83E-01	1,635-01	0.12D-01	Done Done	none none	DODE DODE	none
-Catoria-3-metry prenoi	3.56	3.50E-01	2.50E+01	2.13E+00	5.33E+01	7.32E-01	1.83E+01	7.65E-01	1.91E+01	7.39E-01	1.85E+01	5.27E-01	1.32E+01
4-Methylphenol	4	none	No TRV	none	none	none	none	none	none	DODE	none	none	none
4-Methylphenol	4	none	No TRV	none	none	none	none	DODE	none	DODE	none	none	none
-Nitrophenol none	2	pope	No TRV	none	none	none	none	none	none	DODE	none	none	none
Acenaphthene	4	none	No TRV	none	none	none	none	none	none	pope	none	none	BOTT
Acenaphinylene none	36	DE OI	1 OOF +01	13B+00	2 13/2+01	7 1712-01	7.17F+00	7.65E-01	7 65E+00	7.39E-01	7.39E+00	5.27E-01	5.27E+00
Idrin Rat	100	3.50E-01	2.00E-01	2.13E+00	4.26E-01	7.32E-01	1.46E-01	7.65E-01	1.53E-01	7.39E-01	1,48E-01	5.27E-01	1.05E-01
Alkalinity none	-	none	No TRV	none	none	none	pope	none	none	none	none	none	none
pha-Chlordane Mouse		10E-02	4.58E+00	1.15E+00	5.28E+00	3.96E-01	1.81E+00	4.14E-01	1.90E+00	4.00E-01	1.83E+00	2.85E-01	1318+00
Anthracene none	- 0	Done	No TRV	DODE C	1 cone	0 47E-01	6 478-07	0.05E-01	6 87E-02	9.61F-01	6.58E-02	6.85E-01	4.69E-02
	Rhesus monkey 5.00	0E+00	1.00E-02	4.14E+00	4.14E-02	1.42B+00	1.42E-02	1.49E+00	1.49E-02	1.44E+00	1.44E-02	1.02E+00	1.02E-02
		10E-02	6.80E-02	9.53E-01	6.48E-02	3.27E-01	2.23E-02	3.42E-01	2.33E-02	3.31E-01	2.25E-02	2.36E-01	1.60E-02
1260		none a	No TRV	115000	3 0407+01	1 OCF-01	none 1 04P +01	A 14F-01	1 09E+01	4 00F-01	1 05E+01	2.85E-01	7.52E+00
Senzote Senzote Prome		none	No TRV	none	none	none	none	none	none	none	none	nane	none
	3.0	3.00E-02	1.00E+00	1.15E+00	1.15E+00	3.96E-01	3.96E-01	4.14E-01	4.14E-01	4.00E-01	4.00E-01	2.85E-01	2.85E-01
thene	-	none	No TRV	none	none	none	Done	none	none	none	DONG	none	none
	-	none	No TRV	none	none	none	Done	none	none	none	none	DODE	none
Setizo(k) intoranization mone Renzoic acid	3.0	3.00E-02	4.00E+00	1.15E+00	4.61E+00	3.96E-01	1.58E+00	4.14E-01	1.66E+00	4.00E-01	1.60E+00	2.85E-01	1.14E+00
		none	No TRV	none	none	none	auou	none	none	BIORE	none	none	none
		none	No TRV	none	none	none	none	none	none	anone of	none	1 9 CT 01	S 1724/00
Bis(2-ethylbexyl)phthalate Mouse		00E-02	1.83E+01	1.15E+00	2.11E+01	3.96E-01	7.256+00	4.148-01	7.388-100	4,00E-01	none	none	none
Suly idency ipnimatate Carbazole Done		none	No TRV	none	none	none	pone	none	none	DODE	none	none	none
ulfide		none	No TRV	none	none	none	none	pope	none	Done	none	none	none
		3.00E-02	4.58E+00	1.15E+00	5.28E+00	3,968-01	1.812+00	4.148-01	1.906+00	4.005-01	1.836400	TO-SE-OI	none
Chloroberzene		none	No TRV	none	DODE	none	DODE	nope	none	pope	none	Done	none
	3.5	3.50E-01	1.50E+01	2.13E+00	3.20E+01	7.32E-01	1.10E+01	7.65E-01	1.15E+01	7.39E-01	1.11E+01	5.27E-01	7.91E+00
	-	none	No TRV	none	none	none	none	none	none	none	none	none	none
Chrysene		none	No TRV	none	none	none	none	none	none	none	none	none	none
delta-BHC none	1	none	No TRV	none	none	none	none	none	none	none	pone	none	none
)anthracene		none	No TRV	none	none	none	none	none	none	none	pone	none	none
Dibenzofuran		none	No TRV	none	none	none	none	none	none	BODG	Done	none	none
lion .		none	No TRV	DODE	none	none	none	none	none	none	pone	none	none
	3.5	3.50E-01	2.00E-02	2.13E+00	4.26E-02	7.32E-01	1.46E-02	7.65E-01	1.538-02	7.39E-01	1.48E-02	5.27E-01	1.05E-02
		3.00E-02	4.58E+03	1.15E+00	5.28E+03	3.96E-01	1.81E+03	4.148-01	2.28E+02	4.00E-01	2.20E+02	2.85E-01	1.57E+02
Discentishthalate Mouse		Done none	No TRV	pope	DODE DODE	none	none	none	none	none	none	none	none
	3.5	3.50E-01	1.50E-01	2.13E+00	3.20E-01	7.32E-01	1.10E-01	7.65E-01	1.15E-01	7.39E-01	1.115-01	5.27E-01	7.91E-02
fan sulfate		none	No TRV	none	none	none	none a	none A 14E OI	2 617-03	4 0012-01	1 6815-02	2 85F-01	2 62R-02
		00E-02	9.20E-02	1.15E+00	1.065-01	3.90E-UI	3.04E-02	none none	none	none	none	none	none
Endrin Kelone house		none	No TRV	none	pope	norie	none	none	none	Done	pope	DODE	none
		none	No TRV	none	попе	none	none	none	none	none	none	none	none
Fluorene		none	No TRV	none	adou	DOILE	none	none	1 000 400	4 OOF OI	P GTEADD	7 85P-01	1.318+00
		Annual and	1000	T T STATES	S. TWINSTER	The second second			1.000	S. M. Mariana	001170	***************************************	

Appendix Table C.16. Body-Weight-Adjorted NOAEL Toxicity Reference Valuer (TRVs) for Mammal Receptors

		1			Short-falled shrew	Ш	Cottontail	1	Mink		Muskrat		Red Fox
		species		Body-weight		Body-weight		Body-weight		Body-weight		Body-weight	
Ecological		body		factor	TRV	factor	TRV	factor	TRV	factor	TRV	conversion	TRV
otential concern	Test species	(kg)	(mg/kgBW/d)	(BW,/BW)° H	(mg/kgBW/d) TRV, v BW	(BW,/BW) <sup>233</sup>	(mg/kgBW/d) TRV,r BW	BW, BWies	(mg/kgHW/d)	BW <sub>ree</sub>	(mg/kgBW/d)	BW.may.may.	(mg/kgBW/d)
indane	Rat	3.50E-01	8.00E+00	2.138+00	1.70E+01	7.32E-01	5.85E+00	7.65E-01	6.12Fa00	7 10E-01	ACCUPATION NAMES	(and the by	IRV, r BWage
Teplachier envelop	Mink	1,00E+00	1,00E-01	2.77E+00	2.77E-01	9.52E-01	9 528-02	9.95E-01	9.95E-02	9 612-01	9,618-02	6.85E-01	6.85E-02
ndeno(1,2,3-ed)pyrene	Done	none	No TRV	none	none	none	BODE	none	pope	none	none	SHIDE	notie
WCPA	Done	notice	No TRV	none	none	2000	DOME	none	none	none	popul	Delibe	thome
ACPP	none	none	No TRV	pone	none	bone	Done	none	popp	none	Bone	Denne	poope
Method at the Committee	nome	none	No TRV	none	none	BOTH	none	nane	BODE	none	THOME	none	none
fethyl mercay chloride	Rat	3.50E-01	1,77E+03	2 13E+00	3.77E+03	7,32E-01	1.30E+03	7 65E-01	1.36E+03	7.39E-01	131E+03	5.27E-01	9.33E+02
Methylene chloride	Rat	3 505-01	3.20E-02	2 135+00	6.82E-02	7.32E-01	2.14E-02	7.658-01	2,45E-02	7.39E-01	2.37E-02	5.27E-01	1.69E-02
Methoxyehlor	Rat	3 50E-01	4.00E+00	2.138+00	8 57E+00	7,328-01	4.2KE+00	7,658-01	4 48E+00	7 398-01	4 33E+00	5.27E-01	3.08E+00
Japhthalene	none	none	NoTRV	none non	0 27E 400	10-275-7	2.93E+00	7,658-01	3.06E+00	7.398-01	2.96E+00	5.27E-01	2.11E+00
4-Nitroso-di-M-propylamine	tyone	Done	No TRV	none	DODE	DODG:	none	none	none	none	Dione	9000	none
N-Nitrosediphenylamine	none	agog	No TRV	none	agog	none	pope	Done	BORE	adou	2000	none	none
entachlorophenol	Rat	3 S0E-01	2,405-01	2.13E+00	5,118-01	7.32E-01	1.76E-01	7 65B-01	1.84E-01	7 398-01	1 775-01	9.77P_01	1 755 01
heraphrene	COOR	None	No TRV	Done	none	none	pope	none	none	Mine	DODE	Done	TOWNS OF THE PARTY
Denoi	2000	DODG	No TP.V	toone	pound	None	pone	none	none	DVIDE	notice	none	Borne
Shrene	Doe	1 OUTSAUT	7 NO 1 KV	4 035400	none	0000	none	none	DODE	none	none	Done	morne
ctrachloroethere	Motise	3.00E-02	1.40€+00	1155+00	70+958-6	10,598.400	3.588+02	1.775+00	3 54E+02	1.71E+00	3.42E+02	1.22E+00	2.44E+02
Toforne	Mouse	3 00E-02	2.60B+01	1.15E+00	2.99E+01	1 968-01	1032401	A IAR-OIL	I ORDAGI	4,0005-01	5,608-01	2.85E-01	3.99E-01
Trichloroethere	Meuse	3.00E-02	7.00E-01	1.15E+00	N.07B-01	3.96E-01	2.77E-01	4,14E-01	Z.90E-01	4 00P-01	2 SOF-01	7 850-01	3 000 01
V my I chlorude	Rat	3.50E-01	1.70E-01	2.13E+00	3.62B-01	7.32E-01	1.24E-01	7.65E-01	1.308-01	7.39E-01	1.26E-01	\$ 272-01	8 96F-02
Avience, total	Mouse	3 (00E-02	2.06E+00	1.15E+00	2 37E+00	3.96E-01	8 16E-01	4.14E-01	8 535-01	4.00E-01	8 24E-01	2.85E-01	5.87E-01
	-	2 100 000	4,096,100	1.138440	2.372+00	3.96E-01	8.16E-01	4,14E-01	8.53E-01	4.00E-01	8,248-01	2.85E-01	5.87E-01
Dioxins and Furant	***************************************	-	Mr. Prov.		0.00								
2,3,4,6,7,8-Heptachlorodibergo-p-dioxin none	in none	Done	No TRV	none	none	Shine	none	none	none	none	pouc	2000	none
2,3,4,7,8,9-Heptachlorodibenzofuran	none	popul	No TRV	none	CHOINE	Tionic	none	none	none	none	Done	none	pope
2.3.4.7.8-Hexachlorodibenzofum		none	No TRV	מסמב	none	Tione	DODE	none	none	none	none	none	none
.2.3.4.7.8-Hexachlorodibenzo-p-dioxin		Hone	No TRV	HODE	none	none	BOTH	none	none	none	none	Noon	ation
7 1 6 7 8 Descriptional Beauty Alexander		3.50E-01	1.60E-04	2.13E+00	3.41E-04	7.32E-01	1.178-04	7.65E-01	1.22E-04	7.39E-01	1.18E.04	5.27E-01	8 43E-05
2.3.7.8 9-Hexachlorodiberzofum	none	2000	No TRV	Bone	pope	none	none	CHARLE	pone	none	none	D0136	none
2.3.7.8.9-Hexachlorodibenzo-p-dioxin		Pione	No TRV	DOGE	2000	none	none	District	none	poine	Dobe	none	none
2.3.7.8-Pentachlorodibenzofuran		3 50E-01	1.60E-04	2,13E+00	3.41E-04	7.32E-01	1 175-04	7.65R-01	1 2212.04	7 100 01	2000	anon a	none
2,3,7,8-Pentachlorodibenzo-p-dioxin	none	pione	No TRV	none	THOME	none	none	hone	none	pope	POPPE DODGE	2.475-01	8 43E-US
2,3,4,6,7,8-Hexachlorodibenzofuran	none	DODE	No TRV	None	moon.	none	none	Tions	pone	none	none	DODG	PODDE.
2.3.4.7.8-Pentachlorodiberzofuras	Rat	3.50E-01	1 60E-05	2.13E+00	3.41E-05	7.32E-01	1.17E-05	7.65E-01	1,128-05	7.39E-01	1.18E-05	5,27E-01	8.43E-06
2,3,7,8-Tetrachlorodibenzo-p-dioxin	Rat	3.50E-01	1.00F-06	2 112400	2 118.06	7 175 01	7 175 07	none a	none	none	HODE	none	DODG
Octachlorodibenzofumn	none	DUNE	No TRV	District	Design	horse	Della Partie	10-25-01	7.03E-07	(.39E-01	7.3915-07	5.27E-01	S.27E-07
Octachlarodibenzo-p-dioxin	pone	none	No TRV	PRINCE	none	none	anon	THOUSE	none	none	none	none	Bone
Explosives							1						
3. Distillations	none	DODE	No JRV	Bone	none	none	DATE	none	none	DODG	none	none	none
2,4.6-Trinibololuene	Rat	1 505-01	1 ANE+OU	2 112 400	1 41 12 400	Tana M	BODE	note	Done	Notice	none	none	BODE
4-Distrotoluene	Mouse	3 00E-02	135E+01	1.15E+00	1.56E+01	3.968-01	5.35E+00	4 14E-01	5 SGR-400	4 00P.01	1.18E+00	5.27E-01	8 43E-01
C-Dinitrotoluene	Rat	3.50E-01	7.008-01	2.13E+00	1.49E+00	7.32E-01	5.12E-01	7.65E-01	\$36E-01	7.398-01	\$ 188.01	\$ 17P.01	3,692,01
2-Amino-4,6-dinitrotolisese	BOTSE	none	No TRV	DOOR	none	none	none	none	pone	hone	pour	Done	none
Minhenzene	DOME	none	MoTBV	none	notic	none	Delibe	none	none	pone	DINDE	none	none
Tetryl	none	none	No TRV	none	none	Done	Despe	none	Done	pione	Hone	none	none
BW(kg) Red fox =	4.535										-	NAME OF THE PARTY	MARK
BW(kg) Muskrat =	1,171												
BW(kg) Short-Inited shrew =	2100												
Charle Professional on	1 24												







Page 1 of 1

(mg/kgBW/d) benchmarkx 1.10E+02 No TRV No TRV 5.14E+00 5.14E+00 2.08E+01 No TRV No TRV 1.45E+00 1.45E+00 No TRV No TRV DCF x ECF 1.13E+00 3.53E+00 7.74E+01 1.00E+00 No TRV 7.80E+00 No TRV 1.13E+00 7.74E+01 No TRV No TRV No TRV No TRV No TRV No TRV 9.77E+02 4.50E-01 No TRV 4.70E+01 4.70E+01 No TRV No TRV No TRV No TRV No TRV No TRV 5.00E-01 conversion Endpoint factor 1.0 1.0 1.0 none 1.0 none none 0.1 none none 1.0 1.0 none 1.0 none none none none none none none 1.0 none 1.0 conversion Duration factor 1.0 1.0 1.0 none 1.0 1.0 1.0 1.0 none none none 1.0 1.0 none 1.0 1.0 1.0 1.0 1.0 1.0 none none none 1.0 Smith and Anders (1989) in [1] White and Finley (1978) in [1] White and Finley (1978) in [1] Laskey and Edens (1985) in [1] Hill and Schaffner (1976) in [1] Lepore and Miller (1965) in [1] Haseltine et al. (unpubl.) in [1] Cain and Pafford (1981) in [1] Cain and Pafford (1981) in [1] White and Dieter (1978) in [1] USFWS (1979) in [1]
USFWS (1979) in [1]
Johnson et al. (1960) in [1]
Johnson et al. (1960) in [1] Mehring et al. (1960) in [1] Mehring et al. (1960) in [1] Carriere et al. (1986) in [1] Edens et al. (1976) in [1] Edens et al. (1976) in [1] Heinz et al. (1989) in [1] Stahl et al. (1990) in [1] Stahl et al. (1990) in [1] Pattee et al 1988 none none none none none Reproduction Mortality Mortality Mortality Mortality Mortality Mortality Mortality Growth Growth Growth Endpoint Effect none NOAEL none none none none none none none none none попе none none none none none none subchronic subchronic (mg/kgBW/d) duration chronic none Benchmark Test 5.14E+00 5.14E+00 2.08E+02 .80E+00 13E+00 1.10E+02 2.08E+02 1.45E+00 1.45E+00 1.00E+00 .13E+00 .53E+01 74E+01 2.88E+01 4.70E+01 9.77E+02 74E+01 1.45E+01 1.45E+01 4.70E+01 4.50E-01 1.14E+01 5.00E-01 none nonc none none none .25E+00 .. ISE+00 50E+00 (kg) BW, 5.34E-01 .50E-01 20E-02 21E-01 1.81E-01 1.50E-01 1.50E-01 .82E-01 weight 5.34E-01 .82E-01 none none none none none body none none none none Chick (14 day old) Chick (5 week old) Chick (5 week old) Chick (14 day old) Mallard duckling Mallard duckling eghorn chicken Mallard duck Mallard duck Mallard duck Mallard duck Mallard duck Screech Owl Mallard duck Mallard duck Ringed dove Black duck Chicken Quail none Quail Quail none none none Quail none none none Organics 1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane tromium, bexavalent Beryllium Beryllium (dissolved) dmium (dissolved) rsenic (dissolved) Sarium (dissolved) opper (dissolved) constituent of lickel (dissolved) ead (dissolved) inc (dissolved) Mercury Molybdenum lagnesium langanese losphorus admium Iromium otassium mumonia untimony anadium clenium hallium Arsenic hloride /fetals Barium opper litrate ulfate lickel obalt oron ilver ncon

Appendix Table C-17. Derivation of No observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Bird Test Species

Appendix Table C-17. Derivation of No observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Bird Test Species

		Test						Duration	Endpoint	TRV
Ecological constituent of		body	Benchmark Test	Test				conversion	100	(mg/kgBW/d) benchmarkx
potential concern	Test species	(kg) BW,	(mg/kgBW/d) duration	duration	Endpoint Effect	Effect	Source	DCF	ECF	DCFx ECF
,1-Dichloroethane	none	none	none	none	none	none	none	none	none	No TRV
1, 1-Dichloroethene	none	none	none	none	none	none	none	none	. none	No IRV
,1-Dichloroethene	none	none	none	none	none	none	none	none	none	No TRV
, 1-Dichloroethene	none	none	none	none	none	none	none	none	none	No IRV
,2,3,4,6,7,8-HpCDF	none	none	none	none	none	none	none	none	none	No TRV
,2,4-trichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
,2-cis-Dichloroethene	none	none	none	none	none	none	none	none	none	No TRV
2-Dichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
2-Dichloroethane	Chicken	1.60E+00	1.72E+01	chronic	NOAEL	Reproduction	Alumot et al. (1976b) in [1]	1.0	1.0	1.72E+01
2-Dichloroethane	none	none	none	none	none	none	none	none	none	No TRV
2-Dichloroethene	none	none	none	none	none	none	none	none	none	No TRV
2-Dichloroethene	none	none	none	none	none	none	none	none	none	No TRV
2-Dichloropropane	none	none	none	none	none	none	none	none	none	No TRV
2-trans-Dichloroethene	none	none	none	none	none	none	none	none	none	No TRV
,3-Dichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
,4-Dichlorobenzene	none	none	none	none	none	none	none	none	none	No TRV
2,2,5-Trimethylhexane	none	none	none	none	none	none	none	none	none	No TRV
2,4,5-trichlorophenol	none	none	none	none	none	none	none	none	none	No TRV
2,4-D	none	none	попе	none	none	none	none	none	none	No TRV
2,4-Dimethylphenol	none	none	none	none	none	none	none	none	none	No TRV
2-Chlorophenol	none	none	none	none	none	none	none	none	none	No TRV
2-Hexanone	none	none	none	none	none	none	none	none	none	No TRV
2-Methylnaphthalene	none	none	none	none	none	none	none	none	none	No TRV
2-Methylnaphthalene	none	none	none	none	none	none	none	none	none	No TRV
2-Methylphenol	none	none	none	none	none	none	none	none	none	No TRV
4,4'-DDD	none	none	none	none	none	none	none	none	none	No TRV
4,4'-DDE	Quail	1.50E-01	8.45E+01	Acute	LOAEL	Mortality	Hill and Camardese (1986) in EPA (	0.1	0.1	8.45E-01
4,4'-DDT	Brown pelican	3.50E+00	2.80E-02	chronic	LOAEL	Reproduction	Anderson et al. (1975) in [1]	1.0	0.1	2.80E-03
-Chloro-3-methylphenol	none	none	none	none	none	none	none	none	none	No TRV
4-Methyl-2-pentanone	none	none	none	none	none	none	none	none	none	No TRV
4-Methylphenol	none	none	none	none	none	none	none	none	none	No TRV
4-Methylphenol	none	none	none	none	none	none	none	none	none	No TRV
4-Nitrophenol	none	none	none	none	none	none	none	none	none	No TRV
Acenaphthene	none	none	none	none	none	none	none	none	none	No TRV
Acenaphthylene	none	none	none	none	none	none	none	none	none	No TRV
Acetone	none	none	none	none	none	none	none	none	none	No TRV
Alkalinity	none	none	none	none	none	none	none	none	none	No TRV
Aldrin	none	none	none	none	none	none	none	none	none	No TRV
alpha-Chlordane	Red-winged blackbird	6.40E-02	2.14E+00	chronic	NOAEL	Mortality	Stickel et al. (1983) in [1]	1.0	1.0	2.14E+00
Anthracene	none	none	none	none	none	none		none	none	No TRV
Aroclor-1242	Screech owl	1.81E-01	4.10E-01	chronic	NOAEL	Reproduction	McLane and Hughes (1980) in [1]	1.0	1.0	4.10E-01
Aroclor-1248	none	none	none	none	none	none	none	none	none	No TRV
Aroclor-1254	Ring-necked pheasant	1.00E+00	1.80E+00	chronic	LOAEL	Reproduction	Dahlgren et al. (1972) in [1]	1.0	0.1	1.80E-01
Aroclor-1260	none	none	none	none	none	none	none	none	none	No TRV
Benzene	none	none	none	none	none	none	none	none	none	No TRV
Benzo(a)anthracene	none	none	none	none	none	none	none	none	none	No TRV
Benzo(a)pyrene	none	none	none	none	none	none	none	none	none	No TRV
2.0	2000	none	none	none	none	none	none	none	none	No TRV



Page 3 of 3

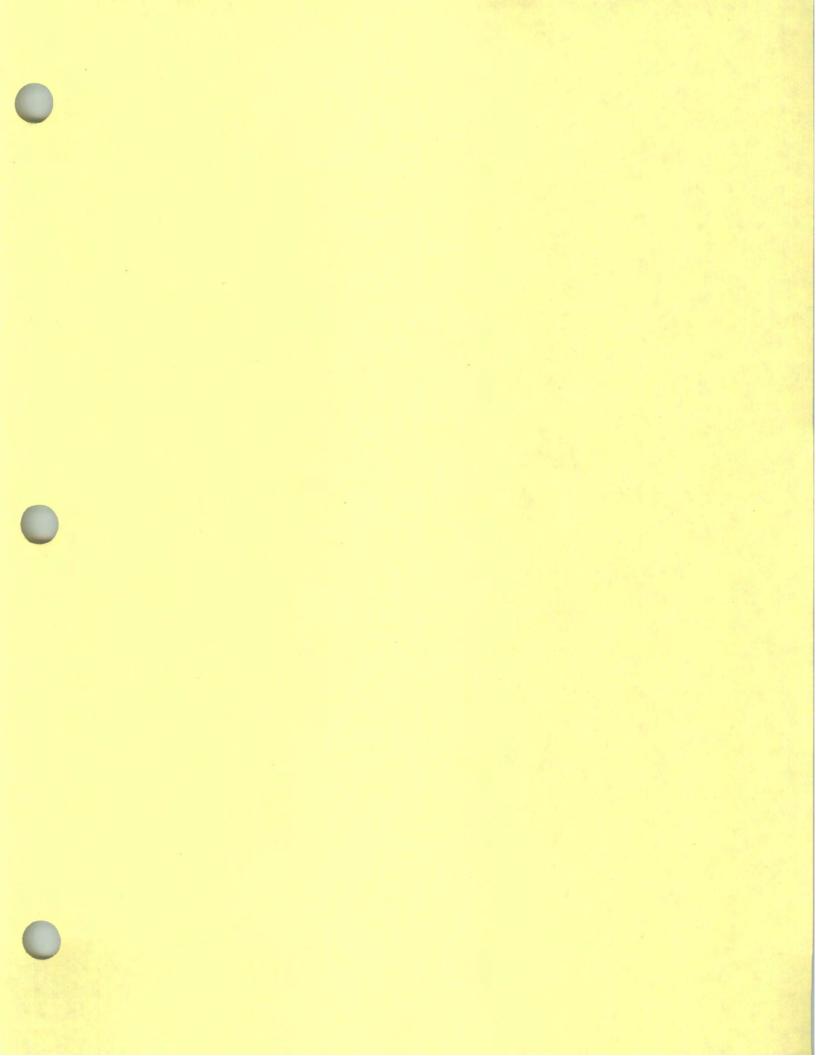
(mg/kgBW/d) benchmarkx DCF x ECF No TRV 2.14E+00 No TRV 2.14E+00 2.00E+00 6.50E-02 No TRV No TRV 1.10E+00 No TRV No TRV No TRV No TRV No TRV 1.11E-01 1.00E+01 No TRV 3.00E-01 No TRV 6.40E-03 No TRV No TRV No TRV 7.70E-02 none 1.0 1.0 1.0 0.1 conversion Duration 1.0 1.0 1.0 0.1 0.1 Hill and Camardese (1986) in EPA ( Chakravarty et al. (1986) in [1] Chakravarty et al. (1986) in [1] Mendenhall et al. (1983) in [1] Stickel et al. (1983) in [1] Stickel et al. (1983) in [1] Spann et al. (1986) in [1] Peakall (1974) in [1] Peakall (1974) in [1] Abiola (1992) in [1] Heinz (1979) in [1] Reproduction Reproduction Reproduction Reproduction Reproduction Reproduction Reproduction Mortality Mortality Mortality Endpoint Effect lone none none none none NOAEL NOAEL NOAEL NOAEL NOAEL LOAEL NOAEL NOAEL NOAEL LOAEL LOAEL none none none none none none none (mg/kgBW/d) duration chronic chronic chronic chronic chronic chronic chronic chronic Acute Benchmark Test 10E+00 2.14E+00 1.11E+00 2,14E+00 2.00E+00 7.70E-02 1.00E+01 2.00E+00 6.50E+00 3.00E-01 6.40E-02 none nonc none none none 1.15E+00 4.66E-01 1.55E-01 6.40E-02 1.00E-01 none Red-winged blackbird Red-winged blackbird Gray partridge none Mallard duck Mallard Duck Mallard Duck Ringed dove Ringed dove Mallard duck Barn owl none none Methyl mercury dicyandiamide Methylene chloride N-Nitroso-di-N-propylamine 3is(2-chloroisopropyI)ether 3is(2-ethylhexyl)phthalate ibenzo(a,h)anthracene nma-BHC (Lindane) Teptachlor epoxide ndeno(1,2,3-cd)pyrene enzo(k)fluoranthene utylbenzylphthalate senzo(g,h,i)perylene fethyl ethyl ketone vi-n-butylphthalate luorene amma-Chlordane i-n-octylphthalate ndosulfan sulfate otential concern Carbon disulfide iethylphthalate indrin aldehyde fethyl bromide Chlorobenzene senzyl alcohol onstituent of ibenzofuran Endrin ketone Methoxychlor ichloroprop enzoic acid Chloroethane Ethylbenzene luoranthene Chloroform Vaphthalene elta-BHC ndosulfan leptachlor arbazole Chlordane p-cresol icamba hrysene ieldrin

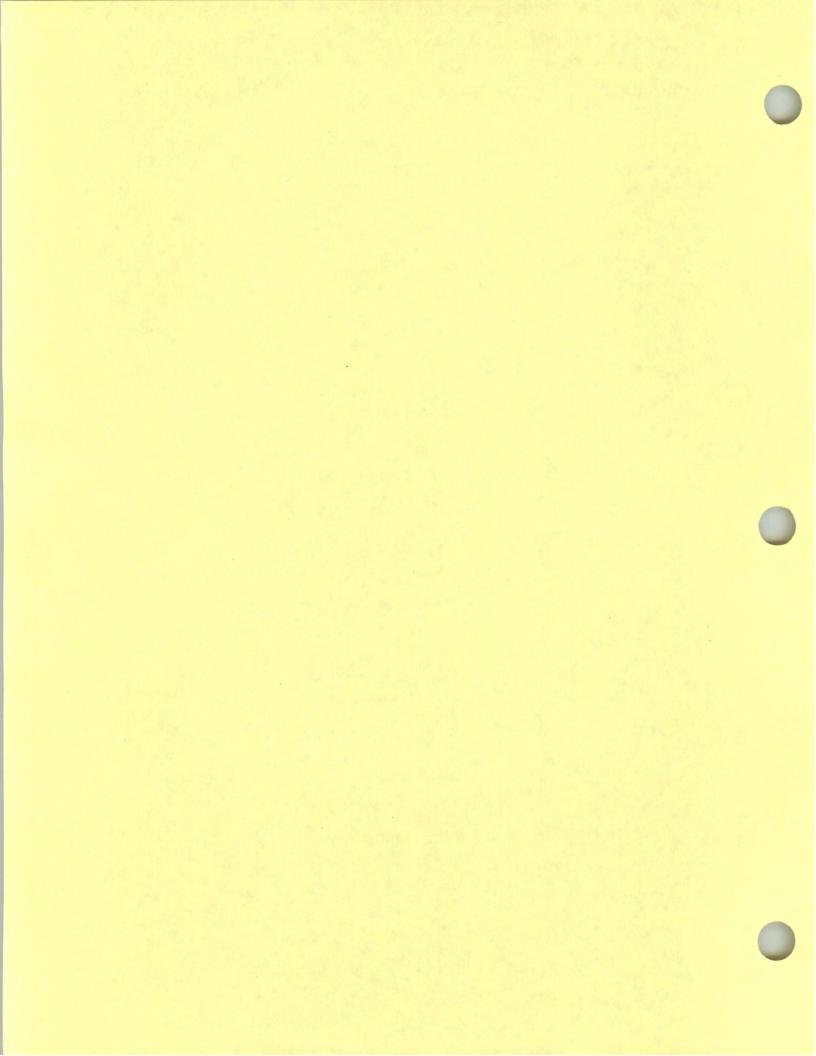
Appendix Table C-17. Derivation of No observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Bird Test Species

Appendix Table C-17. Derivation of No observed Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for Bird Test Species

Ecological Constituent of	Test	species body weight	Benchmark Test	Test	Endpoint Effect	Effect	Source	Duration conversion factor DCF	Endpoint conversion factor ECF	TRV (mg/kgBW/d) benchmarkx DCF x ECF
M. Mittagedishemylamine	none	none none	none	none	none	none	none	none	none	No TRV
	none	none	none	none	none	none	none	none	none	No TRV
	none	none	none	none	none	none	none	none	none	No TRV
	none	none	none	none	none	none	none	none	none	No TRV
	none	none	none	none	none	none	none	none	none	No TRV
Styrene	none	none	none	none	none	none	none	none	none	No TRV
Tetrachloroethene	none	none	none	none	none	none	none	none	none	No TRV
Toluene	none	none	none	none	none	none	none	none	none	No TRV
Trichloroethene	none	none	none	none	none	none	none	none	none	No TRV
Vinyl chloride	none	none	none	none	none	none	none	none	none	No TRV
Xvlenes, Total	none	none	none	none	none	none.	none	none	none	No TRV
1,2-Dimethylbenzene	none	none	none	none	none	none	none	none	none	No TRV
Dioxins and Furans										
1,2,3,4,6,7,8-Heptachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,4,7,8,9-Heptachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,4,7,8-Hexachlorodibenzofuran	none	none	none	none .	none	none	none	none	none	No TRV
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,6,7,8-Hexachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxi	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,7,8,9-Hexachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,7,8-Pentachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
2,3,4,6,7,8-Hexachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
2,3,4,7,8-Pentachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No TRV
2,3,7,8-Tetrachlorodibenzofuran	Chick (1 day old)	1.21E-01	1.00E-04	subchronic		Mortality		0.1	0.1	1.00E-06
2,3,7,8-Tetrachlorodibenzo-p-dioxin	Ring-necked Pheasant	1.00E+00	1.40E-05	chronic	NOAEL	Reproduction	Nosek et al. (1992) in [1]	1.0	1.0	1.40E-05
Octachlorodibenzofuran	none	none	none	none	none	none	none	none	none	No IRV
Octachlorodibenzo-p-dioxin	none	none	none	none	none	none	none	none	none	No TRV
Explosives										
1,3,5-Trinitrobenzene	none	none	none	none	none	none	none	none	none	No TRV
1,3-Dinitrobenzene	none	none	none	none	none	none	none	none	none	No TRV
2,4,6-Trinitrotoluene	none	none	none	none	none	none	none	none	none	No TRV
2,4-Dinitrotoluene	none	none	none	none	none	none	none	none	none	No TRV
2,6-Dinitrotoluene	none	none	none	none	none	none	none	none	none	No TRV
2-Amino-4,6-dinitrotoluene	none	none	none	none	none	none	none	none	none	No TRV
4-Amino-2, 6-dinitrotoluene	none	none	none	none	none	none	none	none	none	No TRV
Nitrobenzene	none	none	none	none	none	none	none	none	none	No TRV
Total	2000	none	none	none	none	none	none	none	none	No TRV

DCF = Duration conversion factor, 1 if chronic, 0.1 if subchronic (Sample et al. 199)
ECF = Endpoint conversion factor, 1 if NOAEL, 0.1 if LOAEL (Sample et al. 199)
NOAEL = No observed adverse effect level
LOAEL = Lowest observed adverse effect level
[1] = Sample et al. (1996)





Page 1 of 1

Red-tailed Hawk TRV (mg/kgBW/d) none none none 2 14E-02 2.08E-01 2.08E-01 2.08E-01 2.08E-01 1.45E-02 1.45E-02 1.45E-02 1.45E-02 none none none none 1.00E-02 none none 1.113E-02 1.13E-02 1.13E-02 2.113E-02 2.1 none none 5.00E-03 none Taxonomic none 1.00E-02 1.00E-02 none 1.00E-02 1.00E-02 1.00E-02 none 1.00E-02 1.00E-02 1.00E-02 none 1.00E-02 none 1.00E-02 1.00E-02 none 1.00E-02 none 1.00E-02 factor" none none none none TRV (mg/kgBW/d) TRV<sub>t</sub>x CF<sub>ux</sub> Mallard Duck 5.14E+00 5.14E+00 2.08E-01 2.08E-01 none none 2.88E+01 1.45E+00 1.45E+00 none none 1.00E+00 none 1.13E-02 1.13E-02 none 9.77E+00 4.50E-03 3.53E-02 7.74E+01 none 4.70E-01 4,70E-01 none 7,80E-02 5.00E-01 none none none none Taxonomic conversion none .00E+00 .00E+00 1.00E-02 none ..00E+00 ..00E+00 none none 1.00E+00 1.00E-02 1.00E-02 none 1.00E-02 1.00E-02 1.00E+00 1.00E+00 none .00E+00 factor" 1.00E-02 1.00E-02 none 1.00E-02 none none none none none none none Great Blue Heron TRV (mg/kgBW/d) TRV, x CFL 1.10E+00 none none 1,13E-02 1,13E-02 none 9,77E+00 4,50E-03 3,53E-02 7,74E-01 none 2.88E-01 1.45E-02 1.45E-02 none none 7.80E-02 5.14E-02 5.14E-02 2.08E-01 2.08E-01 none none 4.70E-01 4.70E-01 none none 5.00E-03 none none none none none none Taxonomic conversion none 1.00E-02 1.00E-02 1.00E-02 none none 1,00E-02 1.00E-02 none 1 00E-02 1.00E-02 none 1.00E-02 1.00E-02 1.00E-02 1.00E-02 factor" none 00E-02 00E-02 00E-02 none none none none TRV (mg/kgBW/d) American Robin TRV, X CF LEX none 1.13E-02 1.13E-02 none 9.77E+00 4.50E-03 3.53E-02 7.74E-01 7.80E-02 1.10E+00 5.14E-02 5.14E-02 2.08E-01 2.08E-01 none none 2.88E-01 1.45E-02 1.45E-02 none 1,00E-02 4.70E-01 none none 5.00E-03 none none none none none none .00E-02 .00E-02 1.00E-02 1.00E-02 none 1 00E-02 1 00E-02 1 00E-02 1 00E-02 .00E-02 none none none CFLEX 1,10E+02
No TRV
No TRV
No TRV
5,14E+00
5,14E+00
2,08E+01
2,08E+01
No TRV
2,88E+01
1,45E+00
1,45E+00
1,45E+00
No TRV
NO TR 7,74E+01 7,74E+01 No TRV No TRV No TRV No TRV S.00E-01 No TRV No TRV No TRV No TRV No TRV none 1.00E+00 1.00E+00 1.21E-01 1.21E-01 1.00E+00 1.15E+00 1.15E+00 1.15E+00 none none none none 5.34E-01 5.34E-01 none 1,50E-01 1,50E-01 none 7,20E-02 1,50E-00 7,82E-01 7,82E-01 .17E+00 .94E+00 .94E+00 none none none Test species body weight (kg) none 1,81E-01 none Chick (5 week old) Chick (5 week old) Chick (14 day old) Chick (14 day old) Quail Chicken Mallard duckling Mallard duckling Mallard duck Leghorn chicken Leghorn chicken none Mallard duck Mallard duck Mallard duck Mallard duck Mallard duck Ringed dove none Black duck Screech Owl none 1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane Dadmium Cadmium (dissolved) hromium, hexavalent eryllium eryllium (dissolved) Copper (dissolved) rsenic (dissolved) arium (dissolved) Vickel Vickel (dissolved) itential concern Ecological constituent of ead (dissolved) ne (dissolved) sarium Metals obalt

Appendix Table C-18. NOAEL Toxicity Reference Values (TRVs) for Bird Receptors

		-	_		American Mobile						
Ecological constituent of potential concern	Test species	rest species body weight (kg)	TRV, (mg/kgBW/d)	Taxonomic conversion factor* CF <sub>lex</sub>	TRV (mg/kgBW/d) TRV <sub>1</sub> x CF <sub>nx</sub>	Taxonomic conversion factor*	TRV (mg/kgBW/d) TRV,x CF <sub>ux</sub>	Taxonomic conversion factor*	TRV (mg/kgBW/d) TRV <sub>t</sub> x CF <sub>tax</sub>	Taxonomic conversion factor*	TRV (mg/kgBW/d) TRV,x CF <sub>lax</sub>
1-Dichloroethane	none	none	No TRV	none	none	none	none	none	none	none	none
1-Dichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
1-Dichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
1-Dichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
2,3,4,6,7,8-HpCDF	none	none	No TRV	none	none	none	none	none	none	none	none
2,4-trichlorobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
,2-cis-Dichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
,2-Dichlorobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
,2-Dichloroethane	Chicken	1.60E+00	1.72E+01	1.00E-02	1.72E-01	1.00E-02	1.72E-01	1.00E-02	1.72E-01	1.00E-02	1.72E-01
,2-Dichloroethane	none	none	No TRV	none	none	none	none	none	none	none	none
,2-Dichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
,2-Dichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
,2-Dichloropropane	none	none	No TRV	none	none	none	none	none	none	none	none
,2-trans-Dichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
,3-Dichlorobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
,4-Dichlorobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
2,2,5-Trimethylhexane	none	none	No TRV	none	none	none	none	none	none	none	none
2,4,5-trichlorophenol	none	none	No TRV	none	none	none	none	none	none	none	none
2,4-D	none	none	No TRV	none	none	none	none	none	none	none	none
2,4-Dimethylphenol	none	none	No TRV	none	none	none	none	none	none	none	none
2-Chlorophenol	none	none	No TRV	none	none	none	none	none	none	none	none
2-Hexanone	none	none	No TRV	none	none	none	none	none	none	none	none
2-Methylnaphthalene	none	none	No TRV	none	none	none	none	none	none	none	none
2-Methylnaphthalene	none	none	No TRV	none	none	none	none	none	none	none	none
2-Methylphenol	none	none	No TRV	none	none	none	none	none	none	none	none
4,4'-DDD	none	none	No TRV	none	none	попе	none	none	none	none	none
4,4'-DDE		1.50E-01	8.45E-01	1.00E-02	8.45E-03	1.00E-02	8.45E-03	1.00E-02	8.45E-03	1.00E-02	8.45E-03
4,4'-DDT	Brown pelican	3.50E+00	2.80E-03	1.00E-02	2.80E-05	1.00E-02	2.80E-05	1.00E-02	2.80E-05	1.00E-02	7.80E-05
4-Chloro-3-methylphenol	none	none	No TRV	none	none	none	none	none	none	none	none
4-Methyl-2-pentanone	none	none	No TRV	none	none	none	none	none	none	none	none
4-Methylphenol	none	none	No TRV	none	none	none	none	none	none	none	none
4-Methylphenol	none	none	No TRV	none	none	none	none	none	none	none	none
+-Nitrophenol	none	none	No TRV	none	none	none	none	none	none	none	none
Acenaphthene	none	none	No TRV	none	none	none	none	none	none	none	none
Acenaphthylene	none	none	No TRV	none	none	none	none	none	none	none	none
Acetone	none	none	No TRV	none	none	none	none	none	none	none	none
Alkalinity	none	none	No TRV	none	none	none	none	none	none	none	none
Aldrin	none	none	No TRV	none	none	none	none	none	none	none	none
alpha-Chlordane	Red-winged blackbird	6.40E-02	2.14E+00	3.30E-01	7.06E-01	1.00E-02	2.14E-02	1.00E-02	2.14E-02	1.00E-02	2.14E-02
Anthracene	none	none	No TRV	none	none	none	none	none	none	none	none
Aroclor-1242	Screech owl	1.81E-01	4.10E-01	1.00E-02	4.10E-03	1.00E-02	4.10E-03	1.00E-02	4.10E-03	1.00E-02	4.10E-03
Aroclor-1248	none	none	No TRV	none	none	none	none	none	none	none	none
Aroclor-1254	Ring-necked pheasant	1.00E+00	1.80E-01	1.00E-02	1.80E-03	1.00E-02	1.80E-03	1.00E-02	1.80E-03	1.00E-02	1.80E-03
Aroclor-1260	none	none	No TRV	none	none	none	none	none	none	none	none
Benzene	none	none	No TRV	none	none	none	none	none	none	none	none
Benzo(a)anthracene	none	none	No TRV	none	none	none	none	none	none	none	none
Benzo(a)pyrene	none	none	No TRV	none	none	none	none	none	none	none	none



Appendix Table C-18. NOAEL Toxicity Reference Values (TRVs) for Bird Receptors

					American Robin		Great Blue Heron		Mallard Duck		Red-tailed Hawk
		Test		Taxonomic							
Ecological constituent of potential concern	Test species	body weight (kg)	TRV <sub>1</sub> (mg/kgBW/d)	conversion factor* CF <sub>tx</sub>	TRV (mg/kgBW/d) TRV, x CF <sub>tax</sub>	Taxonomic conversion factor*	TRV (mg/kgBW/d) TRV,x CF <sub>tox</sub>	Taxonomic conversion factor*	TRV (mg/kgBW/d) TRV, x CF <sub>ix</sub>	Taxonomic conversion factor*	(mg/kgBW/d) TRV,x CF <sub>int</sub>
Benzo(g,h,i)perylene	none	none	No TRV	none	none	none	none	none	none	none	none
Benzo(k)fluoranthene	none	none	No TRV	none	none	none	none	none	none	none	none
Benzoic acid	none	none	No TRV	none	none	none	none	none	none	none	none
Benzyl alcohol	none	none	No TRV	none	none	none	none	none	none	none	none
Bis(2-chloroisopropyl)ether	none	none	No TRV	none	none	none	none	none	none	none	none
Bis(2-ethylhexyl)phthalate	Ringed dove	1.55E-01	1.10E+00	1.00E-02	1.10E-02	1.00E-02	1.10E-02	1.00E-02	1,10E-02	1.00E-02	1.10E-02
Butylbenzylphthalate	none	none	No TRV	none	none	none	none	pone	none	none	none
Carbazole	none	none	No TRV	none	none	none	none	none	none	none	none
Carbon disulfide	none	none	No TRV	none	none	none	none	none	none	none	none
Chlordane	Red-winged blackbird 6.40E-02	6.40E-02	2.14E+00	3,30E-01	7.06E-01	1.00E-02	2.14E-02	1.00E-02	2.14E-02	1.00E-02	2.14E-02
Chlorobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
Chloroethane	none	none	No TRV	none	none	none	попе	none	none	none	none
Chloroform	none	none	No TRV	none	none	none	none	none	none	none	none
Chrysene	none	none	No TRV	none	none	попе	none	none	none	none	none
m,p-cresol	none	none	No TRV	none	none	none	none	none	попе	none	none
Dalapon	none	none	No TRV	none	none	none	none	none	none	none	none
delta-BHC	none	none	No TRV	auou	none	none	none	none	none	none	none
Dibenzo(a,h)anthracene	none	none	No TRV	none	none	none	none	none	none	none	none
Dibenzofuran	none	none	No TRV	none	none	nobe	none	none	none	none	none
Dicamba	none	pone	No IRV	none	none	none	none	none	none	none	none
Dichloroprop		none	No IKV	none.	none	none	none	none	none	none	none
Dietalehtelet	IMO	4.60E-01	1.70E-02	1.00E-02	/. /OE-U4	1.00E-02	7.70E-04	1.00E-02	1.70E-04	1,00E-02	7.70E-04
Dien-hutchhalaire	Ringed doors	1 SSE-D1	1116-01	1 DOE-02	1 1115-03	1 00E-02	1 1 1E-03	1 00 1-02	111E-03	1 00E-02	11111-03
Di-n-octylphthalate	1000	0000	Valley		none	2000	2000	2000	2000	2000	2000
Endosulfan	partridge	4.00E-01	1.00E+01	1.00E-02	1.00E-01	1.00E-02	1.00E-01	1.00E-02	1.00E-01	1.00E-02	1.00E-01
Endosulfan sulfate		none	No TRV	none	none	none	none	none	none	none	none
Endrin	Mallard duck	1.15E+00	3.00E-01	1.00E-02	3.00E-03	1.00E-02	3.00E-03	1.00E+00	3.00E-01	1.00E-02	3.00E-03
Endrin aldehyde	none	none	No TRV	none	none	none	none	none	none	none	none
Endrin ketone	none	none	No TRV	none	none	none	none	none	none	none	none
Elhylbenzene	none	none	No IRV	none	none	none	none	none	none	none	none
Fluoranthene	none	none	No IRV	none	none	none	none	none	none	none	none
Fluorene Fluorene	Dad-winged blackhind	K AOE 02	No IRV	3 30E 01	7 OCE OIL	1 OOE OO	7 14E-02	1 DOE DO	none c	1 OOF 02	7 LAE 07
gamma-BHC (Lindane)	Mallard Duck	1.00E+00	2.00E+00	1.00E-02	2 00E-02	1.00E-02	2.00E-02	1.00E+00	2.00E+00	1.00E-02	2.00E-02
Lindane	Malfard Duck	1,00E+00	2.00E+00	1.00E-02	2.00E-02	1.00E-02	2.00E-02	1.00E+00	2.00E+00	1.00E-02	2.00E-02
Heptachlor.	Quail	1.50E-01	6.50E-02	1.00E-02	6.50E-04	1.00E-02	6.50E-04	1.00E-02	6.50E-04	1.00E-02	6.50E-04
Heptachlor epoxide	none	none	No TRV	none	none	none	none	none	none	none	none
Indeno(1,2,3-cd)pyrene	none	none	No TRV	none	none	none	none	none	none	none	none
MCPA	none	none	No TRV	none	none	none	none	none	none	none	none
MCPP	none	none	No TRV	none	none	none	none	none	none	none	none
Methyl bromide	none	none	No TRV	none	none	none	none	none	none	none	none
Methyl ethyl ketone Methyl mercury disyandiamide	Mallard duck	1 DOE+DO	S 40F-03	1 DOF-02	6 40F-05	1 OOF-03	6 40F-05	1 008+00	6 40F-03	1 OOF-07	6 40E-05
Methylene chloride	none	none	No TRV	none	none	none	none	none	none	none	none
Methoxychlor	none	none	No TRV	none	none	none	none	none	none	none	none
Naphthalene	none	none	No TRV	none	none	none	none	none	none	none	none
N-Nitroso-di-N-propylamine	none	none	No TRV	none	none	none	none	none	none	none	9000

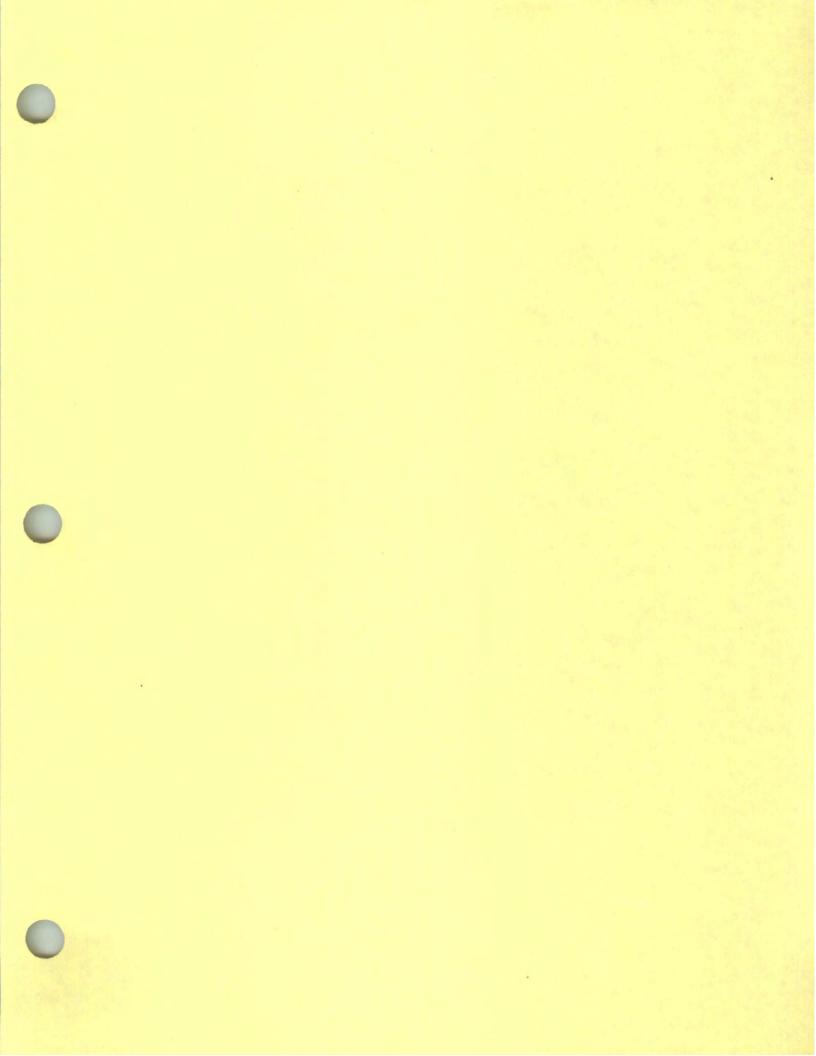
Appendix Table C-18. NOAEL Toxicity Reference Values (TRVs) for Bird Receptors

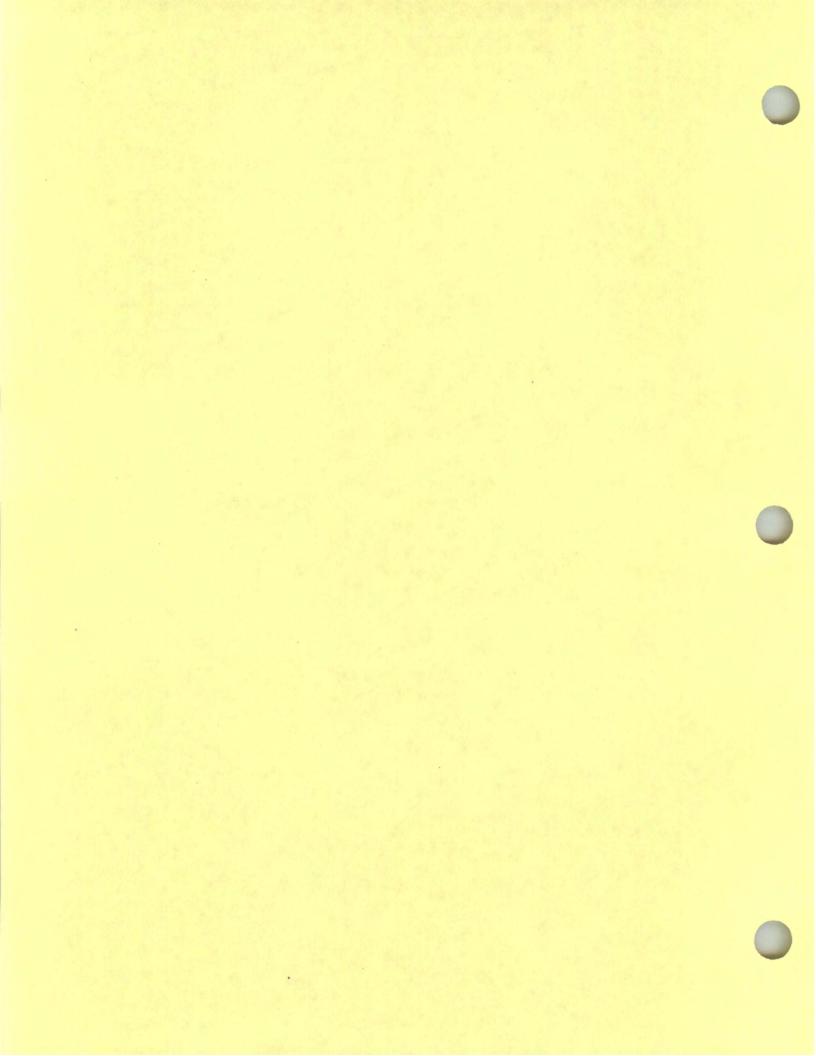
					American Robin		Great Blue Heron		Mallard Duck		Red-tailed Hawk
		Test		Taxonomic							
Ecological constituent of		body	TRV,	conversion factor*	TRV (mg/kgBW/d)	Taxonomic	TRV (mg/kgBW/d)	Taxonomic	TRV (mg/kgBW/d)	Taxonomic	TRV (mg/kgBW/d)
potential concern	Test species	(kg)	(mg/kgBW/d)	CF <sub>lax</sub>	TRV <sub>1</sub> x CF <sub>12x</sub>	factor	TRV <sub>1</sub> x CF <sub>1xx</sub>	factor"	TRV <sub>1</sub> x CF <sub>1ax</sub>	factor."	TRV, x CF <sub>lax</sub>
N-Nitrosodiphenylamine	none	none	No TRV	none	none	none	none	none	none	none	none
Pentachlorophenol	none	none	No TRV	none	none	none	none	none	none	none	none
Phenanthrene	none	none	No TRV	none	none	none	none	none	none	none	none
Phenol	none	none	No TRV	none	none	none	none	none	none	none	none
Pyrene	none	none	No TRV	none	none	none	none	none	none	none	none
Styrene	none	none	No TRV	none	none	none	none	none	none	none	none
Tetrachloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
Toluene	none	none	No TRV	none	none	none	none	none	none	none	none
Trichloroethene	none	none	No TRV	none	none	none	none	none	none	none	none
Vinyl chloride	none	none	No TRV	none	none	none	none	none	none	none	none
Xylenes, Total	none	none	No TRV	none	none	none	none	none	none	none	none
1,2-Dimethylbenzene	none	none	No TRV	none	none	none	none	none	none	none	none
Dioxins and Furans											
1,2,3,4,6,7,8-Heptachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,4,7,8,9-Heptachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,4,7,8-Hexachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,6,7,8-Hexachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,7,8,9-Hexachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,7,8-Pentachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	none	none	No TRV	none	none	none	none	none	none	none	none
2,3,4,6,7,8-Hexachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
2,3,4,7,8-Pentachlorodibenzofuran	none	none	No TRV	none	none	none	none	none	none	none	none
2,3,7,8-Tetrachlorodibenzofuran	Chick (1 day old)	1.21E-01	1.00E-06	1.00E-02	1.00E-08	1.00E-02	1.00E-08	1.00E-02	1.00E-08	1.00E-02	1.00E-08
2,3,7,8-Tetrachlorodibenzo-p-dioxin	Ring-necked Pheasant	1.00E+00	1.40E-05	1.00E-02	1.40E-07	1.00E-02	1.40E-07	1.00E-02	1.40E-07	1.00E-02	1.40E-07
Octachlorodibenzo-p-dioxin	none	none	NoTRV	none	none	none	none	none	none	none	none
Explosives											
1,3,5-Trinitrobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
1,3-Dinitrobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
2,4,6-Trinitrotoluene	none	none	No TRV	none	none	none	none	none	none	none	none
2,4-Dinitrotoluene	none	none	No TRV	none	none	none	none	none	none	none	none
2,6-Dinitrotoluene	none	none	No TRV	none	none	none	none	none	none	none	none
2-Amino-4,6-dinitrotoluene	none	none	No TRV	none	none	none	none	none	none	none	none
4-Amino-2,6-dinitrotoluene	none	none	No TRV	none	none	none	none	none	none	none	none
Nitrobenzene	none	none	No TRV	none	none	none	none	none	none	none	none
Tetryl	none	none	No TRV	none	none	none	none	none	none	none	none

TRV = toxicity reference value

\* Taxonomic adjustment factor for relatedness of test species and receptor (Ohio EPA 2003): 1 if same genus, 0.33 if same family, 0.10 if same order, 0.01 if same class







Appendix Table C-19. 40 mm Range Hazard Quotients for Plants and Earthworms Exposed to Shallow Surface Soil (0-1 ft) COPECs at Ravenna, Ohio

		Plants				Earthworms	
COPECs inputted from ESV media screen	Shallow Surface Soil RME Concentrations (mg/kg)	Plant TRVª	Plant HQ Plant RME/TRV	CAO	Earthworm TRV <sup>b</sup>	Earthworm HQ Earthworm	5 4 5 5
Inorganics	6	(90)			(Sugar)	MME/INV	COEC
Aluminum	1.24E+04	5.00E+01	2.48E+02	Ves	No TRV	No TRV	30%
Arsenic	1.25E+01	1,00E+01	1.25E+00	Ves	6 00F±01	7 08F 01	yes
Cadmium	1.78E-01	4.00E+00	4.45E-02	no no	2 00F+01	8 90F-03	011
Chromium	4.39E+01	1.00E+00	4.39E+01	ves	4.00E-01	1.10E+02	OH
Chromium, hexavalent	2.73E+00	No TRV	No TRV	yes	No TRV	No TRV	VPS
Copper	2.02E+01	1.00E+02	2.02E-01	no	6.00E+01	3.37E-01	000
Lead	1.85E+01	5.00E+01	3.70E-01	no	5.00E+02	3.70E-02	ou ou
Mercury	1.36E-02	3.00E-01	4.53E-02	no	1.00E-01	1 36E-01	04
Thallium	8.04E-01	1.00E+00	8.04E-01	no	No TRV	No TRV	VPC
Vanadium	2.27E+01	2.00E+00	1.14E+01	yes	No TRV	No TRV	VPS
Zinc	6.39E+01	5.00E+01	1.28E+00	200	2 00E+02	3 20E 01	353
Organics-Explosives				255	2,000,102	3.20E-01	no
2,6-Dinitrotoluene Organics-Semivolatiles	5.00E-02	No TRV	No TRV	yes	No TRV	No TRV	yes
Bis(2-ethylhexyl)phthalate Organics-Pesticides	1.50E-01	No TRV	No TRV	yes	No TRV	No TRV	yes
4,4'-DDE	3.30E-04	No TRV	No TRV	ves	No TRV	No TRV	300
Aldrin	1.20E-03	No TRV	No TRV	yes	No TRV	No TRV	yes
Dieldrin	1.17E-03	No TRV	No TRV	yes	No TRV	No TRV	yac
Endrin aldehyde	8.50E-04	No TRV	No TRV	yes	No TRV	No TRV	yes
Heptachlor	7.90E-04	No TRV	No TRV	yes	No TRV	No TRV	ves
Lindane	9.30E-04	No TRV	No TRV	yes	No TRV	No TRV	Ape

COPEC = chemical of potential ecological concern

ESV = ecological screening value

RME = Reasonable maximum exposure (lower of maximum and 95% upper confidence limit of mean)

<sup>a</sup>Plant TRV reference from Efroymson et al. (1997a)

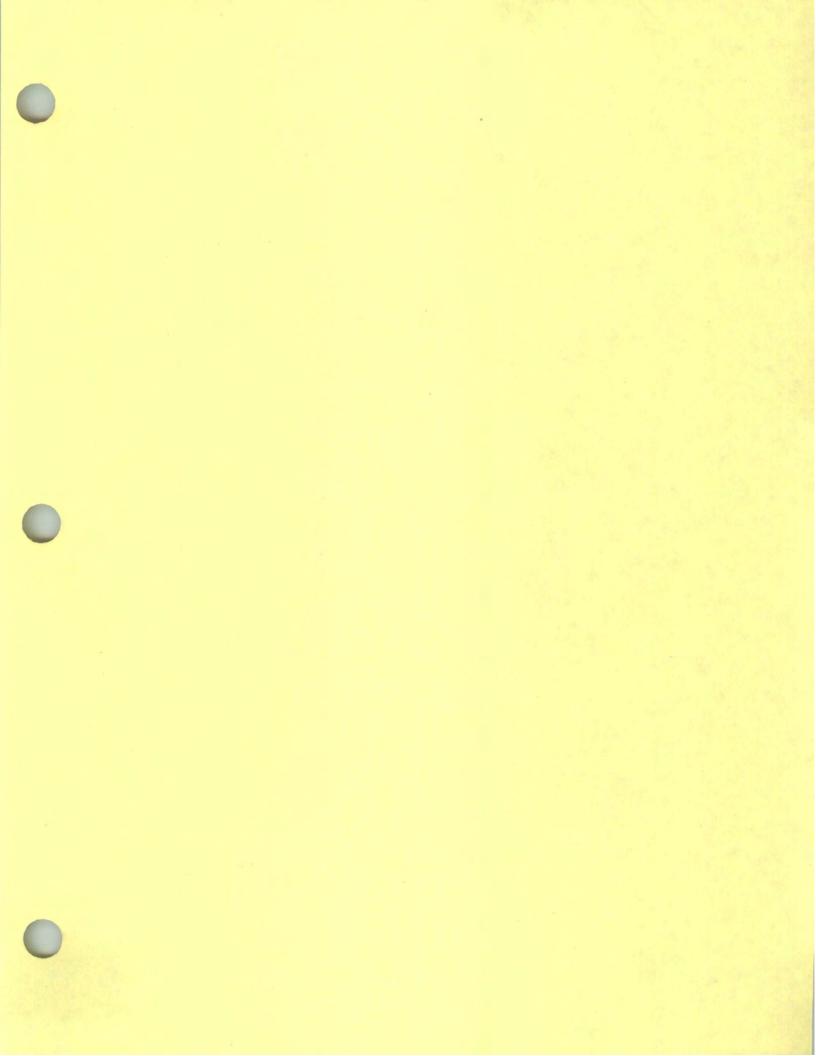
TRV = toxicity reference value

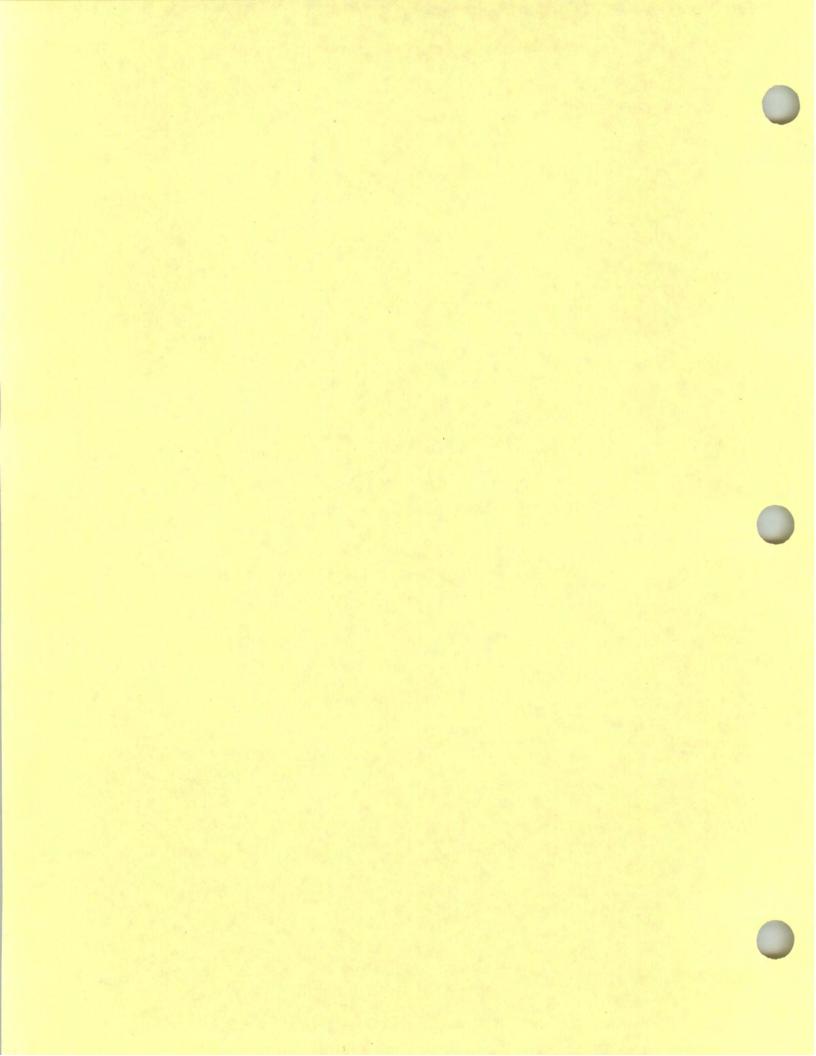
HQ = Hazard quotient COEC = chemical of ecological concern "yes" = HQ > 1 or "No TRV"

"no" = HQ less than or equal to 1

<sup>b</sup>Earthworm TRV reference from Efroymson et al. (1997b)

HQs in bold font are > 1





Appendix Table C-20. 40 mm Range Hazard Quotients for Cottontail Rabbits Exposed to Shallow Surface Soil (0-1 ft) COPECs at Ravanna, Ohio

COPECs inputted from ESV media screen	RME Concentration (mg/kg)	SP.	ADD <sub>P</sub> (mg/kgBW/d) RME $x$ SP <sub>v</sub> $x$ CF $x$ I <sub>o</sub> $x$ AUF	BAF.	ADD <sub>A</sub> (mg/kgBW/d) RME x BAF <sub>1</sub> x CF. x L. x AUR	ADD <sub>A</sub>	ADD <sub>total</sub> (mg/kgBW/d) ADD <sub>P</sub> + ADD <sub>A</sub> +	NOAEL TRV	HQ	Saos
Inorganics					TOTAL WAY WITH	TOTAL VSV WORKS	Some	(mig very min)	AL Liotal LIKV	CORC
Aluminum	1.24E+04	4.00E-03	3.65E-01	2.20E-01	0.00E+00	4.08E+01	4.11E+01	7.64E-01	5 38E+01	200
Arsenic	1.25E+01	4.00E-02	3.68E-03	2.58E-01	0.00E+00	4.11E-02	4.48E-02	4.99E-02	8 98F-01	200
Cadmium	1.78E-01	5.50E-01	7.21E-04	1.71E+01	0.00E+00	5.85E-04	1.31E-03	7.06E-01	1.85E-03	ou ou
Chromium	4.39E+01	7.50E-03	2.42E-03	1.10E+00	0.00E+00	1.44E-01	1.47E-01	2.00E+03	7.33E-05	00
Chromium, hexavalent	2.73E+00	7.50E-03	1.51E-04	1.10E+00	0.00E+00	8.98E-03	9.13E-03	9.62E-01	9.49E-03	по
Copper	2.02E+01	4.00E-01	5.95E-02	4.00E-02	0.00E+00	6.64E-02	1.26E-01	1.11E+01	1.13E-02	no
Lead	1.85E+01	4.50E-02	6.13E-03	3.34E+00	0.00E+00	6.08E-02	6.70E-02	5.85E+00	1.14E-02	no
Mercury	1.36E-02	9.00E-01	9.01E-05	5.23E+00	0.00E+00	4.47E-05	1.35E-04	9.61E-01	1.40E-04	DO.
Thallium	8.04E-01	4.00E-03	2.37E-05	2.20E-01	0.00E+00	2.64E-03	2.67E-03	5.47E-03	4.87E-01	no n
Vanadium	2.27E+01	5.50E-03	9.19E-04	3.21E-01	0.00E+00	7.47E-02	7.56E-02	1.43E-01	5.30E-01	00
Zinc	6.39E+01	1.50E+00	7.05E-01	5.77E+00	0.00E+00	2.10E-01	9.16E-01	1.17E+02	7 87F-03	9
Organics-Explosives									00-770:	OIT
2,6-Dinitrotoluene	5.00E-02	3.15E+00	1.16E-03	2.05E-04	0.00E+00	1.64F-04	1 32F-03	5 10E-01	2 500 03	
Organics-Semivolatiles							200	2.125-01	2.30E-03	no
Bis(2-ethylhexyl)phthalate Organics-Pesticides	1.50E-01	3.80E-02	4.20E-05	3.51E-04	0.00E+00	4.93E-04	5.35E-04	7.25E+00	7.39E-05	no
4,4'-DDE	3,30E-04	9.37E-03	2.28E-08	1.26E+00	0.00E+00	1.09F-06	1.11E-06	7325.01	1 510 00	
Aldrin	1,20E-03	1.04E-02	9.18E-08	4.10E-04	0.00E+00	3.95E-06	4 04F-06	1 46F-01	276F 05	OII
Dieldrin	1.17E-03	3.49E-02	3.00E-07	3.54E-04	0.00E+00	3.85E-06	4.15F-06	1.46F-02	2 63 0 0 4	OH
Endrin aldehyde	8.50E-04	6.51E-02	4.07E-07	3.28E-04	0.00E+00	2 80F-06	3 20E 06	Me TPM	M. TD17	OU
Heptachlor	7.90E-04	4.89E-02	2.84E-07	1.40E+00	0.00E+00	2.60E-06	2.88F-06	9 57E-02	3 03E 05	yes
Lindane	9.30E-04	2.74E-01	1.88E-06	2.76E-04	0.00E+00	3.06E-06	4.93F-06	\$ 85F+00	9.43E 07	ОП

ESV = ecological screening value

CF = correction factor dry wt to wet wt [0.15 kd dry plant/kg wet plant]

RME = Reasonable maximum exposure (lower of maximum or 95% UCL of mean)

SP<sub>v</sub> = Soil-to-plant uptake factor, vegetative

ADD<sub>p</sub> = Average daily dose; plant

Ip (kg/kgBW/d) = Plant ingestion rate for cottontails = 1.88E-01

2.61E-01

AUF = Area use factor =

BAF<sub>i</sub> = Soil-to-animal; invertebrates

CF<sub>1</sub> = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs, and I for all other COPECs - fraction dry wt worm/kg wet wet] ADDA = Average daily dose; animal

I<sub>A</sub> (kg/kgBW/d) = Animal ingestion rate for cottontails = 0.00E+00

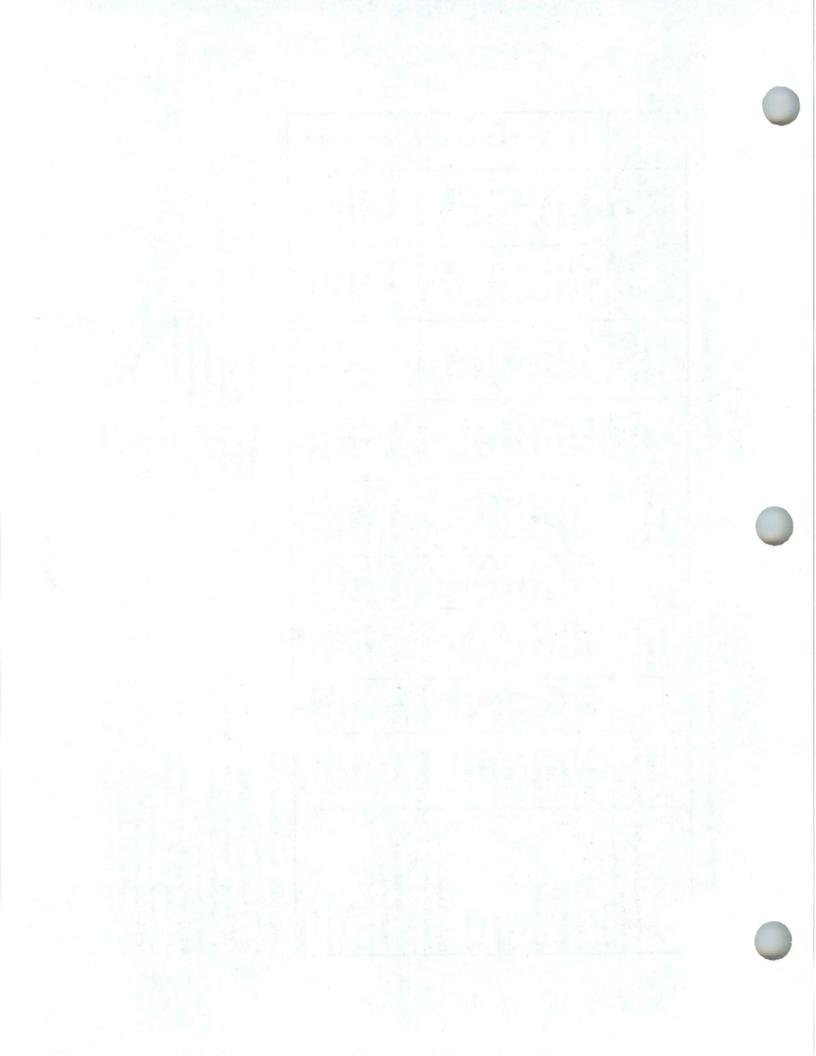
ADD<sub>S</sub> = Average daily dose; soil

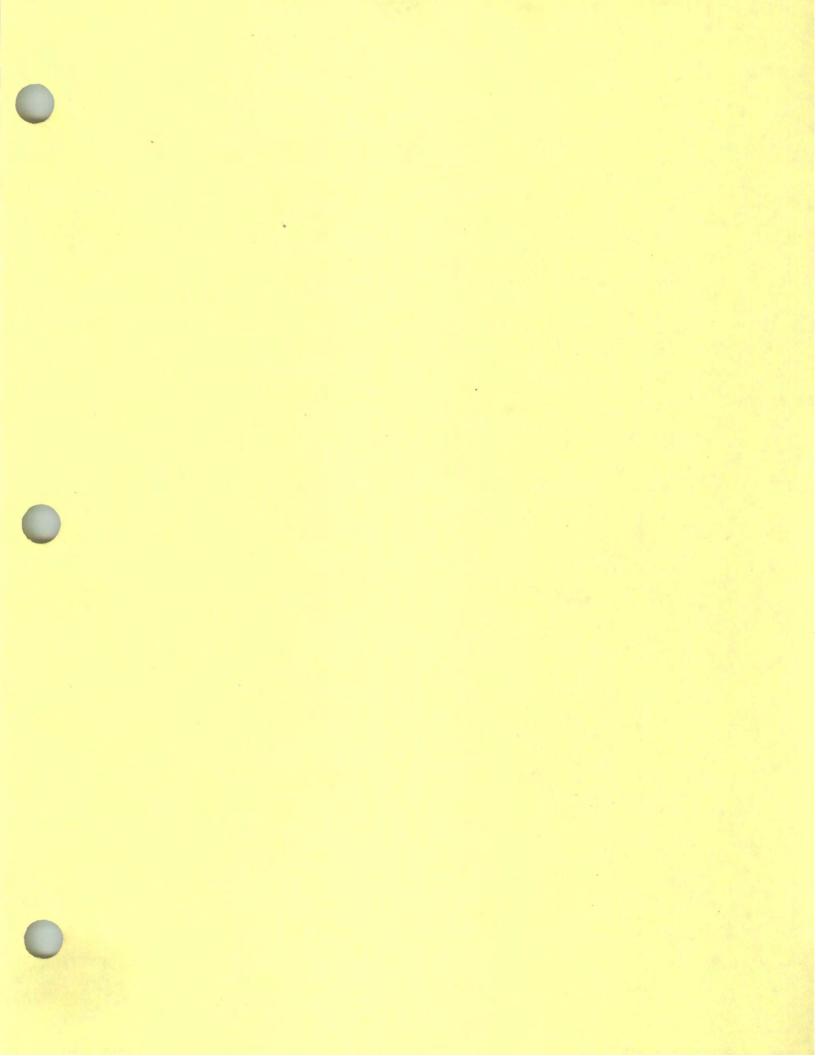
Is (kg/kgBW/d) = Soil ingestion rate for cottontails = 1.26E-02 NOAEL = lowest observed adverse effect level ADDtotal = Average daily dose; total

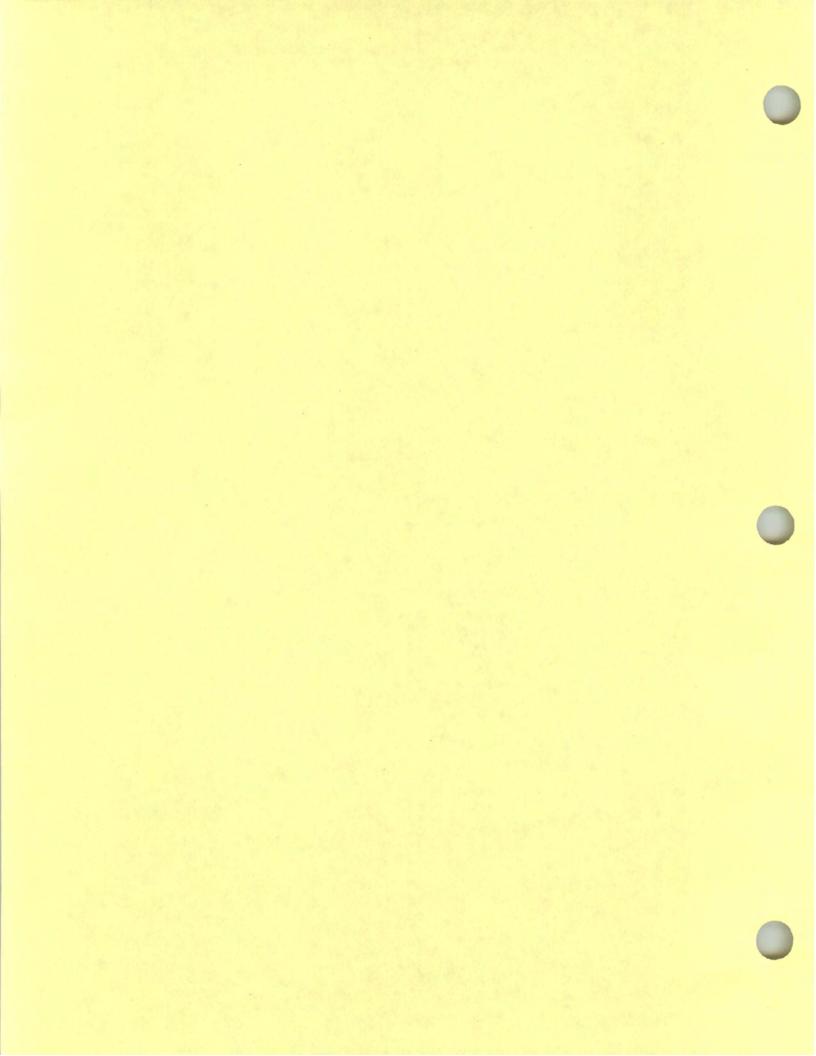
TRV (mg/kgBW/d) = toxicity reference value HQ = hazard quotient

COEC = contaminant of ecological concern

"no" = HQ less than or equal to 1 "yes" = HQ > 1 or "No TRV" HQs in bold font are > 1







Appendix Table C-21, 40 mm Range Hazard Quotients for Shrews Exposed to Shallow Surface Soil (0-1 ft) COPECs at Ravanna, Ohio

COPECs following ESV screen	RME Concentration (mg/kg)	SP	ADD <sub>P</sub> (mg/kgBW/d) RMEx SP <sub>v</sub> x CFx I <sub>b</sub> x AUF	BAF.	ADD <sub>A</sub> (mg/kgBW/d) RMEx BAF <sub>1</sub> x CF <sub>1</sub> x L <sub>2</sub> x ATF	ADD <sub>A</sub> ADD <sub>S</sub> (mg/kgBW/d)         ADD <sub>S</sub> RME x BAF <sub>i</sub> x         (mg/kgBW/d)           CF, x 1, x ATF RME x 1, x ATF	$\begin{aligned} \mathbf{ADD_{total}} \\ (\mathbf{mg/kgBW/d}) \\ \mathbf{ADD_p} + \mathbf{ADD_A} + \\ \mathbf{ADD} \end{aligned}$	NOAEL TRV	HQ Ada	Saco
Inorganics			1		TOTAL WAY TO	TOTAL VSA WOTEN	Socio	(m/McSa/Sm)	ADD total / 1KV	COEC
Aluminum	1.24E+04	4.00E-03	5.42E-01	2.20E-01	1.33E+03	4.17E+02	1.75E+03	2 22F+00	7 85E+07	200
Arsenic	1,25E+01	4.00E-02	5.46E-03	2.58E-01	2.04E-01	4.20E-01	6 30F-01	1 45F-01	4 34F+00	363
Cadmium	1.78E-01	5.50E-01	1.07E-03	1.71E+01	1.93E-01	5.98E-03	2.00E-01	2.05F+00	9 73F-02	SA.
Chromium	4.39E+01	7.50E-03	3.60E-03	1.10E+00	3.06E+00	1.48E+00	4.53E+00	5.83E+03	7.78F-04	OH OH
Chromium, hexavalent	2.73E+00	7.50E-03	2.24E-04	1.10E+00	1.90E-01	9.17E-02	2.82E-01	2.80E+00	1.01E-01	ou
Copper	2.02E+01	4.00E-01	8.82E-02	4.00E-02	5.12E-02	6.79E-01	8.18E-01	3.24E+01	2.52E-02	91
Lead	1.85E+01	4.50E-02	9.09E-03	3.34E+00	3.92E+00	6.22E-01	4.55E+00	1.70E+01	2.67F-01	000
Mercury	1.36E-02	9.00E-01	1.34E-04	5.23E+00	4.51E-03	4.57E-04	5.10E-03	2.80E+00	1.82F-03	no.
Thallium	8.04E-01	4.00E-03	3.51E-05	2.20E-01	8.62E-02	2.70E-02	1.13E-01	1.59E-02	7.11E+00	New Year
Vanadium	2.27E+01	5.50E-03	1.36E-03	3.21E-01	3.55E+00	7.63E-01	4.31E+00	4.15F-01	1 04F+01	3,
Zinc	6.39E+01	1.50E+00	1.05E+00	5.77E+00	2 33E+01	2.15F+00	2 65E±01	2 410-00	7 700 00	363
Organics-Explosives						700 7017	4.0121-01	3,41E±02	7.78E-02	no
2,6-Dinitrotoluene	5.00E-02	3.15E+00	1.72E-03	2.05E-04	5.00E-06	1 68F-03	3 408.03	1 400,000	co doc c	
Organics-Semivolatiles							co-dot-c	1.435100	7.78E-03	no
Bis(2-ethylhexyl)phthalate	1.50E-01	3.80E-02	6.22E-05	3.51E-04	2.56E-05	5.04E-03	5.13E-03	2.11E+01	2.43E-04	no
4 4'-DDF	2 300 04	00 0000	-							
14-1-	3.30E-04	9.37E-03	3.38E-08	1.26E+00	2.03E-04	1.11E-05	2.14E-04	2.13E+00	1.00E-04	no
Aldrin	1.20E-03	1.04E-02	1.36E-07	4.10E-04	2.40E-07	4.03E-05	4.07E-05	4.26E-01	9.55E-05	Ou
Dieldrin	1.17E-03	3.49E-02	4.45E-07	3.54E-04	2.02E-07	3.93E-05	4.00E-05	4.26E-02	9.38F-04	00
Endrin aldehyde	8.50E-04	6.51E-02	6.04E-07	3.28E-04	1.36E-07	2.86E-05	2.93E-05	NoTRV	NoTRV	VAC
Heptachlor	7.90E-04	4.89E-02	4.22E-07	I.40E+00	5.39E-04	2.65E-05	5.66E-04	2.77E-01	2.04F-03	000
Lindane	9.30E-04	2.74E-01	2.78E-06	2.76E-04	1.25E-07	3.12E-05	3.42E-05	1.70E+01	2 00F-06	2

ESV = ecological screening value

CF = correction factor dry wt to wet wt [0.15 kd dry plant/kg wet plant]

RME = Reasonable maximum exposure (lower of maximum or 95% UCL of mean)

SP<sub>v</sub> = Soil-to-plant uptake factor, vegetative

ADD<sub>p</sub> = Average daily dose; plant

Ip (kg/kgBW/d) = Plant ingestion rate for shrews = 7.28E-02

AUF = Area use factor (1.0)

BAF<sub>i</sub> = Soil-to-animal; invertebrates

ADDA = Average daily dose; animal

CF<sub>1</sub> = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs, and 1 for all other COPECs - fraction dry wt worm/kg wet wet]

 $I_A$  (kg/kgBW/d) = Animal ingestion rate for shrews = 4.87E-01

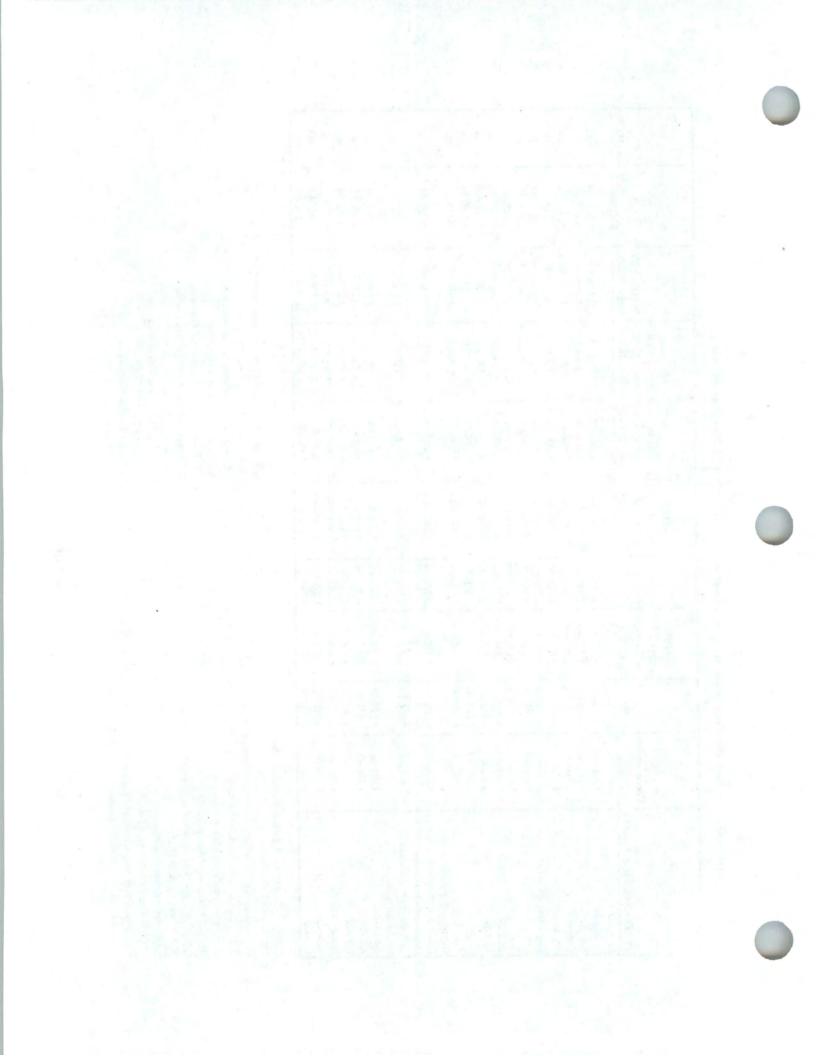
ADD<sub>s</sub> = Average daily dose; soil

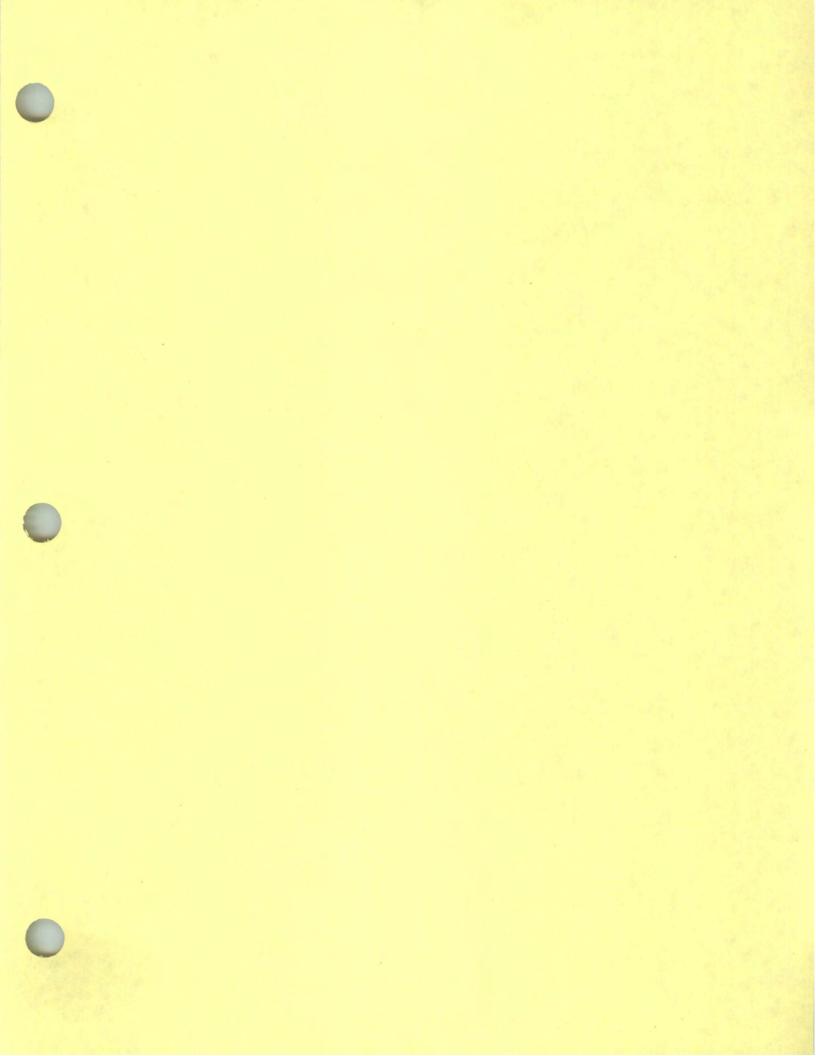
 $I_{S}(kg/kgBW/d) = Soil\ ingestion\ rate\ for\ shrews = 3.36E-02$  ADDtotal = Average daily dose; total

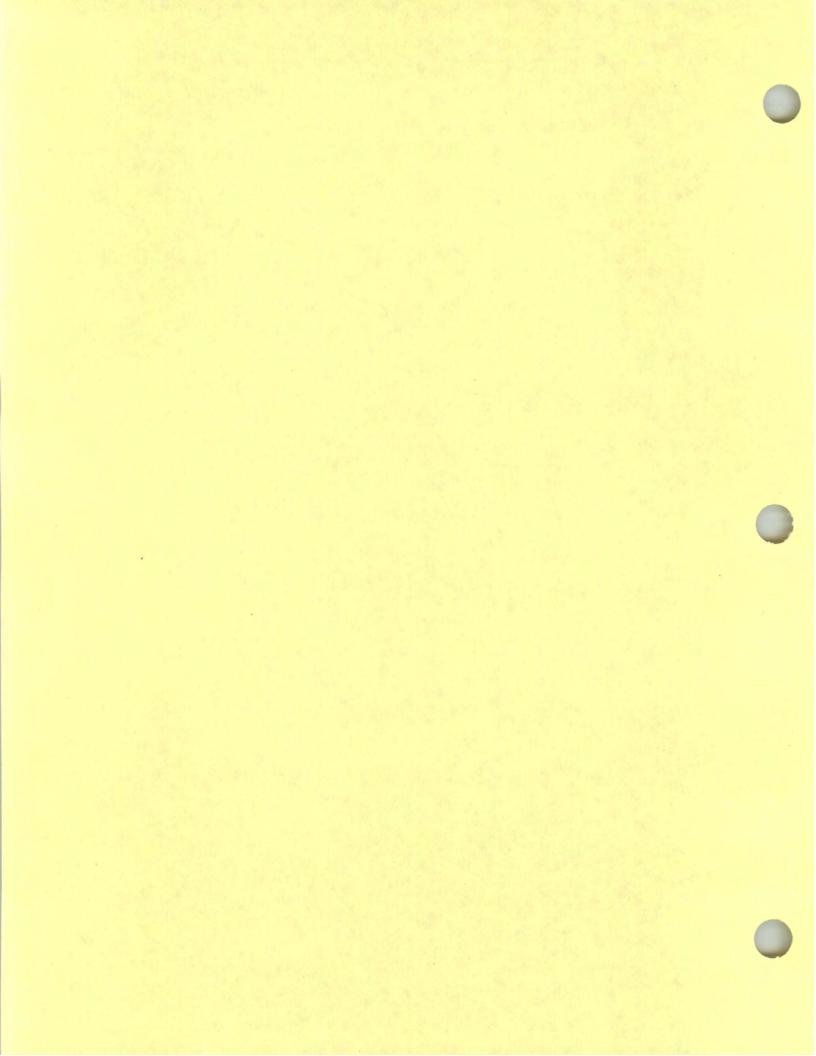
NOAEL = lowest observed adverse effect level TRV (mg/kgBW/d) = toxicity reference value HQ = hazard quotient

COEC = contaminant of ecological concern

"yes" = HQ > 1 or "No TRV" "no" = HQ less than or equal to 1 HQs in hold font are >1







Appendix Table C-22. 40 mm Range Hazard Quotients for Red Foxes Exposed to Shallow Surface Soil (0-1 ft) PBT COPECS at Ravenna, Ohio

PBT COPECs remaining after ESV screen	RME Concentration (mg/kg)	SPr	ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>r</sub> x CP <sub>r</sub> x I <sub>P</sub> x AUE.	SP.	Prey ADD <sub>e</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CFvx I <sub>p</sub> x AUF-s	BAR	Prey ADD <sub>A</sub> (mg/kgBW/d) RME x BAF <sub>1</sub> x CF <sub>1</sub>	Prey ADDs (mg/kgBW/d) RME x Is, x AUF.	
horganics						700	4 West Fulls	n	ADD <sub>F</sub> + ADD <sub>A</sub> + ADD <sub>S</sub>
Cadmium	1.78E-01	1.50E-01	1.87E-08	5.50E-01	1.07E-03	1.71E+01	1 03F-01	5 080 02	10 000 0
Lead	1.85E+01	9.00E-03	1.17E-07	4.50E-02	9 09E-03	3 34E+D0	2 02/24/00	500000	2.005-01
Mercury	1.36E-02	2.00E-01	1.91E-09	9 00H-01	1348 04	5 23E+00	3.525.00	0.22E-01	4.55E+00
Zinc	6.39E+01	9 00F-01	4 04B 05	1 500-00	10000000	3.23ETUU	4.51E-03	4.57E-04	5.10E-03
Organics-Semiyolatiles			TO-STORY.	1.30ETOU	1.02E+00	3.77E+00	2.33E+01	2.15E+00	2.65E+01
Bis(2-ethylhexyl)phihalate Organics-Pestfeides	1,50E-01	3.80E-02	4.00E-09	3.80E-02	6.22E-05	3.51E-04	2.56B-05	5.04E-03	5.13E-03
4,4'-DDE	3.30R-04	0 37F-03	217012	on white or					
Aldrin	1 20F-03	1045 00	2.1/D-12	9.3/E-03	3.38E-08	1.26E+00	2.03E-04	1.11E-05	2.14E-04
Dieldrin	1 17E-03	2 don 02	8.735-12	1.04E-02	1.36E-07	4.10E-04	2.40E-07	4.03E-05	4.07E-05
Endrin aldehyde	8 SOF 04	5.49E-02	Z.80E-11	3.49E-02	4.45E-07	3,54E-04	2.02E-07	3.93E-05	4.00E-05
Heptachlor	7 90E 04	4 80E 02	3.88E-11	6.51E-02	6.04E-07	3.28E-04	1.36E-07	2.86E-05	2.93E-05
Lindane	0 305 04	4.69E-02	2.71E-11	4.89E-02	4.22E-07	1,40E+00	5.39E-04	2.65E-05	5.66E-04
	2,302,04	2.745-01	1.79E-10	2.74E-01	2.78E-06	2.76B-04	1.25E-07	3 100.05	3 425 05

RME = Reasonable maximum exposure (lower of 95% UCL of mean or maximum detection)

SP, = Soil-to-plant; reproductive

SP<sub>v</sub> = Soil-to-plant; vegetative

 $I_P\left(kgkgBW/d\right) = Plant ingestion rate for red foxes = 0.00437$ 

Ir., (kg/kgBW/d) = Plant ingestion rate for shrews = 0.0728 ADD<sub>p</sub> = Average daily dose; plant

0.00161 AUF., = Area use factor for red fox =

AUF-x = Area use factor for shrews = 1.0

BAF<sub>1</sub>= Soil-to-animal, invertebrates

 $I_{A\gamma}(kg/kgBW/d) = Animal ingestion rate for shrews = 0.487$ ADDA = Average daily dose; animal

Is.s (kg/kgBW/d) = Soil ingestion rate for shrews = 0.0336 ADDs = Average daily dose; soil

Cs (mg/kg) = Concentration in the prey

CF, = correction factor dry wt to wet wt [(0.1) kg dry wt reproductive part plant/kg wet wt] IR  $_I$  (kg/kg body wt/d) = Ingestion rate of food for shrews = 0.56

CF<sub>1</sub> = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs,  $CF_v = correction$  factor day wt to wet wt [0.15 kg dry wt vegetative part planukg wet  $w_1$ ]

and 1 for all other COPECs - fraction dry wt worm/kg wet wet]

COPEC = chemical of potential ecological concern

ESV = ecological screening value

lipid ratio = 1 for inorganics, 0.8 for organics, mammal Ba = biotransfer food to cow, BAF. Tr. = Animal-to-mammal transfer factor (Ba<sub>cow</sub> x BW<sub>recepter</sub> x lipid ratio) where

and BW<sub>ccopior</sub> = body wt (kg) of the receptor

Is (kg/kgBW/d) = Soil ingestion rate for red foxes = 0.00266

 $I_A(kg/kgBW/d)$  = Animal ingestion rate for red foxes = 0.0906

ADDIONA = Average daily dose; total

TRV (mg/kgBW/d) = toxicity reference value

COEC = contaminant of ecological concern

"yes" = HQ is >1 or there is "No TRV"

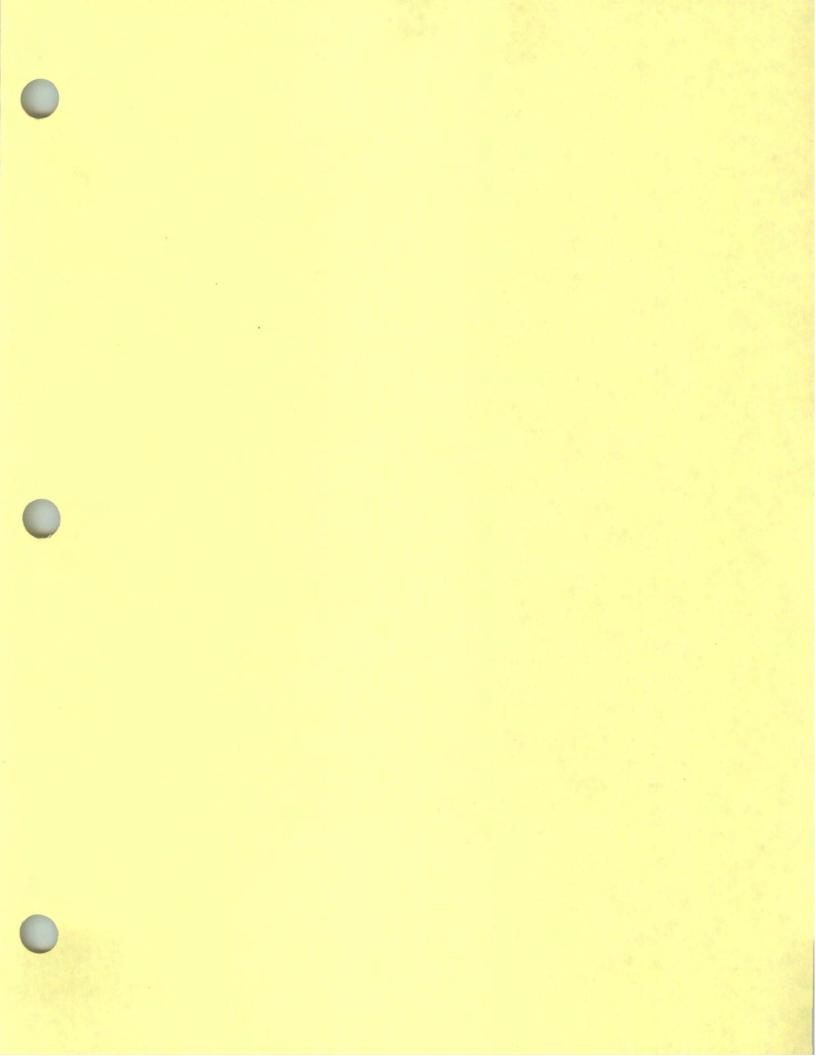
"no" = HQ less than or equal to 1

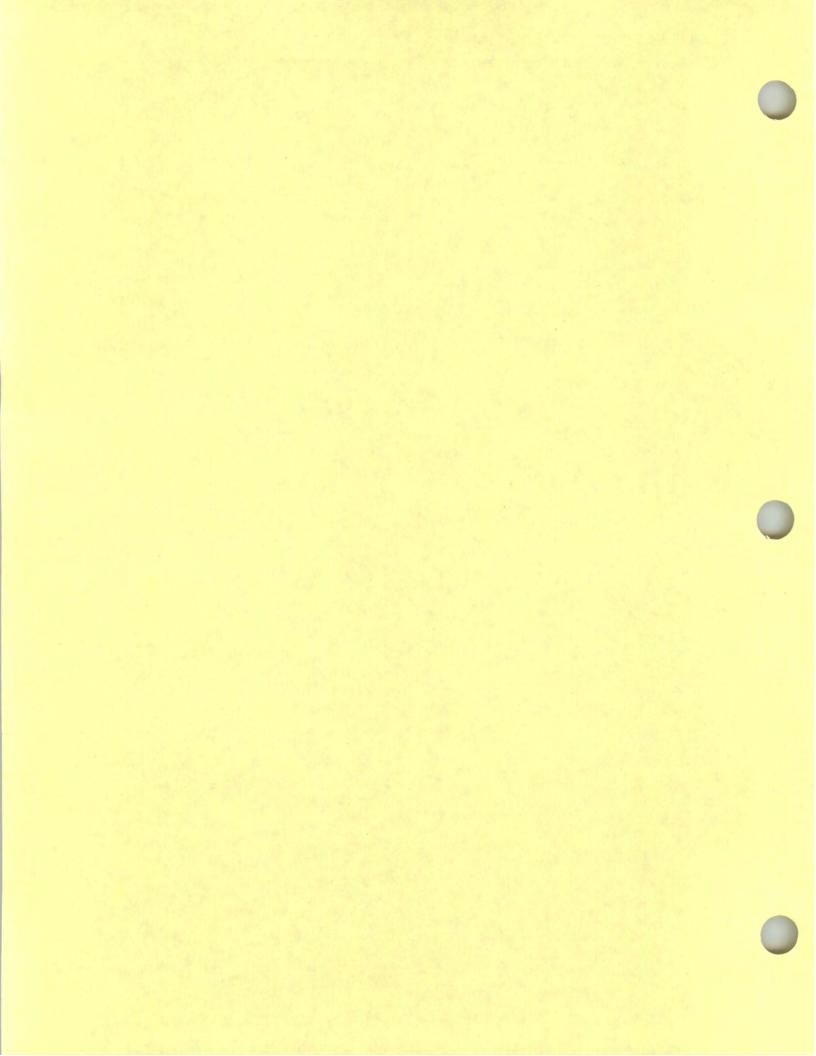
HQ = Hazard quotient

HQ>1 in bold font

Appendix Table C-22. 40 mm Range Hazard Quotients for Red Foxes Exposed to Shallow Surface Soil (0-1 ft) PBT COPECs at Ravenna, Ohio (cont'd)

PBT COPECs remaining after ESV screen	Cs (mg/kg) Prey ADD <sub>lotal</sub> /IR <sub>t</sub>	BAF-TP	ADD <sub>A</sub> (mg/kgBW/d) Cs x BAF <sub>T</sub> x I <sub>A</sub> x AUF <sub>-</sub>	ADDs (mg/kgBW/d) RME x I <sub>s</sub> x AUF. <sub>F</sub>	$\begin{array}{l} \mathrm{ADD}_{\mathrm{total}} \\ \mathrm{(mg/kgBW/d)} \\ \mathrm{ADD}_{\mathrm{p}} + \mathrm{ADD}_{\mathrm{A}} + \\ \mathrm{ADD}_{\mathrm{S}} \end{array}$	NOAEL TRV (mg/kgBW/d)	Site HQ ADD <sub>total</sub> / TRV	COEC?
Inorganics								
Cadmium	3.57E-01	1.54E-02	8.01E-07	7.60E-07	1.58E-06	5.08E-01	3.11E-06	ou
Lead ·	8.12E+00	1.36E-03	1.61E-06	7.90E-05	8.08E-05	4.22E+00	1.92E-05	ou
Mercury	9.10E-03	2.36E-02	3.13E-08	5.81E-08	9.13E-08	6.92E-01	1.32E-07.	no
Zinc	4.74E+01	4.54E-01	3.13E-03	2.73E-04	3.44E-03	8.43E+01	4.08E-05	ou
Organics-Semivolatiles								
Bis(2-ethylhexyl)phthalate	9.16E-03	1.46E-02	1.94E-08	6.41E-07	6.64E-07	5.22E+00	1.27E-07	ou
Organics-Pesticides								
4,4'-DDE	3.82E-04	1.65E-01	9.14E-09	1.41E-09	1.06E-08	5.27E-01	2.00E-08	по
Aldrin	7.27E-05	1.38E-01	1.46E-09	5.13E-09	6.59E-09	1.05E-01	6.25E-08	no
Dieldrin	7.14E-05	1.70E-02	1.76E-10	5.00E-09	5.20E-09	1.05E-02	4.94E-07	ou
Endrin aldehyde	5.23E-05	5.75E-03	4.38E-11	3.63E-09	3.71E-09	No TRV	No TRV	yes
Heptachlor	1.01E-03	9.44E-03	1.39E-09	3.37E-09	4.79E-09	6.85E-02	6.99E-08	ou
Lindane	6.10E-05	4.78E-04	4.25E-12	3.97E-09	4.16E-09	4.22E+00	9.86E-10	no





Appendix Table C-23. 40 mm Range Hazard Quotients for Red-Tailed Hawks Exposed to Shallow Surface Soil (0-1 ft) PBT COPECs at Ravenna, Ohio

PBT COPECs remaining after the ESV Screen	RME Concentration (mg/kg)	SP	ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CF <sub>v</sub> x I <sub>p</sub> x AUF <sub>:R</sub>	Prey ADD <sub>P</sub> (mg/kgB W/d) RME x SP <sub>v</sub> x CFv x I <sub>p-s</sub> x AUF-s	BAF	Prey ADD <sub>A</sub> (mgkgBW/d) RME x BAF <sub>1</sub> x CF <sub>1</sub> x I <sub>A-x</sub> AUF-s	Prey ADDs (mg/kgBW/d) RME x I <sub>S-x</sub> AUF-s	Prey ADD <sub>total</sub> (mg/kgBW/d) ADD <sub>p</sub> + ADD <sub>A</sub> + ADD <sub>o</sub>
Inorganics	1 700 01	20 100 0						
Cadmium	1.78E-01	3.50E-01	0.00E+00	1.07E-03	1.71E+01	1,93E-01	5.98E-03	2.00E-01
Lead	1.85E+01	4.50E-02	0.00E+00	9.09E-03	3.34E+00	3.92E+00	6.22E-01	4.55E+00
Mercury	1.36E-02	9.00E-01	0.00E+00	1.34E-04	5.23E+00	4.51E-03	4.57E-04	5.10E-03
Zinc	6.39E+01	1.50E+00	0.00E+00	1.05E+00	5.77E+00	2.33E+01	2.15E+00	2.65E+01
Organics-Semivolatiles								
Bis(2-ethylhexyl)phthalate	1.50E-01	3.80E-02	0.00E+00	6.22E-05	3,51E-04	2.56E-05	5.04E-03	5.13E-03
1,2-Dimethylbenzene	2.00E-03	6.01E-01	0.00E+00	1.31E-05	2.51E-04	2.45E-07	6.72E-05	8.06E-05
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	0.00E+00	1.44E-03	2.70E-04	5.25E-05	1.34E-02	1.49E-02
Organics-Pesticides								
4,4'-DDE	3.30E-04	9.37E-03	0.00E+00	3,38E-08	1,26E+00	2.03E-04	1.11E-05	2.14E-04
Aldrin	1.20E-03	1.04E-02	0.00E+00	1.36E-07	4,10E-04	2.40E-07	4.03E-05	4.07E-05
Dieldrin	1.17E-03	3.49E-02	0.00E+00	4.45E-07	3.54E-04	2.02E-07	3.93E-05	4.00E-05
Endrin aldehyde	8.50E-04	6.51E-02	0.00E+00	6.04E-07	3.28E-04	1.36E-07	2.86E-05	2.93E-05
Heptachlor	7.90E-04	4.89E-02	0.00E+00	4.22E-07	1,40E+00	5.39E-04	2.65E-05	5,66E-04
Lindane	9.30E-04	2.74E-01	0.00E+00	2.78E-06	2.76E-04	1.25E-07	3.12E-05	3 42F-05

COPEC = contaminant of potential ecological concern

ESV = ecological screening value

RME = reasonable maximum concenetration

SPr = Soil-to-plant; reproductive

SP<sub>v</sub> = Soil-to-plant; vegetative

Ip (kg/kgBW/d) = Plant ingestion rate for red-tailed hawks = 0.00

ADD<sub>p</sub> = Average daily dose; plant

 $CF_v = correction factor [0.15 kg dry wt vegetative plant part/kg wet wt]$ 

 $CF_i$  = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs, and 1 for all other COPECs - fraction dry wt worm/kg wet wet]

Cs (mg/kg) = Concentration in the prey IR  $_{\Gamma}$  (kg/kgBW/d)= Ingestion rate of food for shrews = 0.56

IN (REPRESENTAL) - INFESTION FAIR OF LOOK FOR SITEWS = 0.50 BAK.<sub>TP</sub> = Animal-to-mammal transfer factor (Ba<sub>cow</sub> x BW<sub>resplor</sub> x lipid ratio) where

lipid ratio = 1 for inorganics, 0.8 for organics; mammal Ba = biotransfer food to cow,

and BW<sub>receptor</sub> = body wt (kg) of the receptor  $I_A(kg/kgBW/d)$  = Animal ingestion rate for red-tailed hawks = 0.11

I<sub>s</sub> (kg/kgBW/d) = Soil ingestion rate for red-tailed hawks = 0.00

Appendix Table C-23. 40 mm Range Hazard Quotients for Red-Tailed Hawks Exposed to Shallow Surface Soil (0-1 ft) PBT COPECs at Ravenna, Ohio (cont'd)

PBT COPECs remaining after the ESV Screen	Cs (mg/kg) ADD <sub>total</sub> /IR <sub>f</sub>	BAF.TP	ADD <sub>A</sub> (mg/kgBW/d) Cs x BAF. <sub>TP</sub> x I <sub>A</sub> x AUF. <sub>H</sub>	ADDs (mg/kgBW/d) RME x I <sub>s</sub> x AUF. <sub>H</sub>	$ADD_{total}$ $(mg/kgBW/d)$ $ADD_p + ADD_A +$ $ADD_S$	NOAEL TRV (mg/kgBW/d)	Site HQ ADD <sub>total</sub> / TRV	COEC?
Inorganics	3 57R-01	3.86F-03	1,40E-07	0.00E+00	1.40E-07	1.45E-02	9.65E-06	ou
Lead	8.12E+00	3.40E-04	2.81E-07	0.00E+00	2.81E-07	1.13E-02	2.48E-05	ou
Mercury	9.10E-03	5.90E-03	5.46E-09	0.00E+00	5.46E-09	4.50E-03	1.21E-06	ou
Zinc	4.74E+01	1.13E-01	5.46E-04	0.00E+00	5.46E-04	1.45E-01	3.77E-03	ou
Organics-Semivolatiles								
Bis(2-ethylhexyl)phthalate	9.16E-03	3.65E-03	3.39E-09	0.00E+00	3.39E-09	1.10E-02	3.09E-07	ou
1,2-Dimethylbenzene	1.44E-04	3.08E-05	4.50E-13	0.00E+00	4.50E-13	No TRV	No TRV	yes
3,3'-Dichlorobenzidine	2.67E-02	8.57E-05	2.32E-10	0.00E+00	2.32E-10	No TRV	No TRV	yes
Organics-Pesticides								
4,4'-DDE	3.82E-04	4.12E-02	1.60E-09	0.00E+00	1.60E-09	8.45E-03	1.89E-07	ou
Aldrin	7.27E-05	3.44E-02	2.54E-10	0.00E+00	2.54E-10	No TRV	No TRV	yes
Dieldrin	7.14E-05	4.24E-03	3.07E-11	0.00E+00	3.07E-11	7.70E-04	3.99E-08	ou
Endrin aldehyde	5.23E-05	1.44E-03	7.65E-12	0.00E+00	7.65E-12	No TRV	No TRV	yes
Heptachlor	1.01E-03	2.36E-03	2.42E-10	0.00E+00	2.42E-10	6.50E-04	3.73E-07	ou
Lindane	6.10E-05	1.20E-04	7.41E-13	0.00E+00	7.41E-13	2.00E-02	3.71E-11	ou

 $I_{P-s}(kg/kgBW/d) = Plant ingestion rate for shrews (0.0728)$ AUF<sub>s</sub> = Area use factor for shrew (1.0)

ADDA = Average daily dose; animal BAF<sub>i</sub> = Soil-to-animal; invertebrates

 $I_{A^4}(kg/kgBW/d)$  = Animal ingestion rate for shrews (0.487)  $\rm ADD_8$  = Average daily dose; soil

0.000924 AUF,H = Area use factor hawk

I<sub>S\*</sub> (kg/kgBW/d) = Soil ingestion rate for shrews (0.0336)

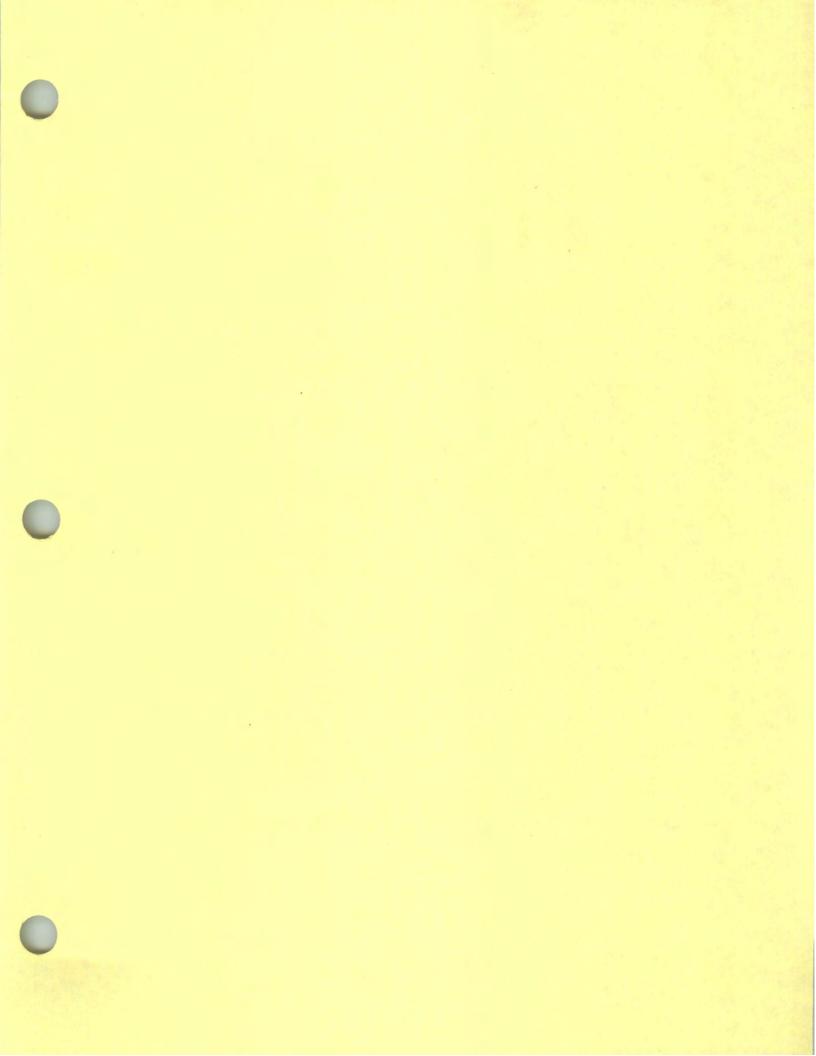
TRV (mg/kgBW/d) = toxicity reference value ADD<sub>total</sub> = Average daily dose; total

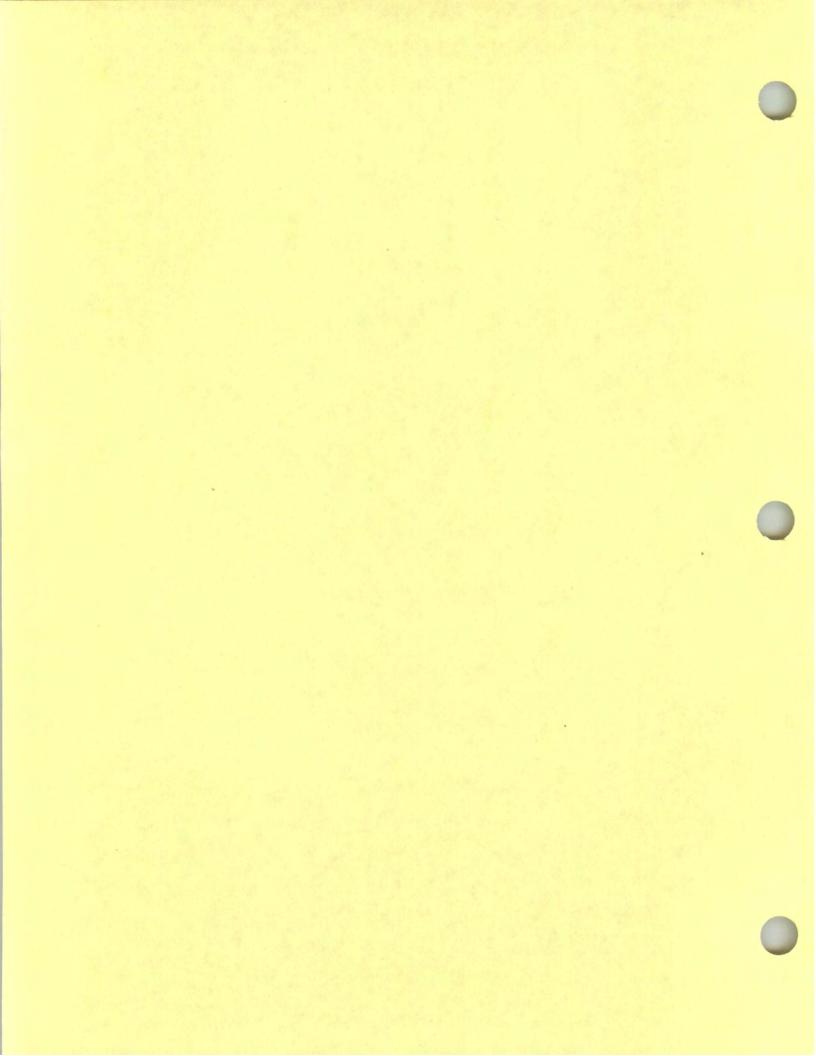
HQ = Hazard quotient

COEC = contaminant of ecological concern "yes" = HQ > 1 or "No TRV"

"no" = HQ less than or equal to 1 HQs in bold font are > 1

Page 2 of 2





Appendix Table C-24. 40 mm Range Hazard Quotients for Plants and Earthworms Exposed to Subsurface Soil (1-3 ft) COPECs at Ravenna, Ohio

		Plants				Earthworms	
il Abd The Property Control	Subsurface Soil RME Concentrations	Plant TRVª	Plant HQ Plant	500	Earthworm TRV <sup>b</sup>	Earthworm HQ Earthworm	
Or ECS imputted from ESV media screen	(IIIg/kg)	(mg/kg)	KIME/IKV	COEC	(mg/kg)	KWE/TRV	COEC
Inorganics			The state of the s				
Aluminum	1.36E+04	5.00E+01	2.72E+02	yes	No TRV	No TRV	yes
Arsenic	1.90E+01	1.00E+01	1.90E+00	yes	6.00E+01	3.17E-01	ou
Cadmium	4.24E-02	4.00E+00	1.06E-02	ou	2.00E+01	2.12E-03	ou
Chromium	1.92E+01	1.00E+00	1.92E+01	yes	4.00E-01	4.80E+01	yes
Chromium, hexavalent	3.15E+00	No TRV	No TRV	yes	No TRV	No TRV	yes
Cobalt	1.25E+01	2.00E+01	6.25E-01	по	No TRV	No TRV	yes
Copper	2.32E+01	1.00E+02	2.32E-01	ou	6.00E+01	3.87E-01	no
Lead	1.63E+01	5.00E+01	3.26E-01	no	5.00E+02	3.26E-02	no
Thallium	1.08E+00	1.00E+00	1.08E+00	yes	No TRV	No TRV	ves
Vanadium	2.36E+01	2.00E+00	1.18E+01	yes	No TRV	No TRV	yes
Organics-Explosives							
2,6-Dinitrotoluene	5.00E-02	No TRV	No TRV	yes	No TRV	No TRV	ves
Organics-Semivolatiles							
3,3'-Dichlorobenzidine	4.00E-01	No TRV	No TRV	yes	No TRV	No TRV	yes
Organics-Volatiles							
1,2-Dimethylbenzene	2.00E-03	No TRV	No TRV	yes	No TRV	No TRV	ves

COPEC = chemical of potential ecological concern

<sup>b</sup>Earthworm TRV reference from Efroymson et al. (1997b)

HQs in bold font are > 1

EU = exposure unit

ESV = ecological screening value

RME = Reasonable maximum exposure (lower of maximum and 95% upper confidence limit of mean)

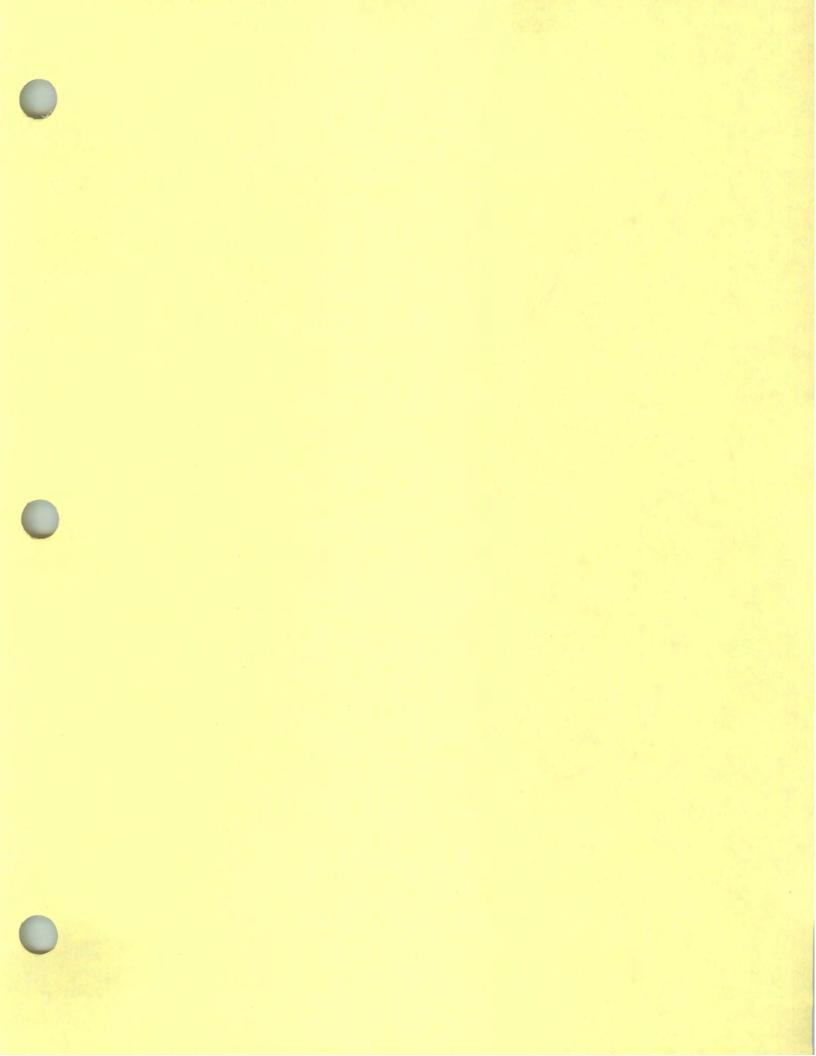
<sup>a</sup>Plant TRV reference from Efroymson et al. (1997a)

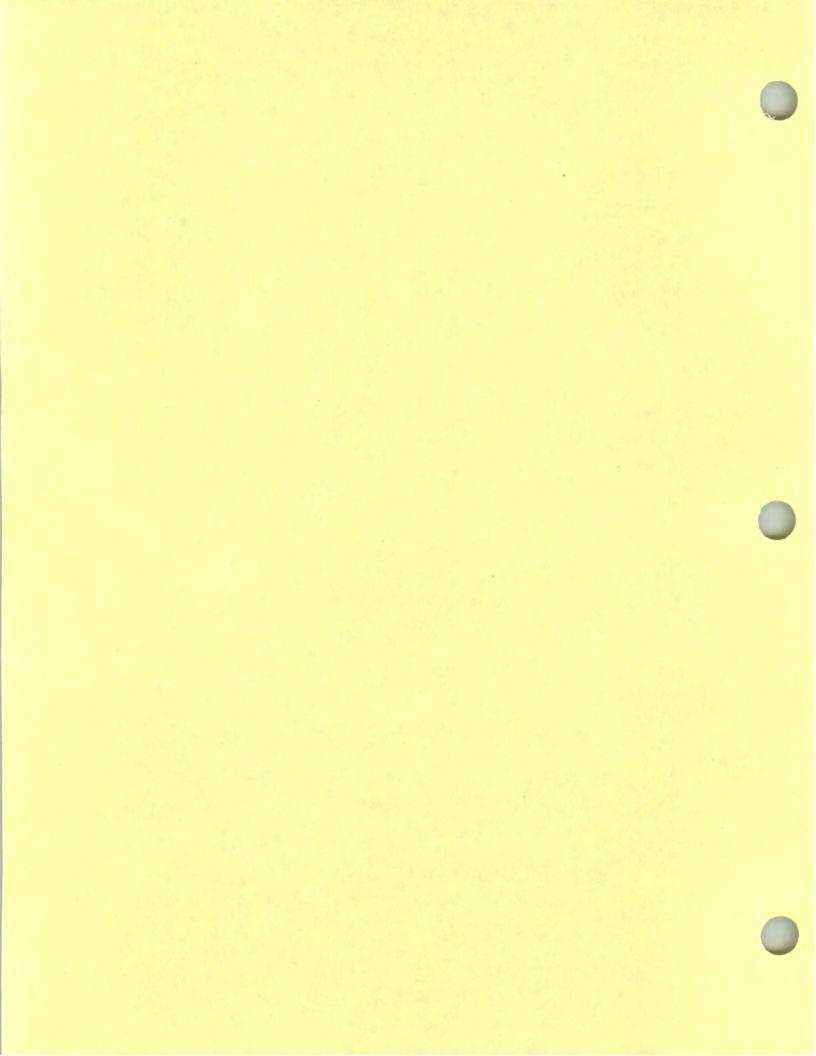
TRV = toxicity reference value

HQ = Hazard quotient COEC = chemical of ecological concern

"yes" = HQ > 1 or "No TRV"

"no" = HQ less than or equal to 1





Appendix Table C-25. 40 mm Range Hazard Quotients for Cottontail Rabbits Exposed to Subsurface Soil (1-3 ft) COPECs at Rayanna, Ohio

RME		ADD <sub>P</sub> (mg/kgBW/d)		ADD <sub>A</sub> (mg/kgBW/d)	ADDs	ADD <sub>total</sub> (mg/kgBW/d)			
(mg/kg)	SP	CFx Ipx AUF	BAF	KME $x$ BAF <sub>1</sub> $x$ $CF_1 \times I_A x$ AUF	$KMEx$ $BAF_ix$ ( $mg/kgBW/d$ ) $CF_ixI_Ax$ $AUF$ $RMExI_Sx$ $AUF$	$ADD_P + ADD_A + NOAEL TRV$ $ADD_S = (mg/kgBW/d)$	(mg/kgBW/d)	HQ ADD <sub>total</sub>	COEC?
.36E+04	4.00E-03	4.00E-01	2.20E-01	0.00E+00	4.47E+01	4.51E+01	7.64E-01	5.90E+01	yes
.90E+01	4.00E-02	5.59E-03	2.58E-01	0.00E+00	6.25E-02	6.81E-02	4.99E-02	1.36E+00	yes
4.24E-02	5.50E-01	1.72E-04	1.71E+01	0.00E+00	1.39E-04	3.11E-04	7.06E-01	4.41E-04	no
.92E+01	7.50E-03	1.06E-03	1.10E+00	0.00E+00	6.31E-02	6.42E-02	2.00E+03	3.21E-05	no
3.15E+00	7.50E-03	1.74E-04	1.10E+00	0.00E+00	1.04E-02	1.05E-02	9.62E-01	1.10E-02	ou
1.25E+01	2.00E-02	1.84E-03	3.21E-01	0.00E+00	4.11E-02	4.29E-02	No TRV	No TRV	yes
2.32E+01	4.00E-01	6.83E-02	4.00E-02	0.00E+00	7.63E-02	1.45E-01	1,11E+01	1.30E-02	no
63E+01	4.50E-02	5.40E-03	3.34E+00	0.00E+00	5.36E-02	5.90E-02	5.85E+00	1.01E-02	no
1.08E+00	4.00E-03	3.18E-05	2.20E-01	0.00E+00	3.55E-03	3.58E-03	5,47E-03	6.55E-01	no
2.36E+01	5.50E-03	9.55E-04	3.21E-01	0.00E+00	7.76E-02	7.86E-02	1.43E-01	5.51E-01	no
5.00E-02	3.15E+00	1.16E-03	2.05E-04	0.00E+00	1.64E-04	1.32E-03	5.12E-01	2.58E-03	ou
4.00E-01	3.30E-01	9.72E-04	2.70E-04	0.00E+00	1.32E-03	2.29E-03	No TRV	No TRV	yes
2.00E-03	6.01E-01	8.84E-06	2.51E-04	0.00E+00	6.58E-06	1.54E-05	8.16E-01	1.89E-05	no

ESV = ecological screening value

CF = correction factor dry wt to wet wt [0.15 kd dry plant/kg wet plant]

RME = Reasonable maximum exposure (lower of maximum or 95% UCL of mean)

SP<sub>v</sub> = Soil-to-plant uptake factor, vegetative

ADD<sub>p</sub> = Average daily dose; plant

Ip (kg/kgBW/d) = Plant ingestion rate for cottontails = 1.88E-01

AUF = Area use factor = 2.61E-01

 $BAF_i$  = Soil-to-animal; invertebrates  $ADD_A$  = Average daily dose; animal CF<sub>1</sub> = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs,

and I for all other COPECs - fraction dry wt worm/kg wet wet]

 $I_A$  (kg/kgBW/d) = Animal ingestion rate for cottontails = 0.00E+00

ADD<sub>S</sub> = Average daily dose; soil

 $\label{eq:local_special} I_{S}\left(kg/kgBW/d\right) = Soil ingestion rate for cottontails = 1.26E-02$  ADDtotal = Average daily dose; total

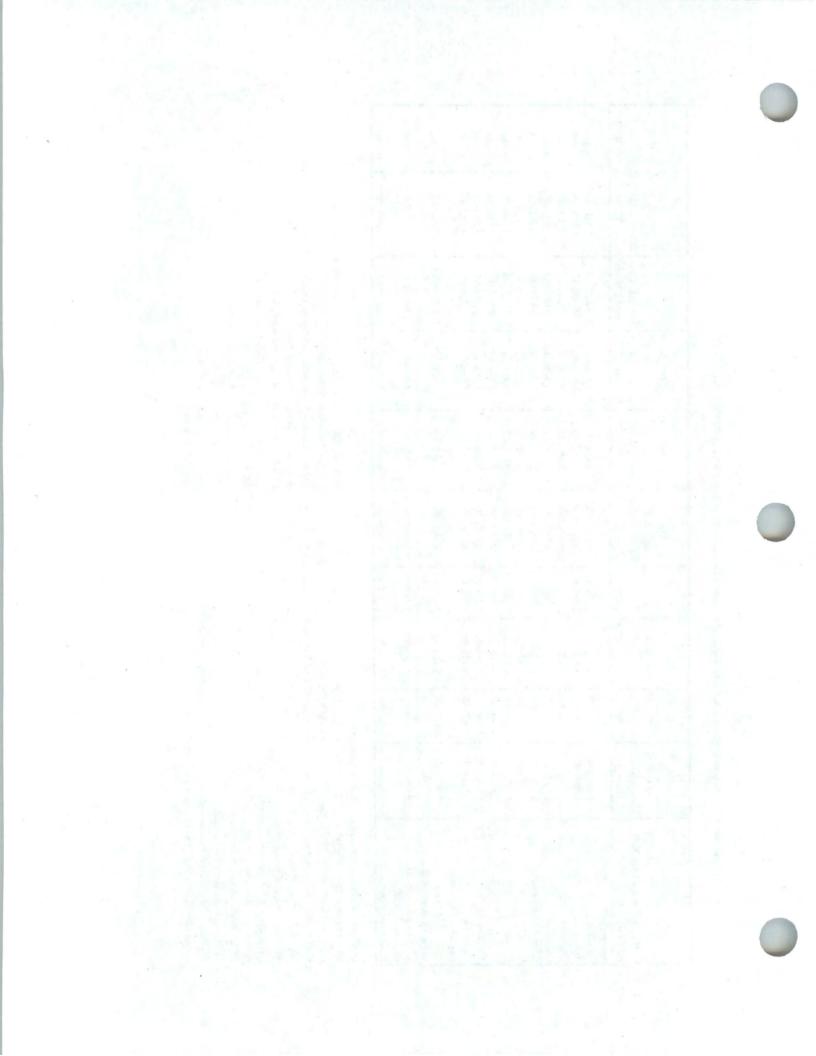
NOAEL = lowest observed adverse effect level

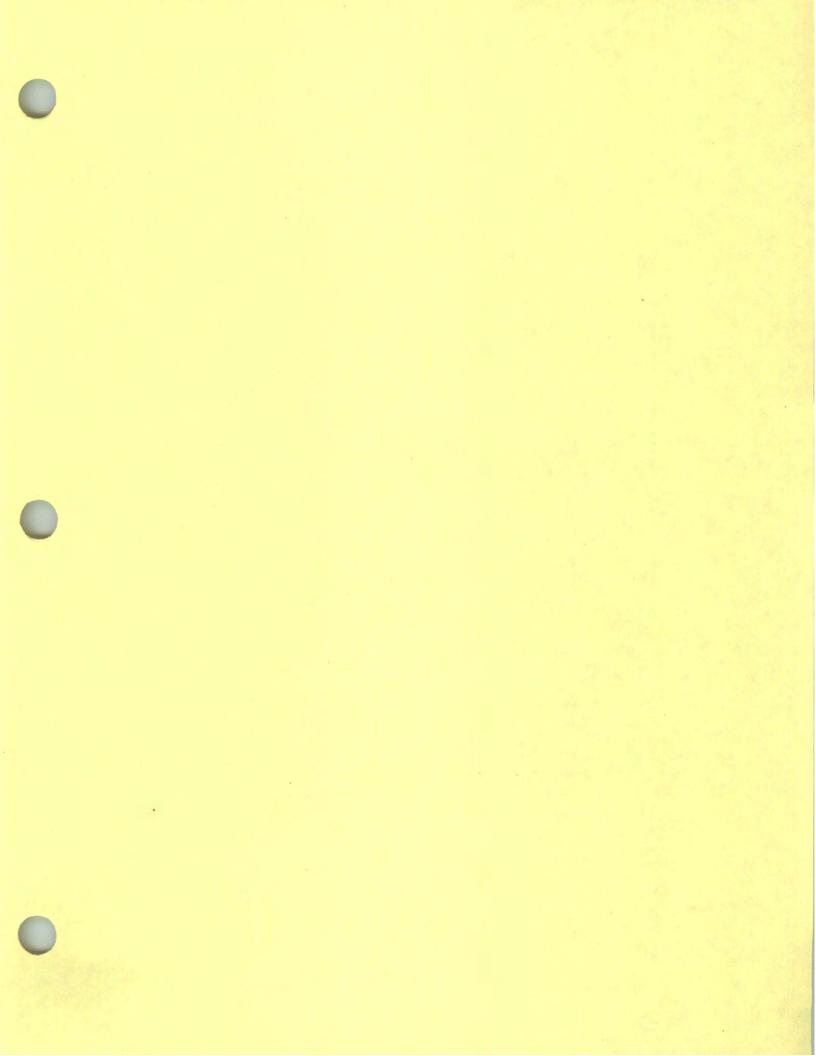
TRV (mg/kgBW/d) = toxicity reference value

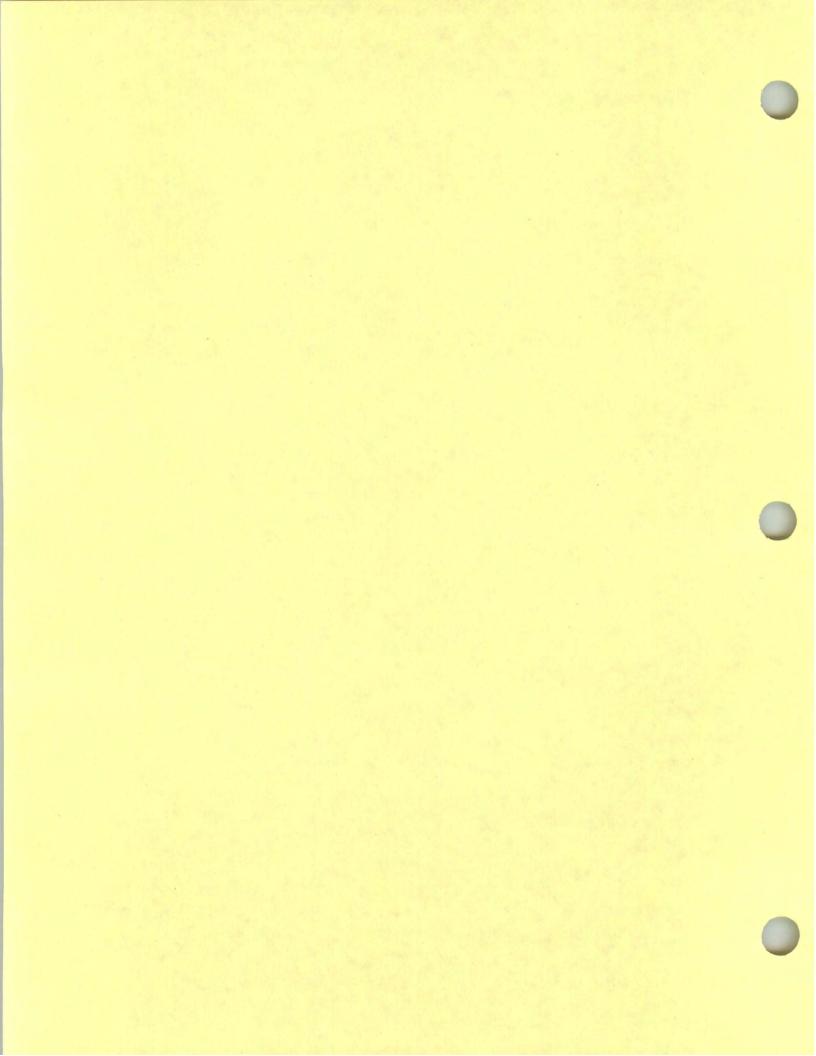
HQ = hazard quotient

COEC = contaminant of ecological concern "yes" = HQ > 1 or "No TRV"

"no" = HQ less than or equal to 1 HQs in **bold font** are > 1







Appendix Table C-26. 40 mm Range Hazard Quotients for Shrews Exposed to Subsurface Soil (1-3 ft) COPECs at Ravanna, Ohio

COPECs following ESV screen	RME Concentration (mg/kg)	$SP_v$	ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CFx I <sub>P</sub> x AUF	BAF	$ADD_A$ (mg/kgBW/d) $RMEx\ BAF_tx$ $CF_tx\ I_Ax\ AUF$	$\begin{array}{c} \mathbf{ADD_A} \\ (\mathbf{mg/kgBW/d}) \\ \mathbf{RME} \times \mathbf{BAE_i} \times \\ (\mathbf{mg/kgBW/d}) \\ CF_i \times \mathbf{I_A} \times \mathbf{AUF} \ \mathbf{RME} \times \mathbf{I_S} \times \mathbf{AUF} \end{array}$	$\begin{array}{c} \mathrm{ADD}_{lotal} \\ (mg/kgBW/d) \\ \mathrm{ADD}_{p} + \mathrm{ADD}_{A} + \\ \mathrm{ADD}_{g} \\ \mathrm{ADD}_{g} \end{array} \\ (mg/kgBW/d) \end{array}$	NOAEL TRV (mg/kgBW/d)	HQ ADD <sub>total</sub> / TRV	COEC?
Inorganics										
Aluminum	1.36E+04	4.00E-03	5.94E-01	2.20E-01	1.46E+03	4.57E+02	1.92E+03	2.22E+00	8.61E+02	ves
Arsenic	1.90E+01	4.00E-02	8.30E-03	2.58E-01	3.10E-01	6.38E-01	9.57E-01	1.45E-01	6.59E+00	ves
Cadmium	4.24E-02	5.50E-01	2.55E-04	1.71E+01	4.59E-02	1.42E-03	4.76E-02	2.05E+00	2.32E-02	ou
Chromium	1.92E+01	7.50E-03	1.57E-03	1.10E+00	1.34E+00	6.45E-01	1.98E+00	5.83E+03	3.40E-04	00
Chromium, hexavalent	3.15E+00	7.50E-03	2.58E-04	1.10E+00	2.19E-01	1.06E-01	3.25E-01	2.80E+00	1.16E-01	no
Cobalt	1.25E+01	2.00E-02	2.73E-03	3.21E-01	1.95E+00	4.20E-01	2.38E+00	No TRV	No TRV	ves
Copper	2.32E+01	4.00E-01	1.01E-01	4.00E-02	5.88E-02	7.80E-01	9.40E-01	3.24E+01	2.90E-02	ou
Lead	1.63E+01	4.50E-02	8.01E-03	3.34E+00	3.45E+00	5.48E-01	4.01E+00	1.70E+01	2.35E-01	no
Thallium	1.08E+00	4.00E-03	4.72E-05	2.20E-01	1.16E-01	3.63E-02	1.52E-01	1.59E-02	9.55E+00	ves
Vanadium	2.36E+01	5.50E-03	1.42E-03	3.21E-01	3.69E+00	7.93E-01	4.49E+00	4.15E-01	1.08E+01	ves
Organics-Explosives										
2,6-Dinitrotoluene	5.00E-02	3.15E+00	1.72E-03	2.05E-04	5.00E-06	1.68E-03	3.40E-03	1.49E+00	2.28F-03	ou
Organics-Semivolatiles										
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	1,44E-03	2.70E-04	5.25E-05	1.34E-02	1.49E-02	No TRV	No TRV	VPS
Organics-Volatiles										
1,2-Dimethylbenzene	2.00E-03	6.01E-01	1.31E-05	2.51E-04	2.45E-07	6.72E-05	8.06E-05	2.37E+00	3.39E-05	ou

ESV = ecological screening value

CF = correction factor dry wt to wet wt [0.15 kd dry plant/kg wet plant]

RME = Reasonable maximum exposure (lower of maximum or 95% UCL of mean)

SP<sub>v</sub> = Soil-to-plant uptake factor, vegetative

ADD<sub>P</sub> = Average daily dose; plant

Ip (kg/kgBW/d) = Plant ingestion rate for shrews = 7.28E-02

AUF = Area use factor (1.0)

BAF<sub>i</sub> = Soil-to-animal; invertebrates

ADD<sub>A</sub> = Average daily dose; animal

 $CF_i$  = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs, and 1 for all other COPECs - fraction dry wt worm/kg wet wet]

 $I_A$  (kg/kgBW/d) = Animal ingestion rate for shrews = 4.87E-01

ADD<sub>S</sub> = Average daily dose; soil

I<sub>s</sub> (kg/kgBW/d) = Soil ingestion rate for shrews = 3.36E-02

ADDtotal = Average daily dose; total

NOAEL = lowest observed adverse effect level

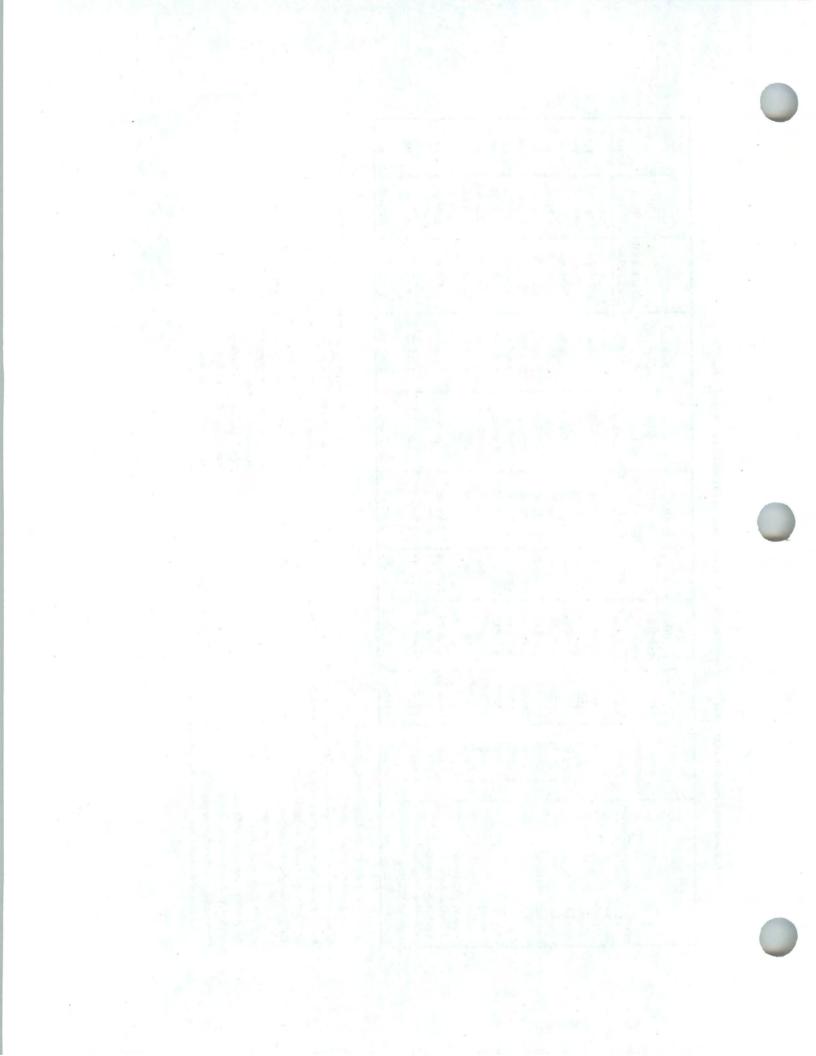
TRV (mg/kgBW/d) = toxicity reference value

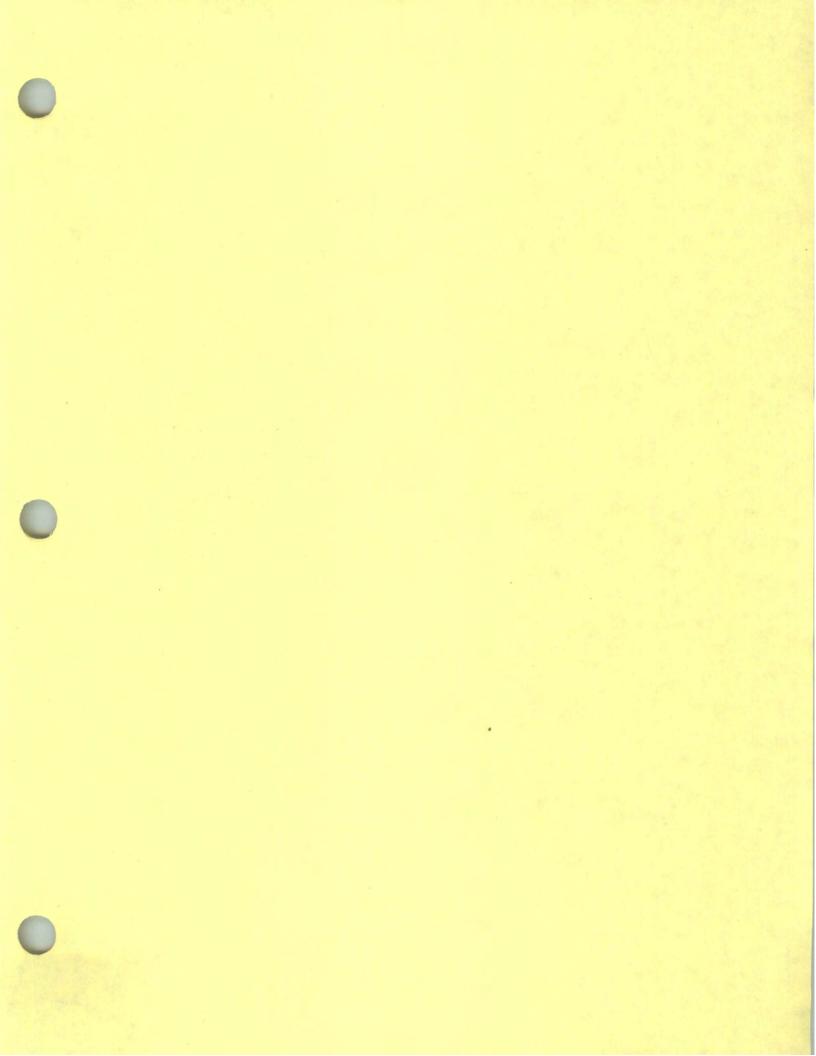
I.K.v. (mg/kg.b.w/d) = toxicity re HQ = hazard quotient

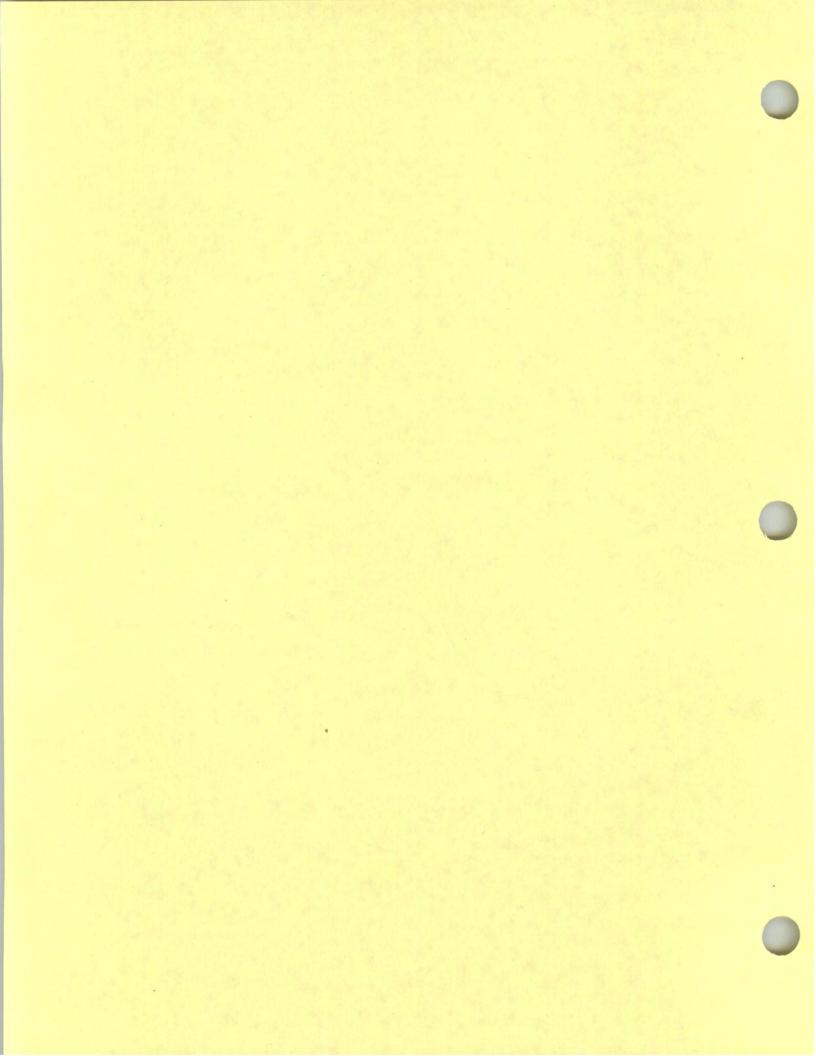
COEC = contaminant of ecological concern

"yes" = HQ > 1 or "No TRV" "no" = HQ less than or equal to 1

HQs in bold font are >1







Appendix Table C-27, 40 mm Range Hazard Quotients for Red Foxes Exposed to Subsurface Soil (1-3 ft) PBT COPECs at Ravenna, Ohio

PBT COPECs remaining after ESV screen	RME Concentration (mg/kg)	SPr	ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>r</sub> x CF <sub>r</sub> x I <sub>P</sub> x AUF <sub>.</sub>	$_{ m v}$	Prey ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CF <sub>v</sub> x I <sub>Ps</sub> x AUF-s	BAF	$egin{align*} \mathbf{PreyADD_A} \ (\mathbf{mg/kgBW/d}) \ \mathbf{RME} \ \mathbf{x} \ \mathbf{BAF_i} \ \mathbf{x} \ CF_i \ \mathbf{x} \ \mathbf{I_{Avg}} \ \mathbf{x} \ \mathbf{AUF.} \ \mathbf{s} \ \mathbf$	Prey ADD <sub>S</sub> (mg/kgBW/d) RME x I <sub>S-8</sub> x AUF-S	Prey ADD <sub>(stall</sub> (mg/kgBW/d) ADD <sub>P</sub> + ADD <sub>A</sub> + ADD <sub>S</sub>
Inorganics									
Cadmium	4.24E-02	1.50E-01	4.46E-09	5.50E-01	2.55E-04	1.71E+01	4.59E-02	1.42E-03	4.76E-02
Lead	1.63E+01	9.00E-03	1.03E-07	4.50E-02	8.01E-03	3.34E+00	3.45E+00	5.48E-01	4.01E+00
Organics-Semivolatiles									
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	9.26E-08	3.30E-01	1.44E-03	2.70E-04	6.83E-06	1.34E-02	1.49E-02
Organics-Volatiles									
1,2-Dimethylbenzene	2.00E-03	6.01E-01	8.43E-10	6.01E-01	1.31E-05	2.51E-04	3.18E-08	6.72E-05	8 04F-05

RME = Reasonable maximum exposure (lower of maximum or 95% UCL of mean)

SP<sub>r</sub> = Soil-to-plant; reproductive

SP<sub>v</sub> = Soil-to-plant, vegetative

(kg/kgBW/d) = Plant ingestion rate for red foxes = 0.00437

ADD<sub>p</sub> = Average daily dose; plant

Plant ingestion rate for shrews = 0.0728

1.61E-03 AUF. = Area use factor for red fox =

AUF-s = Area use factor for shrews = 1.0

BAF<sub>i</sub> = Soil-to-animal; invertebrates

ADDA = Average daily dose; animal

(kg/kgBW/d) = Animal ingestion rate for shrews = 0.487

ADD<sub>s</sub> = Average daily dose; soil

(seg/kgBW/d) = Soil ingestion rate for shrews = 0.0336

Cs (mg/kg) = Concentration in the prey

R r (kg/kg body wt/d) = Ingestion rate of food for shrews = 0.56

CF<sub>r</sub> = correction factor dry wt to wet wt [(0.1) 0.1 kg dry wt reproductive part plant/kg wet wt]

 $CF_v = correction$  factor dry wt to wet wt [0.15 kg dry wt vegetative part plant/kg wet wt]

 $CF_i$  = correction factor dry wt to wet wt [0.13 kg dry wt earthworm/kg wet wt]

COPEC = chemical of potential ecological concern

ESV = ecological screening value BAF. TP = Animal-to-animal; fox (kg/kgBW/d) = Animal ingestion rate for red foxes = 0.0906 Is (kg/kgBW/d) = Soil ingestion rate for red foxes = 0.00266

ADDlotal = Average daily dose; total

TRV (mg/kgBW/d) = toxicity reference value

COEC = contaminant of ecological concern "yes" = HQ is >1 or there is "No TRV"

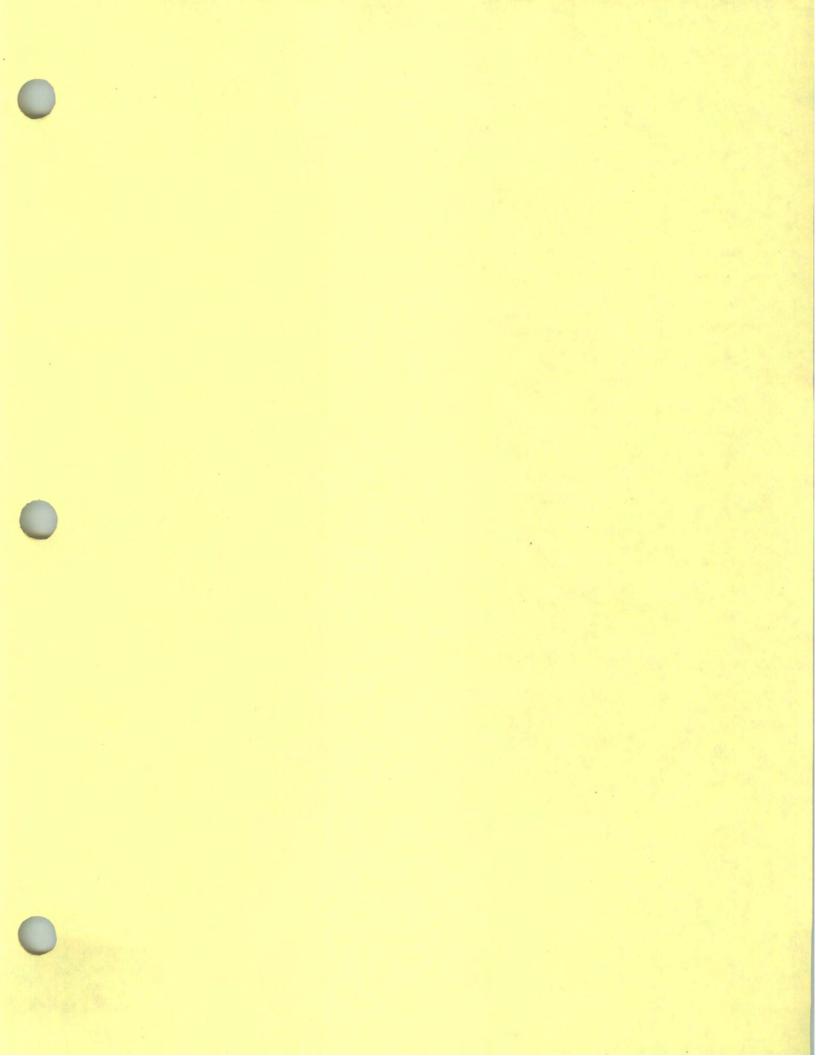
"no" = HQ less than or equal to 1

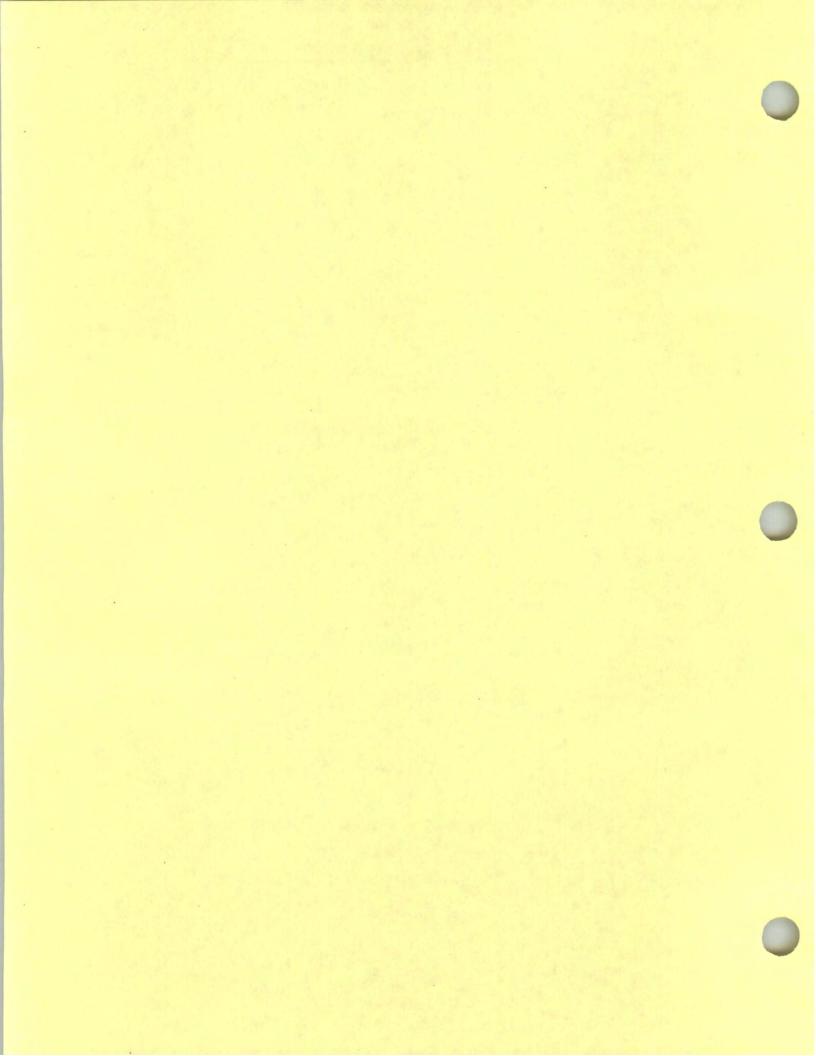
HQ = Hazard quotient

HQ > 1 in bold font

Appendix Table C-27. 40 mm Range Hazard Quotients for Red Foxes Exposed to Subsurface Soil (1-3 ft) PBT COPECs for Red Foxes at Ravenna, Ohio (cont'd)

			2					
					ADDtotal			
					(mg/kgBW			
	Cs		$ADD_A$	ADDs	(p/			
	(mg/kg)		(mg/kgBW/d) (mg/kgBW/	(mg/kgBW/	ADD <sub>p</sub> +		Site HQ	
PBT COPECs remaining	Prey		Cs x BAF <sub>TP</sub> x	d) RME x	ADDA+	Cs x BAF <sub>TP</sub> x d) RME x ADD <sub>A</sub> + NOAEL TRV	ADD <sub>total</sub> /	
after ESV screen	ADD <sub>total</sub> /IR <sub>f</sub>	BAF-TP		Isx AUF.F	ADDs	ADD <sub>s</sub> (mg/kgBW/d)	TRV	COEC?
Inorganics								
Cadmium	8.50E-02	1.54E-02	1.91E-07	1.81E-07	1.81E-07 3.76E-07	5.08E-01	7.40E-07	ou
Lead	7.15E+00	1.36E-03	1.42E-06	6.96E-05	6.96E-05 7.11E-05	4.22E+00	1.69E-05	no
Organics-Semivolatiles						1.00		
3,3'-Dichlorobenzidine	2.66E-02	3.43E-04	1.33E-09	1.71E-06	1.71E-06 1.80E-06	No TRV	No TRV	yes
Organics-Volatiles						The state of the s		
1,2-Dimethylbenzene	1.43E-04	1.43E-04 1.23E-04	_	8.54E-09	9.39E-09	2.57E-12 8.54E-09 9.39E-09 5.87E-01 1.60E-08	1.60E-08	ou





Appendix Table C-28. 40 mm Range Hazard Quotients for Red-Tailed Hawks Exposed to Subsurface Soil (1-3 ft) PBT COPECs at Ravenna, Ohio

PBT COPECs remaining after the ESV Media Screen	RME Concentration (mg/kg)	$SP_{\mathbf{v}}$	ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CFv x I <sub>P</sub> x AUF	Prey ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CFv x I <sub>ps</sub> x AUF-s	BAF	Prey $ADD_A$ (mg/kgBW/d) $RME x BAF_i x$ $CF_i x I_{A \cdot s} x$ $AUF \cdot s$	Prey ADDs (mg/kgBW/d) RME x I <sub>S-s</sub> x AUF-s	Prey ADD <sub>total</sub> (mg/kgBW/d) ADD <sub>p</sub> + ADD <sub>A</sub> + ADD <sub>S</sub>
Inorganics								
Cadmium	4.24E-02	5.50E-01	0.00E+00	2.55E-04	1.71E+01	4.59E-02	1.42E-03	4.76E-02
Lead	1.63E+01	4.50E-02	0.00E+00	8.01E-03	3.34E+00	3.45E+00	5.48E-01	4.01E+00
Organics-Semivolatiles								
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	0.00E+00	1.44E-03	2.70E-04	6.83E-06	1.34E-02	1.49E-02
Organics-Volatiles								
1,2-Dimethylbenzene	2.00E-03	6.01E-01	0.00E+00	1.31E-05	2.51E-04	3.18F-08	6 72F-05	8 04F-05

COPEC = contaminant of potential ecological concern

ESV = ecological screening value

RME = reasonable maximum concenetration

 $BAF_{\text{-TP}} = Animal-to-mammal transfer factor (Ba_{\text{cow}} \times BW_{\text{receptor}} \times lipid ratio)$  where lipid ratio = 1 for inorganics, 0.8 for organics; mammal Ba = biotransfer food to cow,

IR f (kg/kgBW/d)= Ingestion rate of food for shrews = 0.56

Cs (mg/kg) = Concentration in the prey

 $I_A(kg/kgBW/d)$  = Animal ingestion rate for red-tailed hawks = 0.11  $I_S(kg/kgBW/d)$  = Soil ingestion rate for red-tailed hawks = 0.00

and BW<sub>receptor</sub> = body wt (kg) of the receptor

SP<sub>r</sub> = Soil-to-plant; reproductive

SP<sub>v</sub> = Soil-to-plant; vegetative

Ip (kg/kgBW/d) = Plant ingestion rate for red-tailed hawks = 0.00

ADD<sub>p</sub> = Average daily dose; plant

CFv = correction factor [0.15 kg dry wt vegetative plant part/kg wet wt]

 $CF_i$  = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs, and 1 for all other COPECs - fraction dry wt worm/kg wet wet]

Appendix Table C-28. 40 mm Range Hazard Quotients for Red-Tailed Hawks Exposed to Subsurface Soil (1-3 ft) PBT COPECs at Ravenna, Ohio (cont'd)

			ADDA	ADDs	ADDtotal			
	Cs		(mg/kgBW/d)	(mg/kgBW/d)	(mg/kgBW/d)	The second second		
PBT COPECs remaining	(mg/kg)		Cs x BAF.TPx	RME x Isx	ADD <sub>p</sub> + ADD <sub>A</sub> + NOAEL TRV	NOAEL TRV	Site HQ	
after the ESV Media Screen	ADD <sub>total</sub> /IR <sub>f</sub>	BAF.IP	IAX AUF.H	AUF.H	ADDs	(mg/kgBW/d)	ADD <sub>total</sub> / TRV	COEC?
Inorganics								
Cadmium	8.50E-02	3.86E-03	3.33E-08	0.00E+00	3.33E-08	1.45E-02	2.30E-06	ou
Lead	7.15E+00	3.40E-04	2.47E-07	0.00E+00	2.47E-07	1.13E-02	2.19E-05	ou
Organics-Semivolatiles				700				
3,3'-Dichlorobenzidine	2.66E-02	8.57E-05	2.32E-10	0.00E+00	2.32E-10	No TRV	No TRV	yes
Organics-Volatiles								
1.2-Dimethylbenzene	1.43E-04	3.08E-05	4.49E-13	0.00E+00	4.49E-13	No TRV	No TRV	yes

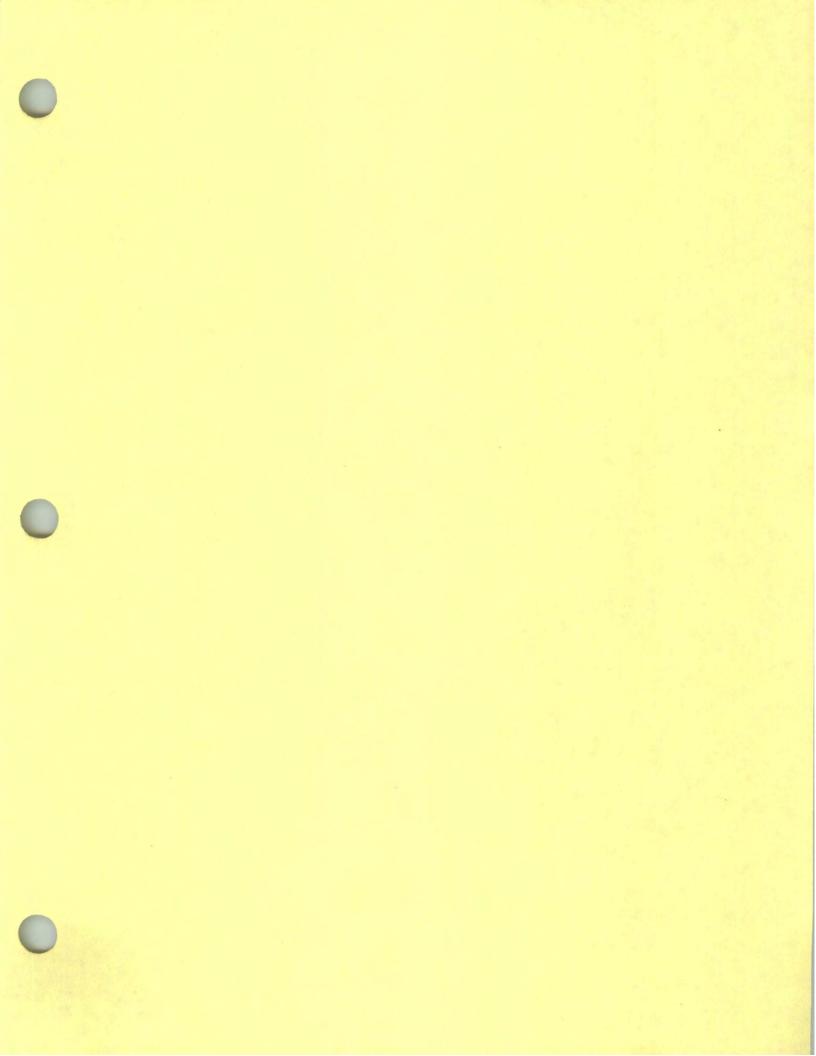
I<sub>P-s</sub> (kg/kgBW/d) = Plant ingestion rate for shrews (0.0728) AUF<sub>s</sub> = Area use factor for shrew (1.0) BAF<sub>i</sub> = Soil-to-animal; invertebrates ADD<sub>A</sub> = Average daily dose; animal

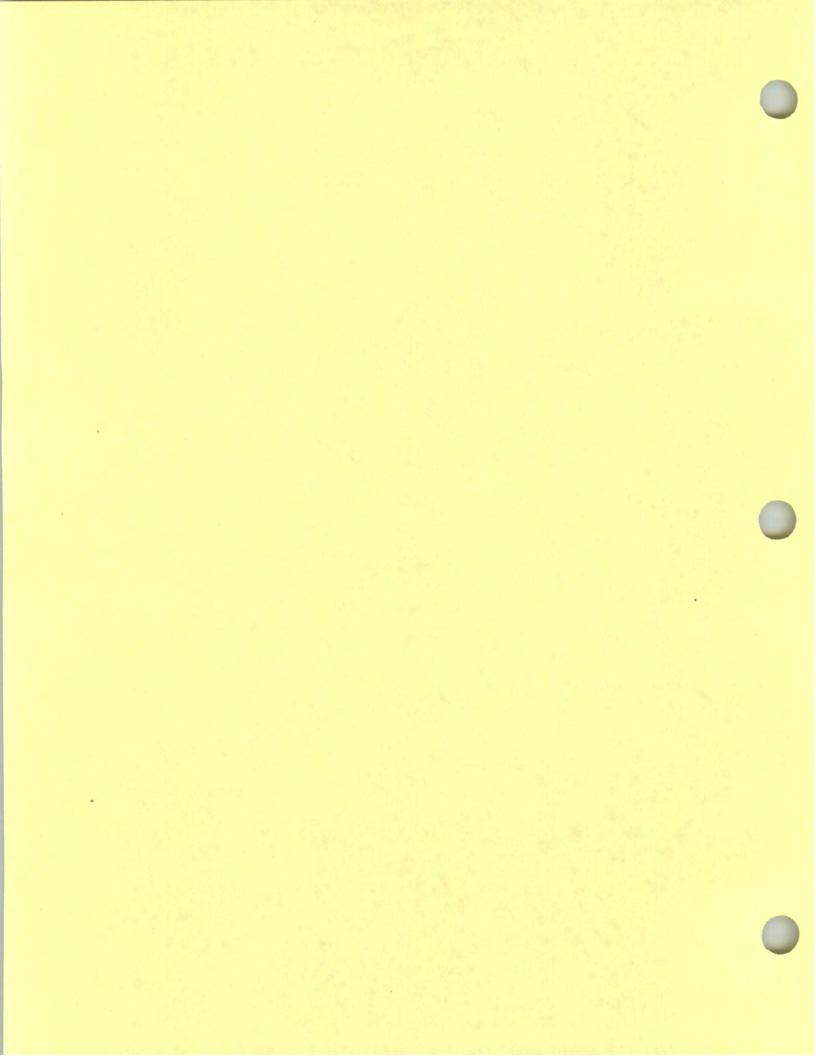
 $ADD_S = Average$  daily dose; soil  $AUF_H = Area$  use factor hawk 0.000924

 $I_{As}(kg/kgBW/d) = Animal ingestion rate for shrews (0.487)$ 

I<sub>S-s</sub> (kg/kgBW/d) = Soil ingestion rate for shrews (0.0336)
ADD<sub>total</sub> = Average daily dose; total
TRV (mg/kgBW/d) = toxicity reference value
HQ = Hazard quotient
COEC = contaminant of ecological concern
"yes" = HQ > 1 or "No TRV"
"no" = HQ less than or equal to 1

Page 2 of 2





Appendix Table C-29. 40 mm Range Hazard Quotients for Plants and Earthworms Exposed to Deep Surface (0-3 ft) Soil COPECs at Ravenna, Ohio

		Plants				Earthworms	
COPECs inputted from ESV media screen	Subsurface Soil RME Concentrations	Plant TRV <sup>a</sup>	Plant HQ Plant	5400	Earthworm TRV <sup>b</sup>	Earthworm HQ Earthworm	
Inorganics	(Augur)	(HIEVAR)	MVIE/1RV	COECS	(mg/kg)	KME/TRV	COEC?
Aluminum	1.26E+04	5.00E+01	2.52E+02	Ves	NoTPV	Mo TDV	
Arsenic	1.50E+01	1 00E+01	1.50E+00	yes	6 NOF-LOI	O SOF OI	yes
Cadmium	1.21E-01	4 00F+00	3 03E-02	200	2.00E+01	Z.30E-01	ou
Chromium	3 36F+01	1 0012400	20-25-52	OII	2.00E+01	6.03E-03	no
Chromium bayayalant	2,500,00	L.OUETOO	3.30E+01	yes	4.00E-01	8.40E+01	yes
Commun, nexavalent	7.50E+00	No TRV	No TRV	yes	No TRV	No TRV	yes
Coball	1.04E+01	2.00E+01	5.20E-01	оп	No TRV	No TRV	yes
Copper	2.10E+01	1.00E+02	2.10E-01	ou	6.00E+01	3.50E-01	OU
Lead	1.72E+01	5.00E+01	3.44E-01	ou	5.00E+02	3.44E-02	no
Nickel	2.01E+01	3.00E+01	6.70E-01	ou	2.00E+02	1.01E-01	011
Thallium	8.38E-01	1.00E+00	8.38E-01	по	No TRV	No TRV	Ves
Vanadium	2.25E+01	2.00E+00	1.13E+01	yes	No TRV	No TRV	Yes
Zinc	6.29E+01	5.00E+01	1.26E+00	ves	2.00F.+02	3.15F-01	500
Organics-Explosives							OTT
2,6-Dinitrotoluene	5.00E-02	No TRV	No TRV	ves	No TRV	NoTRV	No.
Organics-Semivolatiles					ANT OUT	ANI ON	Sac
3,3'-Dichlorobenzidine	4.00E-01	No TRV	NoTRV	Ves	No TRV	No TPV	
Bis(2-ethylhexyl)phthalate	1.50E-01	No TRV	No TRV	ves	No TRV	No TPV	yes
Organics-Volatiles					ANT OUT	ANI ON	yes
1,2-Dimethylbenzene Organics-Pesticides	2.00E-03	No TRV	No TRV	yes	No TRV	No TRV	yes
4,4'-DDE	3.30E-04	No TRV	No TRV	ves	No TRV	No TRV	200
Aldrin	1.13E-03	No TRV	No TRV	ves	No TRV	No TRV	Sa C
Dieldrin	1.09E-03	No TRV	No TRV	Ves	No TRV	No TPV	353
Endrin aldehyde	8.50E-04	No TRV	No TRV	ves	No TRV	No TRV	300
Heptachlor	7.90E-04	No TRV	No TRV	ves	No TRV	No TRV	368
Lindane	9.30E-04	No TRV	No TRV	ves	No TRV	No TRV	yes

# Page 1 of 2

Page 2 of 2

COPEC = chemical of potential ecological concern

EU = exposure unit

ESV = ecological screening value

RME = Reasonable maximum exposure (lower of maximum and 95% upper confidence limit of mean)

<sup>a</sup>Plant TRV reference from Efroymson et al. (1997a)

TRV = toxicity reference value

IRV = toxicity reference HQ = Hazard quotient

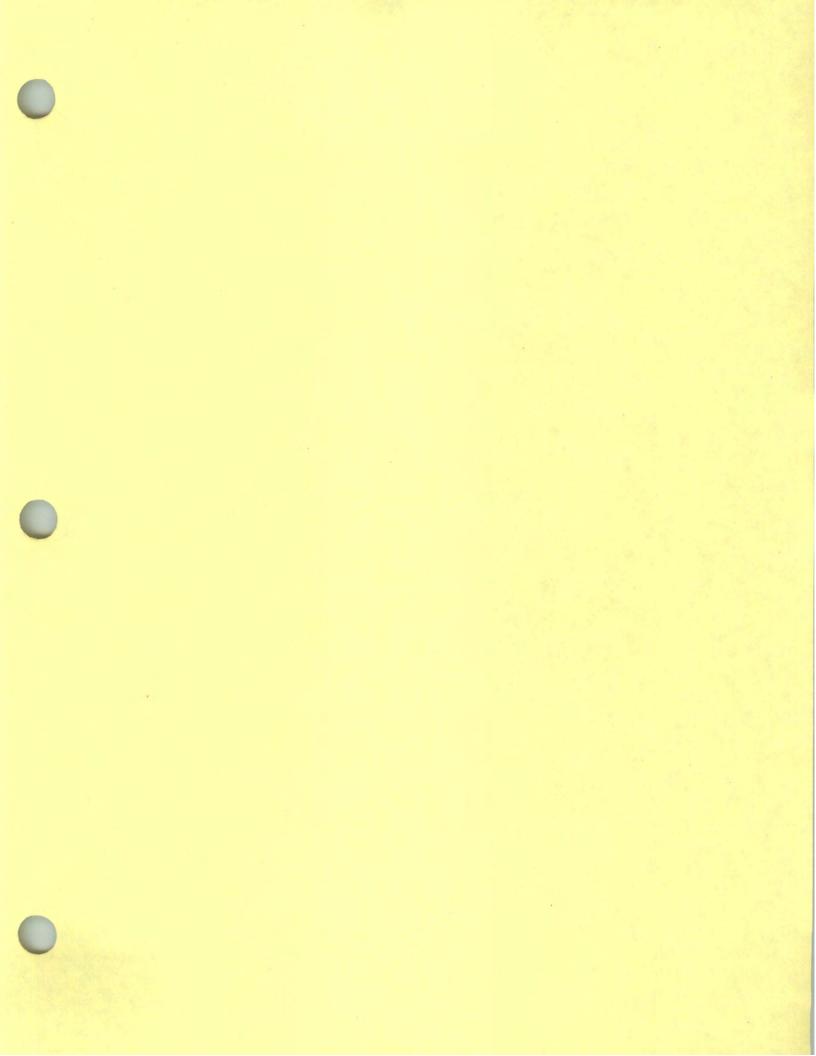
COEC = chemical of ecological concern

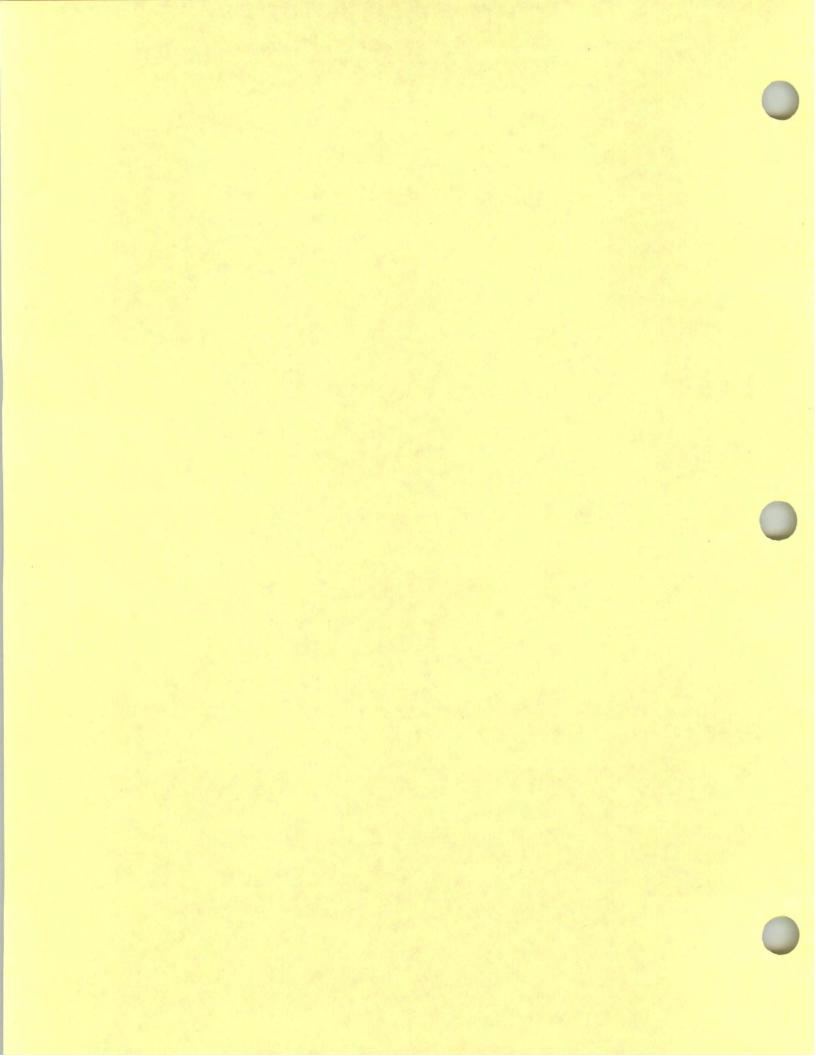
"yes" = HQ > 1 or "No TRV"

"no" = HQ less than or equal to 1

<sup>b</sup>Earthworm TRV reference from Efroymson et al. (1997b)

HQs in bold font are > 1





Appendix Table C-30. 40 mm Range Hazard Quotients for Cottontail Rabbits Exposed to Deep Surface Soil (0-3 ft) COPECs at Ravanna, Ohio

COPECs inputted from ESV media screen	RME Concentration (mg/kg)	SP.	ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CFx I <sub>b</sub> x AUF	BAF.	ADD <sub>A</sub> (mg/kgBW/d) RME x BAF <sub>i</sub> x	ADD <sub>A</sub>	ADD <sub>lotal</sub> (mg/kgBW/d) ADD <sub>p</sub> + ADD <sub>A</sub> +	NOAEL TRV	HQ ADD <sub>total</sub>	5400
Inorganics					TOTT WYT WIT	TOTAL ASA TACA	Sorre	(mgwgman)	/ TEV	COEC
Aluminum	1.26E+04	4.00E-03	3.71E-01	2.20E-01	0.00E+00	4.14E+01	4.18E+01	7.64E-01	5.47E+01	Ves
Arsenic	1.50E+01	4.00E-02	4.42E-03	2.58E-01	0.00E+00	4.93E-02	5.37E-02	4 99F-02	1.08E+00	200
Cadmium	1.21E-01	5.50E-01	4.90E-04	1.71E+01	0.00E+00	3.98E-04	8.88E-04	7.06E-01	1 26F-03	200
Chromium	3.36E+01	7.50E-03	1.85E-03	1.10E+00	0.00E+00	1.10E-01	1.12E-01	2.00E+03	561F-05	011
Chromium, hexavalent	2.50E+00	7.50E-03	1.38E-04	1.10E+00	0.00E+00	8.22E-03	8.36E-03	9.62E-01	8.69E-03	011
Cobalt	1.04E+01	2.00E-02	1.53E-03	3.21E-01	0.00E+00	3.42E-02	3.57E-02	No TRV	No TRV	VPS
Copper	2,10E+01	4.00E-01	6.18E-02	4.00E-02	0.00E+00	6.91E-02	1.31E-01	1.11E+01	1.17E-02	ou
Lead	1.72E+01	4.50E-02	5.70E-03	3.34E+00	0.00E+00	5.66E-02	6.23E-02	5.85E+00	1.06F-02	00
Nickel	2.01E+01	6.00E-02	8.88E-03	1.66E+00	0.00E+00	6.61E-02	7.50E-02	2.93E+01	2.56E-03	00
Thallium	8,38E-01	4.00E-03	2.47E-05	2.20E-01	0.00E+00	2.76E-03	2.78E-03	5.47E-03	\$ 08R-01	000
Vanadium	2.25E+01	5.50E-03	9.11E-04	3.21E-01	0.00E+00	7.40E-02	7.49E-02	1.43E-01	\$ 25F-01	9
Zinc	6.29E+01	1.50E+00	6.94E-01	5.77E+00	0.00E+00	2.07E-01	9.01E-01	1 17E+02	7 70E-03	OH OH
Organics-Explosives								20 77.7.7	CO-701.1	007
2,6-Dinitrotoluene	5.00E-02	3.15E+00	1.16E-03	2.05E-04	0.00E+00	1 64F-04	1 37F-03	\$ 10E.01	2 600 03	
Organics-Semivolatiles							000000000000000000000000000000000000000	0.125-01	2.30E-03	по
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	9.72E-04	2.70E-04	0.00E+00	1.32E-03	2 29F-03	VaTeN	No TDV	
Bis(2-ethylhexyl)phthalate Organics-Volatiles	1.50E-01	3.80E-02	4.20E-05	3.51E-04	0.00E+00	4.93E-04	5.35E-04	7.25E+00	7.39E-05	no no
1,2-Dimethylbenzene	2.00E-03	6.01E-01	8.84E-06	2.51E-04	0.00E+00	6.58E-06	1.54E-05	8.16E-01	1.89E-05	04
Organics-Pesticides										O
4,4'-DDE	3.30E-04	9.37E-03	2.28E-08	1.26E+00	0.00E+00	1.09E-06	1.11E-06	7.32E-01	1.51F-06	04
Aldrin	1.13E-03	1.04E-02	8.64E-08	4.10E-04	0.00E+00	3.72E-06	3.80E-06	1.46E-01	2.60E-05	94
Dieldrin	1.09E-03	3.49E-02	2.80E-07	3.54E-04	0.00E+00	3.58E-06	3.86E-06	1.46F-02	2 64F-04	
Endrin aldehyde	8.50E-04	6.51E-02	4.07E-07	3.28E-04	0.00E+00	2.80E-06	3.20E-06	No TRV	NoTRV	VAS
Heptachlor	7.90E-04	4.89E-02	2.84E-07	1.40E+00	0.00E+00	2.60E-06	2.88E-06	9.52E-02	3.03F-05	2 2
Lindane	9.30E-04	2.74E-01	1.88E-06	2.76E-04	0.00E+00	3.06F-06	4 93F-06	5 85F+00	9 A2D 07	21

COPEC = Constituents of potential ecological concern

ESV = ecological screening value

CF = correction factor dry wt to wet wt [0.15 kd dry plant/kg wet plant]

RME = Reasonable maximum exposure (lower of maximum or 95% UCL of mean)

SP<sub>v</sub> = Soil-to-plant uptake factor; vegetative

ADD<sub>p</sub> = Average daily dose; plant

Ip (kg/kgBW/d) = Plant ingestion rate for cottontails = 1.88E-01

AUF = Area use factor = 2.61E

BAF<sub>i</sub> = Soil-to-animal; invertebrates

ADDA = Average daily dose; animal

 $I_A$  (kg/kgBW/d) = Animal ingestion rate for cottontails = 0.00E+00

ADD<sub>S</sub> = Average daily dose; soil

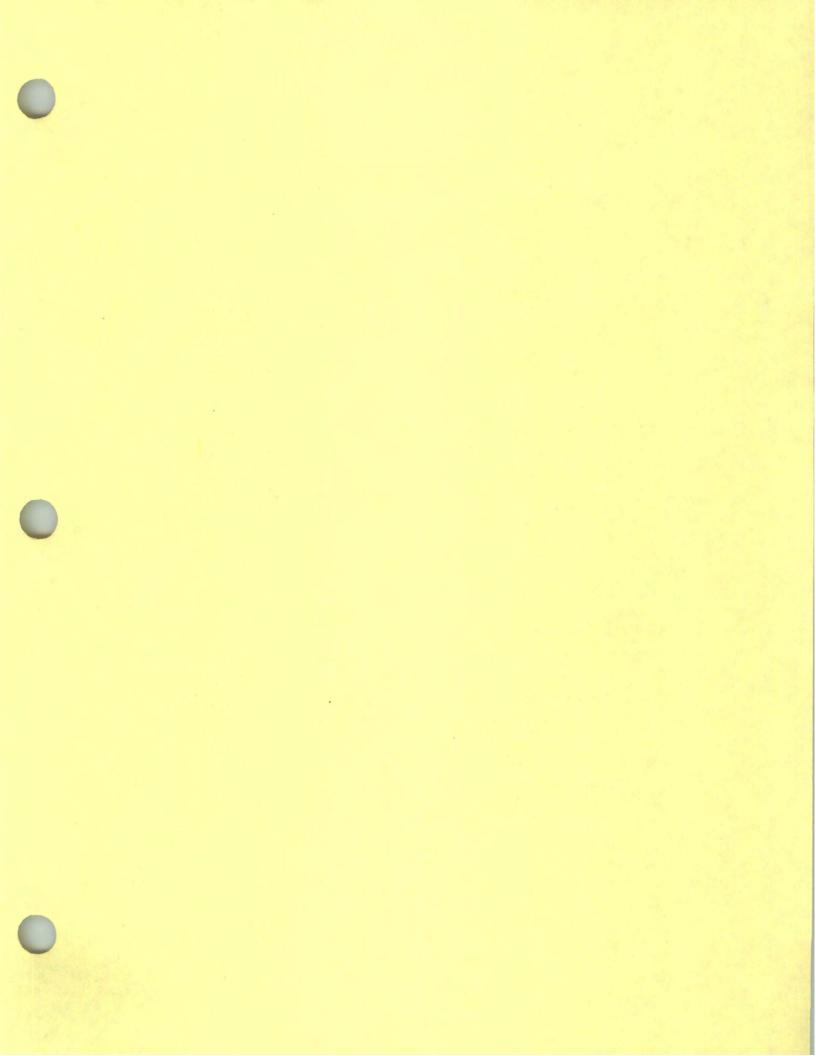
I<sub>S</sub> (kg/kgBW/d) = Soil ingestion rate for cottontails = 1.26E-02 ADDtotal = Average daily dose; total NOAEL = lowest observed adverse effect level

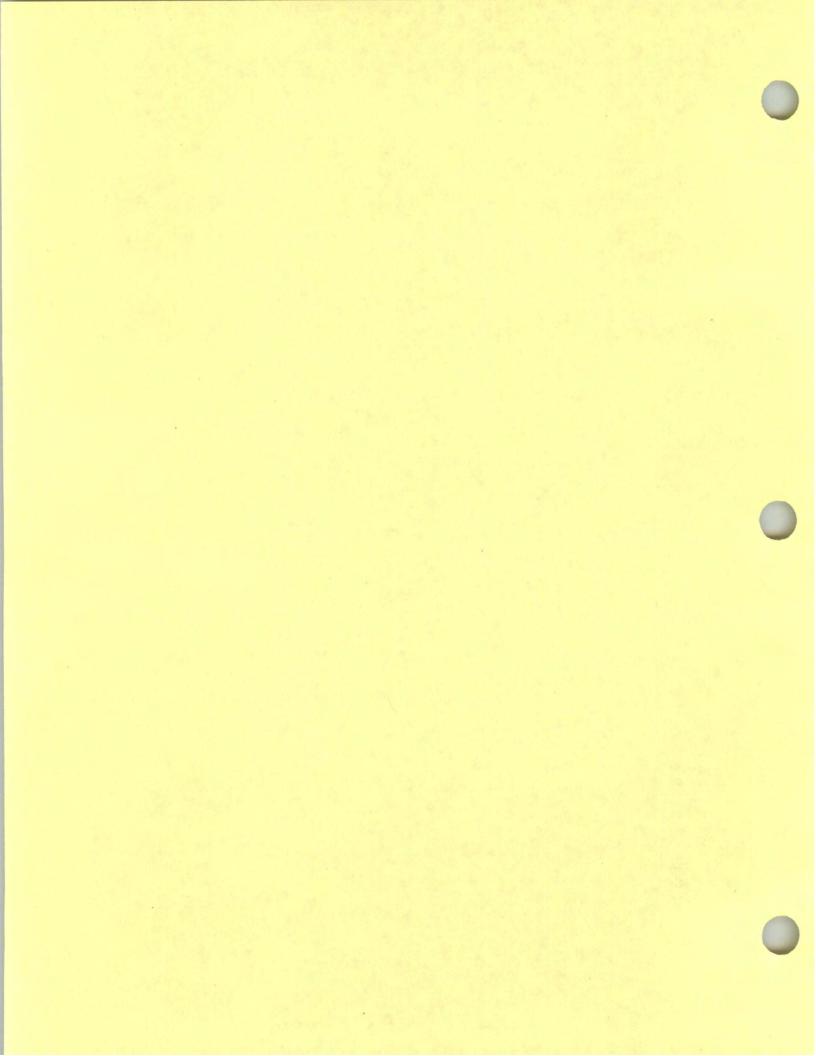
TRV (mg/kgBW/d) = toxicity reference value HQ = hazard quotient

COEC = contaminant of ecological concern "yes" = HQ > 1 or "No TRV"

Page 1 of 2

 $CF_i = correction$  factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs, and I for all other COPECs - fraction dry wt worm/kg wet wet]





Appendix Table C-31. 40 num Range Hazard Quotients for Shrews Exposed to Deep Surface Soil (0-3 ft) COPECs at Ravanna, Ohio

COPECs following ESV screen	RME Concentration (mg/kg)	SP	ADD <sub>P</sub> (mg/kgBW/d) RME $x$ SP <sub>v</sub> $x$ CFx I <sub>P</sub> $x$ AUF	$BAF_1$	$ADD_A$ (mg/kgBW/d) $RME x BAF_1 x$ $CF_1 x I_A x AUF$	$\frac{\text{ADD}_{\text{S}}}{(\text{mg/kgBW/d})}$ RME x I <sub>S</sub> x AUF	$\begin{aligned} & ADD_{lotal} \\ & (mg/kgBW/d) \\ & ADD_P + ADD_A + \\ & ADD_S \end{aligned}$	NOAEL TRV (mg/kgBW/d)	HQ ADD <sub>total</sub> / TRV	COEC?
Inorganics										
Aluminum	1.26E+04	4.00E-03	5.50E-01	2.20E-01	1.35E+03	4.23E+02	1.77E+03	2.22E+00	7.98E+02	yes
Arsenic	1.50E+01	4.00E-02	6.55E-03	2.58E-01	2.45E-01	5.04E-01	7.56E-01	1.45E-01	5.20E+00	yes
Cadmium	1.21E-01	5.50E-01	7.27E-04	1.71E+01	1.31E-01	4.07E-03	1.36E-01	2.05E+00	6.61E-02	ou
Chromium	3.36E+01	7.50E-03	2.75E-03	1.10E+00	2.34E+00	1.13E+00	3.47E+00	5.83E+03	5.95E-04	ou
Chromium, hexavalent	2.50E+00	7.50E-03	2.05E-04	1.10E+00	1.74E-01	8.40E-02	2.58E-01	2.80E+00	9.23E-02	по
Cobalt	1.04E+01	2.00E-02	2.27E-03	3.21E-01	1.63E+00	3.49E-01	1.98E+00	No TRV	No TRV	yes
Copper	2.10E+01	4.00E-01	9.17E-02	4.00E-02	5.32E-02	7.06E-01	8.51E-01	3.24E+01	2.62E-02	ou
Lead	1.72E+01	4.50E-02	8.45E-03	3,34E+00	3.64E+00	5.78E-01	4.23E+00	1.70E+01	2.48E-01	no
Nickel	2.01E+01	6.00E-02	1.32E-02	1.66E+00	2.11E+00	6.75E-01	2.80E+00	8.52E+01	3.28E-02	no
Thallium	8.38E-01	4.00E-03	3.66E-05	2.20E-01	8.98E-02	2.82E-02	1.18E-01	1.59E-02	7.41E+00	yes
Vanadium	2,25E+01	5.50E-03	1.35E-03	3.21E-01	3.52E+00	7.56E-01	4.28E+00	4.15E-01	1.03E+01	yes
Zinc	6.29E+01	1.50E+00	1.03E+00	5.77E+00	2.30E+01	2.11E+00	2.61E+01	3.41E+02	7.66E-02	no
Organics-Explosives										
2,6-Dinitrotoluene	5.00E-02	3.15E+00	1.72E-03	2,05E-04	5.00E-06	1.68E-03	3.40E-03	1.49E+00	2.28E-03	ou
Organics-Semivolatiles										
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	1.44E-03	2.70E-04	5.25E-05	1.34E-02	1.49E-02	No TRV	No TRV	ves
Bis(2-ethylhexyl)phthalate Organics-Volatiles	1.50E-01	3.80E-02	6.22E-05	3.51E-04	2.56E-05	5,04E-03	5.13E-03	2.11E+01	2.43E-04	no
1,2-Dimethylbenzene	2,00E-03	6.01E-01	1.31E-05	2.51E-04	2.45E-07	6.72E-05	8.06E-05	2.37E+00	3.39E-05	no
Organics-resticides	3 300 04	0 375 03	9 300 00	00.000	10 1100 0					
777	3,30E-04	7.3 / E-U3	3.38E-U8	1.202+00	7.03E-04	1.115-05	2.14E-04	2.13E+00	1.00E-04	no
Aldrin	1.13E-03	1.04E-02	1.28E-07	4.10E-04	2.26E-07	3.80E-05	3.83E-05	4.26E-01	9.00E-05	ou
Dieldrin	1.09E-03	3.49E-02	4.15E-07	3.54E-04	1.88E-07	3.66E-05	3.72E-05	4.26E-02	8.74E-04	no
Endrin aldehyde	8.50E-04	6.51E-02	6.04E-07	3.28E-04	1.36E-07	2.86E-05	2.93E-05	No TRV	No TRV	yes
Heptachlor	7.90E-04	4.89E-02	4.22E-07	1.40E+00	5.39E-04	2.65E-05	5.66E-04	2.77E-01	2.04E-03	ou
Lindane	9.30E-04	2.74E-01	2.78E-06	2.76E-04	1.25E-07	3.12E-05	3.42E-05	1.70E+01	2.00E-06	ou

COPEC = Constituents of potential ecological concern

ESV = ecological screening value

CF = correction factor dry wt to wet wt [0.15 kd dry plant/kg wet plant]

RME = Reasonable maximum exposure (lower of maximum or 95% UCL of mean)

SP<sub>v</sub> = Soil-to-plant uptake factor, vegetative

ADD<sub>p</sub> = Average daily dose; plant

I<sub>P</sub> (kg/kgBW/d) = Plant ingestion rate for shrews = 7.28E-02

AUF = Area use factor (1.0)

BAF; = Soil-to-animal; invertebrates

ADDA = Average daily dose; animal

 $I_A\left(kg/kgBW/d\right) = Animal ingestion rate for shrews = 4.87E-01$   $ADD_s = Average daily dose; soil \\ I_S\left(kg/kgBW/d\right) = Soil ingestion rate for shrews = 3.36E-02$ 

ADDtotal = Average daily dose; total NOAEL = lowest observed adverse effect level

TRV (mg/kgBW/d) = toxicity reference value

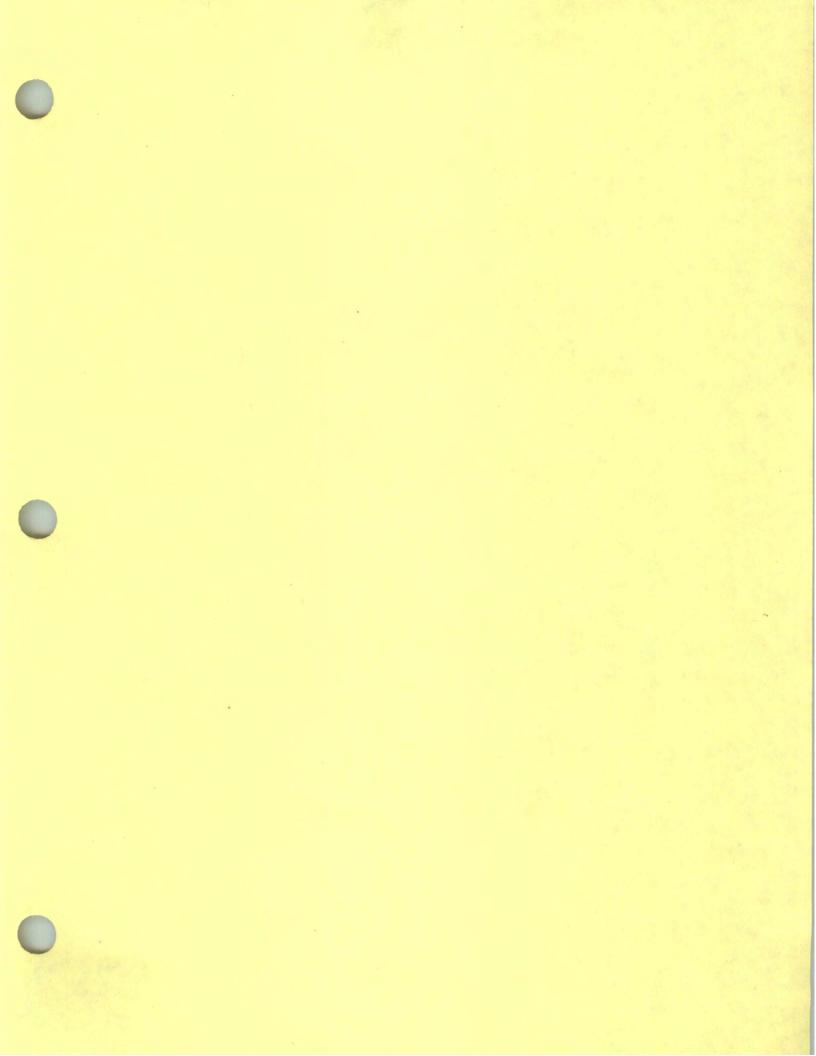
HQ = hazard quotient

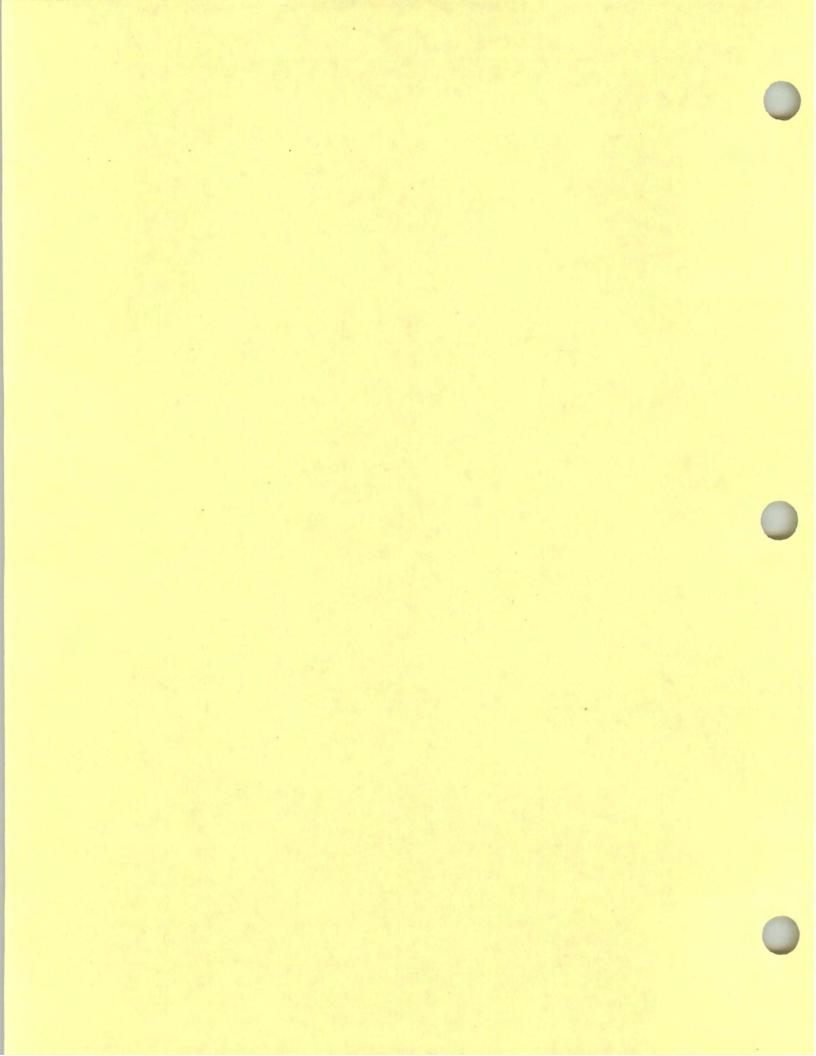
 $\label{eq:coeff} COEC = contaminant of ecological concern \\ "yes" = HQ > 1 \ or "No \ TRV"$ 



 $\mathrm{CF_i}$  = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs, and 1 for all other COPECs - fraction dry wt worm/kg wet wet]

Page 2 of?





Appendix Table C-32. 40 mm Range Hazard Quotients for Red Foxes Exposed to Deep Surface Soil (0-3 ft) PBT COPECs at Ravenna, Ohio

PBT COPECs remaining after ESV screen	RME Concentration (mg/kg)	SPr	ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>r</sub> x CF <sub>r</sub> x I <sub>P</sub> x AUF.	SP	Prey ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CFv x I <sub>P4</sub> x AUF-s	BAF	Prey ADD <sub>A</sub> (mg/kgBW/d) RME x BAF; x $CF_1 \times I_{A*} \times AUF.$ s	Prey ADD <sub>S</sub> (mg/kgBW/d) RME x I <sub>Ss</sub> x AUF-s	Prey ADD <sub>total</sub> (mg/kgBW/d) ADD <sub>P</sub> + ADD <sub>A</sub> + ADD <sub>8</sub>
Inorganics									9
Cadmium	1.21E-01	1.50E-01	1.27E-08	5.50E-01	7.27E-04	1.71E+01	1.31E-01	4.07E-03	1.36E-01
Lead	1.72E+01	9.00E-03	1.09E-07	4.50E-02	8.45E-03	3.34E+00	3.64E+00	5.78E-01	4.23E+00
Zinc	6.29E+01	9.00E-01	3.97E-05	1.50E+00	1.03E+00	5.77E+00	2.30E+01	2.11F+00	2 61E+01
Organics-Semivolatiles									10.010.0
Bis(2-ethylhexyl)phthalate	1.50E-01	3.80E-02	4.00E-09	3.80E-02	6.22E-05	3.51E-04	2.56F-05	\$ 04E-03	\$ 13E-03
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	9.26E-08	3.30E-01	1.44E-03	2 70F-04	5.25E-05	1 34E-02	1 40E-02
Organics-Volatiles							100000	70-71-01	1.425-02
1,2-Dimethylbenzene	2.00E-03	6.01E-01	8.43E-10	6.01E-01	1.31E-05	2.51E-04	2.45E-07	6.72F-05	8 06F-05
Organics-Pesticides									70000
4,4'-DDE	3.30E-04	9.37E-03	2.17E-12	9.37E-03	3.38E-08	1.26E+00	2 03E-04	1.11E-05	2 14E-04
Aldrin	1.13E-03	1.04E-02	8.24E-12	1.04E-02	1.28E-07	4.10E-04	2.26F-07	3 80E-05	3 83E-05
Dieldrin	1.09E-03	3.49E-02	2.67E-11	3.49E-02	4.15E-07	3.54E-04	1.88F-07	3.66F-05	3 72E-05
Endrin aldehyde	8.50E-04	6.51E-02	3.88E-11	6.51E-02	6.04E-07	3.28E-04	1.36E-07	Z.86E-05	2 93F-05
Heptachlor	7.90E-04	4.89E-02	2.71E-11	4.89E-02	4.22E-07	1.40E+00	5.39E-04	2.65E-05	\$ 66F-04
Lindane	9.30E-04	2.74E-01	1.79F-10	2.74F-01	2 78F-06	2 76F-04	1 25E-07	3 120 05	3 470 06

RME = Reasonable maximum exposure (lower of 95% UCL of mean or maximum detection) PBT = persistent, bioaccumulative, and toxic SP<sub>r</sub> = Soil-to-plant; reproductive

Ip (kg/kgBW/d) = Plant ingestion rate for red foxes = 0.00437 SP, = Soil-to-plant; vegetative

ADDp = Average daily dose; plant

Ip., (kg/kgBW/d) = Plant ingestion rate for shrews = 0.0728

1.61E-03 AUF. F = Area use factor for red fox =

AUF-5 = Area use factor for shrews = 1.0

BAF<sub>i</sub> = Soil-to-animal; invertebrates

ADDA = Average daily dose; animal

IA28 (kg/kgBW/d) = Animal ingestion rate for shrews = 0.487

ADDs = Average daily dose; soil

Is-a (kg/kgBW/d) = Soil ingestion rate for shrews = 0.0336

Cs (mg/kg) = Concentration in the prey

IR f (kg/kg BW/d) = Ingestion rate of food for shrews = 0.56

 $CF_t = correction$  factor dry wt to wet wt [0.1 kg dry wt reproductive part plant/kg wet wt]

IA (kg/kgBW/d) = Animal ingestion rate for red foxes = 0.0906 Is (kg/kgBW/d) = Soil ingestion rate for red foxes = 0.00266 COPEC = chemical of potential ecological concern TRV (mg/kgBW/d) = toxicity reference value COEC = contaminant of ecological concern "yes" = HQ is >1 or there is "No TRV" ADD<sub>total</sub> = Average daily dose; total ESV = ecological screening value "no" = HQ less than or equal to 1 BAF.TP = Animal-to-animal; fox HQ = Hazard quotient HQ > 1 in bold font

Appendix Table C-32. 40 mm Range Hazard Quotients for Red Foxes Exposed to Deep Surface Soil (0-3 ft) PBT COPECs at Ravenna, Ohio

+ ADDs	AUF-s	80	BAF	AUF-s	$SP_v$	и	SPr	(mg/kg)	PBT COPECs remaining after ESV screen
DD <sub>P</sub> + ADD <sub>A</sub>	RME x Is.sx A	$CF_{I} \times I_{A^{\circ}} \times AUF$ RME $\times I_{S^{\circ}} \times ADD_{P} + ADD_{A}$		CFvx Ip.sx		CF, xIpx AUF.		Concentration	
(mg/kgBW/d)	(mg/kgBW/d) (	RME x BAFix (		RME x SP <sub>v</sub> x		RME x SPrx		RME	
rey ADD total	Prey ADD <sub>s</sub>   Prey ADD <sub>total</sub>	(mg/kgBW/d)	-	(mg/kgBW/d)		(mg/kgBW/d)			The second secon
		Prey ADDA		Prey ADD <sub>P</sub>		ADDP			
									A.

 $CF_{\nu} = correction$  factor dry wt to wet wt [0.15 kg dry wt vegetative part plant/kg wet wt]  $CF_{i} = correction$  factor dry wt to wet wt [0.13 kg dry wt earthworm/kg wet wt]

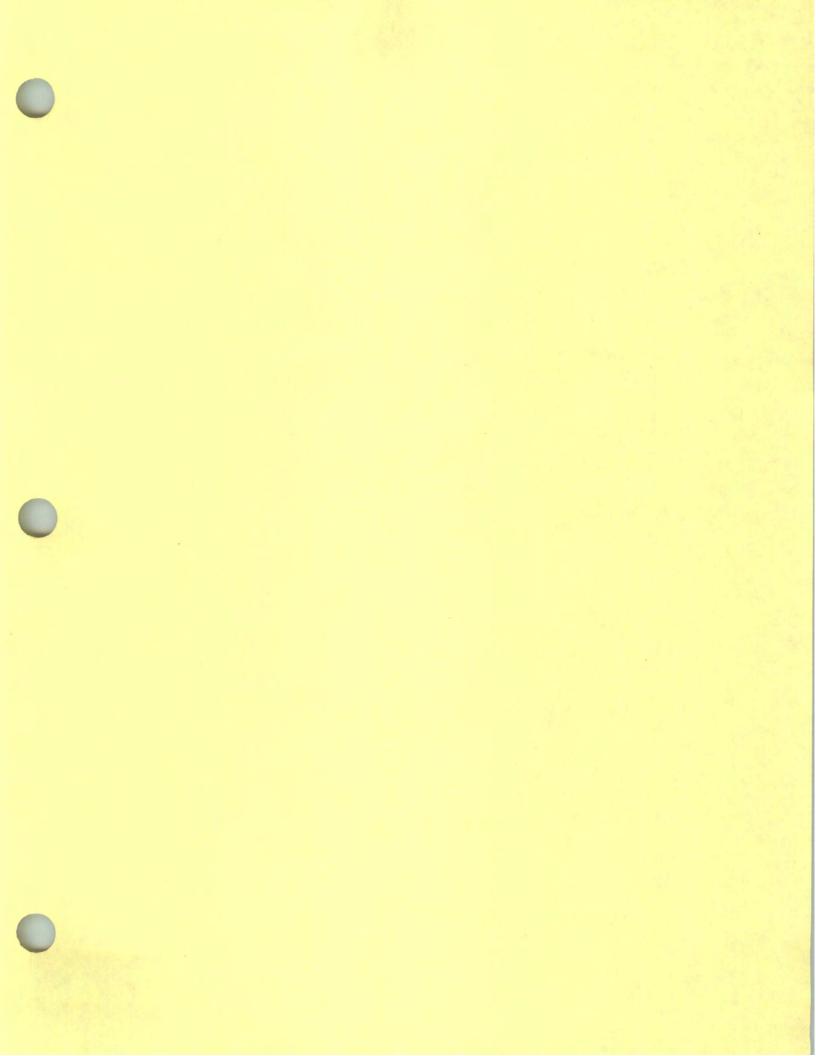
Appendix Table C-32. 40 mm Range Hazard Quotients for Red Foxes Exposed to Deep Surface Soil (0-3 ft) PBT COPECs at Ravenna, Ohio (cont'd)

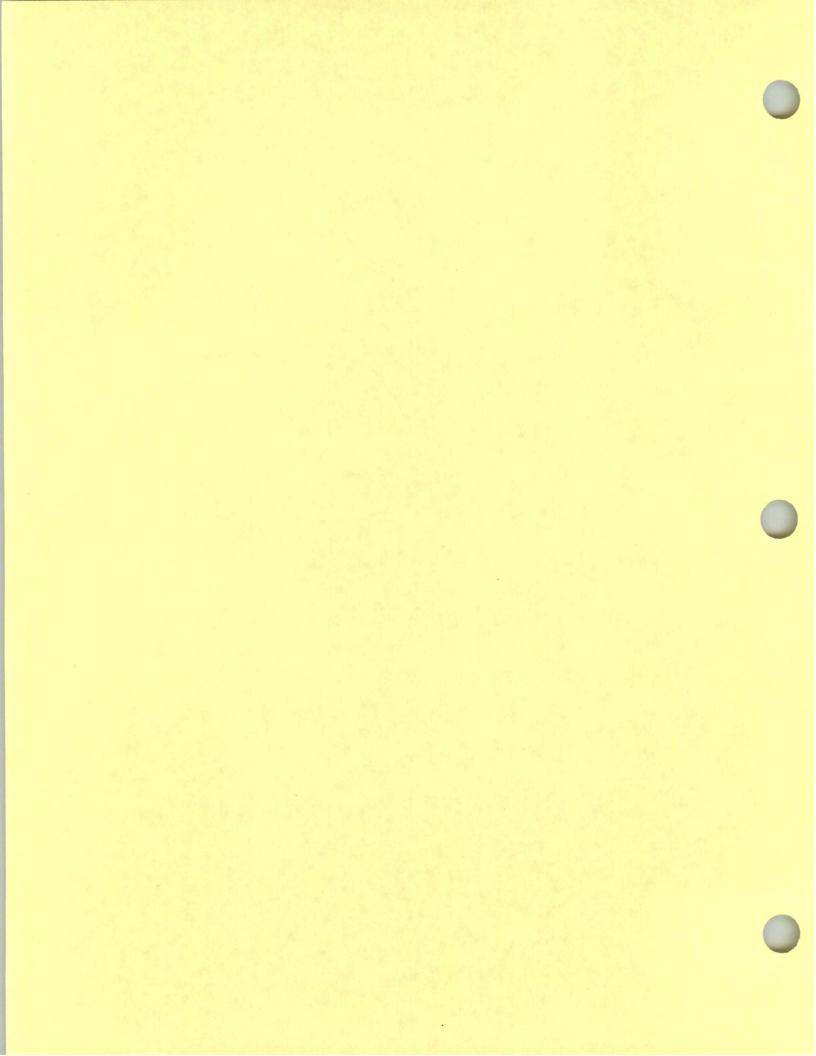
PBT COPECs remaining after ESV screen	Cs (mg/kg) Prey ADD <sub>total</sub> /IR <sub>f</sub>	BAF-TP	$\begin{array}{c} \mathbf{ADD_A} \\ (\mathbf{mg/kgBW/d}) \\ \mathbf{Cs} \ x \ \mathbf{BAF_{TP}} \ x \\ \mathbf{I_A} \ x \ \mathbf{AUF_{:E}} \end{array}$	ADDs (mg/kgBW/d) RME x I <sub>s</sub> x AUF.r	ADD <sub>total</sub> (mg/kgBW/d) ADD <sub>P</sub> + ADD <sub>A</sub> + ADD <sub>S</sub>	NOAEL TRV (mg/kgBW/d)	Site HQ ADD <sub>total</sub> / TRV	COEC?
Inorganies								
Sadmium	2.43E-01	1.54E-02	5.45E-07	5.17E-07	1.07E-06	5.08E-01	2.11E-06	по
ead	7.55E+00	1.36E-03	1.49E-06	7.35E-05	7.51E-05	4.22E+00	1.78E-05	no
Zinc	4.66E+01	4.54E-01	3.08E-03	2.69E-04	3.39E-03	8.43E+01	4.02F-05	04
Organics-Semivolatiles								
Bis(2-ethylhexyl)phthalate	9.16E-03	1.46E-02	1.94E-08	6.41E-07	6.64E-07	5.22E+00	1.27E-07	OU.
3,3'-Dichlorobenzidine	2.67E-02	3,43E-04	1.33E-09	1.71E-06	1.80E-06	No TRV	No TRV	Ape
Organics-Volatiles								3.
,2-Dimethylbenzene	1.44E-04	1.23E-04	2.58E-12	8.54E-09	9.39E-09	5.87E-01	1.60E-08	ou
Organics-Festicides								
4,4'-DDE	3.82E-04	1.65E-01	9.14E-09	1.41E-09	1.06E-08	5.27E-01	2.00E-08	no
Aldrin	6.84E-05	1,38E-01	1.37E-09	4.83E-09	6.21E-09	1.05E-01	5.89E-08	no
Dieldrin	6.65E-05	1.70E-02	1.64E-10	4.66E-09	4.85E-09	1.05E-02	4.60E-07	по
Endrin aldehyde	5.23E-05	5.75E-03	4.38E-11	3.63E-09	3.71E-09	No TRV	No TRV	yes
Heptachlor	1.01E-03	9.44E-03	1.39E-09	3.37E-09	4.79E-09	6.85E-02	6.99E-08	ou
Lindane	6.10E-05	4.78E-04	4.25E-12	3.97E-09	4.16E-09	4.22E+00	9.86F-10	ou

Appendix Table C-32. 40 mm Range Hazard Quotients for Red Foxes Exposed to Deep Surface Soil (0-3 ft) PBT COPECs at Ravenna, Ohio (cont'd)

					ADDtotal			
	Cs		$ADD_A$	ADDs	(mg/kgBW/d)			
	(mo/ko)		(mg/kgBW/d)	(mg/kgBW/d)	ADD <sub>p</sub> +		Site HQ	
BT COPECs remaining	Prev		Cs x BAFTP x	Cs x BAFrp x RME x Isx	ADD <sub>A</sub> +	NOAEL TRV	ADD <sub>total</sub> /	
after ESV screen	Z.	BAF-TP		AUF.F	ADDs	(mg/kgBW/d)	TRV	COEC?

Page 4 of 4





Appendix Table C-33. 40 mm Range Hazard Quotients for Red-Tailed Hawks Exposed to Deep Surface Soil (0-3 ft) PBT COPECs at Ravenna, Ohio

PBT COPECs remaining after the ESV Screen	RME Concentration (mg/kg)	SP	ADD <sub>P</sub> $(mg/kgBW/d)$ $RME x SP_{\nu}x CF\nu x I_{P}x$ $AUF_{:H}$	Prey ADD <sub>P</sub> (mg/kgBW/d) RME x SP <sub>v</sub> x CFv x I <sub>Ps</sub> x AUF-s	BAF	Prey ADD <sub>A</sub> (mgkgBW/d) RME x BAF; x CF <sub>I</sub> x I <sub>A=x</sub> AUF-s	Prey ADDs (mg/kgBW/d) RME x I <sub>Ses</sub> x AUF-s	Prey ADD $_{(otal)}$ (mg $kgBW/d$ ) ADD $_p$ + ADD $_A$ + ADD $_e$
Inorganics								2
Cadmium	1.21E-01	5.50E-01	0.00E+00	7.27E-04	1,71E+01	1,31E-01	4.07E-03	1.36E-01
Lead	1.72E+01	4.50E-02	0.00E+00	8.45E-03	3.34E+00	3.64E+00	5.78E-01	4.23E+00
Zinc	6.29E+01	1.50E+00	0.00E+00	1.03E+00	5.77E+00	2.30E+01	2.11E+00	2.61E+01
Organics-Semivolatiles								
Bis(2-ethylhexyl)phthalate	1.50E-01	3.80E-02	0.00E+00	6,22E-05	3.51E-04	2.56E-05	5.04E-03	5.13E-03
1,2-Dimethylbenzene	2.00E-03	6.01E-01	0.00E+00	1.31E-05	2,51E-04	2.45E-07	6.72E-05	8.06E-05
3,3'-Dichlorobenzidine	4.00E-01	3.30E-01	0.00E+00	1.44E-03	2.70E-04	5.25E-05	1.34E-02	1.49E-02
Organics-Pesticides								
4,4'-DDE	3.30E-04	9.37E-03	0.00E+00	3.38E-08	1.26E+00	2.03E-04	1.11E-05	2.14E-04
Aldrin	1.13E-03	1.04E-02	0.00E+00	1.28E-07	4.10E-04	2.26E-07	3.80E-05	3.83E-05
Dieldrin	1.09E-03	3.49E-02	0.00E+00	4.15E-07	3.54E-04	1.88E-07	3.66E-05	3.72E-05
Endrin aldehyde	8.50E-04	6.51E-02	0.00E+00	6.04E-07	3.28E-04	1.36E-07	2.86E-05	2.93E-05
Heptachlor	7.90E-04	4.89E-02	0.00E+00	4.22E-07	1.40E+00	5.39E-04	2.65E-05	5.66E-04
Lindane	9.30E-04	2.74E-01	0.00E+00	2.78E-06	2.76E-04	1 25F-07	3 17F-05	3 47E-05

PBT = persistent, bioaccumulative, and toxic

COPEC = contaminant of potential ecological concern

ESV = ecological screening value

RME = reasonable maximum concenetration

SPr = Soil-to-plant; reproductive

SP<sub>v</sub> = Soil-to-plant; vegetative

 $I_P(kg/kgBW/d)$  = Plant ingestion rate for red-tailed hawks = 0.00

ADD<sub>p</sub> = Average daily dose; plant

CF<sub>v</sub> = correction factor [0.15 kg dry wt vegetative plant part/kg wet wt]

CF<sub>1</sub> = correction factor (earthworms) [0.13 for As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn, PCBs,

and I for all other COPECs - fraction dry wt worm/kg wet wet]

Cs (mg/kg) = Concentration in the prey

IR r (kg/kgBW/d)= Ingestion rate of food for shrews = 0.56

 $BAF_{TP} = Animal-to-mammal transfer factor (Ba_{cow} \times BW_{receptor} \times lipid ratio)$  where lipid ratio = 1 for inorganics, 0.8 for organics; mammal Ba = biotransfer food to cow,

and BW<sub>receptor</sub> = body wt (kg) of the receptor

I, (kg/kgBW/d) = Animal ingestion rate for red-tailed hawks = 0.11

Is (kg/kgBW/d) = Soil ingestion rate for red-tailed hawks = 0.00

Page 1 of 2

Appendix Table C-33. 40 mm Range Hazard Quotients for Red-Tailed Hawks Exposed to Deep Surface Soil (0-3 ft) PBT COPECs at Ravenna, Ohio (cont'd)

PBT COPECs remaining after the ESV Screen	Cs (mg/kg) ADD <sub>total</sub> /fR <sub>f</sub>	BAF.rp	$ADD_{\mathbf{A}}$ (mg/kgBW/d) $Cs \times BAF{TP} \times I_{\mathbf{A}} \times AUF{H}$	ADDs (mg/kgBW/d) RME x I <sub>8</sub> x AUF. <sub>H</sub>	ADD <sub>total</sub> (mg/kgBW/d) ADD <sub>P</sub> + ADD <sub>A</sub> + ADD <sub>S</sub>	NOAEL TRV (mg/kgBW/d)	Site HQ ADD <sub>lotal</sub> / TRV	COEC?
Inorganics	2.43E-01	3.86E-03	9.51E-08	0.00E+00	9.51E-08	1.45E-02	6.56E-06	ou
Lead	7.55E+00	3.40E-04	2.61E-07	0.00E+00	2.61E-07	1.13E-02	2.31E-05	ou
Zinc	4.66E+01	1.13E-01	5.37E-04	0.00E+00	5.37E-04	1.45E-01	3.71E-03	ou
Organics-Semivolatiles Ris(2-ethylhexyl)nhthalate	9.16E-03	3.65E-03	3.39E-09	0.00E+00	3.39E-09	1.10E-02	3.09E-07	ou
1.2-Dimethylbenzene	1.44E-04	3.08E-05	4.50E-13	0.00E+00	4.50E-13	No TRV	No TRV	yes
3,3'-Dichlorobenzidine	2.67E-02	8.57E-05	2.32E-10	0.00E+00	2.32E-10	No TRV	No TRV	yes
Organics-Pesticides								
4,4'-DDE	3.82E-04	4.12E-02	1.60E-09	0.00E+00	1.60E-09	8.45E-03	1.89E-07	ou
Aldrin	6.84E-05	3.44E-02	2.39E-10	0.00E+00	2.39E-10	No TRV	No TRV	yes
Dieldrin	6.65E-05	4.24E-03	2.86E-11	0.00E+00	2.86E-11	7.70E-04	3.72E-08	ОП
Endrin aldehyde	5.23E-05	1.44E-03	7.65E-12	· 0.00E+00	7.65E-12	No TRV	No TRV	yes
Heptachlor	1.01E-03	2.36E-03	2.42E-10	0.00E+00	2.42E-10	6.50E-04	3.73E-07	ou
Lindane	6.10E-05	1.20E-04	7.41E-13	0.00E+00	7.41E-13	2.00E-02	3.71E-11	ou

$$\begin{split} I_{Pa}(kgkgBW/d) = Plant ingestion rate for shrews (0.0728) \\ AUF_s = Area use factor for shrew (1.0) \\ BAF_i = Soil-to-animal; invertebrates \\ ADD_A = Average daily dose; animal \\ I_{A*}(kgkgBW/d) = Animal ingestion rate for shrews (0.487) \\ ADD_S = Average daily dose; soil \\ AUF_{H} = Area use factor hawk \\ 0.000924 \end{split}$$

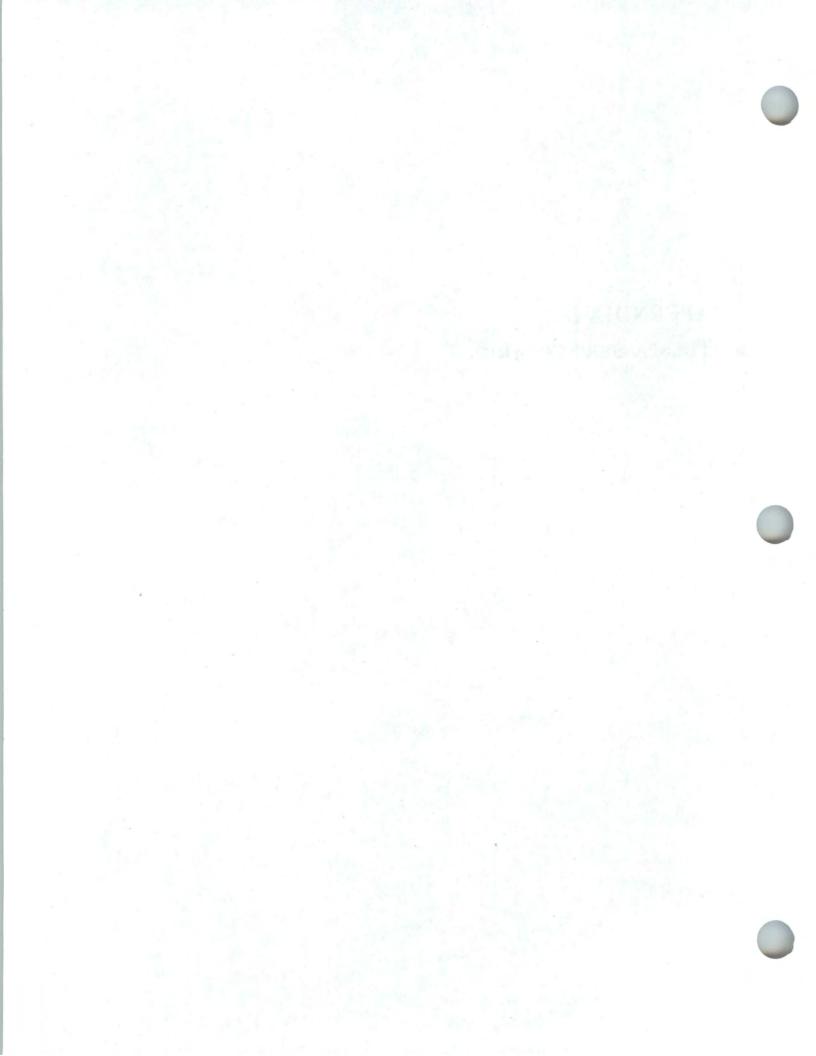
I<sub>S-8</sub> (kg/kgBW/d) = Soil ingestion rate for shrews (0.0336) ADD<sub>total</sub> = Average daily dose; total TRV (mg/kgBW/d) = toxicity reference value HQ = Hazard quotient COEC = contaminant of ecological concern "yes" = HQ > 1 or "No TRV" "no" = HQ less than or equal to 1 HQs in bold font are > 1

Page 2 of 2

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### APPENDIX D

## TRESPASSER SCENARIO



#### 1 RISK CHARACTERIZATION FOR JUVENILE TRESPASSER SCENARIO:

#### 2 40MM RANGE AOC

#### INTRODUCTION

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The HHRA provided in the Analytical Evaluation Of Chemical Residuum at the 40 mm Range evaluates the potential health risks to humans resulting from exposure to contaminated soil at the 40mm Range AOC. The HHRA is based on the methods outlined in the RVAAP FWHHRAM which addresses five receptors to be evaluated at RVAAP [National Guard Trainee, National Guard Dust/Fire Control Worker, Security Guard/Maintenance Worker, Hunter/Trapper/Fisher, and Resident Subsistence Farmer (adult and child)].

In addition to the receptors in the FWHHRAM a Juvenile Trespasser is evaluated in this appendix to supplement the HHRA to provide risk managers with information to support determination of the need for continued security at the facility (i.e., maintenance of the perimeter fence to mitigate trespassing onto RTLS/RVAAP).

This supplemental risk characterization provides exposure assessment results of the risk characterization. The data evaluation, COPCs, and toxicity assessment are provided in the HHRA presented in the *Analytical Evaluation Of Chemical Residuum at the 40 mm Range* and do not change for this evaluation of the Juvenile Trespasser.

#### EXPOSURE ASSESSMENT

One receptor (Juvenile Trespasser) is evaluated in this supplemental HHRA. RVAAP/RTLS is a controlled access facility (it is fenced, gated, and patrolled by security guards); however, if the perimeter fence is not maintained a trespasser could enter the property and be exposed to contaminants in surface soil, sediment, and surface water at the 40 mm Range AOC. The most likely adult trespassers are hunters or National Guard trainees entering unauthorized areas. These adult trespassers will have similar exposures, but with a much lower frequency, to the Hunter and National Guard Trainee receptors that are included in the baseline HHRA. Therefore, a separate adult trespasser is not evaluated quantitatively in this risk assessment. A Juvenile Trespasser (ages 8 to 18) is evaluated quantitatively for exposure to contaminated surface soil (0-1 ft bgs) via incidental ingestion, inhalation of VOCs and particulates, and dermal contact.

Exposure equations for each of these pathways are provided in the FWHHRAM (USACE 2004b). Exposure parameters used to calculate potential chemical intakes by the Juvenile Trespasser are provided in Table 1. Chemical-specific exposure parameters are provided for all COPCs in Table 2.

Table 1. Exposure Parameters for Juvenile Trespasser Scenario: Exposure to Surface Soila

Exposure Pathway and Parameter	Units	Value
Incidental Ingestion		
Soil ingestion rate	kg/day	$0.0002^{b}$
Exposure time	hours/day	2°
Exposure frequency	days/year	50°
Exposure duration	years	10 <sup>c</sup>
Body weight	kg	45 <sup>c</sup>
Carcinogen averaging time	days	25,550 <sup>b</sup>
Non-carcinogen averaging time	days	3,650 <sup>b</sup>
Fraction ingested	Unitless	1
Conversion factor	days/hour	0.042
Dermal Contact		
Skin area	m²/event	$0.46^{d}$
Adherence factor	mg/cm <sup>2</sup>	0.2°
Absorption fraction	Unitless	Chemical Specific - Table A-2
Exposure frequency	events/year	50°
Exposure duration	years	10 <sup>c</sup>
Body weight	kg	45°
Carcinogen averaging time	days	25,550 <sup>b</sup>
Non-carcinogen averaging time	days	$3,650^{b}$
Conversion factor	(kg-cm2)/(mg-m2)	0.01
Inhalation of VOCs and Dust		
Inhalation rate	m3/day	$20^b$
Exposure time	hours/day	2°
Exposure frequency	days/year	50°
Exposure duration	years	10°
Body weight	kg	45°
Volitilization factor	m3/kg	Chemical Specific - Table A-2
Particulate emission factor	m3/kg	9.24E+08 <sup>f</sup>
Carcinogen averaging time	days	25,550 <sup>b</sup>
Non-carcinogen averaging time	days	$3,650^{b}$
Conversion factor	days/hour	0.042

<sup>a</sup>Surface soil is defined as 0-1 ft bgs (shallow surface soil). <sup>b</sup> Default exposure parameter from RAGS, Part B (EPA 1989).

Per Ohio EPA personal communication (EPA 1999), conservatively assumes a trespasser (age 8-18) visits the site every weekend they are

home (i.e., minus 2 weeks away) and spends 2 hours each day at the site.

"Value is 25% of the total 95<sup>th</sup> percentile skin surface area of males age 9-18 (EPA 1997). This is consistent with the source of the skin surface area for the adult farmer (i.e., 0.57 is 25% of the 95<sup>th</sup> percentile total skin surface are for adult male from EPA 1997).

"Value is child default and teen soccor (95<sup>th</sup> percentile) RAGS, Vol. 1 Part E, Supplemental Guidance for Dermal Risk Assessment, Interim,

Default value for Cleveland Ohio from EPA Soil Screening Guidance per FWHHRAM (USACE 2004b) for other receptors.

3 4 5 6 7 8 9 10 11 12 13 Trespasser is assumed to ingest 0.05 L/hour [per RAGS Part A (EPA 1998)] for the two hours/day spent on site for a total ingestion rate of 0.1 L/day.

Table 2. Chemical-specific Exposure Parameters for 40 mm Range COPCs

COPC	Dermal Absorption Factor <sup>a</sup> (unitless)	Volatilization Factor <sup>b</sup> (m³/kg)
Inorganics		
Aluminum	1.0E-03	
Arsenic	3.0E-02	
Chromium (as Chromium III)	1.0E-03	142/
Thallium (as Thallium carbonate)	1.0E-03	
Vanadium	1.0E-03	
Organics		
2-Methyl-4,6-dinitrophenol	1.0E-01	
Benzo(a)pyrene	1.3E-01	-
Bis(2-chloroethyl) ether	1.0E-01	4.0E+04
Dibenz(a,h)anthracene	1.3E-01	44
Hexachlorobenzene	1.0E-01	
N-Nitroso-di-n-propylamine	1.0E-01	

<sup>&</sup>lt;sup>a</sup> Chemical-specific absorption factor values from EPA Region V (EPA, 2000). When chemical-specific values are not available the following default values are used: SVOCs = 0.1, VOCs = 0.01, inorganics = 0.001 per USEPA Region 4 Supplemental Guidance to RAGS.

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#### RISK CHARACTERIZATION

Risk characterization integrates the findings of the exposure and toxicity assessments to estimate the potential for receptors to experience adverse effects as a result of exposure to contaminated media. Risk characterization for the Juvenile Trespasser follows the same methodology used for risk characterization for the other receptors evaluated in the baseline HHRA.

Toxicity values used in the risk characterization are provided in Tables 3 and 4. Detailed hazard and risk results for direct contact with COPCs in surface soil are presented in Tables 5 and 6. Direct contact includes incidental ingestion of soil, inhalation of VOCs and particulates (i.e., dust) from soil, and dermal contact with soil.

The total HI for the Juvenile Trespasser exposed to shallow surface soil is 0.009. The total risk across all COPCs for the Juvenile Trespasser exposed to shallow surface soil is 6.5E-07. Both of these results are s below the threshold levels of 1.0 (HI) and 1E-06 (ILCR); thus, no surface soil COCs are identified for this receptor.

Page 3 of 6

<sup>&</sup>lt;sup>b</sup> Volatilization factors (VFs) calculated using the 1996 EPA Soil Screening Guidance Methodology, using site-specific parameter values for Cleveland, Ohio.

COPC = Chemical of potential concern.

RAGS = Risk Assessment Guidance for Superfund.

SVOC = Semivolatile organic compound.

VOC = Volatile organic compound.

<sup>-- =</sup> No value available.

Table 3. Non-carcinogenic Reference Doses for 40 mm Range COPCs

COPC	Oral Chronic RFD (mg/kg-day)	Confidence Level	% GI absorption <sup>a</sup>	% GI   Chronic RfD   Chronic RfD absorption"   (mg/kg-day)   (mg/kg-day)	Dermal Inhalation Chronic RfD Chronic RfD (mg/kg-day) (mg/kg-day)	RfD Basis (vehicle)	Critical Effect	Uncertainty/ Modifying Factor
Inorganics								
Aluminum								
	1.0E+00	NA	1	1.0E+00	1.4E-03	NA	NA	(O) UF=10
Arsenic								
	3.0E-04	Medium (O)	0.95	3.0E-04	1	Oral, oral-water	Hyperpigmentation, keritosis and Oral, oral-waterpossible vascular complication	d (O) UF=3
Chromium (as Chromium III)	romium III)							
	1.5E+00	Low (O)	0.013	2.0E-02	1	Oral (rat)	Reduced liver/spleen weight	(O) UF=100
Thallium							The second secon	
	8.0E-05	Low (O)	1	8.0E-05	1	Oral	Nervous system, lungs, heart, liver, and kidneys	(O) MF=1 (O) UF=3000
Vanadium								
	7.0E-03	NA	0.026	1.8E-04	1	Inhalation	(I) respiratory system	(O) MF=1 (O) UF=100
Organics								
2-Methyl-4,6-dinitrophenol	itrophenol							
	1.0E-04	NA	1	1.0E-04	1	Oral	Increased basal metabolic rate	NA
Hexachlorobenzene	ene							
	8.0E-04	NA	1	8.0E-04	-	Oral	Liver, kidneys, and thyroid	NA

a% GI absorption values from EPA 2000.
(O) indicates oral, (I) indicates inhalation.
MF = Modifying factor (the default modifying factor is 1).
NA = Not available.
RfD = Reference dose.
UF = Uncertainty factor.

-- = No value available.

Table 4. Cancer Slope Factors for 40 mm Range COPCs

COPC	Oral Slope Factor (mg/kg-day) <sup>-1</sup>	% GI absorption	Factor Factor (mg/kg-day) <sup>-1</sup> absorption (mg/kg-dav) <sup>-1</sup> (mg/k	Inhalation Slope Factor EPA (mg/kg-day) <sup>-1</sup> Class	EPA Class T	Tyne of Cancer
Inorganics				0 0		
Arsenic	1.5E+00	0.95	1.5E+00	1.5E+01 A	4	Reeniratory eyetem tumore
Organics						respiratory system tumors
Benzo(a)pyrene	7.3E+00	0.58	7.3E+00	3.1E+00	B2	Stomach nasal cavity larvay traches alyamy
Bis(2-chloroethyl) ether	1.1E+00	-	1.1E+00	1.2E+00	-	NA
Dibenz(a,h)anthracene	7.3E+00	0.58	7.3E+00	3.1E+00	+	
Hexachlorobenzene	1.6E+00	-	1.6E+00	1.6E+00	+	Liver kidneys and thyroid
N-Nitroso-di-n-propylamine	7.0E+00	-	7.0E+00	1	+	- Liver nose and stomach (animals)

<sup>a</sup>% GI absorption values from EPA 2000. TEF = Toxicity Equivalency Factor is based on the relative potency of each carcinogenic polycyclic aromatic hydrocarbon (PAH) relative to that of benzo(a)pyrene. -- = No value available.

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Table 5. 40 mm Range Shallow Surface Soil Carcinogenic Risks for the Juvenile Trespasser - Direct Contact

		Daily 1	Intake (n	ng/kg-d)		Risk		Total Risk	
COPC	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	across all	
Aluminum	1.2E+04	9.0E-05	5.0E-06	9.7E-09					
Arsenic	1.3E+01	9.1E-08	1.5E-07	9.8E-12	1.4E-07	2.3E-07	1.5E-10	3.6E-07	
Chromium	4.4E+01	3.2E-07	1.8E-08	3.4E-11	1141				
Thallium	8.0E-01	5.8E-09	3.2E-10	6.3E-13					
Vanadium	2.3E+01	1.6E-07	9.1E-09	1.8E-11					
Inorganics Pathway Total					1.4E-07	2.3E-07	1.5E-10	3.6E-07	
2-Methyl-4,6-dinitrophenol	4.6E-01	3.3E-09	1.8E-08	3.6E-13					
Benzo(a)pyrene	2.3E-01	1.7E-09	1.2E-08	1.8E-13	1.2E-08	8.7E-08	5.6E-13	9.9E-08	
Dibenz(a,h)anthracene	2.3E-01	1.7E-09	1.2E-08	1.8E-13	1.2E-08	8.7E-08	5.6E-13	9.9E-08	
Hexachlorobenzene	2.3E-01	1.7E-09	9.2E-09	1.8E-13	2.7E-09	1.5E-08	2.9E-13	1.7E-08	
N-Nitroso-di-n-propylamine	2.3E-01	1.7E-09	9.2E-09	1.8E-13	1.2E-08	6.4E-08		7.6E-08	
Organics Pathway Total					3.9E-08	2.5E-07	1.4E-12	2.9E-07	
Pathway Total - Chemicals					1.7E-07	4.8E-07	1.5E-10	6.5E-07	

<sup>&</sup>lt;sup>a</sup> COPCs are identified as chemicals of concern (COCs) if the total ILCR across all pathways is > 1E-06 (R).

Table 6. 40 mm Range Shallow Surface Soil Non-carcinogenic Hazards for the Juvenile Trespasser - Direct Contact

		Daily	Intake (n	ng/kg-d)	Hazar	d Quotie	nt (HQ)	Total HI	1
COPC	EPC (mg/kg)	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	across all	
Aluminum	1.2E+04	6.3E-04	3.5E-05	6.8E-08	6.3E-04	3.5E-05	4.8E-05	7.1E-04	
Arsenic	1.3E+01	6.3E-07	1.1E-06	6.9E-11	2.1E-03	3.5E-03		5.6E-03	
Chromium	4.4E+01	2.2E-06	1.2E-07	2.4E-10	1.5E-06	6.3E-06		7.8E-06	
Thallium	8.0E-01	4.1E-08	2.3E-09	4.4E-12	5.1E-04	2.8E-05		5.4E-04	
Vanadium	2.3E+01	1.2E-06	6.4E-08	1.2E-10	1.6E-04	3.5E-04		5.1E-04	
Inorganics Pathway Total					3.4E-03	3.9E-03	4.8E-05	7.4E-03	
2-Methyl-4,6-dinitrophenol	4.6E-01	2.3E-08	1.3E-07	2.5E-12	2.3E-04	1.3E-03		1.5E-03	1
Benzo(a)pyrene	2.3E-01	1.2E-08	8.4E-08	1.3E-12					
Dibenz(a,h)anthracene	2.3E-01	1.2E-08	8.4E-08	1.3E-12					
Hexachlorobenzene	2.3E-01	1.2E-08	6.4E-08	1.3E-12	1.5E-05	8.1E-05		9.5E-05	
N-Nitroso-di-n-propylamine	2.3E-01	1.2E-08	6.4E-08	1.3E-12					
Organics Pathway Total					2.5E-04	1.4E-03		1.6E-03	
Pathway Total - Chemicals					3.7E-03	5.3E-03	4.8E-05	9.0E-03	

<sup>&</sup>lt;sup>a</sup> COPCs are identified as chemicals of concern (COCs) if the total HI across all pathways is > 1 (H).

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COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

ILCR = Incremental Lifetime Cancer Risk.

COPC = Chemical of Potential Concern.

EPC = Exposure Point Concentration.

HI = Hazard Index.

# DRAFT REPORT, EVALUATION OF CHEMICAL RESIDUUM AT THE 40 mm RANGE, RAVENNA ARMY AMMUNITION PLANT RESPONSE TO REVIEWERS: EILEEN T. MOHR, OHIO EPA, NEDO, DERR; and LAURIE MOORE, OHIO EPA, SWDO, OFFO DATE: MARCH 22nd, 2006

Cmt. #	Pg/ Line #	Comment	Recommendation	Response
1	iii/5	Change requested.	Change acronym to read: Agency for Toxic Substances Disease Registry.	Corrected. Added Substances on line 5, p iv
2	lii/41	Change requested.	Change to "munitions and explosives of concern." Check entire text for this (for example, it appears on page 11 incorrectly.)	Corrected line 41 p iii; p 11 line 6. Global revealed no other locations
3	General	Text revision.	Do search and replace for the correct acronym for USACE in the document.	USACE identified in acronym list, p 4 line 36P 11 line 34 text corrected to spell acronym.
4	General	Text addition.	Add the 40 mm data to the revised report. A summary table showing all the data (with indications of the detection limits) would be acceptable.	Data Summaries are now included in App A3 and App A4 has been added: Quality Control Summary Report
5	General	Text revision.	At an appropriate page in the report, indicate where the chain of custody reports for the 40 mm data can be found.	Appendix A1 has been added to provide 'Chain of Custody'. Appendix A2 has been added: Fuze and Booster/40 MM Soil Sample Logs
6	General	The Executive Summary contains information that is not needed, such as tables, detailed discussion of the results of the human health and ecological risk assessments, etc. It is our opinion that all this information does not need to be in the ES.	This section should be reduced in length. Cover <u>briefly</u> the main highlights of the text. All the detailed information of the risk assessments and "arguments" regarding why HQs are overestimated (as well as bioavailability, toxic validity "issues", etc.) should not appear in the ES.	Removed lines 10-18 on p 6. Removed risk tables in ES. Removed lines 4-17 and 22 to 29 and added lines 18-22.5 on p 7. Removed Table on p 8. Deleted lines 2-6; 7.5 -8, 13-14.5 and added lines 23-31 on p 9.

7	General	General comment.	This report does not follow the standard format of RI reports that are prepared for RVAAP. For example, there is no description of the installation as a whole (ex location within NE Ohio, boundaries etc.), no sampling information, no discussion of refusal depths (which could put to rest questions of why didn't sampling occur at depths greater than 3 'bgs,) no evaluation of the data in this report, etc. These are standard sections of any RI report. Please cross reference previous RI reports and add pertinent sections to the revision.	Discussion. This analytical evaluation was never intended to be an RI. The DQO of this effort was established during IAP of 2005. DQO was to evaluate the data that characterized 40 MM AOC, specific to the end-user, to determine protectiveness to human health and environment.
8	General	General comment.	All changes in the text of the report must match the ES.	Noted
9	5/3-4	Text change requested.	Change text to read: "Chemical characterization of the soil at the 40 mm range was completed by obtaining and analyzing 40 soil samples."	Text changed p5/3-4: Chemical characterization of the 40 mm Range at RVAAP was completed with by obtaining and analyzing 40 soil samples locations.
10	5/4-6	Text change requested.	Remove the sentence. It is too confusing.	Concur. P5/6-10 now read: Concentrations of chemical constituents identified in each of the 40 samples were similar. Concentrations of organics were low (at or below detection limit). Concentrations of metals were greater than those detected for organic compounds, but were similar in each sample.

11	5/13	Text change requested.	Deep surface at RVAAP is represented by the 0-4' interval.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.
12	5/22 - 29	Clarification requested.	The text seemingly indicates that various constituents were considered if their concentrations exceed the Region 9 PRG. The text must clarify that there is more to the process of COC selection than is what is presented in the ES.	These sentences refer to just COPC or COPEC selection which is in accordance to Section 3.5.2 of the Risk Manual Please refer to added text in Section 3.1.1; P15/8-29. The full explanation is on pp 13-14.
13	5/22	Revision requested.	Revise the text to indicate that it is the Region 9 residential PRG that is used.	P5/25, 30 now reads: the Region 9 residential PRG (arsenic) or 1/10 <sup>th</sup> the Region 9 residential PRG. Also a global search was made to add residential before PRG.
14	5/25	Revision requested.	Revise the text to indicate that it is the Region 9 residential PRG that is used. (2 places)	P5/30 now reads: residential PRG [benzo(a)pyrene, bis(2-chloroethyl)ether (deep surface and
15	5/28	Revision requested.	Revise the text to indicate that it is the Region 9 residential PRG that is used. (2 places)	P5/32 now reads: propylene] or 1/10 <sup>th</sup> the USEPA Region 9 residential PRG (2-methyl-4,6-dinitrophenol). All
16	5/table	Revision requested.	Add a title to the table, if it remains in the report.	Table deleted in ES.
17	5/table	Revision requested.	Add the definitions of the acronyms to the table, if it remains in the revised report.	Table deleted in ES.
18	6/table	Revision requested.	Add a title to the table, if it remains in the report.	Table deleted in ES.

19	6/table	Revision requested.	Add the definitions of the acronyms to the table, if it remains in the revised report.	Table deleted in ES.
20	Pg 5/16- 20 and pg 6/13- 16	Clarification and revision requested.	This appears to be duplicative text. If this text remains in the revised ES, it should only appear in one place.	pg 6/10-18 is deleted.
21	Pg 8	Revision requested.	On the table, put the soil depth in parentheses for each soil category (surface, subsurface, deep surface).	Table deleted in ES
22	Pg 9/line 18	Text clarification requested.	The text should indicate that the figures are located in the main body of the text.	P9/33 reads: Figures 1 through 4 (pp 62-65 in text) show that detected COPCs and COPECs (and, be
23	Pg 9/line 18	Text change requested.	Change "be" to "by."	P9/34 corrected.
24	Pg 9/lines 38-39	The text indicates that the animal life "looks healthy and functioning."	The meaning of this portion of the text is not only unclear, but it is not supported by data. If this remains in the text, please add in additional scientific data which supports the observation.	The phrase was deleted. See P10/7-9.5.
25	Pg 9, line 46	Revision requested.	Move the 4 metals (in parentheses) to after "4 metals" in line # 45. As currently written, it appears that the 4 metals are part of the uncertainty analysis.	P10/16-17 read: The rest of the few HQs were below one hundred and the 4 metals (arsenic, chromium, thallium, and zinc) remaining after the first four steps of the
26	Pg 11/line 1	Text revision requested.	Change site to area of concern.	P11/2: The 40 mm Range area of concern (AOC),
27	Pg 11/line 6	Text revision requested.	Change text to: "Munitions and explosives of concern are suspected at this ~2acre AOC."	P11/6: operation. Munitions and Explosives of Concern (MEC) is suspected at this ~2-acre site.

Page 4 of 18

28	Pg 11/lines 21-22	Delete current text.	Insert the following: "Surface water flow, based upon the existing topographic maps, is expected to be radial in nature."	P11/24-27: Specifically, surface water flow, based upon the existing topographic maps, is expected to be radial in nature.surface water drainage at the 40 mm Range flows radially toward the southern pond, the ditch south of the AOC, after which drainage occurs at Hinkley Creek.
29	Pg 11/lines 32-34	The text indicates that the data for the 40 mm AOC can be found in the FBQ report.	Add an appendix to this report which contains the 40 mm data. As previously discussed, this needs to be a stand-alone document.	App A-3 has been added to include 40 mm data.
30	Pg 11/lines 40-41	Text revision requested.	At RVAAP, deep surface is defined as 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.
31	Pgs 13- 16	AOC maps.	The maps on these pages are out of place as they present data, COPCs, COPECS, etc. They need to be moved to the appropriate section of the report. This area would be better served by having a site map with the AOC marked on it, as well as an AOC map that details the sampling locations.	Maps now placed after risk characterization. Refer to pp 62-65.
32	Pg 17/ lines 18- 19	Text revision requested.	Drilling was not conducted at this AOC, as such, remove this reference from the text. Only hand augering was conducted.	Hand augers were terminated at refusal depth. No machine drilling performed.

33	Pg 18/lines 9-10	Text revision requested.	Change text to read: "Deep surface soil is defined as 0-4' bgs for the National Guard Trainee"	Please note that analytical for this investigation was up to 3 ft bgs. P18/7-10 now read: Because tracked and wheeled operations may result in maneuver damage up to 4-ft bgs. Because of this maneuver damage, as deep as 4 ft bgs, the National Guard Trainee is assumed to be exposed to deep surface soil defined as 0-to 3-ft bgs.
34	Pg 18/lines 18 and 26	Revision requested.	Add the soil depths in parentheses when using the terms shallow and deep surface soil and subsurface soil throughout this report.	Noted: Global edit performed. Changes made on PPs 18, 33, 34 and the like
35	Pg 19/line 13	Revision requested.	Spell out "MDC" with the acronym following in parentheses the first time it appears in the report.	P19/11 reads: Instances where the UCL <sub>95</sub> exceeds the maximum detected concentration (MDC) is used as an estimate of the RME
36	Pg 19/line 25	Revision requested.	Replace "available" with "site specific background levels."	P14/25 reads: 40 mm Range samples are screened against site specific background levels, naturally
37	Pg 19/line 26	Revision requested.	Add "naturally occurring" in front of "inorganics".	P14/26-27 reads: This screening step, which applies only to the naturally occurring inorganics,
38	Pg 19/line 34	Text revision requested.	Please check the WBG Phase II RI regarding background concentrations. It is our recollection that the subsurface soil samples for that effort were collected from a 1-3' bgs depth interval.	P14/33-35 now reads: Final Phase II RI Report for WBG (USACE 2001). Background values for soil are available for two soil depths: shallow surface (0- to 1-ft bgs) and subsurface (>1 ft bgs).
39	Pg 19/lines 35-36	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.

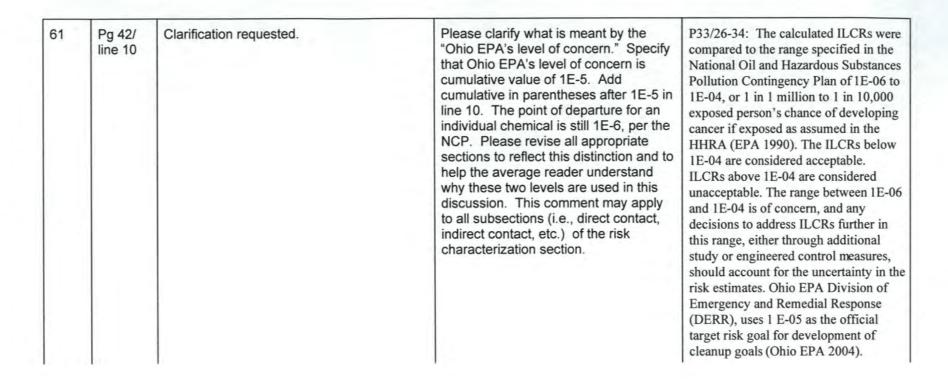
Page 6 of 18

40	Pg 19/line 41	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.
41	Pg 20/line 2	Text revision requested.	Please check the WBG Phase II RI regarding background concentrations. It is our recollection that the subsurface soil samples for that effort were collected from a 1-3' bgs depth interval.	Refer to response provided for comment 38. In the WBG Phase II Report, Section 4 subsurface is defined as greater than 1 ft bgs (> 1 ft bgs).
42	Pg 20/lines 3-4	Text revision requested.	Revise text to read: " EPA Region 9 residential PRG"	Text has changed. Corrections made on PP14,15 and 16; lines 18 and 22; 4; 9 and 16, respectively.
43	Pg 20/lines 25-30	Text revision requested.	Please include the Child and Adult Trespasser receptors to the human health risk assessment evaluation. Also, include a written narrative regarding exposure assumptions for these receptors (similar to the narrative that is found on page 21).	Please refer to AppD for the requested analysis of the juvenile trespasser. The RTLS is a controlled access facility (it is fences, gated and patrolled). The most likely adult trespasser are hunters or National Guard Trainees entering unauthorized areas. A separate adult trespasser evaluation is unwarranted because of lower equivalency to hunters or NG trainees.
44	Pg 20/lines 31-33	Clarification requested.	Confirm that hunters are not allowed in areas that have environmental contamination. It is our recollection that hunters were allowed in certain AOCs.	This AOC is under MMRP and until the SI is done the site can not be cleared for hunting.
45	Pg 21/line 16	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.

46	Pg 21/line 24	Confirmation requested.	Please confirm that there are still daily security patrols. This may have been reduced.	Security patrols do occur daily.
47	Pg 22/line 4	Text revision requested.	Please revise text to read: "constraints (e.g., potential MEC)"	P18/41 reads: (e.g., potential MEC)
48	Pg 27/line 9	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.
49	Pgs 36- 39	Text revision requested.	This section should be moved, so that the ecological risk screening and results are discussed together, but separate from the human health screening and results. This will help the report focus on human health risk information all together, rather than the screening steps and the results being separated by a discussion of the ecological risk screening process.	Agree. Format changed. Human Health and Ecological Risk Analysis ar separate. See Table of Contents on Pii
50	Pg 36/lines 40-41	Point of information.	Please note that the Eco Truthing study conducted at the WBG still has not been finalized. This needs to be done.	Acknowledged. We are working on finalizing the comments of the Dec 2003 letter. The letter was lost when Dr. Elizabeth left.
51	Pg 37/lines 17-18	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.

52	Pg 37/line 26	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.
53	Pg 37/lines 32-34	Text clarification and revision requested.	The text references certain compounds that are not SRCs per Army usage as based upon Army records. Given that a number of records were disposed of by the Army, and that some of these compounds may be linked to activities conducted by the Army, please revise this section to be less definitive. Additionally, if these are considered SRCs, does this change the results of the risk assessments and the conclusions?	P40/14-22 corrected to read: The non-SRCs per Army usage include the following: metals – iron; organics-semivolatiles – 2,4-dimethylphenol, 2-chloronaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and hexachloro-butadiene. The concentrations of organic compounds were less than instrument detection limits. Likewise 2,4-dimethylphenol, 2-chloronaphthalene and hexachloro-butadiene are commonly found in transformer and hydraulic fluids so if these chemicals were released at the site, their concentrations in soil sample would be expected to exceed low instrument detection limits. Concentrations of two chemicals, benzo(a)pyrene, and dibenzo(a,h)anthracene were less than those commonly reported as anthropogenic levels.
54	Pg 38/line1	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.

55	After pg 40	Maps.	Move the maps that appear on pages 13 - 16 to this section of the text.	Good suggestion. Maps now placed after risk characterization. Maps found on pp 63-66.
56	Pg 40/line 18	Text revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.
57	Pg 41/line 9 - 2 places	Text revision requested.	Revise text to read: " EPA Region 9 residential PRG"	All text has been corrected. A global command was introduced to add residential to EPA Region 9 PRG.
58	Pg 41/line 13	Text revision requested.	Revise text to read: " EPA Region 9 residential PRG"	All text has been corrected. A global command was introduced to add residential to EPA Region 9 PRG.
59	Pg 41/line 16	Text revision requested.	Revise text to read: " EPA Region 9 residential PRG"	All text has been corrected. A global command was introduced to add residential to EPA Region 9 PRG.
60	Pg 42, Table 3	Text revision requested.	Explain the "Note" that appears in the footnote section of Table 3. This should be removed, since it is not discussed in the text and only appears as a footnote without any further information or discussion of how this value was calculated for the resident farmer.	P33/15-24: The footnote reads: Note: The estimated risks from exposure of these receptors to the background concentration of arsenic (15.4 mg/kg) in surface soil are: National Guard Trainee 9E-06 Security Guard/Maintenance Worker 6E-06 On-Site Resident Farmer: Adult 2E-05 On-Site Resident Farmer: Child 3E-05 Risks to these receptors from arsenic at 40 MM AOC are below the risks associated with the background concentration of this metal.



62	Pg 42/lines 21-22	Text revision requested.	Add a sentence that clearly states whether or not arsenic is a COC. Lines 21-22 attempt to say this, but don't come out and make a definitive determination that arsenic is not a COC, because the exposure point concentration is less than the site specific background. Also, add text to address whether or not the other chemicals that are listed in Table 3 are COCs. This comment may apply to all subsections of the risk characterization section.	P34/17-20 reads: This indicates, the calculated cancer risk related to arsenic at the 40 mm Range does not exceed the cancer risk for arsenic estimated for facility-wide background and will not be considered a Constituent of Concern.  P34/10-13 changed to read: The total risk for Resident Farmer exceeds 1E-05 due to arsenic and 3 SVOCs [benzo(a)pyrene, dibenz(a,h)anthracene, and n-nitroso-din-propylamine). Individual ILCRs for these SVOCs are each less than 1E-05 and all three of these SVOCs were non-detect in all soil samples, removing them from further consideration.
63	Pg 43/line 12	Clarification and revision requested.	Please clarify in the revised text that background was set to zero, if there was no data available.	P35/4-5; 44-45 has been changed to read: Thallium background criterion for shallow surface (0-1 ft bgs) soil was set to zero (0) because it was not detected in background.

Pg 43/line 27	Text clarification and revision requested.	The text references certain compounds that are not SRCs, per Army usage as based upon Army records. Given that a number of records were disposed of by the Army, and that some of these compounds may be linked to activities conducted by the Army, please revise this section to be less definitive. Additionally, if these are considered SRCs, does this change the results of the risk assessments and the conclusions?	All organics were Below Detection Level. If there was a usage, spillage, disposal it would follow that detects would be other than BDL. Likewise protocol is adhered to as found on p 51 of the Facility Wide Ecological Risk Work Plan, specifically step 4 of the flow chart directs evaluation on whether a contaminant correlates to site usage. P40/14-22 corrected to read: The non- SRCs per Army usage include the following: metals – iron; organics- semivolatiles – 2,4-dimethylphenol, 2- chloronaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and hexachloro-butadiene. The concentrations of organic compounds were less than instrument detection limits. Likewise 2,4-dimethylphenol, 2- chloronaphthalene and hexachloro- butadiene are commonly found in transformer and hydraulic fluids so if these chemicals were released at the site, their concentrations in soil sample would be expected to exceed low instrument detection limits. Concentrations of two chemicals, benzo(a)pyrene, and dibenzo(a,h)anthracene were less than those commonly reported as anthropogenic levels.
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65	Pg 47/lines 13-39	Clarification requested.	This portion of the text is confusing. It makes broad statements as to why certain constituents were eliminated from consideration. For example, the explosives section indicates that 16 explosives compounds were eliminated from further consideration. In comparing this information to the page 44, it looks as if the only compound being considered is 2,6-dinitrotoluene. However, this is not the only explosive compound detected at this AOC, and explosives are definitely Army related. Please clarify.	Analytical screening conditions for COPECs are read on PP37-39.  P40/29-31 corrected to read: Results of the screening for SRCs and identification of the COPECs for shallow surface (0 to 1 ft bgs), subsurface (1 to 3 ft bgs), and deep surface (0 to 3 ft bgs) are presented in Appendix Tables C-3 through C-5, respectively.  What may help is reference to Tables C-3, C-4 and C-5 where the empirical results of screening are identified. For clarification the text in question seems redundant and is removed. Refer to P43/1-28
66	Pg 53/line 14	Text revision requested.	Change "be" to "by."	P62/26 corrected to read: show that detected COPCs and COPECs (and, be by inclusion, COCs and COECs) are
67	Pg 54/lines 1-2	Text revision requested.	Change the text to read: "There are no documented sources for these six chemicals at the 40 mm range. However, in addition to being ubiquitous in the environment, there is also the possibility that they are siterelated due to previous Army activities."	P35/37-39 removed and replaced with: However, in addition to being ubiquitous in the environment, there is also the possibility that they are site- related due to previous Army activities.
68	Pg 55/line 14	Text revision requested.	Revise text to read: " a trespasser could enter the property; land uses could change, etc.).	P37/10-13 corrected to read: While a land-use plan has been drafted for the RTLS, and OHARNG will control the property, there is uncertainty in the details of the future land-use (e.g., if the perimeter fence is not maintained, land uses could change, a trespasser could enter the property, and the like).

69	Pg 66/line 29	Text change requested	Revised text to read: "Lead and zinc"	P62/10 corrected to read: Although Water and sediment quality (lead and zinc); (iron, lead, zinc, or chromium),
70	Pg 67/line 31	Text clarification.	In this sentence, clarify to which receptor there would be no unacceptable health risk. The National Guard Trainee? The Resident Farmer-Adult?	P67/1-10 corrected to read: The estimated human health non-cancer HIs for direct contact exposure pathways are less than 1 for all human health receptors. Calculated ILCRs are less than or equal to 1E-05 for the representative National Guard Receptors (National Guard Trainee and Security Guard/Maintenance Worker) and the Recreational Hunter. Calculated ILCRs exceed 1E-05 for the Resident Farmer scenario; however, risks are the result of background concentrations of arsenic and the analytical detection limits for 3 SVOCs not detected in any soil sample at the 40 mm Range. As discussed in the uncertainty analysis, these estimated risks are more likely to be overestimates than underestimates of actual risk at the site.

71	Pg 67/line 32	Text clarification.	There is no groundwater data available for this AOC. Therefore, the text needs to clarify what is being proposed for no further action - the surface soil and subsurface soil? And then does that leave us in the position again of having a partial answer to what can be done with this AOC?	P67/32- summar recomm location based o
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			Page 16 of 18	

P67/32-46 corrected to read:. In summary the 40 mm Range is recommended as a "no further action location". This recommendation is based on the following:

- Land Use Controls (e.g., no digging nor use of groundwater) will be institutionalized for the site and will reduce the potential for contact with low levels of chemicals identified at the site.
- Results of the human health and ecological risk characterization performed on the relatively low concentrations of chemicals present, and the depth at which these analytes were found (0-3 ft bgs), indicate that there is no unacceptable risk likely to occur.
  - o Initial sampling evidenced no subsurface action from prior use (such as soil discoloration, trenches, buried debris that made its way to the surface, foul odors once surface was broken, and the like). Shallow rock is close to the surface with refusal (0-1 ft bgs) occurring at sample locations 69, 70, 72, 76, 78, 80, 81, 84, 89, 90, 91, 92, 93, and 99. Further surface detects did not evidence residuum, nor source release to subsurfa (below 3').

72	General	Text clarification.	It would be helpful to have summary tables from the risk assessments in the main text of the report rather than presented as an appendix.	Pertinent tables have been excerpted and placed in the text. Specifically 3.3 has the applicable tables. The computation Tables for HH and Eco are found in App B and C, respectively.
73	Section 3	Text revision requested.	A discussion needs to be added that points out that even though this site is proposed for NFA, the subsurface soils below 3 feet were not evaluated. Therefore, there is no knowledge of soil contaminants/exposure below 3' bgs. This point should not get lost when proposing NFA or even unrestricted reuse of an AOC.	Proving the negative is balanced by the following facts:  See response to comment 71
74	Pg 67/lines 37-38	Text clarification.	Add more detail to the text as to how it was determined that the vegetation and animal life are healthy and functioning.	Documentation as required by Level I eco-assessment as defined by Ohio EPA is not available. What is available is the professional biologist's assessment. In the absence of this information it would be best to omit P10/7-8 and P66/13-14 corrected to omit phrase and now reads: This later assumption about low to no risk is supported by the facts that the terrestrial ecosystem has abundant vegetation and animal life.
75	App. A	Revision requested.	Add the data from the 40 mm range into this report. The report needs more than the summary statistics.	Concur. Appendix A-1 has been added to provide 'Chain of Custody'.  Appendix A-2 has been added: Fuze and Booster/40 MM Soil Sample Logs  App A-3 has been added: Laboratory Analytical Data; and App A-4 has been added: Quality Control Summary Report.

76	Several apps.	Revision requested.	Deep surface soil at RVAAP is defined as being from 0-4' bgs.	While you are correct data was only taken at 40 mm AOC up to 3 ft bgs as field screening did not evidence a need to go deeper. Therefore for this AOC deep surface is 0-3 ft bgs.
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