



**FINAL POST PRELIMINARY ASSESSMENT/
SITE INSPECTION IN AREA 7 (AUS-0A07)**

**ADDITIONAL AND UNCHARACTERIZED SITES
OPERABLE UNIT**

**CRAB ORCHARD NATIONAL WILDLIFE REFUGE NPL SITE
MARION, ILLINOIS (WILLIAMSON COUNTY)**

This Final Post PA/SI Report is identical to the
"Draft" Report issued in July 2002.

OCTOBER 2003

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EXECUTIVE SUMMARY

Additional sampling was conducted in and near four buildings in Area 7 (AUS-0A07) of the Additional and Uncharacterized Sites Operable Unit (AUS OU) to supplement information gathered during the Preliminary Assessment/Site Inspection (PA/SI). The primary purpose of the supplemental investigation was to further characterize the pesticide contamination in soil at the site, and to conduct a preliminary evaluation of pesticide contamination in the interiors of the four buildings known to have been used for pesticide storage.

Results indicate that the major contamination is in the vicinity of the former storage buildings; levels in the intermittent stream that drains the area were relatively low to non-detect. At some locations, pesticides were detected at levels in excess of screening criteria at the maximum sampling depth of five feet.

Dust samples were compared with soil screening criteria. Wipe samples indicated the presence of several pesticides in the building interiors.

In addition to the chemicals of potential concern for human health (COPCs) and ecological risk (COPECs) that were identified for AUS-0A07, the following additional chemicals of concern were identified based on the results of this investigation.

Chemicals of Potential Concern

Soil:

- 1,2-Dichloropropane
- Benzene
- Tetrachloroethylene (PCE)
- 4,4'-DDE
- 4,4'-DDT
- Endrin aldehyde
- Gamma-chlordane

Sediment:

- 1,2-Dichloropropane
- Trichloroethylene (TCE)
- Antimony
- Arsenic
- Barium
- Beryllium
- Chromium
- Nickel
- Selenium
- 4,4'-DDD
- Dieldrin

Chemicals of Potential Ecological Concern

Soil:

- Total xylenes
- Acenaphthene
- 2,3,7,8-TCDD TEQ

Sediment:

- Arsenic
- Manganese
- Mercury
- Selenium
- Zinc
- 4,4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- Aldrin
- Dieldrin
- Methoxychlor

Surface Water:

- Aluminum
- Hexachlorobenzene

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ES-1
SECTION 1 INTRODUCTION.....	1-1
SECTION 2 HISTORIC SEARCH INFORMATION.....	2-1
2.1 SITE DESCRIPTION	2-1
2.2 OPERATIONAL HISTORY AND WASTE CHARACTERISTICS	2-1
2.2.1 Building IN-1-3.....	2-1
2.2.2 Building IN-1-4.....	2-4
2.2.3 Building IN-1-5.....	2-4
2.2.4 Building IN-1-6.....	2-5
2.2.5 Building P-1-13.....	2-6
2.3 AREA 7 PREVIOUS SAMPLING RESULTS	2-7
2.3.1 O'Brien & Gere Remedial Investigation, 1988.....	2-7
2.3.2 Golder and Associates Phase I Remedial Investigation (Miscellaneous Areas Operable Unit), 1993	2-9
2.3.3 Woodward Clyde Consultants Remedial Investigation (Miscellaneous Areas Operable Unit), 1996	2-10
2.3.4 USFWS Preliminary Assessment/Site Inspection (AUS OU), 2001 (prepared by URS Corporation)	2-10
SECTION 3 FIELD INVESTIGATION INFORMATION.....	3-1
3.1 OBSERVATIONS DURING SITE VISIT	3-1
3.1.1 Building IN-1-3	3-1
3.1.2 Building IN-1-4.....	3-2
3.1.3 Building IN-1-5.....	3-3
3.1.4 Building IN-1-6.....	3-3
3.2 FIELD INVESTIGATION	3-4
3.2.1 Building IN-1-3	3-4
3.2.2 Building IN-1-4.....	3-4
3.2.3 Building IN-1-5.....	3-5
3.2.4 Building IN-1-6.....	3-6
3.2.5 Main Drainage Ditch/Intermittent Stream.....	3-7
3.3 FIELD RESULTS	3-8
3.3.1 Site Conditions.....	3-8
3.3.1.1 <i>Geologic Conditions</i>	3-8
3.3.1.2 <i>Hydrogeologic Conditions</i>	3-8
3.3.1.3 <i>Hydrologic Conditions</i>	3-8
3.4 CHEMICAL RESULTS	3-8
3.5 AIR SAMPLING RESULTS SUMMARY	3-9
SECTION 4 SCREENING RISK ASSESSMENT.....	4-1
4.1 HUMAN HEALTH RISK	4-2
4.1.1 Soil/Sediment/Dust.....	4-2
4.1.2 Surface Water.....	4-2
4.2 ECOLOGICAL RISK.....	4-2
4.2.1 Soil/Dust.....	4-2

TABLE OF CONTENTS

	4.2.2 Sediment.....	4-3
	4.2.3 Surface Water.....	4-4
SECTION 5	SUMMARY AND RECOMMENDATIONS.....	5-1
5.1	AIR MONITORING SUMMARY.....	5-1
5.2	ANALYTICAL RESULTS SUMMARY FOR SOIL, SEDIMENT, SURFACE WATER, DUST, AND WIPE SAMPLES	5-2

LIST OF TABLES

Table 2-1	Area 7 Post-World War II Operators/Lessees and Building Uses (Buildings IN-1-3, IN-1-4, IN-1-5, and IN-1-6 only)
Table 3-1	Survey Coordinates for Additional Sample Locations in Area 7 (AUS-0A07)
Table 3-2	Matrices Sampled at each Additional Sample Location in Area 7 (AUS-0A07)
Table 3-3	Soil Sample Analytical Results Summary
Table 3-4	Sediment Sample Analytical Results Summary
Table 3-5	Surface Water Sample Analytical Results Summary
Table 3-6	Dust Sample Analytical Results Summary
Table 3-7	Wipe Sample Analytical Results Summary
Table 3-8	Dioxin/Furan Toxicity Equivalents
Table 4-1	Human Health Screening of Soil Results
Table 4-2	Ecological Screening of Soil Results
Table 4-3	Human Health Screening of Sediment Results
Table 4-4	Ecological Screening of Sediment Results
Table 4-5	Human Health Screening of Surface Water
Table 4-6	Ecological Screening of Surface Water
Table 4-7	Summary of Human Health COPC Evaluation
Table 4-8	Summary of Ecological COPC Evaluation
Table 4-9	Summary of Analytical Results for Soil Samples
Table 4-10	Summary of Analytical Results for Sediment Samples
Table 4-11	Summary of Analytical Results for the Surface Water Sample
Table 4-12	Summary of Analytical Results for Dust Samples
Table 4-13	Summary of Analytical Results for Wipe Samples
Table 4-14	Chemicals Detected Above Screening Criteria and Above Refuge Background (Where Applicable)

LIST OF FIGURES

Figure 1-1	Crab Orchard National Wildlife Refuge
Figure 1-2	Area 7 Site Location Map
Figure 1-3	Area 7 Buildings IN-1-3 through IN-1-6
Figure 2-1	Area 7 Original IOP Configuration
Figure 2-2	Previous Sample Results, Site 16, Phases I & II of the 1988 R.I.
Figure 2-3	Previous Sample Results, AUS-0A07 Sample Locations and Detections in Soil, PA/SI Report, September 2001

TABLE OF CONTENTS

Figure 3-1	Pesticides Results for 0-6 inch Soil and Sediment Samples, and for Surface Water
Figure 3-2	Pesticides Results for Soil and Sediment Samples Collected from Depths > 6 inches
Figure 3-3	Pesticides Results for Wipe and Dust Samples Collected from Interiors of Buildings
Figure 3-4	Organic and Inorganic Results for all Soil, Sediment, and Surface Water Samples, Excluding Pesticides

APPENDICES

Appendix A	Data Validation Reports
Appendix B	Letter from IEPA

The Crab Orchard National Wildlife Refuge (CONWR) (Refuge) is administered by the United States Department of Interior (USDOI), Fish and Wildlife Service (USFWS). Figure 1-1 shows the Refuge boundaries. In September 2001, a Draft-Final Preliminary Assessment/Site Inspection (PA/SI) Report was submitted for the Additional and Uncharacterized Sites Operable Unit (AUS OU) of the CONWR Refuge National Priority List (NPL) Site in Marion, Illinois.¹ In the PA/SI report, Area 7 (AUS-0A07) was one of the sites recommended for a Remedial Investigation (RI). The PA/SI found elevated levels of pesticides in soils around four warehouse buildings in Area 7 that had been used for pesticide storage. The primary purpose of this investigation was to further characterize the pesticide contamination in soil at the site, and to conduct a preliminary evaluation of pesticide contamination in the interiors of the four buildings known to have been used for pesticide storage.

Area 7 is shown in Figure 1-2, is located approximately one and a half miles east of the intersection of Highway 148 and Ogden Road, and 0.5 miles north of Ogden Road on Chamnesstown Road. The portion of Area 7 that is the subject of this investigation (as shown in Figure 1-3) includes:

- The interiors and surrounding areas of Buildings IN-1-3, IN-1-4, IN-1-5 and IN-1-6.
- A portion of the main drainage ditch/intermittent stream (ditch) that flows northward through Area 7 to Crab Orchard Lake. The section of the ditch that is included in this investigation, starts just south of Mousertown Road (on the south side of the culvert for this road), and extends northward to the point where this ditch discharges into Crab Orchard Lake.

The additional investigative work in Area 7 was done under URS' contract with the USDOI Bureau of Reclamation (BOR)². The activities were conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The organization of this report is similar to the Draft-Final PA/SI report (September 2001) for the AUS OU. Section 2 details historic search information for Area 7 such as its operational history and waste characteristics, also including previous sampling results. The information in Section 2 is taken directly from the PA/SI report. Sections 3, 4, and 5 include discussions regarding the supplemental field investigation, a screening risk assessment, and a summary, respectively.

¹ The Crab Orchard National Wildlife Refuge was placed on the U.S. Environmental Protection Agency's National Priorities List (NPL) in 1987. 52 Fed. Reg. 27620, 27265 (July 22, 1987).

² Contract No. 1425-97-CA-81-20003, dated November 15, 1996. Delivery Order No. 178.

2.1 SITE DESCRIPTION

Area 7 was the Inert Storage Area for the IOP, and was used for warehousing metal parts and other inert materials used in the production of artillery shells, tank mines and bombs.³ The original IOP configuration of Area 7 is shown in Figure 2-1.

The original building complex consisted of 6 rows of buildings (6 to 7 buildings per row originally) each of which were 51.3-foot (ft) wide by 200-ft long. All building numbers in this area were prefixed with "IN" (for Inert Storage). Figure 2-1 shows the numbering convention for the buildings. As discussed above, the only Area 7 buildings included in this investigation are Buildings IN-1-3, IN-1-4, IN-1-5 and IN-1-6.

2.2 OPERATIONAL HISTORY AND WASTE CHARACTERISTICS

During IOP operations, the Sherwin Williams Defense Corporation, under contract with the War Department (SWDC/War Department), occupied all of the buildings in Area 7. SWDC/War Department used Buildings IN-1-3, IN-1-4, IN-1-5 and IN-1-6 as warehouses for inert storage. There have been numerous post-World War II (WWII) lessees/operators in Area 7: Table 2-1 identifies these lessees/operators and their activities for Buildings IN-1-3, IN-1-4, IN-1-5 and IN-1-6 only. The lease information for these buildings is incomplete since building numbers were not identified in the lease information for some of the tenants that are known to have occupied buildings in Area 7. Many of these lessees appear to have engaged in activities that could have resulted in contamination in the soil, sediment, groundwater and surface water at this site.

This section summarizes the available information about post-WWII lessees for Buildings IN-1-3, IN-1-4, IN-1-5 and IN-1-6 in Area 7. As stated before, lease information is not complete, and often there is little or no information about a lessee's activities. For each building, available lease information is tabulated and other relevant information is summarized in the text following the table.

2.2.1 Building IN-1-3

Lessee	Dates	IN-1-3 Building Use
Hercules Powder ^{4,5}	1949 and 1950	Storage of linter for explosive powder production. Linter consisting of cotton fibers and fuzz escaping removal in the ginning operation. ⁶
Allen Industries	1956 to 1957 ⁷	Warehousing and production of rug underlay

³ U.S. Army Corps of Engineers, 1944, War Department Facilities Inventory of the Illinois Ordnance Plant Carbondale, Illinois, Part I, Section 5, Page 5; and Part I, Section 9, Page 5.

⁴ CRO 000230. U.S. Department of the Interior, Fish and Wildlife Service, 1950, Map of Crab Orchard National Wildlife Refuge showing Recreational Facilities and Industrial Tenants.

⁵ DPRA Document No. 00009075. Undated Refuge lease information document showing new leases up until 10/1/49, from the CONWR files.

⁶ CRO 001572A. Herrin Daily Journal, Newspaper article about Hercules Powder Company, dated February 16, 1949.

⁷ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

SECTION TWO

HISTORIC SEARCH INFORMATION

Lessee	Dates	IN-1-3 Building Use
		samples and for warehousing of packing materials. ^{8,9}
Great Lakes Terminal & Transport Corporation (formerly Great Lakes Solvents, Inc. from 1951 through 1961)	1961 to 1966	Storage of packaged agricultural chemicals (pesticides). ^{10,11}
Norge	1963 to 1964, and 1966 to 1967 ¹²	Warehousing washers and dryers ¹³
Mark Twain Marine Industries	1970 to 1971 ¹⁴	Manufacturing boats and boat accessories ¹⁵
Pennzoil Co. (changed name to Pennzoil Products Company in 1986) ¹⁶	six months in 1971 ¹⁷	Warehousing motor oil, barrel washing operations, oil products distributorship. ^{18,19}
The Federal Prison Industries – U.S. Department of Justice	1976 to 1981 ^{20,21}	Warehousing of prison products ²²
Little Egypt Grain Co.	At least 1986 to 1990 ^{23,24}	Storage of bushels of corn. ²⁵
Maytag Appliances	Current	Storage of service parts for equipment that is no longer manufactured. ²⁶

⁸ U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, Narrative Report, 1964, Page 48.

⁹ ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

¹⁰ DOI 001069. Great Lakes Terminal and Transport Corporation's response to 104e request.

¹¹ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

¹² ACC 000058. Listing of Area 7 leasing information as obtained from leases. Note that lease dates overlap with Great Lakes Terminal and Transport.

¹³ ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

¹⁴ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

¹⁵ CRO 000111. U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, Narrative Report, 1968, Page 59.

¹⁶ CRO 000482. Pennzoil Products Company, Letter to CONWR regarding consigning leases from Pennzoil to Pennzoil Products, dated October 14, 1986.

¹⁷ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

¹⁸ ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

¹⁹ CRO 000181. U.S. Department of the Interior, Fish and Wildlife Service, National Wildlife Refuge System, Narrative Report, 1968, Page 38.

²⁰ Special Use Permit No. SUP-97-76, dated August 26, 1976, between Federal Prison Industries-U.S. Department of Justice and USFWS. Crab Orchard Database # 00027050.

²¹ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

²² ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

²³ DPRA Document No. 00006035. Building Lease Contract No. 14-16-0003-86-555 by and between U. S. Fish and Wildlife Service and Little Egypt Grain Company, Pages 1-2.

²⁴ CRO 000231. CONWR, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, October, 1990.

²⁵ CRO 000190. Department of the Interior, Fish and Wildlife Service, National Wildlife Refuge System, Narrative Report, 1988, Page 58.

²⁶ Interview with Maytag employee, Laurel Johns, on March 13, 2001 during site visit.

Date Discrepancy

Note, the source document²⁷ for Great Lakes Terminal and Transport (GLT&T) and Norge's dates of occupancy in Building IN-1-3 indicates an overlap of time for these two tenants in 1963, 1964, and 1966.

Great Lakes Terminal and Transport

Great Lakes Terminal & Transport reported that they stored the following Shell Chemical products at the Refuge: technical aldrin, 94-97%; technical bidrin; ciodrin 2-3%; ciovap; technical dieldrin 100%; technical endrin 95-99%; technical nemagon; phosdrin; technical planavin; planavin 75%; rabon; vapona 1%; technidal vapona; allyl alcohol; Azordin; compound 4072; halbard; technical methyl parathion; 10% parathion 1% telodrin; niran 10-G; SD-8447 2lb/gal solution XP-837; SD-8447 4lb/gal solution XP-783; SD-8447 75% wettable powder code 3-15-24-1; vapona smear XP-246; vapona in petrolatum XP-507; vapona 50% solution XP-465; vapona 90% solution XP-409; 20% vapona resin XP-555; vapona 0.5% dieldrin-0.5% spray solution; verdan senescence inhibitor; various empty fibre and steel drums; cartons; glass bottles; polyethylene bottles; Celons and celseals for jugs and bottles; caps for gallons and quarts; cartons.²⁸

Some of these pesticides are highly toxic and/or probable carcinogens and have been banned. For example, USEPA banned all uses of aldrin and dieldrin in 1987²⁹.

Little Egypt Grain

In 1986, Cape-Kil Pest Control Co., on behalf of Little Egypt Grain Co., requested permission to apply herbicides and pesticides to Little Egypt's leased facilities.³⁰ USFWS approved the use of MSMA and malathion (57%), but not some other requested pesticides.^{31,32} The herbicides and pesticides approved are in common use, and, based on available data, much less hazardous to human health and the environment than chemicals stored by Great Lakes Terminal and Transport, such as aldrin and dieldrin.³³ For example, the USEPA Region 9 preliminary remediation goal (PRG) for industrial soil for Malathion is more than 100,000 times higher than the PRGs for aldrin or dieldrin.

²⁷ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

²⁸ DOI 001069. Great Lakes Terminal and Transport Corporation's response to 104e request.

²⁹ U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. Source: <http://www.atsdr.cdc.gov/tfacts1.html>

³⁰ FWM 000514-000516, DPRA document 00024861. Letter to Norrel Wallace, Project Manager, Crab Orchard Lake National Wild Life Refuge (sic) from Charles Knot, Cape-Kil Pest Control Co., dated 28 July 1986.

³¹ DPRA documents 00005954-00005960. Letter to Roger Twenhafel, Little Egypt Grain Co., from Norrel Wallace, Project Manager, dated 12 November 1986, with attachments. MSMA is a herbicide, described as 6+, Glyphosate (Roundup), Bromacil & Diuron (mixed). It was to control grasses in a three-ft band around the building. Malathion is a pesticide which was to be applied to the walls, floor, and the grain.

³² Cape-Kil Pest Control had also asked for permission to use Chlorphacinone, a rat poison. Permission was apparently not granted; this compound was not included in the list approved by USFWS. Reference: FWM 000515. Page 2 of letter to Norrel Wallace, Project Manager, Crab Orchard Lake National Wild Life Refuge (sic) from Charles Knot, Cape-Kil Pest Control Co., dated 28 July 1986.

³³ See, for example, U.S. Department of Agriculture Fact Sheets for the listed pesticides/herbicides available at <http://infoventures.com>.

2.2.2 Building IN-1-4

Lessee	Dates	IN-1-4 Building Use
Hercules Powder ^{34,35}	1949 and 1950	Refer to Building IN-1-3 table.
Allen Industries	1956 through 1957 ³⁶	Refer to Building IN-1-3 table.
Great Lakes Terminal & Transport	1951 or 1961 through 1971 ^{37,38}	Pesticide storage. Refer to Building IN-1-3 table.
Pennzoil	Three months in 1971 ³⁹	Refer to Building IN-1-3 table.
Olin	November 1971 through May 1976 ^{40,41}	Storage of ordnance explosives and ordnance materials ^{42,43}
Royal Crown (R.C.) Bottling Company	1976 through at least 1990 ^{44,45,46}	Cola sales/distribution; storage of vehicles and other items ⁴⁷

Aboveground Storage Tank

During the site reconnaissance on March 13, 2001, a horizontal aboveground storage tank (AST) was observed at the east end of the railroad loading dock on the north side of this building. This AST was approximately 6 feet long and 4 feet in diameter. It was rusted, and there was black staining on the loading dock beneath this tank that appeared to be from leakage from the tank. This black material has also stained some of the soils next to the loading dock.

2.2.3 Building IN-1-5

Lessee	Dates	IN-1-5 Building Use
Hercules Powder ^{48,49}	1949 and 1950	See Building IN-1-3 table.
Great Lakes Terminal & Transport	1951 through 1971. ^{50,51}	Pesticide storage. Refer to Building IN-1-3 table.

³⁴ CRO 000230. U.S. Department of the Interior, Fish and Wildlife Service, 1950, Map of Crab Orchard National Wildlife Refuge showing Recreational Facilities and Industrial Tenants.

³⁵ DPRA Document No. 00009075. Undated Refuge lease information document showing new leases up until 10/1/49, from the CONWR files.

³⁶ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

³⁷ DOI 001069. Great Lakes Terminal and Transport Corporation's response to 104e request.

³⁸ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

³⁹ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

⁴⁰ CRO 001518. Special Use Permit No. SUP-14-72, dated October 27, 1971.

⁴¹ CRO 001534. Cancellation of Special Use Permit No. SUP-14-72, dated June 25, 1976.

⁴² CRO 001518. Special Use Permit No. SUP-14-72, dated October 27, 1971.

⁴³ CRO 001533. Special Use Permit No. SUP-04-76, dated July 29, 1975.

⁴⁴ ACC 000058. Listing of Area 7 leasing information as obtained from leases.

⁴⁵ FWM 001249 – FWM 001250. Building Lease Contract No. 14-16-0003-84-545 by and between U. S. Fish and Wildlife Service and R. C. Beverage Company of Herrin, Illinois, Incorporated, Pages 1-2.

⁴⁶ CRO 000231. CONWR, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, October, 1990.

⁴⁷ ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

³⁸ CRO 000230. U.S. Department of the Interior, Fish and Wildlife Service, 1950, Map of Crab Orchard National Wildlife Refuge showing Recreational Facilities and Industrial Tenants.

⁴⁹ DPRA Document No. 00009075. Undated Refuge lease information document showing new leases up until 10/1/49, from the CONWR files.

⁵⁰ DOI 001069. Great Lakes Terminal and Transport Corporation's response to 104e request.

Lessee	Dates	IN-1-5 Building Use
Central Fixtures Manufacturing Company/Cubicon Corporation (name change in 1972) ⁵²	1971 through 1983 ^{53,54,55,56}	Manufacturing interior display cases and shelves (woodworking) /building fixtures ^{57,58}
Little Egypt Grain Co.	At least 1986 through 1990 ^{59,60}	Grain storage. Refer to Building IN-1-3 table.

Aboveground Storage Tanks

A 1951 aerial photograph⁶¹ obtained from USFWS shows what appear to be four aboveground storage tanks on the west side of Building IN-1-5. They are no longer visible in the 1960 photograph, however, ground scarring (black stained soil) remains at the location of these structures.⁶² There are also several patched holes, several inches in diameter, on the west exterior wall of the building.⁶³

2.2.4 Building IN-1-6

Lessee	Dates	IN-1-6 Building Use
Hercules Powder ^{64,65}	1949 and 1950	See Building IN-1-3 table.
Great Lakes Terminal & Transport	1951 to 1971 ^{66,67}	Pesticide storage. Refer to Building IN-1-3 table.
Central Fixtures Manufacturing Company/Cubicon Corporation	1971 to 1972 ^{69,70,71} and again from 1980 to	Manufacturing interior display cases and shelves (woodworking) /building fixtures ^{74,75}

⁵¹ DPRA Document No. 00009039. CONWR, Crab Orchard National Wildlife Refuge, Lease Data, Industrial Unit, dated June 1, 1951, Page 7.

⁵² CRO 000309. Amendment No. 3 to Lease Contract No. 14-16-0003-12645 and Cubicon Corporation formerly Central Fixture Manufacturing Company, effective March 1, 1972, Page 1.

⁵³ CRO 000308. Amendment No. 2 to Lease Contract No. 14-16-0003-12645, Central Fixture Manufacturing Company, effective May 1, 1971, Pages 1-2.

⁵⁴ CRO 000309. Amendment No. 3 to Lease Contract No. 14-16-0003-12645 and Cubicon Corporation formerly Central Fixture Manufacturing Company, effective March 1, 1972, Page 1.

⁵⁵ FWM 000886. Lease Contract No. 14-16-0003-13,980 by and between Cubicon Corporation, effective January 1, 1974, Page 1.

⁵⁶ FWM 000892. Amendment No. 4 to Lease Contract No. 14-16-0003-13,980, Cubicon Corporation, effective December 31, 1983.

⁵⁷ CRO 000111. U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, Narrative Report, 1968, Page 59.

⁵⁸ ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

⁵⁹ DPRA Document No. 00006035. Building Lease Contract No. 14-16-0003-86-555 by and between U. S. Fish and Wildlife Service and Little Egypt Grain Company, Pages 1-2.

⁶⁰ CRO 000231. CONWR, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, October, 1990.

⁶¹ 1951 aerial photograph from the National Archives and Records Administration, College Park, Maryland.

⁶² 1960 aerial photograph from the U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Aerial Photography Field Office, Salt Lake City, Utah.

⁶³ Observed on a site visit in March 2001.

⁶⁴ CRO 000230. U.S. Department of the Interior, Fish and Wildlife Service, 1950, Map of Crab Orchard National Wildlife Refuge showing Recreational Facilities and Industrial Tenants.

⁶⁵ DPRA Document No. 00009075. Undated Refuge lease information document showing new leases up until 10/1/49, from the CONWR files.

⁶⁶ DOI 001069. Great Lakes Terminal and Transport Corporation's response to 104e request.

⁶⁷ DPRA Document No. 00009039. CONWR, Crab Orchard National Wildlife Refuge, Lease Data, Industrial Unit, dated June 1, 1951, Page 7.

Lessee	Dates	IN-1-6 Building Use
(name change in 1972) ⁶⁸	1983 ^{72, 73}	
Southern Illinois Manufacturing Company	1972 to 1974 ^{76, 77}	Unknown
Pre-Hung Door Company	1974 to 1980 ^{78, 79, 80}	Manufacturing wooden doors. ⁸¹
Midwest Woodworking & Fixture	1985 ⁸²	Not specified
Little Egypt Grain Co.	At least 1986 through 1990 ^{83, 84}	Grain storage. Refer to Building IN-1-3 table.
MDM (The Party Shop)	Current (2001) ⁸⁵	Storage of party supplies ⁸⁶

2.2.5 Building P-1-13

Sometime between 1943 and 1951,⁸⁷ building P-1-13 from Area 2P was moved to Area 7. It appears that it was added to the middle of the south side of Building IN-1-5.⁸⁸

⁶⁸ CRO 000309. Amendment No. 3 to Lease Contract No. 14-16-0003-12645 and Cubicon Corporation formerly Central Fixture Manufacturing Company, effective March 1, 1972, Page 1.

⁶⁹ CRO 000308. Amendment No. 2 to Lease Contract No. 14-16-0003-12645, Central Fixture Manufacturing Company, effective May 1, 1971, Pages 1-2.

⁷⁰ CRO 000309. Amendment No. 3 to Lease Contract No. 14-16-0003-12645 and Cubicon Corporation formerly Central Fixture Manufacturing Company, effective March 1, 1972, Page 1.

⁷¹ CRO 000310. Amendment No. 4 to Lease Contract No. 14-16-0003-12645 and Cubicon Corporation formerly Central Fixture Manufacturing Company, effective June 1, 1972, Page 1.

⁷² FWM 000890. Amendment No. 2 to Lease Contract No. 14-16-0003-13,980, Cubicon Corporation, effective June 15, 1980.

⁷³ FWM 000892. Amendment No. 4 to Lease Contract No. 14-16-0003-13,980, Cubicon Corporation, effective December 31, 1983.

⁷⁴ CRO 000111. U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, Narrative Report, 1968, Page 59.

⁷⁵ ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

⁷⁶ DPRA Document No. 00027087. Lease Contract No. 14-16-0003-13737 by and between U.S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife and Southern Illinois Manufacturing Company, Incorporated, Page 1.

⁷⁷ DPRA Document No. 00027092. Amendment No. 2 to Lease Contract No. 14-16-0003-13737 and Southern Illinois Manufacturing Company, Inc., dated April 25, 1974.

⁷⁸ CRO 000496. Lease Contract No. 14-16-0003-30,605 by and between U.S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife and Pre-Hung Door Company, dated May 1, 1974, Page 1.

⁷⁹ DPRA Document Nos. 00019002 and 00019007. Amendment No. 2 to Lease Contract No. 14-16-0003-30,605, Pre-Hung Door, dated April 24, 1979 (re-submitted: July 30, 1979); and Amendment No. 3 to Lease Contract No. 14-16-0003-30,605, Pre-Hung Door Company, dated May 1, 1980.

⁸⁰ CRO 000498. Cancellation of Lease Contract No. 14-16-0003-30,650, Pre-Hung Door Company, Marion, Illinois dated June 13, 1980.

⁸¹ ACO 002105. CONWR, Industrial Committee Report, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, August 1978 (Appendix J).

⁸² FWM 001026. Amendment No. 1 to Building Lease Contract No. 14-16-0003-83-542, Midwest Woodworking & Fixture Corporation, effective date June 1, 1985.

⁸³ DPRA Document No. 00006035. Building Lease Contract No. 14-16-0003-86-555 by and between U. S. Fish and Wildlife Service and Little Egypt Grain Company, Pages 1-2.

⁸⁴ CRO 000231. CONWR, Table of Industrial Tenants, Crab Orchard National Wildlife Refuge, October, 1990.

⁸⁵ Industrial Tenant Roster – March 2001, Crab Orchard National Wildlife Refuge, Section 1, Table 1-3 of this report.

⁸⁶ Interview with MDM employees on site, on March 13, 2001.

⁸⁷ 1943 and 1951 aerial photographs from the National Archives and Records Administration, College Park, Maryland (of Area 2P) (same photographs used by Entech, Inc.).

⁸⁸ DPRA Document No. 00006449. From the Crab Orchard National Wildlife Refuge files, A handwritten annual cost calendar for fire control and the water plant, includes information for Area 7, dated April 20, 1976.

According to Great Lakes Terminal & Transport's CERCLA Section 104(e) response, they were present in Buildings IN-1-5, IN-1-6, and P-1-13 from 1951 through 1971.^{89,90} Central Fixtures/Cubicon's leases also included Building P-1-13.⁹¹

Sometime after 1983, it appears Building P-1-13 was moved to a location where it adjoined Building IN-2-6.^{92, 93}

Southern Illinois Manufacturing Company

The insurance policy for the Southern Illinois Manufacturing Company⁹⁴ included them with the Pre-Hung Door Company (a subsidiary of Marion Metal and Roofing Company, Inc.), who leased this building from 1974 through 1975. Pre-Hung Door Company manufactured wooden doors.

2.3 AREA 7 PREVIOUS SAMPLING RESULTS

2.3.1 O'Brien & Gere Remedial Investigation, 1988

Two sites in or near Area 7 were investigated as part of the O'Brien & Gere RI: Site 15 – the "Plating" Pond, and Site 16 – Area 7 Industrial Site (Figure 2-2). The results reported in the O'Brien & Gere RI were compared with the PA screening values.⁹⁵ Some results reported by O'Brien and Gere are not included in this report because they were determined to be not useable.⁹⁶ Those that are reported here are considered estimated.⁹⁷

Site 15 – The "Plating" Pond

⁸⁹ DOI 001069. Great Lakes Terminal and Transport Corporation's response to 104e request.

⁹⁰ DPRA Document No. 00009039. CONWR, Crab Orchard National Wildlife Refuge, Lease Data, Industrial Unit, dated June 1, 1951, Page 7.

⁹¹ CRO 000308. Amendment No. 2 to Lease Contract No. 14-16-0003-12645, Central Fixture Manufacturing Company, effective May 1, 1971, Pages 1-2.

⁹² DPRA Document No. 00024765. U.S. Department of the Interior, Fish & Wildlife Service, Management Plan Prints, Index, Page 9, date unknown.

⁹³ FWM 001022 – FWM 001023. Building Lease Contract No. 14-16-0003-84-542 by and between U.S. Fish and Wildlife Service and Midwest Woodworking and Fixture Corporation, dated January 1, 1984, Pages 1-2.

⁹⁴ DPRA Document NO. 00027074. Great American Insurance Companies, Certificate of Insurance for Southern Illinois Manufacturing Co., Inc. and Pre-Hung Door Company.

⁹⁵ U.S. Fish & Wildlife Service. Draft-Final Preliminary Assessment/Site Inspection Report, Additional and Uncharacterized Sites Operable Unit, Crab Orchard National Wildlife Refuge NPL Site, September 2001. Report prepared by URS Corporation.

⁹⁶ Some results reported by O'Brien and Gere are not included here because they were determined to be not useable, and those results which are discussed are considered estimated. DPRA Document No. 00018887. Letter from Richard Boice to Dick Ruelle of USFWS regarding Crab Orchard Lake RI/FS, dated February 18, 1987. The letter reports that the data for the following constituents are not useable: 2-butanone, vinyl acetate, 4-methyl-2-pentanone, aniline, bis(2-chloro-isopropyl)ether, 4-chloroaniline, 2-nitro-sodiphenylamine, benzidine, di-n-octyl-phthalate, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, cyanide, Ag, As, Be, Cd, Cu, Ni, Pb, Se, Zn, and Hg.

⁹⁷ DPRA Document No. 00018887. Letter from Richard Boice to Dick Ruelle of USFWS regarding Crab Orchard Lake RI/FS, dated February 18, 1987. The letter reports that the data for the following constituents are not useable: 2-butanone, vinyl acetate, 4-methyl-2-pentanone, aniline, bis(2-chloro-isopropyl)ether, 4-chloroaniline, 2-nitro-sodiphenylamine, benzidine, di-n-octyl-phthalate, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, cyanide, Ag, As, Be, Cd, Cu, Ni, Pb, Se, Zn, and Hg.

The name "Plating" Pond was based on hearsay and is probably inaccurate. However, site 15 was a pond (approximately 50 feet by 30 feet) that had an inlet pipe located on the north side of the pond. The origin of this pipe was not found, and the outlet portion was removed during remediation. (Site 15 was remediated as part of the Metals Areas Operable Unit.) It is actually just south of Area 7 which is an area not discussed as part of this report. Also, remediated sites are not discussed in this report. However, Site 15 is discussed here because the source of the effluent that was discharged to the pond was probably a facility in Area 7.

One composite surface water sample (15-1), one composite sediment sample (15-2), and one groundwater sample (15-3) were collected at Site 15 as part of the O'Brien & Gere RI (Figure 2-2). Both the surface water and sediment samples were collected from the perimeter of the pond and the groundwater sample was collected downgradient of the pond. Barium, boron, calcium, iron, magnesium, manganese, and sodium were detected in the surface water sample (15-1). Barium (4 ug/L) exceeded USEPA ECOTOX thresholds (3.9 ug/L). There are no PA screening criteria for boron (70 ug/L), calcium (8,500 ug/L), magnesium (2,000 ug/L), and sodium (1,200 ug/L).

Arochlor-1260, alpha endosulfan, aluminum, barium, boron, calcium, chromium, iron, magnesium, manganese, molybdenum, sodium, titanium, and vanadium were detected in the sediment sample (15-2) (all sediment results are reported in dry weight). Arochlor-1260 (415 ug/kg) exceeded USEPA ECOTOX thresholds, Region IV Sediment Screening values, and Canadian Sediment Quality Guidelines (CSEQGs). Chromium (508 mg/kg) exceeded USEPA ECOTOX thresholds, Region IV Sediment Screening values, and CSEQGs. There are no PA screening criteria for alpha endosulfan (415 ug/kg), aluminum (15,800 mg/kg), barium (117 mg/kg), boron (83.3 mg/kg), calcium (2,990 mg/kg), iron (43,400 mg/kg), magnesium (2,070 mg/kg), manganese (498 mg/kg), molybdenum (20 mg/kg), sodium (60 mg/kg), titanium (238 mg/kg), and vanadium (35 mg/kg).

Methylene chloride, Arochlor-1254, and chromium were detected in the groundwater sample (15-3). Methylene chloride (6 ug/L) exceeded USEPA Drinking Water Maximum Contaminant Levels (MCLs) and New Dutchlist Groundwater Optimum Levels (DGOLs). Chromium (15 ug/L) exceeded Canadian Water Quality Guidelines (CWQGs) and DGOLs.

Site 16 -- Area 7 Industrial Site

Previous to the AUS OU PA/SI, there were no samples collected from next to Buildings IN-1-3, IN-1-4, IN-1-5 or IN-1-6. However, during the O'Brien & Gere RI, four samples were collected from the ditch that flows northward between Buildings IN-1-3 and IN-1-4, as discussed below.

In total, there were 19 samples were collected at Site 16 (Area 7 Industrial Park) during the O'Brien & Gere RI: five composite surface water samples, five composite sediment samples, and nine composite soil samples. As stated previously, four of those samples were located within the area which is part of this additional investigation: 16-1 (surface water), 16-2 (sediment), 16-18 (surface water), and 16-19 (sediment). Refer to Figure 2-2.

Two samples were located downstream of Area 7 in the drainage ditch: composite surface water sample 16-18, and composite sediment sample 16-19. Acetone, methylene chloride, aldrin, dieldrin, and magnesium (both total and filtered) were detected in the surface water sample. Acetone and methylene chloride were detected below PA screening criteria. Aldrin (0.17 micrograms per Liter (ug/L)) exceeded the IEPA General Use Surface Water Quality Human Health criterion and dieldrin (0.54 ug/L) exceeded the Ecological Direct Pathway Toxicity Reference Value (TRV) for surface water. Both aldrin and dieldrin are considered potentially bioaccumulative chemicals. Magnesium (total) (23,700 ug/L) exceeded background. There are no PA screening criteria for filtered magnesium (26,300 ug/L).

In the sediment sample (16-19), acetone, methylene chloride, di-n-butyl phthalate, and total magnesium were detected. Acetone and magnesium were detected below PA screening criteria. Methylene chloride (18 micrograms per kilogram (ug/kg)) exceeded the USEPA Region IX Migration to Groundwater PRG (dilution attenuation factor ((DAF)=1)). Di-n-butyl phthalate was detected at 1,600 ug/kg and is considered as a potentially bioaccumulative chemical.

Two samples were collected from the drainage ditch between Buildings IN-1-3 and IN-1-4: composite surface water sample 16-1 and composite sediment sample 16-2. In the surface water sample, barium, boron, calcium, iron, magnesium, manganese, and sodium were detected. Boron and manganese were detected below PA screening criteria. Barium (69 ug/L, calcium (74,700 ug/L), iron (300 ug/L), magnesium (25,600 ug/L), and sodium (28,300 ug/L) exceeded background. Refer to Figure 2-2.

In the sediment sample (16-2), alpha endosulfan, aluminum, barium, boron, calcium, chromium, cobalt, iron, magnesium, manganese, sodium, titanium, and vanadium were detected. Boron, cobalt, iron, and sodium were detected below PA screening criteria. Alpha endosulfan (137 ug/kg) and manganese (929 milligrams per kilogram (mg/kg)) exceeded the ecological direct pathway TRV for surface water. Aluminum (12,900 mg/kg), calcium (7,320 mg/kg), chromium (20 mg/kg), magnesium (2,840 mg/kg), and vanadium (36 mg/kg) exceeded background. Chromium and barium (104 mg/kg) also exceeded the USEPA Region IX Migration to Groundwater PRG (DAF=1). There are no PA screening criteria for titanium (148 mg/kg).

Site 16 was later addressed further as part of the MISCA OU RI.

2.3.2 Golder and Associates Phase I Remedial Investigation (Miscellaneous Areas Operable Unit), 1993

Site 16

Several samples were collected from Site 16 during the Phase I RI done by Golder and Associates in 1993. However, none of these samples were located in the portion of Area 7 that is under investigation in this report.

2.3.3 Woodward Clyde Consultants Remedial Investigation (Miscellaneous Areas Operable Unit), 1996*Site 16*

Several samples were collected from Site 16 during the Phase II RI done by Woodward-Clyde in 1996. However, none of these samples were located in the portion of Area 7 that is under investigation in this report.

2.3.4 USFWS Preliminary Assessment/Site Inspection (AUS OU), 2001 (prepared by URS Corporation)*Area 7 - (AUS-0A07)*

Thirty soil samples were collected throughout Area 7 as part of the AUS OU PA/SI. Fourteen⁹⁸ soil samples were collected within the additional investigation area discussed as part of this report (Figure 2-3). Samples AUS-0A07-001 through AUS-0A07-003 were collected from the perimeter of Building IN-1-6 and were analyzed for pesticides. Sample AUS-0A07-004 was collected from the former location of possible ASTs located adjacent (west) of Building IN-1-5. This sample was analyzed for pesticides as well. Sample AUS-0A07-005 was collected from the north perimeter of Building IN-1-5 and was analyzed for pesticides. Sample AUS-0A07-006 was collected from the northeast perimeter of Building IN-1-4 and was analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and inorganics. Finally, sample AUS-0A07-025 was collected from the main drainage ditch, slightly northwest of Building IN-1-3. This sample was analyzed for VOCs and PCBs.

All 001 through 005 had multiple exceedances of screening criteria for pesticides in both the 0-6" and the 2' samples. Some pesticides were detected at very high levels, such as high as 520,000 ug/kg for aldrin (Sample 002) and 290,000 ug/kg for dieldrin (Sample 004) which is the highest level detected in Area 7. This sample was taken from the former location of possible USTs. Many of pesticide samples exceeded several human health and ecological screening criteria. Refer to Figure 2-3 for sample locations, detections, and exceedance information.

VOCs in Sample 006 were not detected; however, SVOC constituent benzo(g,h,i)perylene was detected at 130 ug/kg (at 2') and is considered a potentially bioaccumulative chemical.

Trichloroethylene (TCE) (21 ug/kg) was the only VOC detection in Sample 025 which was located in the drainage ditch. TCE in this sample exceeded the USEPA Region IX Migration to Groundwater PRG (DAF=1). No PCBs were detected. Several inorganic compounds were detected. Iron (22,100 mg/kg) exceeded both the background and the Ecological Direct Exposure Pathway TRV for soil.

⁹⁸ Two soil samples were taken from each of seven locations, one from 0-6" and one from 2 feet below ground surface.

URS conducted a Site Inspection at AUS-0A07 from May 10 through May 11, 2000. The rationale for sample locations, media, and analytes was presented in the Field Sampling Plan (FSP)⁹⁹ for the AUS OU PA/SI. In March of 2001, additional sampling was conducted at this site. Because of sampling errors from the March 2001 event, in May of 2001, several of the March 2001 samples were re-collected. The rejected data are identified in Appendix A and are not included in the tables in this report.

The March/May 2001 sample locations that surrounded the four buildings included in the additional investigation are shown on Figures 3-1 through 3-4. Survey coordinates for all sample locations in this portion of Area 7 (except for the sample locations inside of the buildings) are listed in Table 3-1. Table 3-2 lists the sample locations and the matrix sampled at that location. Soil, sediment, surface water, dust, wipe, and air samples were collected during this investigation.

3.1 OBSERVATIONS DURING SITE VISIT

A site reconnaissance was done in spring of 1999, for all of Area 7. In March of 2001, a second site reconnaissance was done for Buildings IN-1-3, IN-1-4, IN-1-5 and IN-1-6. This site reconnaissance looked more closely at these buildings and included both the interiors of the buildings as well as the exteriors and the areas surrounding these buildings. The first site reconnaissance only included the exteriors and the areas surrounding the buildings. The following observations were noted during these site reconnaissances for the buildings included as part of this additional investigation.

3.1.1 Building IN-1-3

Interior of Building

The concrete floors of the building have some cracks in them and they are somewhat dusty. In the southeast corner of the building there is evidence of possible 55-gallon drum storage on the floor. In the southwest corner of the building, there is some evidence of smaller drum storage, with some staining evident around the possible smaller drums. There is some possible oil staining located near the entrance garage door; however, there is no evidence of drums in this area. According to Mr. Laurel Johns¹⁰⁰, this building does not flood.

The walls are metal and held up by wooden braces. They do not appear to have been insulated at any time. The wooden braces and the trusses have some dust on them. Overall, the building is not excessively dusty.

⁹⁹ U.S. Fish & Wildlife Service, Department of the Interior, March 2000, Draft Final Field Sampling Plan Site Inspection, Additional and Uncharacterized Sites Operable Unit, Crab Orchard National Wildlife Refuge Superfund Site, Marion, Illinois (Williamson County), prepared by URS Corporation.

¹⁰⁰ Laurel Johns is a Maytag employee. Maytag leased Building IN-1-3 at the time of the interview.

Exterior of Building

Along the east side of the building, there is a low spot which was dry at the time of the site visit. To the north of the building, there is a drainage ditch that runs westward approximately 15-20 feet north of the railroad loading dock. This ditch contains some water and it drains into the creek that runs generally northward through the center of Area 7. There is a newer concrete driveway on the south side, western end of the building. There is a low spot that was created just west of this driveway, likely as a result of construction of the driveway. This low spot contained no standing water.

3.1.2 Building IN-1-4***Interior of Building***

Only the western three fourths of the building were visually inspected during the site reconnaissance. The eastern quarter of the building was inaccessible. The building appears to have an insulated, dropped ceiling.

The concrete floors of the building have some cracks in them and are somewhat dusty. There are some large (likely 55-gallon sized) and smaller drum markings on the floors in the center and near the western end of the building. There is some possible oil staining around the drum markings in the center of the building. The building is kept swept by the FWS Fisheries Department. When it rains, water comes into the western end of the building via the second garage door from the west end. The building's floor elevation at the western end of the building is lower than the ground surface outside this garage door, and the garage door does not close completely, thus allowing water to enter.

The walls are metal, held up by wooden braces, and the building may have been insulated at one time. The wooden braces and the trusses have some dust on them. Overall, the building is not excessively dusty.

Exterior of Building

To the north of the building there is a drainage ditch that runs eastward approximately 15-20 feet north of the railroad loading dock. This ditch contains some water and it drains into the creek, which runs generally northward through the center of Area 7. A second drainage ditch starts near the southeasternmost corner of the building and it also drains eastward into the same creek.

There was a horizontal AST observed on the east end of the railroad loading dock that is located on the north side of the building. This AST was approximately six feet long and approximately four feet in diameter, and its owner and contents are unknown. It is rusted and there is black staining on the loading dock beneath this tank which appears to be from leakage from the tank. This black material has also stained some of the soils next to the loading dock.

3.1.3 Building IN-1-5***Interior of Building***

The concrete floors of the building have some cracks in them and they are very dusty with both grain and sawdust on the floor. There are some smaller drum marks and small container markings on the floors of this building – mostly along the walls and near the western end of the building. There is some staining around some of the smaller drum markings. It appears that portions of the floor have been painted in the past – especially at the eastern end of the building and the floor is corroded in places.

The walls are metal, held up by wooden braces and it appears that the building was insulated at one time, as some insulation still remains in places. The metal walls are dusty and the wooden braces also have much dust on them. The trusses contain a lot of dust also. Overall, the building is very dusty, with most of the dust located in the western end of the building.

Exterior of Building

To the north of the building, there is a drainage ditch that runs eastward approximately 15-20 feet north of the railroad loading dock. This ditch contains some water and it drains into the creek, which runs generally northward through the center of Area 7.

Just to the west of this building is an area of black-stained soil. Drainage in the area of this black soil drains northward towards the drainage ditch that flows eastward along the north side of this building. The 1951 aerial photograph shows very linear, parallel objects in the area of the black-stained soil. It is possible that these objects could be ASTs; however, this is just speculation.

3.1.4 Building IN-1-6***Interior of Building***

The concrete floors of the building have some cracks in them and they are a little dusty. There are some smaller drum markings on the floors throughout the building, mostly along the walls of the building and at either end of the building. There are also some smaller container markings at the western end of the building. The floor is somewhat corroded in areas and it is kept swept by the tenants.

The walls are metal, held up by wooden braces and it appears that the building was insulated at one time, as some insulation still remains in places. The metal walls are dusty and the wooden braces were very dusty.

Exterior of Building

To the north of the building, there is a drainage ditch that runs eastward approximately 15-20 feet north of the railroad loading dock. This ditch contains some water and it drains into the

creek, which runs generally northward through the center of Area 7. There was a low spot with standing water located just to the west of the northwest corner of the building.

3.2 FIELD INVESTIGATION

Sampling was done in accordance with the sampling procedures outlined in the AUS OU FSP, except as noted.

3.2.1 Building IN-1-3

Soil Sampling

GLT&T used Building IN-1-3 for storage of pesticides for about five years. Pennzoil also reportedly occupied this building and they may have used this building for warehousing motor oil, and for barrel washing operations, and/or as an oil products distributorship. To evaluate possible contamination from these and other operations in this building, three soil samples were collected from next to the building. Two were located along the back dock on the north side of the building (0A07-071 and 0A07-076). The third sample (0A07-073) was located along the south side of the building, just east of a concrete driveway. This location appears to have been a former entranceway to the building as observed in both the 1965 and 1971 aerial photographs.

Wipe and Dust Sampling

One dust sample and two wipe samples were collected from inside Building IN-1-3. Initially a dust sample (0A07-099) was collected by sweeping an area in the southwest corner of the building. After dust sampling was completed, wipe sampling was done. A floor wipe sample (0A07-095) was collected from the southeast corner of the building and a metal wall wipe sample (0A07-094) was collected from the southern wall near the southeast corner of the building.

3.2.2 Building IN-1-4

Soil Sampling

During the site reconnaissance an aboveground storage tank with staining on the ground next to it was observed northeast of Building IN-1-4. Samples 0A07-006 and 0A07-060 were collected from the stained area next to this AST. The origin of this tank is not known.

GLT&T used Building IN-1-4 for storage of pesticides for at least ten and possibly twenty years. Pennzoil also reportedly occupied this building and they may have used this building for warehousing motor oil, and for barrel washing operations, and/or as an oil products distributorship. As a result, soil samples were collected from the areas surrounding this building.

Samples 0A07-054 (located next to southwest corner of building), 0A07-057 (located next to the second garage door on the east side of the building), and 0A07-061 (located next to the southeast

corner of the building) were collected along the south side of Building IN-1-4. All of these locations could have potentially received spilled materials.

Samples 0A07-053 (located near the northwest corner of the building), 0A07-056 (located near the center of the building), and 0A07-060 (located near the northeast corner of the building-next to the AST) were located along the back dock of this building. There is a shallow, east-flowing drainage ditch that parallels the north side of the building. Four samples were collected from this shallow drainage ditch: 0A07-052 (located near 0A07-053), 0A07-055 (located north of 0A07-056), 0A07-059 (located north of 0A07-060), and 0A07-062 (located midway between Building IN-1-4 and the main drainage ditch/intermittent stream that runs northward through Area 7). North of sample location 0A07-059, sample 0A07-058 was collected from a grassy area at the base of the treeline that is north of the drainage ditch. This treeline is elevated.

Wipe and Dust Sampling

One dust sample and two wipe samples were collected from Building IN-1-4. Initially a dust sample (0A07-098) was collected by sweeping an area in the northwest quarter of the building (near the northern wall). After dust sampling was completed, wipe sampling was done. A floor wipe sample (0A07-093) was collected from the southwest quarter of the building and a metal wall wipe sample (0A07-092) was collected from the southern wall, west of the southwest corner of the building.

3.2.3 Building IN-1-5

Soil Sampling

GLT&T used Building IN-1-5 for storage of pesticides for twenty years. Central Fixtures Manufacturing Company/Cubicon Corporation also reportedly occupied this building for woodworking.

Samples 0A07-046 (located next to the southwest corner of the building), 0A07-048 (located near the center of this building) and 0A07-051 (located next to the southeast corner of the building) were collected along the south side of Building IN-1-5. All of these locations could have potentially received spilled materials.

Just north of sample location 0A07-046, was an area of black-stained soil. This area of black stained soil appears to coincide with the location of four possible ASTs that were observed in the 1951 aerial photograph. Sample locations 0A07-004 and 0A07-045 were located within the area of black-stained soil and sample location 0A07-044 was located just north (down slope) of the area of black-stained soil. Sample location 0A07-040 was located just west of the area of black-stained soil.

Samples 0A07-043 (located near the northwest corner of the building), 0A07-005 (located near the center of the building) and 0A07-050 (located near the northeast corner of the building) were located along the back dock of this building. There is a shallow, east-flowing drainage ditch that

parallels the north side of the building. Three samples were collected from this shallow drainage ditch: 0A07-042 (located near 0A07-043), 0A07-047 (located north of 0A07-005), and 0A07-049 (located north of 0A07-050). North of sample location 0A07-042, sample 0A07-041 was collected from a grassy area at the base of the treeline that is north of the drainage ditch. This treeline is elevated.

Wipe and Dust Sampling

One dust sample and three wipe samples were collected from Building IN-1-5. Initially a dust sample (0A07-097) was collected by sweeping an area in the northeast quarter of the building (near the northern wall). After dust sampling was completed, wipe sampling was done. A floor wipe sample (0A07-091) was collected next to the west wall of the building. A wooden wall wipe sample (0A07-090) was collected from wooden bracing on the southern wall near the southeast corner of the building. A metal wall wipe sample (0A07-089) was collected from the west wall of this building.

3.2.4 Building IN-1-6

Soil Sampling

GLT&T used Building IN-1-6 for storage of pesticides for twenty years. Central Fixtures Manufacturing Company/Cubicon Corporation also reportedly occupied this building for woodworking.

Sample 0A07-032 is located on the west side of Building IN-1-6. Sample 0A07-031 is located northwest of Building IN-1-6, upstream of the area likely to receive drainage from this building. Samples 0A07-033 (located next to southwest corner of building), 0A07-036 (located near the center of this building) and 0A07-039 (located next to southeast corner of building) were collected along the south side of Building IN-1-6. All of these locations could have potentially received spilled materials.

Samples 0A07-001 (located in a low spot near the northwest corner of the building), 0A07-002 (located approximately fifty feet east of the northwest corner of the building) and 0A07-038 (located approximately fifty feet west of the northeast corner of the building) were located along the back dock of this building. There is a shallow, east-flowing drainage ditch that parallels the north side of the building. Three samples were collected from this shallow drainage ditch: 0A07-003 (located in the ditch, just north of the northeast corner of the building), 0A07-035 (located north of 0A07-002) and 0A07-037 (located north of 0A07-038). North of sample location 0A07-035, sample 0A07-034 was collected from a grassy area at the base of the treeline that is north of the drainage ditch. This treeline is elevated.

Wipe and Dust Sampling

One dust sample and seven wipe samples were collected from Building IN-1-6. Initially a dust sample (0A07-096) was collected by sweeping an area in the northwestern corner of the building (near the west wall). After dust sampling was completed, wipe sampling was done. Two floor wipe samples, two metal wall wipe samples, two wooden wall wipe samples (collected from wooden bracing on walls) and one box wipe sample (collected from dust on top of a box) were collected from this building. The first floor wipe sample (0A07-087) was collected from the northwestern corner of the building (where there were drum markings on the floor). The second floor wipe sample (0A07-086) was collected from the northeastern corner of the building (where there were drum markings on the floor, along with an oily residue).

The first wooden wall wipe sample (0A07-083) was collected from wooden bracing on the northern wall in the northwest quarter of the building. The second wooden wall wipe sample (0A07-085) was collected from wooden bracing on the northern wall in the northeast quarter of the building. The first metal wall wipe sample (0A07-082) was collected from the southern wall in the southwest quarter of this building. The second metal wall wipe sample (0A07-084) was collected from the eastern wall in the southeast quarter of this building. The box wipe sample (0A07-088) was collected from a box located along the west wall of the building.

3.2.5 Main Drainage Ditch/Intermittent Stream***Sediment Sampling***

There were 11 sediment samples (0A07-025, 0A07-063 through 0A07-069, 0A07-079 through 0A07-081) collected from the main drainage ditch/intermittent stream that flows northward through Area 7 and discharges into Crab Orchard Lake.

Three samples within the main drainage ditch/intermittent stream were located within the industrial portion of Area 7. Sample 0A07-068 was located in the main drainage ditch/intermittent stream, on the north side of the Mousertown Road culvert. Sample 0A07-069 was located on the south side of this same culvert. Sample 0A07-025 was located north of the former railroad culvert, at the point where the shallow drainage ditches that parallel the north side of Buildings IN-1-1 through IN-1-6, discharge into the main drainage ditch/intermittent stream.

In the intermittent stream to the north of the industrial portion of Area 7, four samples were located south of an un-named roadway (0A07-064, 0A07-065, 0A07-066 and 0A07-067) and three samples were located north of this un-named roadway (0A07-063, 0A07-079 and 0A07-080).

One additional sample (0A07-081) was collected at the confluence of this intermittent stream and Crab Orchard Lake.

Surface Water Sampling

One surface water sample, 0A07-025, was located north of the former railroad culvert, at the point where the shallow drainage ditches that parallel the north side of Buildings IN-1-1 through IN-1-6, discharge into the main drainage ditch/intermittent stream.

3.3 FIELD RESULTS**3.3.1 Site Conditions****3.3.1.1 Geologic Conditions**

One groundwater monitoring well was installed in Area 7 during O'Brien & Gere's RI, however significant geologic information from this well was not found in the report. No monitoring wells were installed in Area 7 during the PA/SI or this investigation.

3.3.1.2 Hydrogeologic Conditions

One groundwater monitoring well was installed in Area 7 during O'Brien & Gere's RI, which indicated a groundwater elevation of 428.12 ft mean sea level (msl) in June 1987.¹⁰¹ No monitoring wells were installed in Area 7 during the PA/SI or this investigation.

3.3.1.3 Hydrologic Conditions

There is a north-flowing drainage ditch/intermittent stream in roughly the middle of Area 7, which flows toward Crab Orchard Lake. The north-flowing drainage ditch collects drainage from smaller east-west flowing ditches throughout Area 7.

There are no permanent water bodies located in Area 7.

3.4 CHEMICAL RESULTS

A full data validation was completed for all constituents in all samples, where applicable. Data validation reports are included in Appendix A. This validation was performed to assess whether the data are suitable for their intended use using applicable sections from the U.S. EPA guidance documents "National Functional Guidelines for Organic Data Review", (October 1999), and "Laboratory Data Validation Functional Guidelines for Inorganic Analyses," (USEPA, 1994). The data validation included validation of duplicate samples obtained in accordance with the QAPP. Based on the criteria outlined, the results reported for all analyses performed as part of the Area 7 supplemental investigation are judged to be valid and it is recommended that they should be accepted as qualified.

¹⁰¹ O'Brien & Gere. 1988. Remedial Investigation Report – Crab Orchard National Wildlife Refuge, Volume I, Final Report, Figure 34-4.

Tables 3-3 through 3-7 list the chemicals detected in AUS-0A07 during this investigation for each sample matrix, along with the frequency and range of detections. Table 3-8 shows the results of the dioxin/furan toxicity equivalents that were calculated for soil samples.

Sample results are presented in figures as follows:

- Figure 3-1 – pesticide results for soil and sediment samples collected from 0 to 6 inches below ground surface and for the surface water sample,
- Figure 3-2 – pesticide results for soil and sediment samples collected from depths deeper than 6 inches,
- Figure 3-3 – pesticide results for wipe and dust samples collected from the interiors of the buildings, and
- Figure 3-4 – organics (except pesticides) and inorganic results for all soil and sediment samples, and for the surface water sample.

3.5 AIR SAMPLING RESULTS SUMMARY

Air samples were collected to correspond with each dust sample.

Building IN-1-3 – Air Sample 0A07-099
Building IN-1-4 – Air Sample 0A07-098
Building IN-1-5 – Air Sample 0A07-097
Building IN-1-6 – Air Sample 0A07-096

Air sampling was performed to estimate the amount of dust that workers in the buildings might be exposed to. The air sampler, which is worn by one of the sampling personnel, creates a vacuum which pulls in air in the vicinity of the worker. The air passes over a filter which collects the dust.

The air sampler measures the volume of air that passes through the filter. The filter is weighed in a laboratory before and after sampling to determine the mass of dust in the volume of air that passed through the filter. These data are then used to calculate an average dust concentration during the time of the sampling (average dust concentration = dust mass collected/air volume measured by sampler). For each building, air was sampled during the approximately 20 minutes it took the sampling crew to sweep up a dust sample, collect it in a jar, label and seal the jar, and prepare the chain of custody. About five minutes of this time was spent sweeping. The measured dust concentrations for each building are as follows:

Building IN-1-3 — 11.0 mg/cubic meter
Building IN-1-4 — 3.0 mg/cubic meter
Building IN-1-5 — 6.7 mg/cubic meter
Building IN-1-6 — 6.9 mg/cubic meter

Results of the screening are presented in Tables 4-1 through 4-6 as follows:

- Table 4-1--human health screening of soils,
- Table 4-2--ecological screening of soils,
- Table 4-3--human health screening of sediment,
- Table 4-4--ecological screening of sediment,
- Table 4-5--human heal screening of surface water, and
- Table 4-6--ecological screening of surface water.

Each table lists the maximum detected concentration for each constituent analyzed at AUS-0A07 during this additional investigation. The screening results are presented in the tables in terms of hazard quotients (HQs). The HQ for any chemical detected, for any particular screening criterion is simply the ratio of the maximum detected concentration to the screening concentration. For human health for carcinogens, a screening level "cancer risk" is calculated instead of an HQ. Chemicals that exceeded the screening criteria are identified as chemicals of potential concern (COPCs for human health risk) or chemicals of potential ecological concern (COPECs for ecological risk).

In cases where the chemical was analyzed but not detected, the HQ is the ratio between the maximum reporting limit and the screening concentration. Chemicals not detected are identified with a "U" or a "UJ" qualifier in the qualifier column. Some of these may have HQ values that exceed one, they are not identified as COPCs/COPECs, but rather as uncertainties.

In Figures 3-1 through 3-4, a shading convention is used that indicates exceedances of particular screening criteria. These criteria are indicated by the code in the analytical results labels on the figures. Duplicate results are shown only if the duplicate result for an analyte exceeded the screening criteria and the result from the original sample did not; or, if the analyte was detected in the duplicate and not in the original sample. Since in the screening process results which are qualified as estimated (coded with "J") are treated the same as unqualified results, data qualifiers are not included in the results shown in the figures. Refer to Tables 4-9 through 4-13 for data qualifiers.

Tables 4-7 (human health) and 4-8 (ecological) list all the analytes and corresponding media sampled and indicate whether each is a COPC (or COPEC), not a COPC (or COPEC), or an uncertainty. The codes in the tables indicate the rationale for each classification. All COPCs (Table 4-7) and COPECs (Table 4-8) are shaded in the tables.

4.1 HUMAN HEALTH RISK**4.1.1 Soil/Sediment/Dust**

Human health screening results for soil and sediment samples are presented in Tables 4-1 and 4-3, respectively. Soil screening values were conservatively used to screen the sediment samples as well as the dust samples. For carcinogens, a cancer risk was calculated using the USEPA Region 9 Industrial Soil PRGs as screening values. The cancer risk was derived by calculating a ratio of the maximum detected concentrations, or the maximum reporting limits, to their appropriate screening values. These ratios were then multiplied by 1×10^{-6} . In addition, ratios were calculated using the USEPA Region 9 Industrial Soil PRG for Toxins, the USEPA Region 9 Migration to Groundwater Criteria (DAF=1), the Illinois Tiered Approach to Corrective Action Objectives (TACO) Industrial/Commercial Soil Ingestion Criteria, the Illinois TACO Construction Worker Soil Ingestion Criteria, and the Illinois TACO Class I Soil Component of Groundwater Criteria.

4.1.2 Surface Water

Human health risk screening results for chemicals in surface water from this area are presented in Table 4-5. The maximum concentrations from this area were screened against the Illinois General Use Surface Water Quality Criteria – Human Health.

4.2 ECOLOGICAL RISK**4.2.1 Soil/Dust**

Ecological screening results for soil samples are presented in Table 4-2. Soil screening values were conservatively used to screen the dust samples as well. Soil screening concentrations for direct exposures were developed using toxicity reference values TRVs derived from several sources, including the following:

- USEPA (2000)¹⁰²
- Environment Canada (1995)¹⁰³
- Talmage *et al.* (1999)¹⁰⁴
- Efrogmson *et al.* (1997a, 1997b)¹⁰⁵

¹⁰² USEPA. 2000. Ecological Soil Screening Level Guidance (Draft). USEPA Office of Emergency and Remedial Response, Washington, DC.

¹⁰³ Environment Canada. 1995. Toxicity Testing of NCSRP Priority Substances for Development of Soil Quality Guidelines for Contaminated Sites. Guidelines Division, Evaluation and Interpretation Branch, Environmental Conservation Directorate, Environment Canada. Hull, Quebec.

¹⁰⁴ Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F. M. Cretella, P.H. Reno, and F. B. Daniel. 1999. Nitroaromatic Munition Compounds: Environmental Effects and Screening Values. *Rev Environ. Contam. Toxicol* 161:1-156.

¹⁰⁵ Efrogmson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten. 1997a. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision*. Oak Ridge National Laboratory, Oak Ridge, Tennessee. ES/ER/TM-85/R3.

- CCME (1999)¹⁰⁶
- MHSPE (1994)¹⁰⁷
- Other sources

A detailed discussion of the screening concentration selection is presented in Appendix G of the AUS OU PA/SI Report dated September 2001.

The screening approach for ingestion pathway exposures was based on the potential for a chemical to bioaccumulate. The potential for a chemical to bioaccumulate was based on the organic chemical-specific octanol-to-water partitioning coefficient (K_{ow}), which provides an indication of the lipophilicity of an organic chemical, and its potential for sequestration in biological tissue. The document *Assessment and Control of Bioconcentratable Contaminants in Surface Waters* (USEPA 1991)¹⁰⁸ used a log K_{ow} of 3.5 as a target threshold value indicative of bioaccumulative chemicals to target organic chemicals of greatest concern. Using this as a guideline, organic chemicals with a log K_{ow} greater than 3.5 were considered potentially bioaccumulative chemicals. Among inorganics, mercury and selenium were considered as potentially bioaccumulative chemicals. Any potentially bioaccumulative chemical that is detected was retained as a COPEC.

4.2.2 Sediment

Ecological screening results for sediment samples are presented in Table 4-4. Sources of TRVs for evaluating direct exposures to aquatic organisms in sediments included:

- Consensus-based freshwater sediment criteria (MacDonald et al. 1999)¹⁰⁹
- USEPA (1996 – summarized by Ingersoll et al. 1996)¹¹⁰
- Ontario Ministry of the Environment and Energy (1995)¹¹¹
- NOAA (1999)¹¹²
- Ecotox (USEPA 1996)¹¹³

Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997b. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision*. Oak Ridge National Laboratory, Oak Ridge, Tennessee. ES/ER/TM-126/R2.

¹⁰⁶ Canadian Council of Ministers of the Environment. 1999. Canadian Environmental Quality Guidelines.

¹⁰⁷ Ministry of Housing, Spatial Planning, and the Environment (MHSPE). 1994. *Intervention Values and Target Values – Soil Quality Standards*. Directorate General for Environmental Protection, Department of Soil Protection, The Hague, The Netherlands.

¹⁰⁸ USEPA 1991. *Assessment and Control of Bioconcentratable Contaminants in Surface Waters (Draft)*. US Environmental Protection Agency Office of Research and Development, Washington, D.C.

¹⁰⁹ MacDonald, D.D., Ingersoll, C.G., Berger, T.A. 1999. *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*. MacDonald Environmental Services Ltd., British Columbia, Canada.

¹¹⁰ Ingersoll, C.G., P.S. Haverland, E.L. Brunson, T.C. Canfield, F.J. Dwyer, C. E. Henke, N.E. Kemble, D.R. Mount, and R.G. Fox. 1996. Calculation and evaluation of sediment effect concentrations for the amphipod *Hyaella azteca* and the midge *Chironomus riparius*. *J. Great Lakes Res.* 22(3):602-623.

¹¹¹ Ontario Ministry of Environment and Energy. 1995. *Ontario's Approach to Sediment Assessment and Remediation*. Second SETAC World Congress (16TH Annual Meeting). Vancouver, British Columbia, Canada.

¹¹² NOAA. 1999. *Screening quick Reference Tables*. National Oceanic and Atmospheric Administration HAZMAT Report 99-1, Seattle Washington.

- Long *et al.* (1995)¹¹⁴
- Equilibrium partitioning
- USEPA Region V Environmental Data Quality Levels (EDQLs)
- Other sources

With respect to effects levels, there are a number of potential sources and endpoints. There are also multiple endpoints from some sources. For example, threshold effects levels (TELs) as reported by Ingersoll *et al.* (1996) are the geometric mean of the 15th percentile in the effects data set and the 50th percentile in the no-effects data set. The effects-range low (ERL) and effects-range medium (ERM) are the 15th percentile and 50th percentile values in the effects datasets, respectively. The Probable Effects Level (PEL) is the geometric mean of the 50th percentile in the effects data set and the 85th percentile in the no-effects data set, and the effects range medium is the 50th percentile value of the effects dataset. A TEL or ERL is assumed to represent a concentration below which toxic effects are rarely observed. The range between the TEL and PEL is assumed to represent the range in which effects are occasionally observed. MacDonald *et al.* (2000) developed "consensus-based" freshwater sediment screening concentrations. Threshold effect concentrations (TECs) were developed as concentrations below which adverse effects are not expected to occur. Probable effect concentrations (PECs) were levels above which effects are frequently expected to occur. Among other potential screening values, no effect concentrations (NECs – Ingersoll *et al.* 1996) and upper effect thresholds (UETs – NOAA 1999) are also levels above which effects are frequently or always observed.

In deriving an ecological screening value (ESV), preference was given to the TEC, TEL and ERL values since these are the most conservative (i.e., levels below which effects are rarely observed). Preference was also given to freshwater-derived values (MacDonald *et al.* [1999], Ingersoll *et al.* [1996], Ontario [1995] and NOAA [1999]) as opposed to estuarine or saltwater (Long *et al.* 1995). If screening values were unavailable from the sources noted above, the "equilibrium-partitioning" (EqP) approach was used. This used the surface water ecological screening value and the expected partitioning between sediment and sediment pore water as described in USEPA (1993). A detailed discussion of the screening concentration selection is presented in Appendix G of the AUS OU PA/SI Report dated September 2001.

The screening approach for ingestion pathway exposures was the same as for soils as presented in Section 4.2.1.

4.2.3 Surface Water

Ecological screening results for surface water samples are presented in Table 4-6. TRVs for direct exposure by aquatic organisms in surface water were obtained from:

- Illinois water quality standards

¹¹³ USEPA. 1996. ECO Update: Ecotox Thresholds. EPA-540/F-95/038. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Washington, D.C. 12pp.

¹¹⁴ Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environ. Management.* 19(1): 81-97.

- National Recommended Ambient Water Quality Criteria (USEPA 1999a)¹¹⁵
- EcoTox (USEPA 1996)¹¹⁶
- USEPA Region IV Freshwater Screening Values (1999b)¹¹⁷
- Maximum Acceptable Toxicant Concentrations (MATCs) or lowest observed effect concentrations (LOECs) obtained from the USEPA Assessment Tools for the Evaluation of Risk database (ASTER 2000)¹¹⁸
- Other sources

The Illinois water quality standards are believed to be the most relevant, followed by national recommended ambient water quality criteria. EcoTox reports values based on ambient water quality criteria, and Tier II water quality criteria have been developed in the absence of sufficient information to support a national recommended water quality criterion using guidelines outlined in the Great Lakes Water Quality Initiative. Remaining sources were prioritized based on relevance to the area and professional judgment. The detailed discussion of the approach for selecting a single ESV from among the multiple sources is presented in Appendix G of the AUS OU PA/SI Report dated September 2001.

The screening approach for ingestion pathway exposures was the same as for soils as presented in Section 4.2.1.

¹¹⁵ USEPA. 1999a. National Recommended Water Quality Criteria--Correction. Office of Water. EPA 822-Z-99-001. April.

¹¹⁶ USEPA. 1996. ECO Update: Ecotox Thresholds. EPA-540/F-95/038. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Washington, D.C. 12pp.

¹¹⁷ USEPA. 1999b. Region IV Ecological Risk Assessment Bulletins – Supplement to RAGS. Available at <http://www.epa.gov/region4/waste/oftecser/ecolbul.htm>.

¹¹⁸ ASTER. 2000. Assessment Tools for Evaluation of Risk Database. United States Environmental Protection Agency, Office of Research and Development.

5.1 AIR MONITORING SUMMARY

Using the measured dust concentrations discussed in Section 3.5, and if we assume that the dust in the air has the same pesticide concentrations as the dust on the floor, the calculated aldrin concentrations for each building, for the 20-minute dust monitoring periods are:

Building IN-1-3 — 0.000044 mg/cubic meter
Building IN-1-4 — 0.00042 mg/cubic meter
Building IN-1-5 — 0.035 mg/cubic meter
Building IN-1-6 — 0.00014 mg/cubic meter

Air monitoring results were compared to the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) standards. OSHA and NIOSH standards are applicable to workers in controlled, monitored, work places, and are not directly applicable to this site. Both OSHA and NIOSH have exposure limits for aldrin of 0.25 mg/cubic meter. This is the maximum average acceptable level that a worker should be exposed to for 40 hours per week. As shown, the calculated aldrin levels for the buildings in Area 7 are well below these limits. When dieldrin, which has the same exposure limits, is also considered, the calculated concentrations are still well below the OSHA/NIOSH exposure limits, even when the maximum pesticide dust detections are used with the maximum air concentrations. However, NIOSH considers both aldrin and dieldrin as potential carcinogens and recommends that occupational exposures to carcinogens be limited to the lowest feasible concentrations.

OSHA and NIOSH exposure limits for DDT are 0.5 mg/cubic meter and 1 mg/cubic meter, respectively. NIOSH classifies DDT as a potential human carcinogen and OSHA does not. OSHA and NIOSH exposure limits for endrin are 0.1 mg/cubic meter. Neither classifies endrin as a potential carcinogen. Based on the results from the sampling, the calculations show no OSHA or NIOSH exceedances of exposure limits for DDT or endrin. There are no OSHA/NIOSH published exposure limits for endrin ketone or isodrin.

The data collected do not indicate exceedances of OSHA/NIOSH standards for worker exposure to the pesticides detected. However these standards are based on air concentrations of pesticides and do not take into account other media and exposure pathways, nor do the exposure limits account for the effects of multiple contaminants. Also, as noted above, OSHA and NIOSH standards are not directly applicable to the site conditions. Aldrin, dieldrin, and DDT are classified as potential human carcinogens by NIOSH. NIOSH recommends limiting exposure to these chemicals to the lowest feasible levels.

In order to assist FWS understand the risk implications of worker contact with pesticides detected inside the buildings, IEPA also calculated conservative screening levels for most of the analyzed pesticides. IEPA suggested worker exposure be minimized to protect against both cancer and noncancer risks since the maximum amounts of aldrin and dieldrin exceed both the

cancer and noncancer risk-based screening level. A copy of IEPA's letter containing their calculations and recommendation can be found in Appendix B.

5.2 ANALYTICAL RESULTS SUMMARY FOR SOIL, SEDIMENT, SURFACE WATER, DUST, AND WIPE SAMPLES

Dust samples were compared with soil screening criteria. Wipe samples indicated the presence of several pesticides, but results were not compared to any standards.

Chemicals that exceeded the AUS OU PA/SI screening criteria and Refuge background (if applicable) for soil, sediment, and surface water are listed in Table 4-14.

The following chemicals are included in Table 4-14 but were not identified as COPCs or COPECs in the PA/SI report. These chemicals should be added to the COPC/COPEC list for AUS-0A07.

Chemicals of Potential Concern

Soil:

- 1,2-Dichloropropane
- Benzene
- Tetrachloroethylene (PCE)
- 4,4'-DDE
- 4,4'-DDT
- Endrin aldehyde
- Gamma-chlordane

Sediment:

- 1,2-Dichloropropane
- Trichloroethylene (TCE)
- Antimony
- Arsenic
- Barium
- Beryllium
- Chromium
- Nickel
- Selenium
- 4,4'-DDD
- Dieldrin

Chemicals of Potential Ecological Concern

Soil:

- Total xylenes
- Acenaphthene
- 2,3,7,8-TCDD TEQ

Sediment:

- Arsenic
- Manganese
- Mercury
- Selenium
- Zinc
- 4,4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- Aldrin
- Dieldrin
- Methoxychlor

Surface Water:

- Aluminum
- Hexachlorobenzene

**TABLE 2-1
AREA 7 POST-WORLD WAR II
OPERATORS/LESSEES AND BUILDING USES
(Buildings IN-1-3, IN-1-4, IN-1-5, and IN-1-6 only)**

OPERATOR/LESSEE	AREA 7 BUILDING NUMBER	YEARS OF OCCUPANCY	INDUSTRIAL ACTIVITY IN BUILDINGS
Allen Industries	IN-1-3	195-1957	Warehousing/production of rug underlay samples and warehousing of packing materials
	IN-1-4	1956-1957	
Central Fixtures Manufacturing Company (changed its name to Cubicon Corporation in 1972 - see below)	IN-1-5	1971-1972	Makes interior display cases and shelves for many kinds of businesses (wood working) (Cubicon manufactured building fixtures)
	IN-1-6	1971-1972 1980-1983	
	P-1-13	1971-1973	
FPI (likely Federal Prison Industries)	IN-1-3	1976-1981	Warehousing of prison products
Great Lakes Terminal & Transport Corporation (formerly Great Lakes Solvents, Inc. from 1951 through 1961)	IN-1-3	1961-1966	Storage of packaged agricultural chemicals (pesticides)
	IN-1-4	1951 or 1961-1971	
	IN-1-5	1951-1971	
	IN-1-6	1951-1971	
	P-1-13	1951-1971	
Hercules Powder	IN-1-3	1949-1950	Storage of linter for explosive powder production; linter consists of cotton fibers and fuzz that escapes removal in the ginning operation
	IN-1-4	1949-1950	
	IN-1-5	1949-1950	
	IN-1-6	1949-1950	
Little Egypt Grain Co. (original lease was from 1986 through 1990; the 1990 tenant list only showed Little Egypt Grain Co. as leasing the equivalent of one of these buildings (unknown building number), so it is assumed that some of the rest of these buildings were unoccupied by that time)	IN-1-3	1986-1990	Storage of bushels of corn
	IN-1-5	1986-1990	
	IN-1-6	1986-1990	
Mark Twain Marine Industries	IN-1-3	1970-1971	Manufacture of boats and boat accessories
Maytag Appliances	IN-1-3	Current	Storage of service parts for equipment that is no longer manufactured
MDM - the Party Shop	IN-1-6	1998-2001	Observed during the spring of 2001 by USFWS personnel—the building contains boxes of party supplies (paper plates, etc.)
Midwest Woodworking & Fixture	IN-1-6	1985	Unknown
Norge	IN-1-2	1957-1965	Warehouse Washers/Dryers
	IN-1-3	1963-1964, 1966-1967	
Olin Corporation	IN-1-	1971-1976	Storage of ordnance explosives and ordnance materials
Pennzoil Co. (changed name to Pennzoil Products Company in 1986)	IN-1-3	1971 (6 months)	Warehousing motor oil and a barrel washing operation; and as an oil products distributorship
	IN-1-4	1971 (3 months)	
Pre-Hung Door Co. (Subsidiary of Marion Metal and Roofing Company, Inc.)	IN-1-6	1974-1980	Manufacturing Wooden Doors
Royal Crown (R.C.) Bottle Company (Hargreave, A.C.)	IN-1-4	1976-1990 (at least)	Cola Sales/Distribution
Southern Illinois Manufacturing Company, Inc.	IN-1-6	1972-1974	Unknown

Note: References for the information in this table are found in the associated text.

Table Created By: MAM
Table Checked By: CMW

TABLE 3-1
SURVEY COORDINATES FOR ADDITIONAL SAMPLE LOCATIONS
IN AREA 7 (AUS 0A07)

SAMPLE LOCATION	NORTHING	EASTING	GROUND SURFACE ELEVATION	TOP OF CASING ELEVATION	COMMENTS
0A07-001	371128.2	793045.8	424.83	NA	
0A07-002	371134.6	793120.2	425.2	NA	
0A07-003	371159.4	793268.5	423.38	NA	
0A07-004	371127.6	793355	425.02	NA	
0A07-005	371155.8	793471	423.24	NA	
0A07-006	371182.8	793869.6	420.84	NA	
0A07-025	371218.8	794033.1	417.09	NA	
0A07-031	371137.8	793008.8	424.49	NA	
0A07-032	371108.3	793043.5	426.89	NA	
0A07-033	371070	793062.3	428.52	NA	
0A07-034	371153.8	793118.1	425.06	NA	
0A07-035	371144.1	793120	424.33	NA	
0A07-036	371067	793163.7	429.01	NA	
0A07-037	371150.6	793211.9	424.01	NA	
0A07-038	371139.8	793212.1	424.5	NA	
0A07-039	371079.2	793274.1	428.21	NA	
0A07-041	371176.8	793350.2	424.35	NA	
0A07-042	371161.1	793351.2	423.3	NA	
0A07-043	371150.8	793368.8	423.94	NA	
0A07-044	371141.9	793350	425.1	NA	
0A07-045	371097.6	793359.3	426.6	NA	
0A07-046	371088.6	793360.2	428.12	NA	
0A07-047	371168.1	793471.2	422.77	NA	
0A07-048	371086.2	793484.3	428.12	NA	
0A07-049	371174	793568	422.21	NA	
0A07-050	371163	793569.8	422.71	NA	
0A07-051	371094.2	793581.7	427.2	NA	
0A07-052	371179.8	793663.8	421.5	NA	
0A07-053	371168.6	793675.8	422.06	NA	
0A07-054	371102.7	793674.5	423.08	NA	
0A07-055	371193.1	793773.8	420	NA	
0A07-056	371175.8	793777.5	421.56	NA	
0A07-057	371107.6	793828.2	423.31	NA	
0A07-058	371209	793873.7	418.86	NA	
0A07-059	371198.5	793873.7	419.25	NA	
0A07-060	371182.2	793873.5	421.35	NA	
0A07-061	371113.3	793890.7	421.73	NA	
0A07-062	371196.9	793959.1	420.76	NA	
0A07-063	371627.1	793562.2	411.55	NA	
0A07-064	371533.4	793637.8	411.87	NA	
0A07-065	371505.9	793671.3	411.85	NA	
0A07-066	371447.5	793750.3	412.92	NA	
0A07-067	371388.2	793834.6	412.78	NA	
0A07-068	371115.7	794064.1	416.92	NA	

**TABLE 3-1
SURVEY COORDINATES FOR ADDITIONAL SAMPLE LOCATIONS
IN AREA 7 (AUS 0A07)**

SAMPLE LOCATION	NORTHING	EASTING	GROUND SURFACE ELEVATION	TOP OF CASING ELEVATION	COMMENTS
0A07-069	371047.8	794084.3	416.92	NA	
0A07-071	371200.5	794183	420.72	NA	
0A07-073	371128.9	794220.5	422.53	NA	
0A07-076	371205.3	794269.1	420.25	NA	
0A07-079	372260.9	793384	408.97	NA	
0A07-080	372618.4	793554	407.07	NA	
0A07-081	373060.4	793599.3	404.41	NA	

NA = Not Applicable

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Table Checked By: *MAM*

**TABLE 3-2
MATRICES SAMPLED AT EACH ADDITIONAL SAMPLE LOCATION IN AREA 7 (AUS-0A07)**

SOIL	SEDIMENT	SURFACE WATER	DUST	WIPE	AIR MONITORING
AUS-0A07-001	AUS-0A07-025	AUS-0A07-025	AUS-0A07-096	AUS-0A07-082	AUS-0A07-096
AUS-0A07-002	AUS-0A07-063		AUS-0A07-097	AUS-0A07-083	AUS-0A07-097
AUS-0A07-003	AUS-0A07-064		AUS-0A07-098	AUS-0A07-084	AUS-0A07-098
AUS-0A07-004	AUS-0A07-065		AUS-0A07-099	AUS-0A07-085	AUS-0A07-099
AUS-0A07-006	AUS-0A07-066			AUS-0A07-086	
AUS-0A07-005	AUS-0A07-067			AUS-0A07-087	
AUS-0A07-031	AUS-0A07-068			AUS-0A07-088	
AUS-0A07-032	AUS-0A07-069			AUS-0A07-089	
AUS-0A07-033	AUS-0A07-079			AUS-0A07-090	
AUS-0A07-034	AUS-0A07-080			AUS-0A07-091	
AUS-0A07-035	AUS-0A07-081			AUS-0A07-092	
AUS-0A07-036				AUS-0A07-093	
AUS-0A07-037				AUS-0A07-094	
AUS-0A07-038				AUS-0A07-095	
AUS-0A07-039					
AUS-0A07-040					
AUS-0A07-041					
AUS-0A07-042					
AUS-0A07-043					
AUS-0A07-044					
AUS-0A07-045					
AUS-0A07-046					
AUS-0A07-047					
AUS-0A07-048					
AUS-0A07-049					
AUS-0A07-050					
AUS-0A07-051					
AUS-0A07-052					
AUS-0A07-053					
AUS-0A07-054					
AUS-0A07-055					
AUS-0A07-056					
AUS-0A07-057					
AUS-0A07-058					
AUS-0A07-059					
AUS-0A07-060					
AUS-0A07-061					
AUS-0A07-062					
AUS-0A07-071					
AUS-0A07-073					
AUS-0A07-076					

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Table Checked By: CMW

**TABLE 3-3
SOIL SAMPLE ANALYTICAL RESULTS SUMMARY**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CONSTITUENT	NUMBER OF DETECTIONS	RANGE OF DETECTIONS
VOLATILE ORGANIC COMPOUNDS		
1,2-Dichloropropane	5/10	20 ug/kg to 660 ug/kg
Acetone	8/10	9 ug/kg to 24 ug/kg
Benzene	3/10	7 ug/kg to 8 ug/kg
Chlorobenzene	3/10	13 ug/kg to 48 ug/kg
Ethylbenzene	2/10	27 ug/kg to 41 ug/kg
Styrene	2/10	21 ug/kg to 28 ug/kg
Tetrachloroethene	2/10	15 ug/kg to 48 ug/kg
Toluene	3/10	4 ug/kg to 11 ug/kg
Xylene (total)	3/10	200 ug/kg to 4,500 ug/kg
SEMI-VOLATILE ORGANIC COMPOUNDS		
Acenaphthene	2/17	150 ug/kg to 320 ug/kg
Acenaphthylene	3/17	95 ug/kg to 420 ug/kg
Anthracene	3/17	2.8 ug/kg to 87 ug/kg
Benzo(a)Anthracene	4/17	8.2 ug/kg to 100 ug/kg
Benzo(a)Pyrene	2/17	10 ug/kg to 17 ug/kg
Benzo(b)Fluoranthene	4/17	5 ug/kg to 21 ug/kg
Benzo(g,h,i)Perylene	2/17	15 ug/kg to 130 ug/kg
Benzo(k)Fluoranthene	4/17	2.7 ug/kg to 11 ug/kg
Bis(2-ethylhexyl) Phthalate	1/13	2,500 ug/kg
Chrysene	4/17	10 ug/kg to 81 ug/kg
Fluoranthene	4/17	28 ug/kg to 620 ug/kg
Fluorene	2/17	55 ug/kg to 210 ug/kg
Indeno(1,2,3-c,d)Pyrene	2/17	10 ug/kg to 14 ug/kg
Naphthalene	2/17	150 ug/kg to 330 ug/kg
Phenanthrene	4/17	24 ug/kg to 360 ug/kg
Pyrene	4/17	20 ug/kg to 330 ug/kg
PESTICIDES		
4,4'-DDD	28/91	1.5 ug/kg to 12,000 ug/kg
4,4'-DDE	17/91	3 ug/kg to 4,800 ug/kg
4,4'-DDT	32/90	1 ug/kg to 100,000 ug/kg
Aldrin	63/90	1.7 ug/kg to 1,300,000 ug/kg
Alpha Endosulfan	4/91	0.62 ug/kg to 12 ug/kg
Alpha-Chlordane	7/91	0.66 ug/kg to 490 ug/kg
Beta BHC (Beta Hexachlorocyclohexane)	2/91	1.3 ug/kg to 8.4 ug/kg
Beta Endosulfan	2/91	5.3 ug/kg to 18 ug/kg
Dieldrin	78/91	2 ug/kg to 290,000 ug/kg
Endosulfan Sulfate	1/91	7.7 ug/kg
Endrin	30/92	5.4 ug/kg to 12,000 ug/kg
Endrin Aldehyde	15/91	1.7 ug/kg to 9,000 ug/kg
Endrin Ketone	31/89	1.9 ug/kg to 20,000 ug/kg
Gamma BHC (Lindane)	5/92	0.59 ug/kg to 5.6 ug/kg
Gamma-Chlordane	12/91	0.73 ug/kg to 1,600 ug/kg

**TABLE 3-3
SOIL SAMPLE ANALYTICAL RESULTS SUMMARY**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CONSTITUENT	NUMBER OF DETECTIONS	RANGE OF DETECTIONS
Heptachlor	5/91	4 ug/kg to 69 ug/kg
Heptachlor Epoxide	6/92	0.72 ug/kg to 11 ug/kg
Hexachlorobenzene	11/92	4.4 ug/kg to 2,700 ug/kg
Isodrin	29/90	0.9 ug/kg to 60,000 ug/kg
Methoxychlor	1/92	26 ug/kg
DIOXIN/FURANS		
TCDD equivalent	1/3	0.000289 ug/kg
INORGANICS		
Aluminum	17/17	2,720 mg/kg to 17,900 mg/kg
Antimony	8/17	0.34 mg/kg to 0.63 mg/kg
Arsenic	17/17	4.3 mg/kg to 9.6 mg/kg
Barium	17/17	18.8 mg/kg to 153 mg/kg
Beryllium	16/17	0.13 mg/kg to 1.2 mg/kg
Boron	10/17	0.85 mg/kg to 6.2 mg/kg
Cadmium	5/17	0.1 mg/kg to 0.39 mg/kg
Calcium	17/17	1,010 mg/kg to 217,000 mg/kg
Chromium, Total	17/17	6.1 mg/kg to 25.6 mg/kg
Cobalt	17/17	2.4 mg/kg to 15.1 mg/kg
Copper	17/17	8.6 mg/kg to 23.5 mg/kg
Iron	17/17	6,170 mg/kg to 34,000 mg/kg
Lead	17/17	9.3 mg/kg to 64.8 mg/kg
Magnesium	17/17	1650 mg/kg to 19,700 mg/kg
Manganese	17/17	209 mg/kg to 1,370 mg/kg
Mercury	4/17	0.011 mg/kg to 0.053 mg/kg
Nickel	17/17	9.2 mg/kg to 22.9 mg/kg
Potassium	17/17	524 mg/kg to 930 mg/kg
Selenium	1/17	0.78 mg/kg
Sodium	17/17	60.4 mg/kg to 1,360 mg/kg
Vanadium	17/17	5.7 mg/kg to 38.1 mg/kg
Zinc	17/17	28.9 mg/kg to 95.4 mg/kg

mg/kg = milligrams per kilogram

ug/kg = micrograms per kilogram

Note: This table was derived from the figures that show the analytical results. As a result, duplicates are shown only if the duplicate result for an analyte exceeded the screening criteria and the result from the original sample did not; or, if the analyte was detected in the duplicate and not in the original sample. There may be some duplicate results, not shown in the table, that are outside the range shown. In addition, the frequency and range of detections is based on the number of sample locations, not the total number of samples (the total number of samples includes originals plus duplicates).

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**TABLE 3-4
SEDIMENT SAMPLE ANALYTICAL RESULTS SUMMARY**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CONSTITUENT	NUMBER OF DETECTIONS	RANGE OF DETECTIONS
VOLATILE ORGANIC COMPOUNDS		
1,2-Dichloropropane	1/3	10 ug/kg
Trichloroethylene	1/3	21 ug/kg
PESTICIDES		
4,4'-DDD	5/17	2.9 ug/kg to 1,400 ug/kg
4,4'-DDE	2/17	8.3 ug/kg to 400 ug/kg
4,4'-DDT	3/17	4.7 ug/kg to 48 ug/kg
Aldrin	3/17	8.8 ug/kg to 35 ug/kg
Dieldrin	1/17	16 ug/kg
Methoxychlor	1/17	14 ug/kg
INORGANICS		
Aluminum	1/1	8,760 mg/kg
Antimony	1/1	0.33 mg/kg
Arsenic	1/1	25.2 mg/kg
Barium	1/1	85.8 mg/kg
Beryllium	1/1	1.3 mg/kg
Boron	1/1	3.5 mg/kg
Calcium	1/1	3,790 mg/kg
Chromium, Total	1/1	28.1 mg/kg
Cobalt	1/1	16.4 mg/kg
Copper	1/1	14.8 mg/kg
Iron	1/1	38,600 mg/kg
Lead	1/1	33.7 mg/kg
Magnesium	1/1	2,530 mg/kg
Manganese	1/1	1,180 mg/kg
Mercury	1/1	0.036 mg/kg
Nickel	1/1	13 mg/kg
Potassium	1/1	497 mg/kg
Selenium	1/1	1.8 mg/kg
Sodium	1/1	1,090 mg/kg
Vanadium	1/1	65.1 mg/kg
Zinc	1/1	144 mg/kg

mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram

Note: This table was derived from the figures that show the analytical results. As a result, duplicates are shown only if the duplicate result for an analyte exceeded the screening criteria and the result from the original sample did not; or, if the analyte was detected in the duplicate and not in the original sample. There may be some duplicate results, not shown in the table, that are outside the range shown. In addition, the frequency and range of detections is based on the number of sample locations, not the total number of samples (the total number of samples includes originals plus duplicates).

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TABLE 3-5
SURFACE WATER SAMPLE ANALYTICAL RESULTS SUMMARY
AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

CONSTITUENT	NUMBER OF DETECTIONS	RANGE OF DETECTIONS
PESTICIDES		
Hexachlorobenzene	1/1	0.027 ug/l
INORGANICS		
Aluminum	1/1	625 ug/l
Barium	1/1	80.9 ug/l
Boron	1/1	20.9 ug/l
Calcium	1/1	77,100 ug/l
Iron	1/1	493 ug/l
Magnesium	1/1	33,500 ug/l
Manganese	1/1	180 ug/l
Potassium	1/1	1,110 ug/l
Sodium	1/1	34,200 ug/l
Vanadium	1/1	2.1 ug/l
Zinc	1/1	19.3 ug/l

ug/l = micrograms per liter

Note: This table was derived from the figures that show the analytical results. As a result, duplicates are shown only if the duplicate result for an analyte exceeded the screening criteria and the result from the original sample did not; or, if the analyte was detected in the duplicate and not in the original sample. There may be some duplicate results, not shown in the table, that are outside the range shown. In addition, the frequency and range of detections is based on the number of sample locations, not the total number of samples (the total number of samples includes originals plus duplicates).

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**TABLE 3-6
DUST SAMPLE ANALYTICAL RESULTS SUMMARY**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CONSTITUENT	NUMBER OF DETECTIONS	RANGE OF DETECTIONS
PESTICIDES		
4,4'-DDT	3/4	3,200 ug/kg to 39,000 ug/kg
Aldrin	4/4	4,000 ug/kg to 5,300,000 ug/kg
Dieldrin	4/4	7,500 ug/kg to 460,000 ug/kg
Endrin	3/4	1,200 ug/kg to 45,000 ug/kg
Endrin Ketone	4/4	3,700 ug/kg to 150,000 ug/kg
Isodrin	2/4	910 ug/kg to 2,100 ug/kg

ug/kg = micrograms per kilogram

Note: This table was derived from the figures that show the analytical results. As a result, duplicates are shown only if the duplicate result for an analyte exceeded the screening criteria and the result from the original sample did not; or, if the analyte was detected in the duplicate and not in the original sample. There may be some duplicate results, not shown in the table, that are outside the range shown. In addition, the frequency and range of detections is based on the number of sample locations, not the total number of samples (the total number of samples includes originals plus duplicates).

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**TABLE 3-7
WIPE SAMPLE ANALYTICAL RESULTS SUMMARY**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CONSTITUENT	NUMBER OF DETECTIONS	RANGE OF DETECTIONS
PESTICIDES		
4,4'-DDD	4/14	11 ug/wipe to 39 ug/wipe
4,4'-DDT	8/14	3.3 ug/wipe to 59 ug/wipe
Aldrin	11/14	0.63 ug/wipe to 720 ug/wipe
Dieldrin	14/14	1.8 ug/wipe to 590 ug/wipe
Endrin	13/14	1.5 ug/wipe to 99 ug/wipe
Endrin Ketone	12/14	1 ug/wipe to 200 ug/wipe
Isodrin	7/14	0.34 ug/wipe to 110 ug/wipe

ug/wipe = micrograms per wipe

Note: This table was derived from the figures that show the analytical results. As a result, duplicates are shown only if the duplicate result for an analyte exceeded the screening criteria and the result from the original sample did not; or, if the analyte was detected in the duplicate and not in the original sample. There may be some duplicate results, not shown in the table, that are outside the range shown. In addition, the frequency and range of detections is based on the number of sample locations, not the total number of samples (the total number of samples includes originals plus duplicates).

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**TABLE 3-8
DIOXIN/FURAN TOXICITY EQUIVALENTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	TEF	AUS-0A07-002-SS-0X			AUS-0A07-045-SS-0X			AUS-0A07-076-SS-0X		
		Result	Qual	TEQ	Result	Qual	TEQ	Result	Qual	TEQ
DIOXINS / FURANS (ng/kg)										
2,3,7,8-TCDD	1.000	<	U		0.289		0.2890	<	U	
1,2,3,7,8-PeCDD	1.000	0.126		0.1260	0.373		0.3730	0.0971		0.0971
1,2,3,4,7,8-HxCDD	0.100	0.214		0.0214	0.59		0.0590	0.154		0.0154
1,2,3,6,7,8-HxCDD	0.100	0.51		0.0510	1.3		0.1300	0.363		0.0363
1,2,3,7,8,9-HxCDD	0.100	0.303		0.0303	0.997		0.0997	0.448		0.0448
1,2,3,4,6,7,8-HpCDD	0.010	17.8		0.1780	55.5		0.5550	22.4		0.2240
OCDD	0.0001	878		0.0878	1250		0.1250	925		0.0925
2,3,7,8-TCDF	0.100	4.16		0.4160	0.13		0.0130	<	U	
1,2,3,7,8-PeCDF	0.050	3.5		0.1750	0.106		0.0053	0.0612		0.0031
2,3,4,7,8-PeCDF	0.500	3.35		1.6750	0.583		0.2915	0.0823		0.0412
1,2,3,4,7,8-HxCDF	0.100	2.29		0.2290	0.289		0.0289	0.0844		0.0084
1,2,3,6,7,8-HxCDF	0.100	0.98		0.0980	0.412		0.0412	0.101		0.0101
2,3,4,6,7,8-HxCDF	0.100	0.765		0.0765	0.638		0.0638	<	U	
1,2,3,7,8,9-HxCDF	0.100	1.14		0.1140	<	U		<	U	
1,2,3,4,6,7,8-HpCDF	0.010	6.66		0.0666	7.31		0.0731	1.06		0.0106
1,2,3,4,7,8,9-HpCDF	0.010	1.42		0.0142	0.597		0.0060	<	U	
OCDF	0.0001	33.4		0.0033	25.7		0.0026	3.39		0.0003
Total TCDDs		<	U		0.351			<	U	
Total PeCDDs		0.126			3.55			0.103		
Total HxCDDs		3.54			14.9			3.32		
Total HpCDDs		44.1			166			51.9		
Total TCDFs		15.2			1.07			<	U	
Total PeCDFs		15.6			6.42			0.435		
Total HxCDFs		9.53			9.98			1.01		
Total HpCDFs		14.7			21.4			3.6		
TOTAL TEQ				3.3621			2.156			0.5838

ng/kg = nanograms per kilogram
 TEF = Toxic Equivalency Factor
 Qual = Qualifier
 TEQ = Toxicity Equivalent
 U = Nondetect

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**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SOIL)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
Volatile Organic Compounds								
71-55-6	1,1,1-Trichloroethane	6	U	UG/KG			1.80E-06	6.00E-02
79-34-5	1,1,2,2-Tetrachloroethane	6	U	UG/KG		6.6797E-09	1.54E-06	3.00E+01
79-00-5	1,1,2-Trichloroethane	6	U	UG/KG		3.15533E-09	3.94E-05	6.67E+00
75-34-3	1,1-Dichloroethane	6	U	UG/KG			2.91E-06	6.00E-03
75-35-4	1,1-Dichloroethene	6	U	UG/KG		5.05459E-08	8.91E-05	2.00E+00
107-06-2	1,2-Dichloroethane (EDC)	6	U	UG/KG		7.84507E-09	1.70E-04	6.00E+00
78-87-5	1,2-Dichloropropane	660		UG/KG		8.59642E-07	3.10E-02	6.60E+02
78-93-3	2-Butanone (MEK)	6	U	UG/KG			2.16E-07	
591-78-6	2-Hexanone	6	U	UG/KG				
108-10-1	4-Methyl-2-pentanone (MIBK)	6	U	UG/KG			2.08E-06	
67-64-1	Acetone	24		UG/KG			3.86E-06	3.00E-02
71-43-2	Benzene	8		UG/KG		5.4622E-09	3.30E-04	4.00E+00
75-27-4	Bromodichloromethane	6	U	UG/KG		2.54529E-09	5.75E-06	2.00E-01
75-25-2	Bromoform	6	U	UG/KG		1.92157E-11	3.41E-07	1.50E-01
74-83-9	Bromomethane	6	U	UG/KG			4.57E-04	6.00E-01
75-15-0	Carbon disulfide	6	U	UG/KG			4.96E-06	3.00E-03
56-23-5	Carbon tetrachloride	6	U	UG/KG		1.13366E-08	8.58E-04	2.00E+00
108-90-7	Chlorobenzene	48		UG/KG			8.84E-05	6.86E-01
75-00-3	Chloroethane	6	U	UG/KG		9.22102E-10	3.18E-07	
67-66-3	Chloroform	6	U	UG/KG		1.15161E-08	4.66E-03	2.00E-01
74-87-3	Chloromethane	6	U	UG/KG		2.25409E-09		
156-59-2	cis-1,2-Dichloroethene	6	U	UG/KG			4.07E-05	3.00E-01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SOIL)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
10061-01-5	cis-1,3-Dichloropropene	6	U	UG/KG		3.37382E-08	1.36E-04	
124-48-1	Dibromochloromethane	6	U	UG/KG		2.26093E-09	3.77E-06	3.00E-01
100-41-4	Ethylbenzene	41		UG/KG			6.86E-06	5.86E-02
75-09-2	Methylene chloride	6	U	UG/KG		2.9231E-10	6.14E-07	6.00E+00
110-54-3	N-Hexane	6	U	UG/KG			1.49E-05	
100-42-5	Styrene	28		UG/KG			1.37E-06	1.40E-01
127-18-4	Tetrachloroethylene (PCE)	48		UG/KG		2.57139E-09	2.82E-05	1.60E+01
108-88-3	Toluene	11		UG/KG			5.53E-06	1.83E-02
1330-20-7	total Xylenes	4500		UG/KG			1.01E-03	4.50E-01
156-60-5	trans-1,2-Dichloroethene	6	U	UG/KG			2.80E-05	2.00E-01
10061-02-6	trans-1,3-Dichloropropene	6	U	UG/KG		3.37382E-08	1.36E-04	
79-01-6	Trichloroethylene (TCE)	6	U	UG/KG		9.80997E-10	7.59E-05	2.00E+00
75-01-4	Vinyl chloride	6	U	UG/KG		1.2329E-07		8.57E+00
Semivolatile Organic Compounds								
120-82-1	1,2,4-Trichlorobenzene	1500	U	UG/KG			1.97E-04	5.00E+00
95-50-1	1,2-Dichlorobenzene	1500	U	UG/KG			4.52E-04	1.67E+00
541-73-1	1,3-Dichlorobenzene	1500	U	UG/KG			2.90E-02	
106-46-7	1,4-Dichlorobenzene	1500	U	UG/KG		1.84532E-07	7.81E-04	1.50E+01
95-95-4	2,4,5-Trichlorophenol	7700	U	UG/KG			8.74E-05	7.70E-01
88-06-2	2,4,6-Trichlorophenol	1500	U	UG/KG		6.68943E-09		1.88E+02
120-83-2	2,4-Dichlorophenol	1500	U	UG/KG			5.68E-04	3.00E+01
105-67-9	2,4-Dimethylphenol	1500	U	UG/KG			8.51E-05	3.75E+00
51-28-5	2,4-Dinitrophenol	7700	U	UG/KG			4.37E-03	7.70E+02

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SOIL)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
121-14-2	2,4-Dinitrotoluene	1500	U	UG/KG			8.51E-04	3.75E+04
606-20-2	2,6-Dinitrotoluene	1500	U	UG/KG			1.70E-03	5.00E+04
91-58-7	2-Chloronaphthalene	1500	U	UG/KG			5.50E-05	
95-57-8	2-Chlorophenol	1500	U	UG/KG			6.22E-03	7.50E+00
91-57-6	2-Methylnaphthalene	1500	U	UG/KG			2.77E-05	7.50E-03
95-48-7	2-Methylphenol	1500	U	UG/KG			3.41E-05	1.88E+00
88-74-4	2-Nitroaniline	7700	U	UG/KG			1.53E-01	
88-75-5	2-Nitrophenol	1500	U	UG/KG			2.13E-04	
91-94-1	3,3'-Dichlorobenzidine	3000	U	UG/KG		5.47318E-07		1.00E+04
99-09-2	3-Nitroaniline	7700	U	UG/KG			1.53E-01	
534-52-1	4,6-Dinitro-2-methylphenol	7700	U	UG/KG				
101-55-3	4-Bromophenyl phenyl ether	1500	U	UG/KG				
59-50-7	4-Chloro-3-methylphenol	1500	U	UG/KG			3.41E-05	
106-47-8	4-Chloroaniline	1500	U	UG/KG			4.26E-04	5.00E+01
7005-72-3	4-Chlorophenyl phenyl ether	1500	U	UG/KG				
106-44-5	4-Methylphenol	1500	U	UG/KG			3.41E-04	
100-01-6	4-Nitroaniline	7700	U	UG/KG			1.53E-01	
100-02-7	4-Nitrophenol	7700	U	UG/KG			1.09E-03	
83-32-9	Acenaphthene	320		UG/KG			8.34E-06	1.07E-02
208-96-8	Acenaphthylene	420		UG/KG			7.75E-06	2.10E-03
120-12-7	Anthracene	87		UG/KG			2.23E-07	1.45E-04
56-55-3	Benzo(a)anthracene	100		UG/KG		3.46445E-08		1.25E+00
50-32-8	Benzo(a)pyrene	17		UG/KG		5.88957E-08		4.25E-02

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
I = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SOIL)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
205-99-2	Benzo(b)fluoranthene	21		UG/KG		7.27535E-09		1.05E-01
191-24-2	Benzo(g,h,i)perylene	130		UG/KG			2.40E-06	6.50E-04
207-08-9	Benzo(k)fluoranthene	11	J	UG/KG		3.8109E-10		5.50E-03
111-91-1	bis(2-Chloroethoxy)methane	1500	U	UG/KG				
117-81-7	bis(2-Ethylhexyl) phthalate (DEHP)	2500		UG/KG		1.41897E-08	1.42E-04	
85-68-7	Butyl benzyl phthalate	1500	U	UG/KG			8.51E-06	1.88E-03
86-74-8	Carbazole	1500	U	UG/KG		1.21626E-08		5.00E+01
218-01-9	Chrysene	81		UG/KG		2.8062E-10		1.01E-02
84-74-2	Di-n-butyl phthalate	1500	U	UG/KG			1.70E-05	5.00E-03
117-84-0	Di-n-octyl phthalate	1500	U	UG/KG			8.51E-05	1.50E-04
53-70-3	Dibenz(a,h)anthracene	1500	U	UG/KG		5.19668E-06		1.88E+01
132-64-9	Dibenzofuran	1500	U	UG/KG			2.96E-04	
84-66-2	Diethyl phthalate	1500	U	UG/KG			2.13E-06	
131-11-3	Dimethyl phthalate	1500	U	UG/KG			1.70E-07	
206-44-0	Fluoranthene	620		UG/KG			2.06E-05	3.10E-03
86-73-7	Fluorene	210		UG/KG			6.34E-06	7.00E-03
87-68-3	Hexachlorobutadiene	1500	U	UG/KG		4.74342E-08	8.51E-03	1.50E+01
77-47-4	Hexachlorocyclopentadiene	1500	U	UG/KG			2.54E-04	7.50E-02
67-72-1	Hexachloroethane	1500	U	UG/KG		8.51384E-09	1.70E-03	7.50E+01
193-39-5	Indeno(1,2,3-c,d)pyrene	14	J	UG/KG		4.85023E-09		2.00E-02
78-59-1	Isophorone	1500	U	UG/KG		5.77725E-10	8.51E-06	5.00E+01
621-64-7	N-Nitroso-di-n-propylamine	1500	U	UG/KG		4.25692E-06		7.50E+05
86-30-6	N-Nitrosodiphenylamine	1500	U	UG/KG		2.97984E-09		2.50E+01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
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**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
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91-20-3	Naphthalene	330		UG/KG			1.75E-03	8.25E-02
98-95-3	Nitrobenzene	1500	U	UG/KG			1.31E-02	
87-86-5	Pentachlorophenol	7700	U	UG/KG		6.94276E-07	5.40E-04	7.70E+03
85-01-8	Phenanthrene	360		UG/KG			6.64E-06	1.80E-03
108-95-2	Phenol	1500	U	UG/KG			2.84E-06	3.00E-01
129-00-0	Pyrene	330		UG/KG			6.09E-06	1.65E-03
Inorganics								
7429-90-5	Aluminum	17900		MG/KG	6.22E-01		1.07E-02	
7440-36-0	Antimony	0.63		MG/KG	7.59E-01		7.71E-04	2.10E+00
7440-38-2	Arsenic	9.6		MG/KG	7.11E-01	3.52011E-06	2.19E-02	9.60E+00
7440-39-3	Barium	153		MG/KG	7.85E-01		1.23E-03	1.91E+00
7440-41-7	Beryllium	1.2		MG/KG	1.58E+00	5.35335E-10	3.25E-04	4.00E-01
7440-42-8	Boron	6.2		MG/KG	1.17E+00		7.84E-05	
7440-43-9	Cadmium	0.39		MG/KG	2.05E+00	1.30489E-10	4.81E-04	9.75E-01
7440-70-2	Calcium	217000		MG/KG	8.69E+01			
7440-47-3	Chromium	25.6		MG/KG	1.02E+00	5.71025E-08		1.28E+01
7440-48-4	Cobalt	15.1		MG/KG	6.96E-01		1.23E-04	
7440-50-8	Copper	23.5		MG/KG	2.08E+00		3.10E-04	
7439-89-6	Iron	34000		MG/KG	1.76E+00		5.55E-02	
7439-92-1	Lead	64.8		MG/KG	2.77E+00			
7439-95-4	Magnesium	19700		MG/KG	1.27E+01			
7439-96-5	Manganese	1370		MG/KG	3.76E-01		4.25E-02	
7439-97-6	Mercury	0.053		MG/KG	8.83E-01			

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**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SOIL)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
7440-02-0	Nickel	22.9		MG/KG	1.21E+00		5.60E-04	3.27E+00
2023695	Potassium	930		MG/KG	1.49E+00			
7782-49-2	Selenium	0.78		MG/KG	3.33E-01		7.63E-05	2.60E+00
7440-22-4	Silver	2.1	U	MG/KG	3.62E+00		2.05E-04	1.05E+00
7440-23-5	Sodium	1360		MG/KG	8.00E+00			
7440-28-0	Thallium	4.2	U	MG/KG	1.02E+01		2.94E-05	
7440-62-2	Vanadium	38.1		MG/KG	8.07E-01		2.66E-03	1.27E-01
7440-66-6	Zinc	95.4		MG/KG	1.86E+00		1.56E-04	1.59E-01
Pesticides (Organochlorine)								
72-54-8	4,4'-DDD	12000		UG/KG		7.02641E-07		1.50E+01
72-55-9	4,4'-DDE	4800		UG/KG		3.98163E-07		1.60E+00
50-29-3	4,4'-DDT	100000		UG/KG		8.29507E-06	1.37E-01	5.00E+01
309-00-2	Aldrin	1300000		UG/KG		0.008959809	4.92E+01	2.17E+00
319-84-6	alpha-BHC	30000	U	UG/KG		5.04699E-05		1.00E+06
5103-71-9	alpha-Chlordane	490		UG/KG		4.57968E-08	7.33E-04	9.80E-01
959-98-8	alpha-Endosulfan	12	EJ	UG/KG			2.27E-06	
319-85-7	beta-BHC	8.4	EJ	UG/KG		4.03759E-09		8.40E+01
33213-65-9	beta-Endosulfan	18	EJ	UG/KG			3.41E-06	
57-74-9	Chlordane	120000	U	UG/KG		1.12155E-05	1.80E-01	2.40E+02
319-86-8	delta-BHC	30000	U	UG/KG		1.442E-05		
60-57-1	Dieldrin	290000	J	UG/KG		0.001881154	6.58E+00	1.45E+06
1031-07-8	Endosulfan sulfate	7.7		UG/KG			1.46E-06	
72-20-8	Endrin	12000		UG/KG			4.54E-02	2.40E+02

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J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SOIL)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
7421-93-4	Endrin aldehyde	9000		UG/KG			3.41E-02	1.80E+02
53494-70-5	Endrin Ketone	20000		UG/KG			7.57E-02	4.00E+02
58-89-9	gamma-BHC (Lindane)	5.6	J	UG/KG		1.94403E-09	1.40E-05	1.12E+01
5566-34-7	gamma-Chlordane	1600		UG/KG		1.49541E-07	2.39E-03	3.20E+00
76-44-8	Heptachlor	69	EJ	UG/KG		1.25883E-07	1.57E-04	6.90E-02
1024-57-3	Heptachlor epoxide	11	EJ	UG/KG		4.05826E-08	9.61E-04	3.67E-01
118-74-1	Hexachlorobenzene	2700		UG/KG		1.75142E-06	3.83E-03	2.70E+01
465-73-6	Isodrin	60000	J	UG/KG				
72-43-5	Methoxychlor	26	J	UG/KG			5.90E-06	3.25E-03
8001-35-2	Toxaphene	600000	U	UG/KG		0.000267578		3.00E+02
Polychlorinated Biphenyls (PCB)								
12674-11-2	PCB-1016	28	U	UG/KG		9.75447E-10	5.57E-04	
11104-28-2	PCB-1221	28	U	UG/KG		2.78699E-08		
11141-16-5	PCB-1232	28	U	UG/KG		2.78699E-08		
53469-21-9	PCB-1242	28	U	UG/KG		2.78699E-08		
12672-29-6	PCB-1248	28	U	UG/KG		2.78699E-08		
11097-69-1	PCB-1254	28	U	UG/KG		2.78699E-08	1.95E-03	
11096-82-5	PCB-1260	28	U	UG/KG		2.78699E-08		
Other Parameters								
Dioxins	2,3,7,8-TCDD	0.000289		UG/KG				

Table Created By: MAM

Table Checked By: CMW

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
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Volatile Organic Compounds							
71-55-6	1,1,1-Trichloroethane	6	U	UG/KG			3.00E-03
79-34-5	1,1,2,2-Tetrachloroethane	6	U	UG/KG			
79-00-5	1,1,2-Trichloroethane	6	U	UG/KG	7.32E-07	7.32E-07	3.00E-01
75-34-3	1,1-Dichloroethane	6	U	UG/KG	3.00E-08	3.00E-08	2.61E-04
75-35-4	1,1-Dichloroethene	6	U	UG/KG	3.33E-07	3.33E-06	1.00E-01
107-06-2	1,2-Dichloroethane (EDC)	6	U	UG/KG	9.52E-05	4.29E-06	3.00E-01
78-87-5	1,2-Dichloropropane	660		UG/KG	7.86E-03	3.67E-04	2.20E+01
78-93-3	2-Butanone (MEK)	6	U	UG/KG			
591-78-6	2-Hexanone	6	U	UG/KG			
108-10-1	4-Methyl-2-pentanone (MIBK)	6	U	UG/KG			
67-64-1	Acetone	24		UG/KG	1.20E-07	1.20E-07	1.50E-03
71-43-2	Benzene	8		UG/KG	4.00E-05	1.86E-06	2.67E-01
75-27-4	Bromodichloromethane	6	U	UG/KG	6.52E-05	3.00E-06	1.00E-02
75-25-2	Bromoform	6	U	UG/KG	8.33E-06	3.75E-07	7.50E-03
74-83-9	Bromomethane	6	U	UG/KG	2.07E-06	6.00E-06	3.00E-02
75-15-0	Carbon disulfide	6	U	UG/KG	3.00E-08	3.00E-07	1.88E-04
56-23-5	Carbon tetrachloride	6	U	UG/KG	1.36E-04	1.46E-05	8.57E-02
108-90-7	Chlorobenzene	48		UG/KG	1.17E-06	1.17E-05	4.80E-02
75-00-3	Chloroethane	6	U	UG/KG			
67-66-3	Chloroform	6	U	UG/KG	6.38E-06	3.00E-06	1.00E-02
74-87-3	Chloromethane	6	U	UG/KG			
156-59-2	cis-1,2-Dichloroethene	6	U	UG/KG	3.00E-07	3.00E-07	1.50E-02

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10061-01-5	cis-1,3-Dichloropropene	6	U	UG/KG			
124-48-1	Dibromochloromethane	6	U	UG/KG	1.46E-07	1.46E-07	1.50E-02
100-41-4	Ethylbenzene	41		UG/KG	2.05E-07	2.05E-06	3.15E-03
75-09-2	Methylene chloride	6	U	UG/KG	7.89E-06	5.00E-07	3.00E-01
110-54-3	N-Hexane	6	U	UG/KG			
100-42-5	Styrene	28		UG/KG	6.83E-08	6.83E-07	7.00E-03
127-18-4	Tetrachloroethylene (PCE)	48		UG/KG	4.36E-04	2.00E-05	8.00E-01
108-88-3	Toluene	11		UG/KG	2.68E-08	2.68E-08	9.17E-04
1330-20-7	total Xylenes	4500		UG/KG	4.50E-06	1.10E-05	3.00E-02
156-60-5	trans-1,2-Dichloroethene	6	U	UG/KG	1.46E-07	1.46E-07	8.57E-03
10061-02-6	trans-1,3-Dichloropropene	6	U	UG/KG			
79-01-6	Trichloroethylene (TCE)	6	U	UG/KG	1.15E-05	5.00E-06	1.00E-01
75-01-4	Vinyl chloride	6	U	UG/KG	2.00E-03	9.23E-05	6.00E-01
Semivolatile Organic Compounds							
120-82-1	1,2,4-Trichlorobenzene	1500	U	UG/KG	7.50E-05	7.50E-04	3.00E-01
95-50-1	1,2-Dichlorobenzene	1500	U	UG/KG	8.33E-06	8.33E-05	8.82E-02
541-73-1	1,3-Dichlorobenzene	1500	U	UG/KG			
106-46-7	1,4-Dichlorobenzene	1500	U	UG/KG			7.50E-01
95-95-4	2,4,5-Trichlorophenol	7700	U	UG/KG	3.85E-05	3.85E-05	2.85E-02
88-06-2	2,4,6-Trichlorophenol	1500	U	UG/KG	2.88E-03	1.36E-04	7.50E+00
120-83-2	2,4-Dichlorophenol	1500	U	UG/KG	2.46E-04	2.46E-03	1.50E+00
105-67-9	2,4-Dimethylphenol	1500	U	UG/KG	3.66E-05	3.66E-05	1.67E-01
51-28-5	2,4-Dinitrophenol	7700	U	UG/KG	1.88E-03	1.88E-02	3.85E+01

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J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

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121-14-2	2,4-Dinitrotoluene	1500	U	UG/KG	0.178571429	8.33E-03	1.88E+03
606-20-2	2,6-Dinitrotoluene	1500	U	UG/KG	0.178571429	8.33E-03	2.14E+03
91-58-7	2-Chloronaphthalene	1500	U	UG/KG			
95-57-8	2-Chlorophenol	1500	U	UG/KG	1.50E-04	1.50E-04	3.75E-01
91-57-6	2-Methylnaphthalene	1500	U	UG/KG	2.46E-05	2.46E-05	3.57E-04
95-48-7	2-Methylphenol	1500	U	UG/KG	1.50E-05	1.50E-05	1.00E-01
88-74-4	2-Nitroaniline	7700	U	UG/KG			
88-75-5	2-Nitrophenol	1500	U	UG/KG			
91-94-1	3,3'-Dichlorobenzidine	3000	U	UG/KG	2.31E-01	1.07E-02	4.29E+02
99-09-2	3-Nitroaniline	7700	U	UG/KG			
534-52-1	4,6-Dinitro-2-methylphenol	7700	U	UG/KG			
101-55-3	4-Bromophenyl phenyl ether	1500	U	UG/KG			
59-50-7	4-Chloro-3-methylphenol	1500	U	UG/KG			
106-47-8	4-Chloroaniline	1500	U	UG/KG	1.83E-04	1.83E-03	2.14E+00
7005-72-3	4-Chlorophenyl phenyl ether	1500	U	UG/KG			
106-44-5	4-Methylphenol	1500	U	UG/KG			
100-01-6	4-Nitroaniline	7700	U	UG/KG			
100-02-7	4-Nitrophenol	7700	U	UG/KG			
83-32-9	Acenaphthene	320		UG/KG	2.67E-06	2.67E-06	5.61E-04
208-96-8	Acenaphthylene	420		UG/KG	6.89E-06	6.89E-06	1.00E-04
120-12-7	Anthracene	87		UG/KG	1.43E-07	1.43E-07	7.25E-06
56-55-3	Benzo(a)anthracene	100		UG/KG	1.25E-02	5.88E-04	5.00E-02
50-32-8	Benzo(a)pyrene	17		UG/KG	2.13E-02	1.00E-03	2.13E-03

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
205-99-2	Benzo(b)fluoranthene	21		UG/KG	2.63E-03	1.24E-04	4.20E-03
191-24-2	Benzo(g,h,i)perylene	130		UG/KG	2.13E-06	2.13E-06	3.10E-05
207-08-9	Benzo(k)fluoranthene	11	J	UG/KG	1.41E-04	6.47E-06	2.24E-04
111-91-1	bis(2-Chloroethoxy)methane	1500	U	UG/KG			
117-81-7	bis(2-Ethylhexyl) phthalate (DEHP)	2500		UG/KG	6.10E-03	6.10E-04	6.94E-04
85-68-7	Butyl benzyl phthalate	1500	U	UG/KG	3.66E-06	3.66E-06	1.61E-03
86-74-8	Carbazole	1500	U	UG/KG	5.17E-03	2.42E-04	2.50E+00
218-01-9	Chrysene	81		UG/KG	1.04E-04	4.76E-06	5.06E-04
84-74-2	Di-n-butyl phthalate	1500	U	UG/KG	7.50E-06	7.50E-06	6.52E-04
117-84-0	Di-n-octyl phthalate	1500	U	UG/KG	3.66E-05	3.66E-04	1.50E-04
53-70-3	Dibenz(a,h)anthracene	1500	U	UG/KG	1.88E+00	8.82E-02	7.50E-01
132-64-9	Dibenzofuran	1500	U	UG/KG			
84-66-2	Diethyl phthalate	1500	U	UG/KG	1.50E-06	1.50E-06	3.19E-03
131-11-3	Dimethyl phthalate	1500	U	UG/KG			
206-44-0	Fluoranthene	620		UG/KG	7.56E-06	7.56E-06	1.44E-04
86-73-7	Fluorene	210		UG/KG	2.56E-06	2.56E-06	3.75E-04
87-68-3	Hexachlorobutadiene	1500	U	UG/KG			
77-47-4	Hexachlorocyclopentadiene	1500	U	UG/KG	1.07E-04	1.07E-04	3.75E-03
67-72-1	Hexachloroethane	1500	U	UG/KG	7.50E-04	7.50E-04	3.00E+00
193-39-5	Indeno(1,2,3-c,d)pyrene	14	J	UG/KG	1.75E-03	8.24E-05	1.00E-03
78-59-1	Isophorone	1500	U	UG/KG	3.66E-06	3.66E-06	1.88E-01
621-64-7	N-Nitroso-di-n-propylamine	1500	U	UG/KG	1.88E+00	8.33E-02	3.00E+04
86-30-6	N-Nitrosodiphenylamine	1500	U	UG/KG	1.25E-03	6.00E-05	1.50E+00

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
91-20-3	Naphthalene	330		UG/KG	4.02E-06	4.02E-05	3.93E-03
98-95-3	Nitrobenzene	1500	U	UG/KG	0.0015	1.50E-03	1.50E+01
87-86-5	Pentachlorophenol	7700	U	UG/KG	3.21E-01	1.48E-02	2.57E+02
85-01-8	Phenanthrene	360		UG/KG	5.90E-06	5.90E-06	8.57E-05
108-95-2	Phenol	1500	U	UG/KG	1.50E-06	1.25E-05	1.50E-02
129-00-0	Pyrene	330		UG/KG	5.41E-06	5.41E-06	7.86E-05
Inorganics							
7429-90-5	Aluminum	17900		MG/KG			
7440-36-0	Antimony	0.63		MG/KG	7.68E-04	7.68E-03	1.26E-01
7440-38-2	Arsenic	9.6		MG/KG	3.20E+00	1.57E-01	3.43E-01
7440-39-3	Barium	153		MG/KG	1.09E-03	1.09E-02	1.28E-01
7440-41-7	Beryllium	1.2		MG/KG	1.20E+00	4.14E-02	1.82E-01
7440-42-8	Boron	6.2		MG/KG	3.44E-05	3.44E-04	
7440-43-9	Cadmium	0.39		MG/KG	1.95E-04	1.95E-03	1.05E-01
7440-70-2	Calcium	217000		MG/KG			
7440-47-3	Chromium	25.6		MG/KG	2.56E-03	6.24E-03	9.14E-01
7440-48-4	Cobalt	15.1		MG/KG	1.26E-04	1.26E-03	
7440-50-8	Copper	23.5		MG/KG	2.87E-04	2.87E-03	2.14E-03
7439-89-6	Iron	34000		MG/KG			
7439-92-1	Lead	64.8		MG/KG	1.62E-01	1.62E-01	
7439-95-4	Magnesium	19700		MG/KG			
7439-96-5	Manganese	1370		MG/KG	1.43E-02	1.43E-01	
7439-97-6	Mercury	0.053		MG/KG	8.69E-05	8.69E-04	3.53E-01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
7440-02-0	Nickel	22.9		MG/KG	5.59E-04	5.59E-03	3.01E-01
2023695	Potassium	930		MG/KG			
7782-49-2	Selenium	0.78		MG/KG	7.80E-05	7.80E-04	3.25E-01
7440-22-4	Silver	2.1	U	MG/KG	2.10E-04	2.10E-03	1.40E+00
7440-23-5	Sodium	1360		MG/KG			
7440-28-0	Thallium	4.2	U	MG/KG	2.63E-02	2.63E-02	1.75E+00
7440-62-2	Vanadium	38.1		MG/KG	2.72E-03	2.72E-02	3.89E-02
7440-66-6	Zinc	95.4		MG/KG	1.56E-04	1.56E-03	2.65E-02
Pesticides (Organochlorine)							
72-54-8	4,4'-DDD	12000		UG/KG	5.00E-01	2.31E-02	7.50E-01
72-55-9	4,4'-DDE	4800		UG/KG	2.82E-01	1.30E-02	8.89E-02
50-29-3	4,4'-DDT	100000		UG/KG	5.88E+00	1.00E+00	3.13E+00
309-00-2	Aldrin	1300000		UG/KG	4.33E+03	2.13E+02	2.60E+03
319-84-6	alpha-BHC	30000	U	UG/KG	3.33E+01	1.50E+00	6.00E+04
5103-71-9	alpha-Chlordane	490		UG/KG	1.23E-01	4.08E-02	4.90E-02
959-98-8	alpha-Endosulfan	12	EJ	UG/KG			
319-85-7	beta-BHC	8.4	EJ	UG/KG			
33213-65-9	beta-Endosulfan	18	EJ	UG/KG			
57-74-9	Chlordane	120000	U	UG/KG	30	1.00E+01	1.00E+01
319-86-8	delta-BHC	30000	U	UG/KG			
60-57-1	Dieldrin	290000	J	UG/KG	7.25E+02	3.72E+01	7.25E+04
1031-07-8	Endosulfan sulfate	7.7		UG/KG			4.28E-04
72-20-8	Endrin	12000		UG/KG	1.97E-02	0.196721311	1.20E+01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-1
HUMAN HEALTH SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
7421-93-4	Endrin aldehyde	9000		UG/KG	1.48E-02	0.147540984	9.00E+00
53494-70-5	Endrin Ketone	20000		UG/KG	3.28E-02	0.327868852	2.00E+01
58-89-9	gamma-BHC (Lindane)	5.6	J	UG/KG	1.40E-03	5.83333E-05	6.22E-01
5566-34-7	gamma-Chlordane	1600		UG/KG	4.00E-01	0.133333333	1.60E-01
76-44-8	Heptachlor	69	EJ	UG/KG	6.90E-02	0.002464286	3.00E-03
1024-57-3	Heptachlor epoxide	11	EJ	UG/KG	1.83E-02	0.004074074	1.57E-02
118-74-1	Hexachlorobenzene	2700		UG/KG	6.75E-01	3.46E-02	1.35E+00
465-73-6	Isodrin	60000	J	UG/KG			
72-43-5	Methoxychlor	26	J	UG/KG	2.60E-06	0.000026	1.63E-04
8001-35-2	Toxaphene	600000	U	UG/KG	1.15E+02	5.454545455	1.94E+01
Polychlorinated Biphenyls (PCB)							
12674-11-2	PCB-1016	28	U	UG/KG			
11104-28-2	PCB-1221	28	U	UG/KG			
11141-16-5	PCB-1232	28	U	UG/KG			
53469-21-9	PCB-1242	28	U	UG/KG			
12672-29-6	PCB-1248	28	U	UG/KG			
11097-69-1	PCB-1254	28	U	UG/KG			
11096-82-5	PCB-1260	28	U	UG/KG			
Other Parameters							
Dioxins	2,3,7,8-TCDD	0.000289		UG/KG			

Table Created By: MAM
Table Checked By: CMW

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-2
ECOLOGICAL SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SOIL)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SOIL)	Retained as Potential Bioaccumulator
Volatile Organic Compounds							
71-55-6	1,1,1-Trichloroethane		6	U	UG/KG	2.01E-04	
79-34-5	1,1,2,2-Tetrachloroethane		6	U	UG/KG	4.72E-02	
79-00-5	1,1,2-Trichloroethane		6	U	UG/KG	2.10E-04	
75-34-3	1,1-Dichloroethane		6	U	UG/KG	2.99E-04	
75-35-4	1,1-Dichloroethene		6	U	UG/KG	7.25E-04	
107-06-2	1,2-Dichloroethane (EDC)		6	U	UG/KG	2.83E-04	
78-87-5	1,2-Dichloropropane		660		UG/KG	9.43E-04	
78-93-3	2-Butanone (MEK)		6	U	UG/KG	6.70E-05	
591-78-6	2-Hexanone		6	U	UG/KG	4.76E-04	
108-10-1	4-Methyl-2-pentanone (MIBK)		6	U	UG/KG	1.35E-05	
67-64-1	Acetone		24		UG/KG	9.60E-03	
71-43-2	Benzene		8		UG/KG	5.00E-04	
75-27-4	Bromodichloromethane		6	U	UG/KG	1.11E-02	
75-25-2	Bromoform		6	U	UG/KG	3.77E-04	
74-83-9	Bromomethane		6	U	UG/KG	2.55E-02	
75-15-0	Carbon disulfide		6	U	UG/KG	6.37E-02	
56-23-5	Carbon tetrachloride		6	U	UG/KG	6.00E-06	
108-90-7	Chlorobenzene		48		UG/KG	1.20E-03	
75-00-3	Chloroethane		6	U	UG/KG		
67-66-3	Chloroform		6	U	UG/KG	5.04E-03	
74-87-3	Chloromethane		6	U	UG/KG	5.77E-04	
156-59-2	cis-1,2-Dichloroethene		6	U	UG/KG	7.62E-03	
10061-01-5	cis-1,3-Dichloropropene		6	U	UG/KG	1.51E-02	
124-48-1	Dibromochloromethane		6	U	UG/KG	2.93E-03	
100-41-4	Ethylbenzene		41		UG/KG	8.20E-03	
75-09-2	Methylene chloride		6	U	UG/KG	1.48E-03	
110-54-3	N-Hexane		6	U	UG/KG		
100-42-5	Styrene		28		UG/KG	9.33E-05	
127-18-4	Tetrachloroethylene (PCE)		48		UG/KG	3.69E-03	
108-88-3	Toluene		11		UG/KG	3.67E-03	
1330-20-7	total Xylenes		4500		UG/KG	7.50E+00	
156-60-5	trans-1,2-Dichloroethene		6	U	UG/KG	7.62E-03	
10061-02-6	trans-1,3-Dichloropropene		6	U	UG/KG	1.51E-02	
79-01-6	Trichloroethylene (TCE)		6	U	UG/KG	6.67E-04	
75-01-4	Vinyl chloride		6	U	UG/KG	9.29E-03	
Semivolatile Organic Compounds							
120-82-1	1,2,4-Trichlorobenzene		1500	U	UG/KG	7.50E-02	
95-50-1	1,2-Dichlorobenzene		1500	U	UG/KG	5.07E-01	
541-73-1	1,3-Dichlorobenzene		1500	U	UG/KG	3.98E-02	
106-46-7	1,4-Dichlorobenzene		1500	U	UG/KG	7.50E-02	

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-2
ECOLOGICAL SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SOIL)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SOIL)	Retained as Potential Bioaccumulator
95-95-4	2,4,5-Trichlorophenol		7700	U	UG/KG	1.93E+00	
88-06-2	2,4,6-Trichlorophenol		1500	U	UG/KG	1.50E-01	
120-83-2	2,4-Dichlorophenol		1500	U	UG/KG	1.71E-02	
105-67-9	2,4-Dimethylphenol		1500	U	UG/KG	1.50E+02	
51-28-5	2,4-Dinitrophenol		7700	U	UG/KG	3.85E-01	
121-14-2	2,4-Dinitrotoluene		1500	U	UG/KG	1.17E+00	
606-20-2	2,6-Dinitrotoluene		1500	U	UG/KG	4.57E+01	
91-58-7	2-Chloronaphthalene		1500	U	UG/KG	1.23E+02	
95-57-8	2-Chlorophenol		1500	U	UG/KG	6.18E+00	
91-57-6	2-Methylnaphthalene		1500	U	UG/KG	4.63E-01	
95-48-7	2-Methylphenol		1500	U	UG/KG	3.71E-02	
88-74-4	2-Nitroaniline		7700	U	UG/KG	1.04E-01	
88-75-5	2-Nitrophenol		1500	U	UG/KG	9.38E-01	
91-94-1	3,3'-Dichlorobenzidine		3000	U	UG/KG	4.64E+00	
99-09-2	3-Nitroaniline		7700	U	UG/KG	2.44E+00	
534-52-1	4,6-Dinitro-2-methylphenol		7700	U	UG/KG		
101-55-3	4-Bromophenyl phenyl ether		1500	U	UG/KG		
59-50-7	4-Chloro-3-methylphenol		1500	U	UG/KG	1.89E-01	
106-47-8	4-Chloroaniline		1500	U	UG/KG	1.36E+00	
7005-72-3	4-Chlorophenyl phenyl ether		1500	U	UG/KG		
106-44-5	4-Methylphenol		1500	U	UG/KG	9.20E-03	
100-01-6	4-Nitroaniline		7700	U	UG/KG	3.52E-01	
100-02-7	4-Nitrophenol		7700	U	UG/KG	1.10E+00	
83-32-9	Acenaphthene		320		UG/KG	4.69E-04	YES
208-96-8	Acenaphthylene		420		UG/KG	6.15E-04	
120-12-7	Anthracene		87		UG/KG	5.88E-05	YES
56-55-3	Benzo(a)anthracene		100		UG/KG	1.92E-02	YES
50-32-8	Benzo(a)pyrene		17		UG/KG	3.86E-06	YES
205-99-2	Benzo(b)fluoranthene		21		UG/KG	3.51E-04	YES
191-24-2	Benzo(g,h,i)perylene		130		UG/KG	1.09E-03	YES
207-08-9	Benzo(k)fluoranthene		11	J	UG/KG	1.84E-04	YES
111-91-1	bis(2-Chloroethoxy)methane		1500	U	UG/KG	4.95E+00	
111-44-4	bis(2-Chloroethyl) ether		1500	U	UG/KG	6.33E-02	
117-81-7	bis(2-Ethylhexyl) phthalate (DEHP)		2500		UG/KG	2.70E+00	YES
85-68-7	Butyl benzyl phthalate		1500	U	UG/KG	6.28E+00	
86-74-8	Carbazole		1500	U	UG/KG		
218-01-9	Chrysene		81		UG/KG	1.71E-02	YES
84-74-2	Di-n-butyl phthalate		1500	U	UG/KG	7.50E-03	
117-84-0	Di-n-octyl phthalate		1500	U	UG/KG	2.12E-03	
53-70-3	Dibenz(a,h)anthracene		1500	U	UG/KG	8.15E-02	
132-64-9	Dibenzofuran		1500	U	UG/KG		

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-2
ECOLOGICAL SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SOIL)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SOIL)	Retained as Potential Bioaccumulator
84-66-2	Diethyl phthalate		1500	U	UG/KG	1.50E-02	
131-11-3	Dimethyl phthalate		1500	U	UG/KG	7.50E-03	
206-44-0	Fluoranthene		620		UG/KG	5.08E-03	YES
86-73-7	Fluorene		210		UG/KG	7.00E-03	YES
87-68-3	Hexachlorobutadiene		1500	U	UG/KG	3.77E+01	
77-47-4	Hexachlorocyclopentadiene		1500	U	UG/KG	1.50E-01	
67-72-1	Hexachloroethane		1500	U	UG/KG	2.52E+00	
193-39-5	Indeno(1,2,3-c,d)pyrene		14	J	UG/KG	1.28E-04	YES
78-59-1	Isophorone		1500	U	UG/KG	1.08E-02	
621-64-7	N-Nitroso-di-n-propylamine		1500	U	UG/KG	2.76E+00	
86-30-6	N-Nitrosodiphenylamine		1500	U	UG/KG	7.50E-02	
91-20-3	Naphthalene		330		UG/KG	1.33E-03	
98-95-3	Nitrobenzene		1500	U	UG/KG	3.75E-02	
87-86-5	Pentachlorophenol		7700	U	UG/KG	1.28E+00	
85-01-8	Phenanthrene		360		UG/KG	7.88E-03	YES
108-95-2	Phenol		1500	U	UG/KG	3.75E-02	
129-00-0	Pyrene		330		UG/KG	4.20E-03	YES
Inorganics							
7429-90-5	Aluminum	28800	17900		MG/KG		
7440-36-0	Antimony	0.83	0.63		MG/KG	1.26E-01	
7440-38-2	Arsenic	13.5	9.6		MG/KG	1.07E+00	
7440-39-3	Barium	195	153		MG/KG	3.06E-01	
7440-41-7	Beryllium	0.76	1.2		MG/KG	1.20E-01	
7440-42-8	Boron	5.3	6.2		MG/KG	1.24E+01	
7440-43-9	Cadmium	0.19	0.39		MG/KG	1.34E-02	
7440-70-2	Calcium	2497	217000		MG/KG		
7440-47-3	Chromium	25.2	25.6		MG/KG	5.12E+00	
7440-48-4	Cobalt	21.7	15.1		MG/KG	7.55E-01	
7440-50-8	Copper	11.3	23.5		MG/KG	7.58E-01	
7439-89-6	Iron	19306	34000		MG/KG	1.70E+02	
7439-92-1	Lead	23.4	64.8		MG/KG	1.50E-01	
7439-95-4	Magnesium	1552	19700		MG/KG		
7439-96-5	Manganese	3640	1370		MG/KG	1.37E+01	
7439-97-6	Mercury	0.06	0.053		MG/KG	7.57E-03	YES
7440-02-0	Nickel	18.9	22.9		MG/KG	7.63E-01	
2023695	Potassium	625	930		MG/KG		
7782-49-2	Selenium	2.34	0.78		MG/KG	7.80E-01	YES
7440-22-4	Silver	0.58	2.1	U	MG/KG	1.05E+00	
7440-23-5	Sodium	170	1360		MG/KG		
7440-28-0	Thallium	0.41	4.2	U	MG/KG	4.20E+00	
7440-62-2	Vanadium	47.2	38.4		MG/KG	8.35E-01	

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-2
ECOLOGICAL SCREENING OF SOIL RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SOIL)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SOIL)	Retained as Potential Bioaccumulator
7440-66-6	Zinc	51.4	95.4		MG/KG	7.95E-01	
Pesticides (Organochlorine)							
72-54-8	4,4'-DDD		12000		UG/KG	1.58E+01	YES
72-55-9	4,4'-DDE		4800		UG/KG	8.06E+00	YES
50-29-3	4,4'-DDT		100000		UG/KG	5.71E+03	YES
309-00-2	Aldrin		1300000		UG/KG	3.92E+05	YES
319-84-6	alpha-BHC		30000	U	UG/KG	3.02E+02	
5103-71-9	alpha-Chlordane		490		UG/KG	2.19E+00	YES
959-98-8	alpha-Endosulfan		12	EJ	UG/KG	1.01E-01	
319-85-7	beta-BHC		8.4	EJ	UG/KG	2.11E+00	YES
33213-65-9	beta-Endosulfan		18	EJ	UG/KG	1.51E-01	
57-74-9	Chlordane		120000	U	UG/KG	5.36E+02	
319-86-8	delta-BHC		30000	U	UG/KG	3.02E+00	
60-57-1	Dieldrin		290000	J	UG/KG	1.22E+05	YES
1031-07-8	Endosulfan sulfate		7.7		UG/KG	2.15E-01	YES
72-20-8	Endrin		12000		UG/KG	1.19E+03	YES
7421-93-4	Endrin aldehyde		9000		UG/KG	8.57E+02	YES
53494-70-5	Endrin Ketone		20000		UG/KG		
58-89-9	gamma-BHC (Lindane)		5.6	J	UG/KG	1.12E+00	YES
5566-34-7	gamma-Chlordane		1600		UG/KG	7.14E+00	YES
76-44-8	Heptachlor		69	EJ	UG/KG	1.15E+01	YES
1024-57-3	Heptachlor epoxide		11	EJ	UG/KG	7.24E-02	YES
118-74-1	Hexachlorobenzene		2700		UG/KG	2.70E-03	YES
465-73-6	Isodrin		60000	J	UG/KG	1.81E+04	
72-43-5	Methoxychlor		26	J	UG/KG	1.31E+00	YES
8001-35-2	Toxaphene		600000	U	UG/KG	5.03E+03	
Polychlorinated Biphenyls (PCB)							
12674-11-2	PCB-1016		28	U	UG/KG		
11104-28-2	PCB-1221		28	U	UG/KG		
11141-16-5	PCB-1232		28	U	UG/KG		
53469-21-9	PCB-1242		28	U	UG/KG		
12672-29-6	PCB-1248		28	U	UG/KG		
11097-69-1	PCB-1254		28	U	UG/KG		
11096-82-5	PCB-1260		28	U	UG/KG		
Other Parameters							
Dioxin	2,3,7,8-TCDD		0.000289		UG/KG		YES

Table Created By: MAM

Table Checked By: CMW

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SEDIMENT)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
Volatile Organic Compounds								
71-55-6	1,1,1-Trichloroethane	6	U	UG/KG			1.80E-06	6.00E-02
79-34-5	1,1,2,2-Tetrachloroethane	6	U	UG/KG		6.68E-09	1.54E-06	3.00E+01
79-00-5	1,1,2-Trichloroethane	6	U	UG/KG		3.16E-09	3.94E-05	6.67E+00
75-34-3	1,1-Dichloroethane	6	U	UG/KG			2.91E-06	6.00E-03
75-35-4	1,1-Dichloroethene	6	U	UG/KG		5.05E-08	8.91E-05	2.00E+00
107-06-2	1,2-Dichloroethane (EDC)	6	U	UG/KG		7.85E-09	1.70E-04	6.00E+00
78-87-5	1,2-Dichloropropane	10		UG/KG		1.30E-08	4.69E-04	1.00E+01
78-93-3	2-Butanone (MEK)	6	U	UG/KG			2.16E-07	
591-78-6	2-Hexanone	6	U	UG/KG				
108-10-1	4-Methyl-2-pentanone (MIBK)	6	U	UG/KG			2.08E-06	
67-64-1	Acetone	23	U	UG/KG			3.70E-06	2.88E-02
71-43-2	Benzene	6	U	UG/KG		4.10E-09	2.48E-04	3.00E+00
75-27-4	Bromodichloromethane	6	U	UG/KG		2.55E-09	5.75E-06	2.00E-01
75-25-2	Bromoform	6	U	UG/KG		1.92E-11	3.41E-07	1.50E-01
74-83-9	Bromomethane	6	U	UG/KG			4.57E-04	6.00E-01
75-15-0	Carbon disulfide	6	U	UG/KG			4.96E-06	3.00E-03
56-23-5	Carbon tetrachloride	6	U	UG/KG		1.13E-08	8.58E-04	2.00E+00
108-90-7	Chlorobenzene	6	U	UG/KG			1.11E-05	8.57E-02
75-00-3	Chloroethane	6	U	UG/KG		9.22E-10	3.18E-07	
67-66-3	Chloroform	6	U	UG/KG		1.15E-08	4.66E-03	2.00E-01
74-87-3	Chloromethane	6	U	UG/KG		2.25E-09		
156-59-2	cis-1,2-Dichloroethene	6	U	UG/KG			4.07E-05	3.00E-01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SEDIMENT)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
10061-01-5	cis-1,3-Dichloropropene	6	U	UG/KG		3.37E-08	1.36E-04	
124-48-1	Dibromochloromethane	6	U	UG/KG		2.26E-09	3.77E-06	3.00E-01
100-41-4	Ethylbenzene	6	U	UG/KG			1.00E-06	8.57E-03
75-09-2	Methylene chloride	6	U	UG/KG		2.92E-10	6.14E-07	6.00E+00
110-54-3	N-Hexane	6	U	UG/KG			1.49E-05	
100-42-5	Styrene	6	U	UG/KG			2.94E-07	3.00E-02
127-18-4	Tetrachloroethylene (PCE)	6	U	UG/KG		3.21E-10	3.52E-06	2.00E+00
108-88-3	Toluene	6	U	UG/KG			3.02E-06	1.00E-02
1330-20-7	total Xylenes	6	U	UG/KG			1.35E-06	6.00E-04
156-60-5	trans-1,2-Dichloroethene	6	U	UG/KG			2.80E-05	2.00E-01
10061-02-6	trans-1,3-Dichloropropene	6	U	UG/KG		3.37E-08	1.36E-04	
79-01-6	Trichloroethylene (TCE)	21		UG/KG		3.43E-09	2.66E-04	7.00E+00
75-01-4	Vinyl chloride	6	U	UG/KG		1.23E-07		8.57E+00
Semivolatile Organic Compounds								
120-82-1	1,2,4-Trichlorobenzene	1300	U	UG/KG			1.71E-04	4.33E+00
95-50-1	1,2-Dichlorobenzene	1300	U	UG/KG			3.92E-04	1.44E+00
541-73-1	1,3-Dichlorobenzene	1300	U	UG/KG			2.51E-02	
106-46-7	1,4-Dichlorobenzene	1300	U	UG/KG		1.60E-07	6.77E-04	1.30E+01
	2,2-Oxybis(1-chloro)propane	1300	U	UG/KG				
95-95-4	2,4,5-Trichlorophenol	6500	U	UG/KG			7.38E-05	6.50E-01
88-06-2	2,4,6-Trichlorophenol	1300	U	UG/KG		5.80E-09		1.63E+02
120-83-2	2,4-Dichlorophenol	1300	U	UG/KG			4.92E-04	2.60E+01
105-67-9	2,4-Dimethylphenol	1300	U	UG/KG			7.38E-05	3.25E+00

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SEDIMENT)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
51-28-5	2,4-Dinitrophenol	6500	U	UG/KG			3.69E-03	6.50E+02
121-14-2	2,4-Dinitrotoluene	1300	U	UG/KG			7.38E-04	3.25E+04
606-20-2	2,6-Dinitrotoluene	1300	U	UG/KG			1.48E-03	4.33E+04
91-58-7	2-Chloronaphthalene	1300	U	UG/KG			4.76E-05	
95-57-8	2-Chlorophenol	1300	U	UG/KG			5.39E-03	6.50E+00
91-57-6	2-Methylnaphthalene	1300	U	UG/KG			2.40E-05	6.50E-03
95-48-7	2-Methylphenol	1300	U	UG/KG			2.95E-05	1.63E+00
88-74-4	2-Nitroaniline	6500	U	UG/KG			1.29E-01	
88-75-5	2-Nitrophenol	1300	U	UG/KG			1.84E-04	
91-94-1	3,3'-Dichlorobenzidine	2600	U	UG/KG		4.74E-07		8.67E+03
99-09-2	3-Nitroaniline	6500	U	UG/KG			1.29E-01	
534-52-1	4,6-Dinitro-2-methylphenol	6500	U	UG/KG				
101-55-3	4-Bromophenyl phenyl ether	1300	U	UG/KG				
59-50-7	4-Chloro-3-methylphenol	1300	U	UG/KG			2.95E-05	
106-47-8	4-Chloroaniline	1300	U	UG/KG			3.69E-04	4.33E+01
7005-72-3	4-Chlorophenyl phenyl ether	1300	U	UG/KG				
106-44-5	4-Methylphenol	1300	U	UG/KG			2.95E-04	
100-01-6	4-Nitroaniline	6500	U	UG/KG			1.29E-01	
100-02-7	4-Nitrophenol	6500	U	UG/KG			9.22E-04	
83-32-9	Acenaphthene	1300	U	UG/KG			3.39E-05	4.33E-02
208-96-8	Acenaphthylene	1300	U	UG/KG			2.40E-05	6.50E-03
120-12-7	Anthracene	1300	U	UG/KG			3.34E-06	2.17E-03
56-55-3	Benzo(a)anthracene	1300	U	UG/KG		4.50E-07		1.63E+01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SEDIMENT)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
50-32-8	Benzo(a)pyrene	1300	U	UG/KG		4.50E-06		3.25E+00
205-99-2	Benzo(b)fluoranthene	1300	U	UG/KG		4.50E-07		6.50E+00
191-24-2	Benzo(g,h,i)perylene	1300	U	UG/KG			2.40E-05	6.50E-03
207-08-9	Benzo(k)fluoranthene	1300	U	UG/KG		4.50E-08		6.50E-01
111-91-1	bis(2-Chloroethoxy)methane	1300	U	UG/KG				
111-44-4	bis(2-Chloroethyl) ether	1300	U	UG/KG		2.10E-06		6.50E+04
117-81-7	bis(2-Ethylhexyl) phthalate (DEHP)	1300	U	UG/KG		7.38E-09	7.38E-05	
85-68-7	Butyl benzyl phthalate	1300	U	UG/KG			7.38E-06	1.63E-03
86-74-8	Carbazole	1300	U	UG/KG		1.05E-08		4.33E+01
218-01-9	Chrysene	1300	U	UG/KG		4.50E-09		1.63E-01
84-74-2	Di-n-butyl phthalate	1300	U	UG/KG			1.48E-05	4.33E-03
117-84-0	Di-n-octyl phthalate	1300	U	UG/KG			7.38E-05	1.30E-04
53-70-3	Dibenz(a,h)anthracene	1300	U	UG/KG		4.50E-06		1.63E+01
132-64-9	Dibenzofuran	1300	U	UG/KG			2.57E-04	
84-66-2	Diethyl phthalate	1300	U	UG/KG			1.84E-06	
131-11-3	Dimethyl phthalate	1300	U	UG/KG			1.48E-07	
206-44-0	Fluoranthene	1300	U	UG/KG			4.32E-05	6.50E-03
86-73-7	Fluorene	1300	U	UG/KG			3.92E-05	4.33E-02
87-68-3	Hexachlorobutadiene	1300	U	UG/KG		4.11E-08	7.38E-03	1.30E+01
77-47-4	Hexachlorocyclopentadiene	1300	U	UG/KG			2.20E-04	6.50E-02
118-74-1	Hexachlorobenzene	1300	U	UG/KG		8.43E-07	1.84E-03	1.30E+01
67-72-1	Hexachloroethane	1300	U	UG/KG		7.38E-09	1.48E-03	6.50E+01
193-39-5	Indeno(1,2,3-c,d)pyrene	1300	U	UG/KG		4.50E-07		1.86E+00

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SEDIMENT)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
78-59-1	Isophorone	1300	U	UG/KG		5.01E-10	7.38E-06	4.33E+01
621-64-7	N-Nitroso-di-n-propylamine	1300	U	UG/KG		3.69E-06		6.50E+05
86-30-6	N-Nitrosodiphenylamine	1300	U	UG/KG		2.58E-09		2.17E+01
91-20-3	Naphthalene	1300	U	UG/KG			6.89E-03	3.25E-01
98-95-3	Nitrobenzene	1300	U	UG/KG			1.14E-02	
87-86-5	Pentachlorophenol	6500	U	UG/KG		5.86E-07	4.56E-04	6.50E+03
85-01-8	Phenanthrene	1300	U	UG/KG			2.40E-05	6.50E-03
108-95-2	Phenol	1300	U	UG/KG			2.46E-06	2.60E-01
129-00-0	Pyrene	1300	U	UG/KG			2.40E-05	6.50E-03
Inorganics								
7429-90-5	Aluminum	8760		MG/KG	7.79E-01		5.22E-03	
7440-36-0	Antimony	0.33		MG/KG	1.74E-01		4.04E-04	1.10E+00
7440-38-2	Arsenic	25.2		MG/KG	2.45E+00	9.24E-06	5.74E-02	2.52E+01
7440-39-3	Barium	85.8		MG/KG	4.38E-01		6.89E-04	1.07E+00
7440-41-7	Beryllium	1.3		MG/KG	8.13E-01	5.80E-10	3.52E-04	4.33E-01
7440-42-8	Boron	3.5		MG/KG			4.42E-05	
7440-43-9	Cadmium	0.33	U	MG/KG	2.06E-01	1.10E-10	4.07E-04	8.25E-01
7440-70-2	Calcium	3790		MG/KG	2.62E+00			
7440-47-3	Chromium	28.1		MG/KG	1.63E+00	6.27E-08		1.41E+01
7440-48-4	Cobalt	16.4		MG/KG	1.80E+00		1.34E-04	
7440-50-8	Copper	14.8		MG/KG	8.81E-01		1.95E-04	
7439-89-6	Iron	38600		MG/KG	1.86E+00		6.30E-02	
7439-92-1	Lead	33.7		MG/KG	1.40E+00			

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
j = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SEDIMENT)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
7439-95-4	Magnesium	2530		MG/KG	1.33E+00			
7439-96-5	Manganese	1180		MG/KG	1.13E+00		3.66E-02	
7439-97-6	Mercury	0.036		MG/KG	2.40E-01			
7440-02-0	Nickel	13		MG/KG	7.69E-01		3.18E-04	1.86E+00
2023695	Potassium	497		MG/KG	3.50E-01			
7782-49-2	Selenium	1.8		MG/KG	2.81E+00		1.76E-04	6.00E+00
7440-22-4	Silver	0.45	U	MG/KG	1.50E-01		4.40E-05	2.25E-01
7440-23-5	Sodium	1090		MG/KG	7.52E-01			
7440-28-0	Thallium	1.1	U	MG/KG	3.55E+00		7.69E-06	
7440-62-2	Vanadium	65.1		MG/KG	2.33E+00		4.55E-03	2.17E-01
7440-66-6	Zinc	144		MG/KG	2.52E+00		2.35E-04	2.40E-01
Pesticides (Organochlorine)								
72-54-8	4,4'-DDD	1400		UG/KG		8.20E-08		1.75E+00
72-55-9	4,4'-DDE	400		UG/KG		3.32E-08		1.33E-01
50-29-3	4,4'-DDT	48	J	UG/KG		3.98E-09	6.56E-05	2.40E-02
309-00-2	Aldrin	35		UG/KG		2.41E-07	1.32E-03	5.83E-05
319-84-6	alpha-BHC	37	U	UG/KG		6.22E-08		1.23E+03
5103-71-9	alpha-Chlordane	37	U	UG/KG		3.46E-09	5.53E-05	7.40E-02
959-98-8	alpha-Endosulfan	37	U	UG/KG			7.00E-06	
319-85-7	beta-BHC	37	U	UG/KG		1.78E-08		3.70E+02
33213-65-9	beta-Endosulfan	75	U	UG/KG			1.42E-05	
57-74-9	Chlordane	150	U	UG/KG		1.40E-08	2.24E-04	3.00E-01
319-86-8	delta-BHC	37	U	UG/KG		1.78E-08		

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (SEDIMENT)	Cancer Risk Based on USEPA Region 9 Industrial Soil PRG for Carcinogens	Hazard Quotient (HQ) Based on USEPA Region 9 Industrial Soil PRG for Toxins	Ratio of Max Concentration (or Max RL) to Migration to Groundwater Criteria (DAF-1)
60-57-1	Dieldrin	16		UG/KG		1.04E-07	3.63E-04	8.00E+01
1031-07-8	Endosulfan sulfate	75	U	UG/KG			1.42E-05	
72-20-8	Endrin	75	U	UG/KG			2.84E-04	1.50E+00
7421-93-4	Endrin aldehyde	75	U	UG/KG			2.84E-04	1.50E+00
53494-70-5	Endrin Ketone	75	U	UG/KG			2.84E-04	1.50E+00
58-89-9	gamma-BHC (Lindane)	37	U	UG/KG		1.28E-08	9.22E-05	7.40E+01
5566-34-7	gamma-Chlordane	37	U	UG/KG		3.46E-09	5.53E-05	7.40E-02
76-44-8	Heptachlor	37	U	UG/KG		6.75E-08	8.40E-05	3.70E-02
1024-57-3	Heptachlor epoxide	37	U	UG/KG		1.37E-07	3.23E-03	1.23E+00
465-73-6	Isodrin	75	U	UG/KG				
72-43-5	Methoxychlor	14	J	UG/KG			3.18E-06	1.75E-03
8001-35-2	Toxaphene	740	U	UG/KG		3.30E-07		3.70E-01
Polychlorinated Biphenyls (PCB)								
12674-11-2	PCB-1016	9	U	UG/KG		3.14E-10	1.79E-04	
11104-28-2	PCB-1221	18	U	UG/KG		1.79E-08		
11141-16-5	PCB-1232	9	U	UG/KG		8.96E-09		
53469-21-9	PCB-1242	9	U	UG/KG		8.96E-09		
12672-29-6	PCB-1248	9	U	UG/KG		8.96E-09		
11097-69-1	PCB-1254	9	U	UG/KG		8.96E-09	6.27E-04	
11096-82-5	PCB-1260	9	U	UG/KG		8.96E-09		

Table Created By: MAM

Table Checked By: CMW

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
Volatile Organic Compounds							
71-55-6	1,1,1-Trichloroethane	6	U	UG/KG			3.00E-03
79-34-5	1,1,2,2-Tetrachloroethane	6	U	UG/KG			
79-00-5	1,1,2-Trichloroethane	6	U	UG/KG	7.32E-07	7.32E-07	3.00E-01
75-34-3	1,1-Dichloroethane	6	U	UG/KG	3.00E-08	3.00E-08	2.61E-04
75-35-4	1,1-Dichloroethene	6	U	UG/KG	3.33E-07	3.33E-06	1.00E-01
107-06-2	1,2-Dichloroethane (EDC)	6	U	UG/KG	9.52E-05	4.29E-06	3.00E-01
78-87-5	1,2-Dichloropropane	10		UG/KG	1.19E-04	5.56E-06	3.33E-01
78-93-3	2-Butanone (MEK)	6	U	UG/KG			
591-78-6	2-Hexanone	6	U	UG/KG			
108-10-1	4-Methyl-2-pentanone (MIBK)	6	U	UG/KG			
67-64-1	Acetone	23	U	UG/KG	1.15E-07	1.15E-07	1.44E-03
71-43-2	Benzene	6	U	UG/KG	3.00E-05	1.40E-06	2.00E-01
75-27-4	Bromodichloromethane	6	U	UG/KG	6.52E-05	3.00E-06	1.00E-02
75-25-2	Bromoform	6	U	UG/KG	8.33E-06	3.75E-07	7.50E-03
74-83-9	Bromomethane	6	U	UG/KG	2.07E-06	6.00E-06	3.00E-02
75-15-0	Carbon disulfide	6	U	UG/KG	3.00E-08	3.00E-07	1.88E-04
56-23-5	Carbon tetrachloride	6	U	UG/KG	1.36E-04	1.46E-05	8.57E-02
108-90-7	Chlorobenzene	6	U	UG/KG	1.46E-07	1.46E-06	6.00E-03
75-00-3	Chloroethane	6	U	UG/KG			
67-66-3	Chloroform	6	U	UG/KG	6.38E-06	3.00E-06	1.00E-02
74-87-3	Chloromethane	6	U	UG/KG			
156-59-2	cis-1,2-Dichloroethene	6	U	UG/KG	3.00E-07	3.00E-07	1.50E-02

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
10061-01-5	cis-1,3-Dichloropropene	6	U	UG/KG			
124-48-1	Dibromochloromethane	6	U	UG/KG	1.46E-07	1.46E-07	1.50E-02
100-41-4	Ethylbenzene	6	U	UG/KG	3.00E-08	3.00E-07	4.62E-04
75-09-2	Methylene chloride	6	U	UG/KG	7.89E-06	5.00E-07	3.00E-01
110-54-3	N-Hexane	6	U	UG/KG			
100-42-5	Styrene	6	U	UG/KG	1.46E-08	1.46E-07	1.50E-03
127-18-4	Tetrachloroethylene (PCE)	6	U	UG/KG	5.45E-05	2.50E-06	1.00E-01
108-88-3	Toluene	6	U	UG/KG	1.46E-08	1.46E-08	5.00E-04
1330-20-7	total Xylenes	6	U	UG/KG	6.00E-09	1.46E-08	4.00E-05
156-60-5	trans-1,2-Dichloroethene	6	U	UG/KG	1.46E-07	1.46E-07	8.57E-03
10061-02-6	trans-1,3-Dichloropropene	6	U	UG/KG			
79-01-6	Trichloroethylene (TCE)	21		UG/KG	4.04E-05	1.75E-05	3.50E-01
75-01-4	Vinyl chloride	6	U	UG/KG	2.00E-03	9.23E-05	6.00E-01
Semivolatile Organic Compounds							
120-82-1	1,2,4-Trichlorobenzene	1300	U	UG/KG	6.50E-05	6.50E-04	2.60E-01
95-50-1	1,2-Dichlorobenzene	1300	U	UG/KG	7.22E-06	7.22E-05	7.65E-02
541-73-1	1,3-Dichlorobenzene	1300	U	UG/KG			
106-46-7	1,4-Dichlorobenzene	1300	U	UG/KG			6.50E-01
	2,2-Oxybis(1-chloro)propane	1300	U	UG/KG			
95-95-4	2,4,5-Trichlorophenol	6500	U	UG/KG	3.25E-05	3.25E-05	2.41E-02
88-06-2	2,4,6-Trichlorophenol	1300	U	UG/KG	2.50E-03	1.18E-04	6.50E+00
120-83-2	2,4-Dichlorophenol	1300	U	UG/KG	2.13E-04	2.13E-03	1.30E+00
105-67-9	2,4-Dimethylphenol	1300	U	UG/KG	3.17E-05	3.17E-05	1.44E-01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
51-28-5	2,4-Dinitrophenol	6500	U	UG/KG	1.59E-03	1.59E-02	3.25E+01
121-14-2	2,4-Dinitrotoluene	1300	U	UG/KG	1.55E-01	7.22E-03	1.63E+03
606-20-2	2,6-Dinitrotoluene	1300	U	UG/KG	1.55E-01	7.22E-03	1.86E+03
91-58-7	2-Chloronaphthalene	1300	U	UG/KG			
95-57-8	2-Chlorophenol	1300	U	UG/KG	1.30E-04	1.30E-04	3.25E-01
91-57-6	2-Methylnaphthalene	1300	U	UG/KG	2.13E-05	2.13E-05	3.10E-04
95-48-7	2-Methylphenol	1300	U	UG/KG	1.30E-05	1.30E-05	8.67E-02
88-74-4	2-Nitroaniline	6500	U	UG/KG			
88-75-5	2-Nitrophenol	1300	U	UG/KG			
91-94-1	3,3'-Dichlorobenzidine	2600	U	UG/KG	2.00E-01	9.29E-03	3.71E+02
99-09-2	3-Nitroaniline	6500	U	UG/KG			
534-52-1	4,6-Dinitro-2-methylphenol	6500	U	UG/KG			
101-55-3	4-Bromophenyl phenyl ether	1300	U	UG/KG			
59-50-7	4-Chloro-3-methylphenol	1300	U	UG/KG			
106-47-8	4-Chloroaniline	1300	U	UG/KG	1.59E-04	1.59E-03	1.86E+00
7005-72-3	4-Chlorophenyl phenyl ether	1300	U	UG/KG			
106-44-5	4-Methylphenol	1300	U	UG/KG			
100-01-6	4-Nitroaniline	6500	U	UG/KG			
100-02-7	4-Nitrophenol	6500	U	UG/KG			
83-32-9	Acenaphthene	1300	U	UG/KG	1.08E-05	1.08E-05	2.28E-03
208-96-8	Acenaphthylene	1300	U	UG/KG	2.13E-05	2.13E-05	3.10E-04
120-12-7	Anthracene	1300	U	UG/KG	2.13E-06	2.13E-06	1.08E-04
56-55-3	Benzo(a)anthracene	1300	U	UG/KG	1.63E-01	7.65E-03	6.50E-01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
50-32-8	Benzo(a)pyrene	1300	U	UG/KG	1.63E+00	7.65E-02	1.63E-01
205-99-2	Benzo(b)fluoranthene	1300	U	UG/KG	1.63E-01	7.65E-03	2.60E-01
191-24-2	Benzo(g,h,i)perylene	1300	U	UG/KG	2.13E-05	2.13E-05	3.10E-04
207-08-9	Benzo(k)fluoranthene	1300	U	UG/KG	1.67E-02	7.65E-04	2.65E-02
111-91-1	bis(2-Chloroethoxy)methane	1300	U	UG/KG			
111-44-4	bis(2-Chloroethyl) ether	1300	U	UG/KG	2.60E-01	1.73E-02	3.25E+03
117-81-7	bis(2-Ethylhexyl) phthalate (DEHP)	1300	U	UG/KG	3.17E-03	3.17E-04	3.61E-04
85-68-7	Butyl benzyl phthalate	1300	U	UG/KG	3.17E-06	3.17E-06	1.40E-03
86-74-8	Carbazole	1300	U	UG/KG	4.48E-03	2.10E-04	2.17E+00
218-01-9	Chrysene	1300	U	UG/KG	1.67E-03	7.65E-05	8.13E-03
84-74-2	Di-n-butyl phthalate	1300	U	UG/KG	6.50E-06	6.50E-06	5.65E-04
117-84-0	Di-n-octyl phthalate	1300	U	UG/KG	3.17E-05	3.17E-04	1.30E-04
53-70-3	Dibenz(a,h)anthracene	1300	U	UG/KG	1.63E+00	7.65E-02	6.50E-01
132-64-9	Dibenzofuran	1300	U	UG/KG			
84-66-2	Diethyl phthalate	1300	U	UG/KG	1.30E-06	1.30E-06	2.77E-03
131-11-3	Dimethyl phthalate	1300	U	UG/KG			
206-44-0	Fluoranthene	1300	U	UG/KG	1.59E-05	1.59E-05	3.02E-04
86-73-7	Fluorene	1300	U	UG/KG	1.59E-05	1.59E-05	2.32E-03
87-68-3	Hexachlorobutadiene	1300	U	UG/KG			
77-47-4	Hexachlorocyclopentadiene	1300	U	UG/KG	9.29E-05	9.29E-05	3.25E-03
118-74-1	Hexachlorobenzene	1300	U	UG/KG	3.25E-01	1.67E-02	6.50E-01
67-72-1	Hexachloroethane	1300	U	UG/KG	6.50E-04	6.50E-04	2.60E+00
193-39-5	Indeno(1,2,3-c,d)pyrene	1300	U	UG/KG	1.63E-01	7.65E-03	9.29E-02

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**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
78-59-1	Isophorone	1300	U	UG/KG	3.17E-06	3.17E-06	1.63E-01
621-64-7	N-Nitroso-di-n-propylamine	1300	U	UG/KG	1.63E+00	7.22E-02	2.60E+04
86-30-6	N-Nitrosodiphenylamine	1300	U	UG/KG	1.08E-03	5.20E-05	1.30E+00
91-20-3	Naphthalene	1300	U	UG/KG	1.59E-05	1.59E-04	1.55E-02
98-95-3	Nitrobenzene	1300	U	UG/KG	1.30E-03	1.30E-03	1.30E+01
87-86-5	Pentachlorophenol	6500	U	UG/KG	2.71E-01	1.25E-02	2.17E+02
85-01-8	Phenanthrene	1300	U	UG/KG	2.13E-05	2.13E-05	3.10E-04
108-95-2	Phenol	1300	U	UG/KG	1.30E-06	1.08E-05	1.30E-02
129-00-0	Pyrene	1300	U	UG/KG	2.13E-05	2.13E-05	3.10E-04
Inorganics							
7429-90-5	Aluminum	8760		MG/KG			
7440-36-0	Antimony	0.33		MG/KG	4.02E-04	4.02E-03	6.60E-02
7440-38-2	Arsenic	25.2		MG/KG	8.40E+00	4.13E-01	9.00E-01
7440-39-3	Barium	85.8		MG/KG	6.13E-04	6.13E-03	7.15E-02
7440-41-7	Beryllium	1.3		MG/KG	1.30E+00	4.48E-02	1.97E-01
7440-42-8	Boron	3.5		MG/KG	1.94E-05	1.94E-04	
7440-43-9	Cadmium	0.33	U	MG/KG	1.65E-04	1.65E-03	8.92E-02
7440-70-2	Calcium	3790		MG/KG			
7440-47-3	Chromium	28.1		MG/KG	2.81E-03	6.85E-03	1.00E+00
7440-48-4	Cobalt	16.4		MG/KG	1.37E-04	1.37E-03	
7440-50-8	Copper	14.8		MG/KG	1.80E-04	1.80E-03	1.35E-03
7439-89-6	Iron	38600		MG/KG			
7439-92-1	Lead	33.7		MG/KG	8.43E-02	8.43E-02	

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**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
7439-95-4	Magnesium	2530		MG/KG			
7439-96-5	Manganese	1180		MG/KG	1.23E-02	1.23E-01	
7439-97-6	Mercury	0.036		MG/KG	5.90E-05	5.90E-04	2.40E-01
7440-02-0	Nickel	13		MG/KG	3.17E-04	3.17E-03	1.71E-01
2023695	Potassium	497		MG/KG			
7782-49-2	Selenium	1.8		MG/KG	1.80E-04	1.80E-03	7.50E-01
7440-22-4	Silver	0.45	U	MG/KG	4.50E-05	4.50E-04	3.00E-01
7440-23-5	Sodium	1090		MG/KG			
7440-28-0	Thallium	1.1	U	MG/KG	6.88E-03	6.88E-03	4.58E-01
7440-62-2	Vanadium	65.1		MG/KG	4.65E-03	4.65E-02	6.64E-02
7440-66-6	Zinc	144		MG/KG	2.36E-04	2.36E-03	4.00E-02
Pesticides (Organochlorine)							
72-54-8	4,4'-DDD	1400		UG/KG	5.83E-02	2.69E-03	8.75E-02
72-55-9	4,4'-DDE	400		UG/KG	2.35E-02	1.08E-03	7.41E-03
50-29-3	4,4'-DDT	48	J	UG/KG	2.82E-03	4.80E-04	1.50E-03
309-00-2	Aldrin	35		UG/KG	1.17E-01	5.74E-03	7.00E-02
319-84-6	alpha-BHC	37	U	UG/KG	4.11E-02	1.85E-03	7.40E+01
5103-71-9	alpha-Chlordane	37	U	UG/KG	9.25E-03	3.08E-03	3.70E-03
959-98-8	alpha-Endosulfan	37	U	UG/KG			
319-85-7	beta-BHC	37	U	UG/KG			
33213-65-9	beta-Endosulfan	75	U	UG/KG			
57-74-9	Chlordane	150	U	UG/KG	3.75E-02	1.25E-02	1.25E-02
319-86-8	delta-BHC	37	U	UG/KG			

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-3
HUMAN HEALTH SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to IEPA Industrial/Commercial Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Construction Worker Soil Ingestion Criteria	Ratio of Max Concentration (or Max RL) to IEPA Class I Soil Component of Groundwater Criteria
60-57-1	Dieldrin	16		UG/KG	4.00E-02	2.05E-03	4.00E+00
1031-07-8	Endosulfan sulfate	75	U	UG/KG			4.17E-03
72-20-8	Endrin	75	U	UG/KG	1.23E-04	1.23E-03	7.50E-02
7421-93-4	Endrin aldehyde	75	U	UG/KG	1.23E-04	1.23E-03	7.50E-02
53494-70-5	Endrin Ketone	75	U	UG/KG	1.23E-04	1.23E-03	7.50E-02
58-89-9	gamma-BHC (Lindane)	37	U	UG/KG	9.25E-03	3.85E-04	4.11E+00
5566-34-7	gamma-Chlordane	37	U	UG/KG	9.25E-03	3.08E-03	3.70E-03
76-44-8	Heptachlor	37	U	UG/KG	3.70E-02	1.32E-03	1.61E-03
1024-57-3	Heptachlor epoxide	37	U	UG/KG	6.17E-02	1.37E-02	5.29E-02
465-73-6	Isodrin	75	U	UG/KG			
72-43-5	Methoxychlor	14	J	UG/KG	1.40E-06	1.40E-05	8.75E-05
8001-35-2	Toxaphene	740	U	UG/KG	1.42E-01	6.73E-03	2.39E-02
Polychlorinated Biphenyls (PCB)							
12674-11-2	PCB-1016	9	U	UG/KG			
11104-28-2	PCB-1221	18	U	UG/KG			
11141-16-5	PCB-1232	9	U	UG/KG			
53469-21-9	PCB-1242	9	U	UG/KG			
12672-29-6	PCB-1248	9	U	UG/KG			
11097-69-1	PCB-1254	9	U	UG/KG			
11096-82-5	PCB-1260	9	U	UG/KG			

Table Created By: MAM

Table Checked By: CMW

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-4
ECOLOGICAL SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SEDIMENT)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SEDIMENT)	Retained as Potential Bioaccumulator
Volatile Organic Compounds							
71-55-6	1,1,1-Trichloroethane		6	U	UG/KG	3.53E-02	
79-34-5	1,1,2,2-Tetrachloroethane		6	U	UG/KG	6.38E-03	
79-00-5	1,1,2-Trichloroethane		6	U	UG/KG	5.64E-03	
75-34-3	1,1-Dichloroethane		6	U	UG/KG	6.40E-02	
75-35-4	1,1-Dichloroethene		6	U	UG/KG	5.63E-02	
107-06-2	1,2-Dichloroethane (EDC)		6	U	UG/KG	4.89E-03	
78-87-5	1,2-Dichloropropane		10		UG/KG	7.25E-03	
78-93-3	2-Butanone (MEK)		6	U	UG/KG	1.36E-03	
591-78-6	2-Hexanone		6	U	UG/KG	4.52E-02	
108-10-1	4-Methyl-2-pentanone (MIBK)		6	U	UG/KG	2.87E-02	
67-64-1	Acetone		23	U	UG/KG	2.73E-01	
71-43-2	Benzene		6	U	UG/KG	1.05E-01	
75-27-4	Bromodichloromethane		6	U	UG/KG	3.42E-04	
75-25-2	Bromoform		6	U	UG/KG	4.80E-03	
74-83-9	Bromomethane		6	U	UG/KG	5.73E-04	
75-15-0	Carbon disulfide		6	U	UG/KG	3.00E+00	
56-23-5	Carbon tetrachloride		6	U	UG/KG	7.71E-02	
108-90-7	Chlorobenzene		6	U	UG/KG	7.32E-03	
75-00-3	Chloroethane		6	U	UG/KG	4.15E-04	
67-66-3	Chloroform		6	U	UG/KG	8.53E-02	
74-87-3	Chloromethane		6	U	UG/KG	1.26E-04	
156-59-2	cis-1,2-Dichloroethene		6	U	UG/KG	5.10E-03	
10061-01-5	cis-1,3-Dichloropropene		6	U	UG/KG	2.40E+01	
124-48-1	Dibromochloromethane		6	U	UG/KG	1.95E-04	
100-41-4	Ethylbenzene		6	U	UG/KG	1.67E-03	
75-09-2	Methylene chloride		6	U	UG/KG	6.50E-03	
110-54-3	N-Hexane		6	U	UG/KG		
100-42-5	Styrene		6	U	UG/KG	2.78E-04	
127-18-4	Tetrachloroethylene (PCE)		6	U	UG/KG	1.13E-02	
108-88-3	Toluene		6	U	UG/KG	8.96E-03	
1330-20-7	total Xylenes		6	U	UG/KG	2.40E-01	
156-60-5	trans-1,2-Dichloroethene		6	U	UG/KG	5.10E-03	
10061-02-6	trans-1,3-Dichloropropene		6	U	UG/KG	1.23E-01	
79-01-6	Trichloroethylene (TCE)		21		UG/KG	1.31E-02	
75-01-4	Vinyl chloride		6	U	UG/KG	2.28E-04	
Semivolatile Organic Compounds							
120-82-1	1,2,4-Trichlorobenzene		1300	U	UG/KG	1.41E-01	
95-50-1	1,2-Dichlorobenzene		1300	U	UG/KG	3.82E+00	
541-73-1	1,3-Dichlorobenzene		1300	U	UG/KG	7.65E-01	
106-46-7	1,4-Dichlorobenzene		1300	U	UG/KG	3.71E+00	

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-4
ECOLOGICAL SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SEDIMENT)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SEDIMENT)	Retained as Potential Bioaccumulator
	2,2-Oxybis(1-chloro)propane		1300	U	UG/KG		
95-95-4	2,4,5-Trichlorophenol		6500	U	UG/KG	4.49E+00	
88-06-2	2,4,6-Trichlorophenol		1300	U	UG/KG	7.07E+01	
120-83-2	2,4-Dichlorophenol		1300	U	UG/KG	3.56E+00	
105-67-9	2,4-Dimethylphenol		1300	U	UG/KG	2.89E+01	
51-28-5	2,4-Dinitrophenol		6500	U	UG/KG	5.24E+02	
121-14-2	2,4-Dinitrotoluene		1300	U	UG/KG	2.00E+00	
606-20-2	2,6-Dinitrotoluene		1300	U	UG/KG	1.52E+01	
91-58-7	2-Chloronaphthalene		1300	U	UG/KG	3.71E-01	
95-57-8	2-Chlorophenol		1300	U	UG/KG	5.87E+00	
91-57-6	2-Methylnaphthalene		1300	U	UG/KG	1.86E+01	
95-48-7	2-Methylphenol		1300	U	UG/KG	2.85E+02	
88-74-4	2-Nitroaniline		6500	U	UG/KG	1.35E-01	
88-75-5	2-Nitrophenol		1300	U	UG/KG	4.08E-01	
91-94-1	3,3'-Dichlorobenzidine		2600	U	UG/KG	1.30E+00	
99-09-2	3-Nitroaniline		6500	U	UG/KG	1.09E-01	
534-52-1	4,6-Dinitro-2-methylphenol		6500	U	UG/KG	7.76E+02	
101-55-3	4-Bromophenyl phenyl ether		1300	U	UG/KG	1.00E+00	
59-50-7	4-Chloro-3-methylphenol		1300	U	UG/KG	8.67E+03	
106-47-8	4-Chloroaniline		1300	U	UG/KG	7.93E-02	
7005-72-3	4-Chlorophenyl phenyl ether		1300	U	UG/KG	9.46E-01	
106-44-5	4-Methylphenol		1300	U	UG/KG	3.25E-01	
100-01-6	4-Nitroaniline		6500	U	UG/KG	1.80E-01	
100-02-7	4-Nitrophenol		6500	U	UG/KG	1.57E+02	
83-32-9	Acenaphthene		1300	U	UG/KG	8.13E+01	
208-96-8	Acenaphthylene		1300	U	UG/KG	2.95E+01	
120-12-7	Anthracene		1300	U	UG/KG	2.28E+01	
56-55-3	Benzo(a)anthracene		1300	U	UG/KG	1.20E+01	
50-32-8	Benzo(a)pyrene		1300	U	UG/KG	8.67E+00	
205-99-2	Benzo(b)fluoranthene		1300	U	UG/KG	4.81E+01	
191-24-2	Benzo(g,h,i)perylene		1300	U	UG/KG	8.13E+01	
207-08-9	Benzo(k)fluoranthene		1300	U	UG/KG	4.81E+01	
111-91-1	bis(2-Chloroethoxy)methane		1300	U	UG/KG	1.00E+00	
111-44-4	bis(2-Chloroethyl) ether		1300	U	UG/KG	4.55E-01	
117-81-7	bis(2-Ethylhexyl) phthalate (DEHP)		1300	U	UG/KG	1.73E+00	
85-68-7	Butyl benzyl phthalate		1300	U	UG/KG	1.18E-01	
86-74-8	Carbazole		1300	U	UG/KG	3.94E-01	
218-01-9	Chrysene		1300	U	UG/KG	7.83E+00	
84-74-2	Di-n-butyl phthalate		1300	U	UG/KG	1.18E-01	
117-84-0	Di-n-octyl phthalate		1300	U	UG/KG	1.84E-03	
53-70-3	Dibenz(a,h)anthracene		1300	U	UG/KG	3.94E+01	

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-4
ECOLOGICAL SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SEDIMENT)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SEDIMENT)	Retained as Potential Bioaccumulator
132-64-9	Dibenzofuran		1300	U	UG/KG	6.50E-01	
84-66-2	Diethyl phthalate		1300	U	UG/KG	2.06E+00	
131-11-3	Dimethyl phthalate		1300	U	UG/KG	2.49E-03	
206-44-0	Fluoranthene		1300	U	UG/KG	3.07E+00	
86-73-7	Fluorene		1300	U	UG/KG	1.68E+01	
118-74-1	Hexachlorobenzene		1300	U	UG/KG	1.30E+01	
87-68-3	Hexachlorobutadiene		1300	U	UG/KG	2.73E+01	
77-47-4	Hexachlorocyclopentadiene		1300	U	UG/KG	4.35E+02	
67-72-1	Hexachloroethane		1300	U	UG/KG	1.91E+01	
193-39-5	Indeno(1,2,3-c,d)pyrene		1300	U	UG/KG	7.65E+01	
78-59-1	Isophorone		1300	U	UG/KG	1.13E+00	
621-64-7	N-Nitroso-di-n-propylamine		1300	U	UG/KG		
86-30-6	N-Nitrosodiphenylamine		1300	U	UG/KG	1.86E+00	
91-20-3	Naphthalene		1300	U	UG/KG	7.39E+00	
98-95-3	Nitrobenzene		1300	U	UG/KG	2.22E+00	
87-86-5	Pentachlorophenol		6500	U	UG/KG	8.78E+01	
85-01-8	Phenanthrene		1300	U	UG/KG	6.37E+00	
108-95-2	Phenol		1300	U	UG/KG	2.71E+01	
129-00-0	Pyrene		1300	U	UG/KG	6.67E+00	
Inorganics							
7429-90-5	Aluminum	11241	8760		MG/KG	3.37E-01	
7440-36-0	Antimony	1.9	0.33		MG/KG	1.10E-01	
7440-38-2	Arsenic	10.3	25.2		MG/KG	2.57E+00	
7440-39-3	Barium	196	85.8		MG/KG		
7440-41-7	Beryllium	1.6	1.3		MG/KG		
7440-42-8	Boron		3.5		MG/KG		
7440-43-9	Cadmium	1.6	0.33	U	MG/KG	3.33E-01	
7440-70-2	Calcium	1448	3790		MG/KG		
7440-47-3	Chromium	17.2	28.1		MG/KG	6.47E-01	
7440-48-4	Cobalt	9.1	16.4		MG/KG	3.28E-01	
7440-50-8	Copper	16.8	14.8		MG/KG	4.68E-01	
7439-89-6	Iron	20750	38600		MG/KG	2.03E-01	
7439-92-1	Lead	24	33.7		MG/KG	9.41E-01	
7439-95-4	Magnesium	1909	2530		MG/KG		
7439-96-5	Manganese	1043	1180		MG/KG	1.87E+00	
7439-97-6	Mercury	0.15	0.036		MG/KG	2.00E-01	YES
7440-02-0	Nickel	16.9	13		MG/KG	5.73E-01	
2023695	Potassium	1421	497		MG/KG		
7782-49-2	Selenium	0.64	1.8		MG/KG		YES
7440-22-4	Silver	3	0.45	U	MG/KG	4.50E-01	
7440-23-5	Sodium	1450	1090		MG/KG		

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-4
ECOLOGICAL SCREENING OF SEDIMENT RESULTS**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (SEDIMENT)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Direct Exposure Hazard Quotient (HQ) (SEDIMENT)	Retained as Potential Bioaccumulator
7440-28-0	Thallium	0.31	1.1	U	MG/KG		
7440-62-2	Vanadium	28	65.1		MG/KG		
7440-66-6	Zinc	57.1	144		MG/KG	1.19E+00	
Pesticides (Organochlorine)							
72-54-8	4,4'-DDD		1400		UG/KG	2.87E+02	YES
72-55-9	4,4'-DDE		400		UG/KG	1.27E+02	YES
50-29-3	4,4'-DDT		48	J	UG/KG	1.15E+01	YES
309-00-2	Aldrin		35		UG/KG	1.75E+01	YES
319-84-6	alpha-BHC		37	U	UG/KG	6.17E+00	
5103-71-9	alpha-Chlordane		37	U	UG/KG		
959-98-8	alpha-Endosulfan		37	U	UG/KG	1.28E+01	
319-85-7	beta-BHC		37	U	UG/KG	7.40E+00	
33213-65-9	beta-Endosulfan		75	U	UG/KG	5.36E+00	
57-74-9	Chlordane		150	U	UG/KG	4.63E+01	
319-86-8	delta-BHC		37	U	UG/KG	1.22E+00	
60-57-1	Dieldrin		16		UG/KG	8.42E+00	YES
1031-07-8	Endosulfan sulfate		75	U	UG/KG	2.50E+01	
72-20-8	Endrin		75	U	UG/KG	3.38E+01	
7421-93-4	Endrin aldehyde		75	U	UG/KG	2.34E-02	
53494-70-5	Endrin Ketone		75	U	UG/KG		
58-89-9	gamma-BHC (Lindane)		37	U	UG/KG	1.56E+01	
5566-34-7	gamma-Chlordane		37	U	UG/KG		
76-44-8	Heptachlor		37	U	UG/KG	3.70E+00	
1024-57-3	Heptachlor epoxide		37	U	UG/KG	1.50E+01	
465-73-6	Isodrin		75	U	UG/KG	1.36E+00	
72-43-5	Methoxychlor		14	J	UG/KG	7.37E-01	YES
8001-35-2	Toxaphene		740	U	UG/KG	2.64E+01	
Polychlorinated Biphenyls (PCB)							
12674-11-2	PCB-1016		9	U	UG/KG	1.29E+00	
11104-28-2	PCB-1221		18	U	UG/KG	4.50E+00	
11141-16-5	PCB-1232		9	U	UG/KG		
53469-21-9	PCB-1242		9	U	UG/KG		
12672-29-6	PCB-1248		9	U	UG/KG	3.00E-01	
11097-69-1	PCB-1254		9	U	UG/KG	1.50E-01	
11096-82-5	PCB-1260		9	U	UG/KG	1.80E+00	

Table Created By: MAM

Table Checked By: CMW

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, mg/kg = milligrams per kilogram, ug/kg = micrograms per kilogram

**TABLE 4-5
HUMAN HEALTH SCREENING OF SURFACE WATER**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (Surface Water)	Ratio of Max Concentration (or Max RL) to IEPA General Use Surface Water Quality Criteria - Human Health
Pesticides (Organochlorine)						
72-54-8	4,4'-DDD	0.054	U	UG/L		2.00E+02
72-55-9	4,4'-DDE	0.054	U	UG/L		2.84E+02
50-29-3	4,4'-DDT	0.054	U	UG/L		2.84E+02
309-00-2	Aldrin	0.027	U	UG/L		5.87E+02
319-84-6	alpha-BHC	0.027	U	UG/L		
5103-71-9	alpha-Chlordane	0.027	U	UG/L		1.42E+02
959-98-8	alpha-Endosulfan	0.027	U	UG/L		
319-85-7	beta-BHC	0.027	U	UG/L		
33213-65-9	beta-Endosulfan	0.054	U	UG/L		
57-74-9	Chlordane	0.11	U	UG/L		5.79E+02
319-86-8	delta-BHC	0.027	U	UG/L		
60-57-1	Dieldrin	0.054	U	UG/L		
1031-07-8	Endosulfan sulfate	0.054	U	UG/L		
72-20-8	Endrin	0.054	U	UG/L		2.08E-01
7421-93-4	Endrin aldehyde	0.054	U	UG/L		2.08E-01
53494-70-5	Endrin Ketone	0.054	U	UG/L		2.08E-01
58-89-9	gamma-BHC (Lindane)	0.027	U	UG/L		
5566-34-7	gamma-Chlordane	0.027	U	UG/L		1.42E+02
76-44-8	Heptachlor	0.027	U	UG/L		3.97E+02
1024-57-3	Heptachlor epoxide	0.027	U	UG/L		
118-74-1	Hexachlorobenzene	0.027		UG/L		
465-73-6	Isodrin	0.054	U	UG/L		
72-43-5	Methoxychlor	0.27	U	UG/L		
8001-35-2	Toxaphene	0.54	U	UG/L		
Inorganics						
7429-90-5	Aluminum	625		UG/L	3.13E+00	
7440-36-0	Antimony	3	U	UG/L	5.00E-01	
7440-38-2	Arsenic	10	U	UG/L	1.00E+00	
7440-39-3	Barium	80.9		UG/L	3.56E+00	1.62E-02
7440-41-7	Beryllium	4	U	UG/L	8.00E-01	
7440-42-8	Boron	20.9		UG/L		2.09E-02
7440-43-9	Cadmium	2	U	UG/L	4.00E-01	
7440-70-2	Calcium	77100		UG/L	1.07E+01	
7440-47-3	Chromium	10	U	UG/L	1.00E+00	
7440-48-4	Cobalt	5	U	UG/L	1.00E-01	
7440-50-8	Copper	10	U	UG/L	1.00E+00	
7439-89-6	Iron	493		UG/L	4.93E+00	4.93E-01
7439-92-1	Lead	2	U	UG/L	1.00E+00	

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, ug/L = micrograms per Liter

**TABLE 4-5
HUMAN HEALTH SCREENING OF SURFACE WATER**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Ratio of Max Concentration (or Max RL) to Background (Surface Water)	Ratio of Max Concentration (or Max RL) to IEPA General Use Surface Water Quality Criteria - Human Health
7439-95-4	Magnesium	33500		UG/L	1.32E+01	
7439-96-5	Manganese	180		UG/L	3.09E-01	1.80E-01
7439-97-6	Mercury	0.2	U	UG/L	1.00E+00	1.67E+01
7440-02-0	Nickel	10	U	UG/L	1.00E+00	1.00E-02
2023695	Potassium	1110		UG/L	6.88E-01	
7782-49-2	Selenium	5	U	UG/L	1.85E+00	5.00E-03
7440-22-4	Silver	5	U	UG/L	5.00E-01	1.00E+00
7440-23-5	Sodium	34200		UG/L	1.08E+01	
7440-28-0	Thallium	10	U	UG/L	1.00E+00	
7440-62-2	Vanadium	2.1		UG/L	4.20E-02	
7440-66-6	Zinc	19.3		UG/L	9.65E-01	1.93E-02

Table Created By: MAM

Table Checked By: CMW

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, ug/L = micrograms per Liter

**TABLE 4-6
ECOLOGICAL SCREENING OF SURFACE WATER**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (Surface Water)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Eco Direct SW	Direct Exposure Hazard Quotient (HQ)
Pesticides (Organochlorine)							
72-54-8	4,4'-DDD		0.054	U	UG/L	6.40E-03	8.44E+00
72-55-9	4,4'-DDE		0.054	U	UG/L	1.05E+01	5.14E-03
50-29-3	4,4'-DDT		0.054	U	UG/L	1.00E-03	5.40E+01
309-00-2	Aldrin		0.027	U	UG/L	3.00E-01	9.00E-02
319-84-6	alpha-BHC		0.027	U	UG/L	2.20E+00	1.23E-02
5103-71-9	alpha-Chlordane		0.027	U	UG/L	1.09E+00	2.48E-02
959-98-8	alpha-Endosulfan		0.027	U	UG/L	5.60E-02	4.82E-01
319-85-7	beta-BHC		0.027	U	UG/L	2.20E+00	1.23E-02
33213-65-9	beta-Endosulfan		0.054	U	UG/L	5.60E-02	9.64E-01
57-74-9	Chlordane		0.11	U	UG/L	4.30E-03	2.56E+01
319-86-8	delta-BHC		0.027	U	UG/L	2.20E+00	1.23E-02
60-57-1	Dieldrin		0.054	U	UG/L	5.60E-02	9.64E-01
1031-07-8	Endosulfan sulfate		0.054	U	UG/L	5.10E-02	1.06E+00
72-20-8	Endrin		0.054	U	UG/L	3.60E-02	1.50E+00
7421-93-4	Endrin aldehyde		0.054	U	UG/L	1.50E-01	3.60E-01
53494-70-5	Endrin Ketone		0.054	U	UG/L		
58-89-9	gamma-BHC (Lindane)		0.027	U	UG/L	8.00E-02	3.38E-01
5566-34-7	gamma-Chlordane		0.027	U	UG/L	1.09E+00	2.48E-02
76-44-8	Heptachlor		0.027	U	UG/L	3.80E-03	7.11E+00
1024-57-3	Heptachlor epoxide		0.027	U	UG/L	3.80E-03	7.11E+00
118-74-1	Hexachlorobenzene		0.027		UG/L	3.68E+00	7.34E-03
465-73-6	Isodrin		0.054	U	UG/L	3.09E-02	1.75E+00
72-43-5	Methoxychlor		0.27	U	UG/L	3.00E-02	9.00E+00
8001-35-2	Toxaphene		0.54	U	UG/L	2.00E-04	2.70E+03
Inorganics							
7429-90-5	Aluminum	200	625		UG/L	8.70E+01	7.18E+00
7440-36-0	Antimony	6	3	U	UG/L	3.00E+01	1.00E-01
7440-38-2	Arsenic	10	10	U	UG/L	1.90E+02	5.26E-02
7440-39-3	Barium	22.7	80.9		UG/L	5.00E+03	1.62E-02
7440-41-7	Beryllium	5	4	U	UG/L	5.30E-01	7.55E+00
7440-42-8	Boron		20.9		UG/L	1.00E+03	2.09E-02
7440-43-9	Cadmium	5	2	U	UG/L	1.10E+00	1.82E+00
7440-70-2	Calcium	7197	77100		UG/L	1.16E+05	6.65E-01
7440-47-3	Chromium	10	10	U	UG/L	2.07E+02	4.83E-02
7440-48-4	Cobalt	50	5	U	UG/L	2.30E+00	2.17E+00
7440-50-8	Copper	10	10	U	UG/L	1.18E+01	8.47E-01
7439-89-6	Iron	100	493		UG/L	1.00E+03	4.93E-01
7439-92-1	Lead	2	2	U	UG/L	2.01E+01	9.95E-02
7439-95-4	Magnesium	2534	33500		UG/L	8.20E+04	4.09E-01
7439-96-5	Manganese	582	180		UG/L	1.00E+03	1.80E-01

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, ug/L = micrograms per Liter

**TABLE 4-6
ECOLOGICAL SCREENING OF SURFACE WATER**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (Surface Water)	Max Result or Max Reporting Limit (RL)	Qualifier	Units	Eco Direct SW	Direct Exposure Hazard Quotient (HQ)
7439-97-6	Mercury	0.2	0.2	U	UG/L	1.30E+00	1.54E-01
7440-02-0	Nickel	10	10	U	UG/L	1.00E+03	1.00E-02
2023695	Potassium	1613	1110		UG/L	5.30E+04	2.09E-02
7782-49-2	Selenium	2.7	5	U	UG/L	1.00E+03	5.00E-03
7440-22-4	Silver	10	5	U	UG/L	5.00E+00	1.00E+00
7440-23-5	Sodium	3169	34200		UG/L	6.80E+05	5.03E-02
7440-28-0	Thallium	10	10	U	UG/L	4.00E+00	2.50E+00
7440-62-2	Vanadium	50	2.1		UG/L	1.90E+01	1.11E-01
7440-66-6	Zinc	20	19.3		UG/L	1.00E+03	1.93E-02

Table Created By: *MAM*

Table Checked By: *CMW*

**TABLE 4-6
ECOLOGICAL SCREENING OF SURFACE WATER**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (Surface Water)	Max Result or Max Reporting Limit (RL)	Qualifier	Kow>3.5	Retained as Potential Bioaccumulator
Pesticides (Organochlorine)						
72-54-8	4,4'-DDD		0.054	U	6.10E+00	
72-55-9	4,4'-DDE		0.054	U	6.80E+00	
50-29-3	4,4'-DDT		0.054	U	6.50E+00	
309-00-2	Aldrin		0.027	U	6.50E+00	
319-84-6	alpha-BHC		0.027	U	3.80E+00	
5103-71-9	alpha-Chlordane		0.027	U	6.00E+00	
959-98-8	alpha-Endosulfan		0.027	U		
319-85-7	beta-BHC		0.027	U	3.80E+00	
33213-65-9	beta-Endosulfan		0.054	U		
57-74-9	Chlordane		0.11	U	6.30E+00	
319-86-8	delta-BHC		0.027	U	4.10E+00	
60-57-1	Dieldrin		0.054	U	5.10E+00	
1031-07-8	Endosulfan sulfate		0.054	U	3.70E+00	
72-20-8	Endrin		0.054	U	5.10E+00	
7421-93-4	Endrin aldehyde		0.054	U	4.00E+00	
53494-70-5	Endrin Ketone		0.054	U		
58-89-9	gamma-BHC (Lindane)		0.027	U	3.70E+00	
5566-34-7	gamma-Chlordane		0.027	U	6.40E+00	
76-44-8	Heptachlor		0.027	U	6.30E+00	
1024-57-3	Heptachlor epoxide		0.027	U	5.00E+00	
118-74-1	Hexachlorobenzene		0.027		5.90E+00	YES
465-73-6	Isodrin		0.054	U		
72-43-5	Methoxychlor		0.27	U	5.10E+00	
8001-35-2	Toxaphene		0.54	U	5.50E+00	
Inorganics						
7429-90-5	Aluminum	200	625			
7440-36-0	Antimony	6	3	U		
7440-38-2	Arsenic	10	10	U		
7440-39-3	Barium	22.7	80.9			
7440-41-7	Beryllium	5	4	U		
7440-42-8	Boron		20.9			
7440-43-9	Cadmium	5	2	U		
7440-70-2	Calcium	7197	77100			
7440-47-3	Chromium	10	10	U		
7440-48-4	Cobalt	50	5	U		
7440-50-8	Copper	10	10	U		
7439-89-6	Iron	100	493			
7439-92-1	Lead	2	2	U		
7439-95-4	Magnesium	2534	33500			
7439-96-5	Manganese	582	180			

ND = Not Detected E = Outside of Range UJ = Estimated Nondetect
J = Estimated U = Nondetect, ug/L = micrograms per Liter

**TABLE 4-6
ECOLOGICAL SCREENING OF SURFACE WATER**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

CAS Number	Chemical	Background (Surface Water)	Max Result or Max Reporting Limit (RL)	Qualifier	Kow>3.5	Retained as Potential Bioaccumulator
7439-97-6	Mercury	0.2	0.2	U		
7440-02-0	Nickel	10	10	U		
2023695	Potassium	1613	1110			
7782-49-2	Selenium	2.7	5	U		
7440-22-4	Silver	10	5	U		
7440-23-5	Sodium	3169	34200			
7440-28-0	Thallium	10	10	U		
7440-62-2	Vanadium	50	2.1			
7440-66-6	Zinc	20	19.3			

Table Created By: *MAM*

Table Checked By: *CMW*

**TABLE 4-7
SUMMARY OF HUMAN HEALTH COPC EVALUATION**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Groundwater		Sediment		Soil	
	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale
Volatile Organic Compounds								
1,1,1-Trichloroethane	NA	NA	NA	NA	No	A	No	A
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
1,1,2-Trichloroethane	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
1,1-Dichloroethane	NA	NA	NA	NA	No	A	No	A
1,1-Dichloroethene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
1,2-Dichloroethane (EDC)	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
1,2-Dichloropropane	NA	NA	NA	NA	Yes	E	Yes	E
2-Butanone (MEK)	NA	NA	NA	NA	No	A	No	A
2-Hexanone	NA	NA	NA	NA	No	C	No	C
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	NA	No	A	No	A
Acetone	NA	NA	NA	NA	No	A	No	F
Benzene	NA	NA	NA	NA	Uncertainty	B	Yes	E
Bromodichloromethane	NA	NA	NA	NA	No	A	No	A
Bromoform	NA	NA	NA	NA	No	A	No	A
Bromomethane	NA	NA	NA	NA	No	A	No	A
Carbon disulfide	NA	NA	NA	NA	No	A	No	A
Carbon tetrachloride	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Chlorobenzene	NA	NA	NA	NA	No	A	No	F
Chloroethane	NA	NA	NA	NA	No	A	No	A
Chloroform	NA	NA	NA	NA	No	A	No	A
Chloromethane	NA	NA	NA	NA	No	A	No	A
cis-1,2-Dichloroethene	NA	NA	NA	NA	No	A	No	A
cis-1,3-Dichloropropene	NA	NA	NA	NA	No	A	No	A
Dibromochloromethane	NA	NA	NA	NA	No	A	No	A
Ethylbenzene	NA	NA	NA	NA	No	A	No	F
Methylene chloride	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
N-Hexane	NA	NA	NA	NA	No	A	No	A
Styrene	NA	NA	NA	NA	No	A	No	F
Tetrachloroethylene (PCE)	NA	NA	NA	NA	Uncertainty	B	Yes	E
Toluene	NA	NA	NA	NA	No	A	No	F
total Xylenes	NA	NA	NA	NA	No	A	No	F
trans-1,2-Dichloroethene	NA	NA	NA	NA	No	A	No	A
trans-1,3-Dichloropropene	NA	NA	NA	NA	No	A	No	A
Trichloroethylene (TCE)	NA	NA	NA	NA	Yes	E	Uncertainty	B
Vinyl chloride	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Semivolatile Organic Compounds								
1,2,4-Trichlorobenzene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
1,2-Dichlorobenzene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
1,3-Dichlorobenzene	NA	NA	NA	NA	No	A	No	A
1,4-Dichlorobenzene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2,2-Oxybis(1-chloro)propane	NA	NA	NA	NA	No	C	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	No	A	No	A
2,4,6-Trichlorophenol	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B

**TABLE 4-7
SUMMARY OF HUMAN HEALTH COPC EVALUATION**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Groundwater		Sediment		Soil	
	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale
2,4-Dichlorophenol	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2,4-Dimethylphenol	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2,4-Dinitrophenol	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2,4-Dinitrotoluene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2,6-Dinitrotoluene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2-Chloronaphthalene	NA	NA	NA	NA	No	A	No	A
2-Chlorophenol	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2-Methylnaphthalene	NA	NA	NA	NA	No	A	No	A
2-Methylphenol	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
2-Nitroaniline	NA	NA	NA	NA	No	A	No	A
2-Nitrophenol	NA	NA	NA	NA	No	A	No	A
3,3'-Dichlorobenzidine	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
3-Nitroaniline	NA	NA	NA	NA	No	A	No	A
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	No	C	No	C
4-Bromophenyl phenyl ether	NA	NA	NA	NA	No	C	No	C
4-Chloro-3-methylphenol	NA	NA	NA	NA	No	A	No	A
4-Chloroaniline	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	No	C	No	C
4-Methylphenol	NA	NA	NA	NA	No	A	No	A
4-Nitroaniline	NA	NA	NA	NA	No	A	No	A
4-Nitrophenol	NA	NA	NA	NA	No	A	No	A
Acenaphthene	NA	NA	NA	NA	No	A	No	F
Acenaphthylene	NA	NA	NA	NA	No	A	No	F
Anthracene	NA	NA	NA	NA	No	A	No	F
Benzo(a)anthracene	NA	NA	NA	NA	Uncertainty	B	Yes	E
Benzo(a)pyrene	NA	NA	NA	NA	Uncertainty	B	No	F
Benzo(b)fluoranthene	NA	NA	NA	NA	Uncertainty	B	No	F
Benzo(g,h,i)perylene	NA	NA	NA	NA	No	A	No	F
Benzo(k)fluoranthene	NA	NA	NA	NA	No	A	No	F
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	No	C	No	C
bis(2-Chloroethyl) ether	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
bis(2-Ethylhexyl) phthalate	NA	NA	NA	NA	No	A	No	F
Butyl benzyl phthalate	NA	NA	NA	NA	No	A	No	A
Carbazole	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Chrysene	NA	NA	NA	NA	No	A	No	F
Di-n-butyl phthalate	NA	NA	NA	NA	No	A	No	A
Di-n-octyl phthalate	NA	NA	NA	NA	No	A	No	A
Dibenz(a,h)anthracene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Dibenzofuran	NA	NA	NA	NA	No	A	No	A
Diethyl phthalate	NA	NA	NA	NA	No	A	No	A
Dimethyl phthalate	NA	NA	NA	NA	No	A	No	A
Fluoranthene	NA	NA	NA	NA	No	A	No	F
Fluorene	NA	NA	NA	NA	No	A	No	F
Hexachlorobutadiene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B

**TABLE 4-7
SUMMARY OF HUMAN HEALTH COPC EVALUATION**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Groundwater		Sediment		Soil	
	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale
Hexachlorocyclopentadiene	NA	NA	NA	NA	No	A	No	A
Hexachlorobenzene	NA	NA	NA	NA	Uncertainty	B	NA	NA
Hexachloroethane	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Indeno(1,2,3-c,d)pyrene	NA	NA	NA	NA	Uncertainty	B	No	F
Isophorone	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
N-Nitrosodiphenylamine	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Naphthalene	NA	NA	NA	NA	No	A	No	F
Nitrobenzene	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Pentachlorophenol	NA	NA	NA	NA	Uncertainty	B	Uncertainty	B
Phenanthrene	NA	NA	NA	NA	No	A	No	F
Phenol	NA	NA	NA	NA	No	A	No	A
Pyrene	NA	NA	NA	NA	No	A	No	F
Inorganics								
Aluminum	Uncertainty	G	NA	NA	No	F	No	F
Antimony	No	C	NA	NA	Yes	D	Yes	D
Arsenic	No	C	NA	NA	Yes	E	Yes	D
Barium	No	F	NA	NA	Yes	D	Yes	D
Beryllium	No	C	NA	NA	Yes	D	Yes	E
Boron	No	F	NA	NA	No	F	No	F
Cadmium	No	C	NA	NA	No	A	No	F
Calcium	No	H	NA	NA	No	H	No	H
Chromium	No	C	NA	NA	Yes	E	Yes	E
Cobalt	No	C	NA	NA	No	F	No	F
Copper	No	C	NA	NA	No	F	No	F
Iron	No	F	NA	NA	No	F	No	F
Lead	No	C	NA	NA	No	F	No	F
Magnesium	No	H	NA	NA	No	H	No	H
Manganese	No	F	NA	NA	No	F	No	F
Mercury	Uncertainty	B	NA	NA	No	F	No	F
Nickel	No	A	NA	NA	Yes	D	Yes	E
Potassium	No	H	NA	NA	No	H	No	H
Selenium	No	A	NA	NA	Yes	E	Yes	D
Silver	Uncertainty	B	NA	NA	No	A	Uncertainty	B
Sodium	No	H	NA	NA	No	H	No	H
Thallium	No	C	NA	NA	No	A	Uncertainty	B
Vanadium	Uncertainty	G	NA	NA	No	F	No	F
Zinc	No	F	NA	NA	No	F	No	F
Other Parameters								
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	Uncertainty	G
Pesticides (Organochlorine)								
4,4'-DDD	Uncertainty	B	NA	NA	Yes	E	Yes	E
4,4'-DDE	Uncertainty	B	NA	NA	No	F	Yes	E
4,4'-DDT	Uncertainty	B	NA	NA	No	F	Yes	E

**TABLE 4-7
SUMMARY OF HUMAN HEALTH COPC EVALUATION**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Groundwater		Sediment		Soil	
	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale	COPC (yes/no)	Rationale
Aldrin	Uncertainty	B	NA	NA	No	F	Yes	E
alpha-BHC	No	C	NA	NA	Uncertainty	B	Uncertainty	B
alpha-Chlordane	Uncertainty	B	NA	NA	No	A	No	F
alpha-Endosulfan	No	C	NA	NA	No	A	No	F
beta-BHC	No	C	NA	NA	Uncertainty	B	Yes	E
beta-Endosulfan	No	C	NA	NA	No	A	No	F
Chlordane	Uncertainty	B	NA	NA	No	A	Uncertainty	B
delta-BHC	No	C	NA	NA	No	A	No	A
Dieldrin	No	C	NA	NA	Yes	E	Yes	E
Endosulfan sulfate	No	C	NA	NA	No	A	No	F
Endrin	No	A	NA	NA	Uncertainty	B	Yes	E
Endrin aldehyde	No	A	NA	NA	Uncertainty	B	Yes	E
Endrin Ketone	No	A	NA	NA	Uncertainty	B	Yes	E
gamma-BHC (Lindane)	No	C	NA	NA	Uncertainty	B	Yes	E
gamma-Chlordane	Uncertainty	B	NA	NA	No	A	Yes	E
Heptachlor	Uncertainty	B	NA	NA	No	A	No	F
Heptachlor epoxide	No	C	NA	NA	Uncertainty	B	No	F
Hexachlorobenzene	Uncertainty	G	NA	NA	NA	NA	Yes	E
Isodrin	No	C	NA	NA	No	C	Uncertainty	G
Methoxychlor	No	C	NA	NA	No	F	No	F
Toxaphene	No	C	NA	NA	No	A	Uncertainty	B
Polychlorinated Biphenyls (PCB)								
PCB-1016	NA	NA	NA	NA	No	A	No	A
PCB-1221	NA	NA	NA	NA	No	A	No	A
PCB-1232	NA	NA	NA	NA	No	A	No	A
PCB-1242	NA	NA	NA	NA	No	A	No	A
PCB-1248	NA	NA	NA	NA	No	A	No	A
PCB-1254	NA	NA	NA	NA	No	A	No	A
PCB-1260	NA	NA	NA	NA	No	A	No	A

- A - Chemical was not detected and the reporting limit does not exceed the screening concentration.
- B - Chemical was not detected, but reporting limit was equal to or exceeded screening concentration.
- C - Chemical was not detected and there is no screening concentration.
- D - Chemical was detected and was equal to or exceeded screening concentration, but did not exceed background.
- E - Chemical was detected and was equal to or exceeded screening concentration and background, if applicable.
- F - Chemical was detected and did not exceed screening concentration.
- G - Chemical was detected, but no screening value was available.
- H - Chemical was detected, but it is an essential nutrient.
- NA - Not Analyzed or not applicable.

Table Created By: MAM
Table Checked By: CMW

**TABLE 4-8
SUMMARY OF ECOLOGICAL**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Sediment		Soil	
	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale
Volatile Organic Compounds						
1,1,1-Trichloroethane	NA	NA	No	A	No	A
1,1,2,2-Tetrachloroethane	NA	NA	No	A	No	A
1,1,2-Trichloroethane	NA	NA	No	A	No	A
1,1-Dichloroethane	NA	NA	No	A	No	A
1,1-Dichloroethene	NA	NA	No	A	No	A
1,2-Dichloroethane (EDC)	NA	NA	No	A	No	A
1,2-Dichloropropane	NA	NA	No	F	No	F
2-Butanone (MEK)	NA	NA	No	A	No	A
2-Hexanone	NA	NA	No	A	No	A
4-Methyl-2-pentanone (MIBK)	NA	NA	No	A	No	A
Acetone	NA	NA	No	A	No	F
Benzene	NA	NA	No	A	No	F
Bromodichloromethane	NA	NA	No	A	No	A
Bromoform	NA	NA	No	A	No	A
Bromomethane	NA	NA	No	A	No	A
Carbon disulfide	NA	NA	Uncertainty	B	No	A
Carbon tetrachloride	NA	NA	No	A	No	A
Chlorobenzene	NA	NA	No	A	No	F
Chloroethane	NA	NA	No	A	No	C
Chloroform	NA	NA	No	A	No	A
Chloromethane	NA	NA	No	A	No	A
cis-1,2-Dichloroethene	NA	NA	No	A	No	A
cis-1,3-Dichloropropene	NA	NA	Uncertainty	B	No	A
Dibromochloromethane	NA	NA	No	A	No	A
Ethylbenzene	NA	NA	No	A	No	F
Methylene chloride	NA	NA	No	A	No	A
N-Hexane	NA	NA	No	C	No	C
Styrene	NA	NA	No	A	No	F
Tetrachloroethylene (PCE)	NA	NA	No	A	No	F
Toluene	NA	NA	No	A	No	F
total Xylenes	NA	NA	No	A	Yes	E
trans-1,2-Dichloroethene	NA	NA	No	A	No	A
trans-1,3-Dichloropropene	NA	NA	No	A	No	A
Trichloroethylene (TCE)	NA	NA	No	F	No	A
Vinyl chloride	NA	NA	No	A	No	A
Semivolatile Organic Compounds						
1,2,4-Trichlorobenzene	NA	NA	No	A	No	A
1,2-Dichlorobenzene	NA	NA	Uncertainty	B	No	A
1,3-Dichlorobenzene	NA	NA	No	A	No	A
1,4-Dichlorobenzene	NA	NA	Uncertainty	B	No	A
2,2-Oxybis(1-chloro)propane	NA	NA	No	C	NA	NA
2,4,5-Trichlorophenol	NA	NA	Uncertainty	B	Uncertainty	B
2,4,6-Trichlorophenol	NA	NA	Uncertainty	B	No	A

**TABLE 4-8
SUMMARY OF ECOLOGICAL**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Sediment		Soil	
	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale
2,4-Dichlorophenol	NA	NA	Uncertainty	B	No	A
2,4-Dimethylphenol	NA	NA	Uncertainty	B	Uncertainty	B
2,4-Dinitrophenol	NA	NA	Uncertainty	B	No	A
2,4-Dinitrotoluene	NA	NA	Uncertainty	B	Uncertainty	B
2,6-Dinitrotoluene	NA	NA	Uncertainty	B	Uncertainty	B
2-Chloronaphthalene	NA	NA	No	A	Uncertainty	B
2-Chlorophenol	NA	NA	Uncertainty	B	Uncertainty	B
2-Methylnaphthalene	NA	NA	Uncertainty	B	No	A
2-Methylphenol	NA	NA	Uncertainty	B	No	A
2-Nitroaniline	NA	NA	No	A	No	A
2-Nitrophenol	NA	NA	No	A	No	A
3,3'-Dichlorobenzidine	NA	NA	Uncertainty	B	Uncertainty	B
3-Nitroaniline	NA	NA	No	A	Uncertainty	B
4,6-Dinitro-2-methylphenol	NA	NA	Uncertainty	B	No	C
4-Bromophenyl phenyl ether	NA	NA	Uncertainty	B	No	C
4-Chloro-3-methylphenol	NA	NA	Uncertainty	B	No	A
4-Chloroaniline	NA	NA	No	A	Uncertainty	B
4-Chlorophenyl phenyl ether	NA	NA	No	A	No	C
4-Methylphenol	NA	NA	No	A	No	A
4-Nitroaniline	NA	NA	No	A	No	A
4-Nitrophenol	NA	NA	Uncertainty	B	Uncertainty	B
Acenaphthene	NA	NA	Uncertainty	B	Yes	E
Acenaphthylene	NA	NA	Uncertainty	B	No	F
Anthracene	NA	NA	Uncertainty	B	Yes	E
Benzo(a)anthracene	NA	NA	Uncertainty	B	Yes	E
Benzo(a)pyrene	NA	NA	Uncertainty	B	Yes	E
Benzo(b)fluoranthene	NA	NA	Uncertainty	B	Yes	E
Benzo(g,h,i)perylene	NA	NA	Uncertainty	B	Yes	E
Benzo(k)fluoranthene	NA	NA	Uncertainty	B	Yes	E
bis(2-Chloroethoxy)methane	NA	NA	Uncertainty	B	Uncertainty	B
bis(2-Chloroethyl) ether	NA	NA	No	A	No	A
bis(2-Ethylhexyl) phthalate	NA	NA	Uncertainty	B	Yes	E
Butyl benzyl phthalate	NA	NA	No	A	Uncertainty	B
Carbazole	NA	NA	No	A	No	C
Chrysene	NA	NA	Uncertainty	B	Yes	E
Di-n-butyl phthalate	NA	NA	No	A	No	A
Di-n-octyl phthalate	NA	NA	No	A	No	A
Dibenz(a,h)anthracene	NA	NA	Uncertainty	B	No	A
Dibenzofuran	NA	NA	No	A	No	C
Diethyl phthalate	NA	NA	Uncertainty	B	No	A
Dimethyl phthalate	NA	NA	No	A	No	A
Fluoranthene	NA	NA	Uncertainty	B	Yes	E
Fluorene	NA	NA	Uncertainty	B	Yes	E
Hexachlorobenzene	NA	NA	Uncertainty	B	NA	NA

**TABLE 4-8
SUMMARY OF ECOLOGICAL**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Sediment		Soil	
	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale
Hexachlorobutadiene	NA	NA	Uncertainty	B	Uncertainty	B
Hexachlorocyclopentadiene	NA	NA	Uncertainty	B	No	A
Hexachloroethane	NA	NA	Uncertainty	B	Uncertainty	B
Indeno(1,2,3-c,d)pyrene	NA	NA	Uncertainty	B	Yes	E
Isophorone	NA	NA	Uncertainty	B	No	A
N-Nitroso-di-n-propylamine	NA	NA	No	C	Uncertainty	B
N-Nitrosodiphenylamine	NA	NA	Uncertainty	B	No	A
Naphthalene	NA	NA	Uncertainty	B	No	F
Nitrobenzene	NA	NA	Uncertainty	B	No	A
Pentachlorophenol	NA	NA	Uncertainty	B	Uncertainty	B
Phenanthrene	NA	NA	Uncertainty	B	Yes	E
Phenol	NA	NA	Uncertainty	B	No	A
Pyrene	NA	NA	Uncertainty	B	Yes	E
Inorganics						
Aluminum	Yes	E	No	F	Uncertainty	G
Antimony	No	A	No	F	No	F
Arsenic	No	A	Yes	E	Yes	D
Barium	No	F	Uncertainty	G	No	F
Beryllium	Uncertainty	B	Uncertainty	G	No	F
Boron	No	F	Uncertainty	G	Yes	E
Cadmium	Uncertainty	B	No	A	No	F
Calcium	No	F,H	Uncertainty	G,H	Uncertainty	G,H
Chromium	No	A	No	F	Yes	E
Cobalt	Uncertainty	B	No	F	No	F
Copper	No	A	No	F	No	F
Iron	No	F	No	F	Yes	E
Lead	No	A	No	F	No	F
Magnesium	No	F,H	Uncertainty	G,H	Uncertainty	G,H
Manganese	No	F	Yes	E	Yes	D
Mercury	No	A	Yes	D	Yes	D
Nickel	No	A	No	F	No	F
Potassium	No	F,H	Uncertainty	G,H	Uncertainty	G,H
Selenium	No	A	Yes	E	Yes	D
Silver	Uncertainty	B	No	A	Uncertainty	B
Sodium	No	F,H	Uncertainty	G,H	Uncertainty	G,H
Thallium	Uncertainty	B	No	C	Uncertainty	B
Vanadium	No	F	Uncertainty	G	No	F
Zinc	No	F	Yes	E	No	F
Other Parameters						
2,3,7,8-TCDD	NA	NA	NA	NA	Yes	E
Pesticides (Organochlorine)						
4,4'-DDD	Uncertainty	B	Yes	E	Yes	E
4,4'-DDE	No	A	Yes	E	Yes	E
4,4'-DDT	Uncertainty	B	Yes	E	Yes	E

**TABLE 4-8
SUMMARY OF ECOLOGICAL**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Surface Water		Sediment		Soil	
	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale	COPEC (yes/no)	Rationale
Aldrin	No	A	Yes	E	Yes	E
alpha-BHC	No	A	Uncertainty	B	Uncertainty	B
alpha-Chlordane	No	A	No	C	Yes	E
alpha-Endosulfan	No	A	Uncertainty	B	No	F
beta-BHC	No	A	Uncertainty	B	Yes	E
beta-Endosulfan	No	A	Uncertainty	B	No	F
Chlordane	Uncertainty	B	Uncertainty	B	Uncertainty	B
delta-BHC	No	A	Uncertainty	B	Uncertainty	B
Dieldrin	No	A	Yes	E	Yes	E
Endosulfan sulfate	Uncertainty	B	Uncertainty	B	Yes	E
Endrin	Uncertainty	B	Uncertainty	B	Yes	E
Endrin aldehyde	No	A	No	A	Yes	E
Endrin Ketone	No	C	No	C	Uncertainty	G
gamma-BHC (Lindane)	No	A	Uncertainty	B	Yes	E
gamma-Chlordane	No	A	No	C	Yes	E
Heptachlor	Uncertainty	B	Uncertainty	B	Yes	E
Heptachlor epoxide	Uncertainty	B	Uncertainty	B	Yes	E
Hexachlorobenzene	Yes	E	NA	NA	Yes	E
Isodrin	Uncertainty	B	Uncertainty	B	Yes	E
Methoxychlor	Uncertainty	B	Yes	E	Yes	E
Toxaphene	Uncertainty	B	Uncertainty	B	Uncertainty	B
Polychlorinated Biphenyls (PCB)						
PCB-1016	NA	NA	Uncertainty	B	No	C
PCB-1221	NA	NA	Uncertainty	B	No	C
PCB-1232	NA	NA	No	C	No	C
PCB-1242	NA	NA	No	C	No	C
PCB-1248	NA	NA	No	A	No	C
PCB-1254	NA	NA	No	A	No	C
PCB-1260	NA	NA	Uncertainty	B	No	C

- A - Chemical was not detected and the reporting limit does not exceed the screening concentration.
- B - Chemical was not detected, but reporting limit was equal to or exceeded screening concentration.
- C - Chemical was not detected and there is no screening concentration.
- D - Chemical was detected and was equal to or exceeded screening concentration, but did not exceed background.
- E - Chemical was detected and was equal to or exceeded screening concentration and background, if applicable.
- F - Chemical was detected and did not exceed screening concentration.
- G - Chemical was detected, but no screening value was available.
- H - Chemical was detected, but it is an essential nutrient.
- I - If pH<5.5, Aluminum is a COPEC, otherwise it is not.
- NA - Not Analyzed or not applicable.

Table Created By: MAM

Table Checked By: CMW

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R01-SS-04			AUS-0A07-002-SS-0X			AUS-0A07-R02-SS-03			AUS-0A07-R02-SS-04			AUS-0A07-R02-SS-05			AUS-0A07-R03-SS-04			AUS-0A07-R05-SS-04		
			May 22, 2001			March 23, 2001			May 22, 2001			May 22, 2001			May 22, 2001			May 22, 2001					
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,1,1-Trichloroethane	ND	0 / 17																					
1,1,2,2-Tetrachloroethane	ND	0 / 17																					
1,1,2-Trichloroethane	ND	0 / 17																					
1,1-Dichloroethane	ND	0 / 17																					
1,1-Dichloroethene	ND	0 / 17																					
1,2-Dichloroethane	ND	0 / 17																					
1,2-Dichloropropane	660	5 / 17																					
2-Butanone	ND	0 / 17																					
2-Hexanone	ND	0 / 17																					
4-Methyl-2-Pentanone	ND	0 / 17																					
Acetone	24	8 / 17																					
Benzene	8	3 / 17																					
Bromodichloromethane	ND	0 / 17																					
Bromoform	ND	0 / 17																					
Bromomethane	ND	0 / 17																					
Carbon Disulfide	ND	0 / 17																					
Carbon Tetrachloride	ND	0 / 17																					
Chlorobenzene	48	3 / 17																					
Chloroethane	ND	0 / 17																					
Chloroform	ND	0 / 17																					
Chloromethane	ND	0 / 17																					
cis-1,2-Dichloroethene	ND	0 / 17																					
cis-1,3-Dichloropropene	ND	0 / 17																					
Dibromochloromethane	ND	0 / 17																					
Ethylbenzene	41	2 / 17																					
Methylene Chloride	ND	0 / 17																					
n-Hexane	ND	0 / 17																					
Styrene	28	2 / 17																					
Tetrachloroethene	48	2 / 17																					
Toluene	11	3 / 17																					
trans-1,2-Dichloroethene	ND	0 / 17																					
trans-1,3-Dichloropropene	ND	0 / 17																					
Trichloroethene	ND	0 / 17																					
Vinyl Chloride	ND	0 / 17																					
Xylene (total)	4500	3 / 17																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R01-SS-04			AUS-0A07-002-SS-0X			AUS-0A07-R02-SS-03			AUS-0A07-R02-SS-04			AUS-0A07-R02-SS-05			AUS-0A07-R03-SS-04			AUS-0A07-R05-SS-04			
			May 22, 2001			March 23, 2001			May 22, 2001			May 22, 2001			May 22, 2001			May 22, 2001			May 22, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,2,4-Trichlorobenzene	ND	0 / 14																						
1,2-Dichlorobenzene	ND	0 / 14																						
1,3-Dichlorobenzene	ND	0 / 14																						
1,4-Dichlorobenzene	ND	0 / 14																						
2,2-Oxybis(1-chloro)propane	ND	0 / 14																						
2,4,5-Trichlorophenol	ND	0 / 14																						
2,4,6-Trichlorophenol	ND	0 / 14																						
2,4-Dichlorophenol	ND	0 / 14																						
2,4-Dimethylphenol	ND	0 / 14																						
2,4-Dinitrophenol	ND	0 / 14																						
2,4-Dinitrotoluene	ND	0 / 14																						
2,6-Dinitrotoluene	ND	0 / 14																						
2-Chloronaphthalene	ND	0 / 14																						
2-Chlorophenol	ND	0 / 14																						
2-Methylnaphthalene	ND	0 / 14																						
2-Methylphenol (o-cresol)	ND	0 / 14																						
2-Nitroaniline	ND	0 / 14																						
2-Nitrophenol	ND	0 / 14																						
3,3-Dichlorobenzidine	ND	0 / 14																						
3-Nitroaniline	ND	0 / 14																						
4,6-Dinitro-2-methylphenol	ND	0 / 14																						
4-Bromophenyl-phenylether	ND	0 / 14																						
4-Chloro-3-methylphenol	ND	0 / 14																						
4-Chloroaniline	ND	0 / 14																						
4-Chlorophenyl-phenylether	ND	0 / 14																						
4-Methylphenol (p-cresol)	ND	0 / 14																						
4-Nitroaniline	ND	0 / 14																						
4-Nitrophenol	ND	0 / 14																						
Acenaphthene	ND	0 / 14																						
Acenaphthylene	ND	0 / 14																						
Anthracene	ND	0 / 14																						
Benzo(a)anthracene	ND	0 / 14																						
Benzo(a)pyrene	ND	0 / 14																						
Benzo(b)fluoranthene	ND	0 / 14																						
Benzo(g,h,i)perylene	ND	0 / 14																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R01-SS-04			AUS-0A07-002-SS-0X			AUS-0A07-R02-SS-03			AUS-0A07-R02-SS-04			AUS-0A07-R02-SS-05			AUS-0A07-R03-SS-04			AUS-0A07-R05-SS-04		
			May 22, 2001			March 23, 2001			May 22, 2001			May 22, 2001			May 22, 2001			May 22, 2001					
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14																					
bis(2-Chloroethoxy)methane	ND	0 / 14																					
bis(2-Chloroethyl)ether	ND	0 / 14																					
bis(2-Ethylhexyl)phthalate	2500	1 / 14																					
Butylbenzylphthalate	ND	0 / 14																					
Carbazole	ND	0 / 14																					
Chrysene	ND	0 / 14																					
Di-n-butylphthalate	ND	0 / 14																					
Di-n-octylphthalate	ND	0 / 14																					
Dibenz(a,h)anthracene	ND	0 / 14																					
Dibenzofuran	ND	0 / 14																					
Diethylphthalate	ND	0 / 14																					
Dimethylphthalate	ND	0 / 14																					
Fluoranthene	ND	0 / 14																					
Fluorene	ND	0 / 14																					
Hexachlorobenzene	ND	0 / 14																					
Hexachlorobutadiene	ND	0 / 14																					
Hexachlorocyclopentadiene	ND	0 / 14																					
Hexachloroethane	ND	0 / 14																					
Indeno(1,2,3-cd)pyrene	ND	0 / 14																					
Isophorone	ND	0 / 14																					
N-Nitroso-di-n-propylamine	ND	0 / 14																					
N-Nitrosodiphenylamine	ND	0 / 14																					
Naphthalene	ND	0 / 14																					
Nitrobenzene	ND	0 / 14																					
Pentachlorophenol	ND	0 / 14																					
Phenanthrene	ND	0 / 14																					
Phenol	ND	0 / 14																					
Pyrene	ND	0 / 14																					
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	AUS-0A07-R01-SS-04		AUS-0A07-002-SS-0X			AUS-0A07-R02-SS-03			AUS-0A07-R02-SS-04			AUS-0A07-R02-SS-05			AUS-0A07-R03-SS-04			AUS-0A07-R05-SS-04					
			May 22, 2001			March 23, 2001			May 22, 2001			May 22, 2001			May 22, 2001			May 22, 2001					
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual			
Benzo(g,h,i)perylene	15 J	1 / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	59	28					470000	16000		150000	16000		21000	2900		2.6	2.9	J	130	29	
Alpha-BHC	ND	0 / 105	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
Alpha-Chlordane	490	4 / 104	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
beta-BHC	ND	0 / 104	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
delta-BHC	ND	0 / 104	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
Dieldrin	190000 J	92 / 104	81	57					170000	33000		40000	6500		13000	590		2	6	J	55	59	J
Endosulfan I	ND	0 / 104	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
Endosulfan II	5.3 J	1 / 104	<	57	U				<	3300	U	<	6500	U	<	590	U	<	6	U	<	59	U
Endosulfan sulfate	ND	0 / 104	<	57	U				<	3300	U	<	6500	U	<	590	U	<	6	U	<	59	U
Endrin	12000	30 / 105	<	57	U				1600	3300	J	<	6500	U	<	590	U	<	6	U	<	59	U
Endrin aldehyde	9000	16 / 104	<	57	U				9000	3300		<	6500	U	770	590		<	6	U	<	59	U
Endrin ketone	20000	29 / 102	<	57	U				20000	3300		4200	6500	J	1700	590		<	6	U	<	59	U
gamma-BHC (Lindane)	ND	0 / 105	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
gamma-Chlordane	1600	11 / 104	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
Heptachlor	ND	0 / 104	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
Heptachlor epoxide	ND	0 / 105	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
Hexachlorobenzene	2700	11 / 105	<	28	U				<	1600	U	<	3200	U	<	290	U	<	2.9	U	<	29	U
Isodrin	49000 J	29 / 103	<	57	U				46000	33000		19000	6500		2300	590		<	6	U	<	59	U
Methoxychlor	ND	0 / 105	<	280	U				<	16000	U	<	32000	U	<	2900	U	<	29	U	<	290	U
4,4-DDD	12000	30 / 104	<	57	U				8600	3300		<	6500	U	690	590		<	6	U	<	59	U
4,4-DDE	4800	14 / 104	<	57	U				<	3300	U	<	6500	U	<	590	U	<	6	U	<	59	U
4,4-DDT	100000	38 / 103	<	57	U				<	3300	U	<	6500	U	<	590	U	<	6	U	<	59	U
Technical Chlordane	ND	0 / 104	<	110	U				<	6400	U	<	13000	U	<	1100	U	<	12	U	<	110	U
Toxaphene	ND	0 / 104	<	560	U				<	33000	U	<	64000	U	<	5800	U	<	59	U	<	580	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R01-SS-04			AUS-0A07-002-SS-0X			AUS-0A07-R02-SS-03			AUS-0A07-R02-SS-04			AUS-0A07-R02-SS-05			AUS-0A07-R03-SS-04			AUS-0A07-R05-SS-04			
			May 22, 2001			March 23, 2001			May 22, 2001			May 22, 2001			May 22, 2001			May 22, 2001						
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																								
Aroclor 1016	ND	0/3																						
Aroclor 1221	ND	0/3																						
Aroclor 1232	ND	0/3																						
Aroclor 1242	ND	0/3																						
Aroclor 1248	ND	0/3																						
Aroclor 1254	ND	0/3																						
Aroclor 1260	ND	0/3																						
DIOXINS/FURANS (ng/kg)																								
1,2,3,4,6,7,8-HpCDD	55.5	3/3				17.8	0.1788																	
1,2,3,4,6,7,8-HpCDF	7.31	3/3				6.66	0.1221																	
1,2,3,4,7,8,9-HpCDF	1.42	2/3				1.42	0.1488																	
1,2,3,4,7,8-HxCDD	0.59	3/3				0.214	0.0858																	
1,2,3,4,7,8-HxCDF	2.29	3/3				2.29	0.1249																	
1,2,3,6,7,8-HxCDD	1.3	3/3				0.51	0.0903																	
1,2,3,6,7,8-HxCDF	0.98	3/3				0.98	0.119																	
1,2,3,7,8,9-HxCDD	0.997	3/3				0.303	0.0813																	
1,2,3,7,8,9-HxCDF	1.14	1/3				1.14	0.1454																	
1,2,3,7,8-PeCDD	0.373	3/3				0.126	0.0625																	
1,2,3,7,8-PeCDF	3.5	3/3				3.5	0.0456																	
2,3,4,6,7,8-HxCDF	0.765	2/3				0.765	0.1325																	
2,3,4,7,8-PeCDF	3.35	3/3				3.35	0.0445																	
2,3,7,8-TCDD	0.289	1/3				<	0.0917	U																
2,3,7,8-TCDF	4.16	2/3				4.16	0.1294																	
OCDD	1250	3/3				878	0.1684																	
OCDF	33.4	3/3				33.4	0.1226																	
Total HpCDDs	166	3/3				44.1	0.1788																	
Total HpCDFs	21.4	3/3				14.7	0.1341																	
Total HxCDDs	14.9	3/3				3.54	0.447																	
Total HxCDFs	9.98	3/3				9.53	0.1303																	
Total PeCDDs	3.55	3/3				0.126	0.5193																	
Total PeCDFs	15.6	3/3				15.6	0.0452																	
Total TCDDs	0.351	1/3				<	0.3364	U																
Total TCDFs	15.2	2/3				15.2	0.1294																	

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID DATE COLLECTED			AUS-0A07-R01-SS-04 May 22, 2001			AUS-0A07-002-SS-0X March 23, 2001			AUS-0A07-R02-SS-03 May 22, 2001			AUS-0A07-R02-SS-04 May 22, 2001			AUS-0A07-R02-SS-05 May 22, 2001			AUS-0A07-R03-SS-04 May 22, 2001			AUS-0A07-R05-SS-04 May 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18																					
Antimony	0.63	7 / 18																					
Arsenic	9.6	18 / 18																					
Barium	153	18 / 18																					
Beryllium	1.2	17 / 18																					
Boron	6.2	10 / 18																					
Cadmium	0.39	5 / 18																					
Calcium	217000	18 / 18																					
Chromium	25.6	18 / 18																					
Cobalt	15.1	18 / 18																					
Copper	23.5	18 / 18																					
Iron	34000	18 / 18																					
Lead	58.1	18 / 18																					
Magnesium	19700	18 / 18																					
Manganese	1370	18 / 18																					
Mercury	0.053	3 / 18																					
Nickel	22.9	18 / 18																					
Potassium	930	18 / 18																					
Selenium	0.78	1 / 18																					
Silver	ND	0 / 18																					
Sodium	1360	18 / 18																					
Thallium	ND	0 / 18																					
Vanadium	38.1	18 / 18																					
Zinc	95.4	18 / 18																					

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	Maximum Frequency		AUS-0A07-031-SS-0X			AUS-0A07-032-SS-0X			AUS-0A07-032-SS-02			AUS-0A07-033-SS-0X			AUS-0A07-R33-SS-02			AUS-0A07-034-SS-0X			AUS-0A07-035-SS-0X			
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			May 22, 2001			March 21, 2001			March 21, 2001			
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
VOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,1,1-Trichloroethane	ND	0 / 17																						
1,1,2,2-Tetrachloroethane	ND	0 / 17																						
1,1,2-Trichloroethane	ND	0 / 17																						
1,1-Dichloroethane	ND	0 / 17																						
1,1-Dichloroethene	ND	0 / 17																						
1,2-Dichloroethane	ND	0 / 17																						
1,2-Dichloropropane	660	5 / 17																						
2-Butanone	ND	0 / 17																						
2-Hexanone	ND	0 / 17																						
4-Methyl-2-Pentanone	ND	0 / 17																						
Acetone	24	8 / 17																						
Benzene	8	3 / 17																						
Bromodichloromethane	ND	0 / 17																						
Bromoform	ND	0 / 17																						
Bromomethane	ND	0 / 17																						
Carbon Disulfide	ND	0 / 17																						
Carbon Tetrachloride	ND	0 / 17																						
Chlorobenzene	48	3 / 17																						
Chloroethane	ND	0 / 17																						
Chloroform	ND	0 / 17																						
Chloromethane	ND	0 / 17																						
cis-1,2-Dichloroethene	ND	0 / 17																						
cis-1,3-Dichloropropene	ND	0 / 17																						
Dibromochloromethane	ND	0 / 17																						
Ethylbenzene	41	2 / 17																						
Methylene Chloride	ND	0 / 17																						
n-Hexane	ND	0 / 17																						
Styrene	28	2 / 17																						
Tetrachloroethene	48	2 / 17																						
Toluene	11	3 / 17																						
trans-1,2-Dichloroethene	ND	0 / 17																						
trans-1,3-Dichloropropene	ND	0 / 17																						
Trichloroethene	ND	0 / 17																						
Vinyl Chloride	ND	0 / 17																						
Xylene (total)	4500	3 / 17																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-031-SS-0X			AUS-0A07-032-SS-0X			AUS-0A07-032-SS-02			AUS-0A07-033-SS-0X			AUS-0A07-R33-SS-02			AUS-0A07-034-SS-0X			AUS-0A07-035-SS-0X		
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			May 22, 2001			March 21, 2001			March 21, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,2,4-Trichlorobenzene	ND	0 / 14																					
1,2-Dichlorobenzene	ND	0 / 14																					
1,3-Dichlorobenzene	ND	0 / 14																					
1,4-Dichlorobenzene	ND	0 / 14																					
2,2-Oxybis(1-chloro)propane	ND	0 / 14																					
2,4,5-Trichlorophenol	ND	0 / 14																					
2,4,6-Trichlorophenol	ND	0 / 14																					
2,4-Dichlorophenol	ND	0 / 14																					
2,4-Dimethylphenol	ND	0 / 14																					
2,4-Dinitrophenol	ND	0 / 14																					
2,4-Dinitrotoluene	ND	0 / 14																					
2,6-Dinitrotoluene	ND	0 / 14																					
2-Chloronaphthalene	ND	0 / 14																					
2-Chlorophenol	ND	0 / 14																					
2-Methylnaphthalene	ND	0 / 14																					
2-Methylphenol (o-cresol)	ND	0 / 14																					
2-Nitroaniline	ND	0 / 14																					
2-Nitrophenol	ND	0 / 14																					
3,3-Dichlorobenzidine	ND	0 / 14																					
3-Nitroaniline	ND	0 / 14																					
4,6-Dinitro-2-methylphenol	ND	0 / 14																					
4-Bromophenyl-phenylether	ND	0 / 14																					
4-Chloro-3-methylphenol	ND	0 / 14																					
4-Chloroaniline	ND	0 / 14																					
4-Chlorophenyl-phenylether	ND	0 / 14																					
4-Methylphenol (p-cresol)	ND	0 / 14																					
4-Nitroaniline	ND	0 / 14																					
4-Nitrophenol	ND	0 / 14																					
Acenaphthene	ND	0 / 14																					
Acenaphthylene	ND	0 / 14																					
Anthracene	ND	0 / 14																					
Benzo(a)anthracene	ND	0 / 14																					
Benzo(a)pyrene	ND	0 / 14																					
Benzo(b)fluoranthene	ND	0 / 14																					
Benzo(g,h,i)perylene	ND	0 / 14																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-031-SS-0X			AUS-0A07-032-SS-0X			AUS-0A07-032-SS-02			AUS-0A07-033-SS-0X			AUS-0A07-R33-SS-02			AUS-0A07-034-SS-0X			AUS-0A07-035-SS-0X		
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			May 22, 2001			March 21, 2001			March 21, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14																					
bis(2-Chloroethoxy)methane	ND	0 / 14																					
bis(2-Chloroethyl)ether	ND	0 / 14																					
bis(2-Ethylhexyl)phthalate	2500	1 / 14																					
Butylbenzylphthalate	ND	0 / 14																					
Carbazole	ND	0 / 14																					
Chrysene	ND	0 / 14																					
Di-n-butylphthalate	ND	0 / 14																					
Di-n-octylphthalate	ND	0 / 14																					
Dibenz(a,h)anthracene	ND	0 / 14																					
Dibenzofuran	ND	0 / 14																					
Diethylphthalate	ND	0 / 14																					
Dimethylphthalate	ND	0 / 14																					
Fluoranthene	ND	0 / 14																					
Fluorene	ND	0 / 14																					
Hexachlorobenzene	ND	0 / 14																					
Hexachlorobutadiene	ND	0 / 14																					
Hexachlorocyclopentadiene	ND	0 / 14																					
Hexachloroethane	ND	0 / 14																					
Indeno(1,2,3-cd)pyrene	ND	0 / 14																					
Isophorone	ND	0 / 14																					
N-Nitroso-di-n-propylamine	ND	0 / 14																					
N-Nitrosodiphenylamine	ND	0 / 14																					
Naphthalene	ND	0 / 14																					
Nitrobenzene	ND	0 / 14																					
Pentachlorophenol	ND	0 / 14																					
Phenanthrene	ND	0 / 14																					
Phenol	ND	0 / 14																					
Pyrene	ND	0 / 14																					
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
($\mu\text{g}/\text{kg}$)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-031-SS-0X			AUS-0A07-032-SS-0X			AUS-0A07-032-SS-02			AUS-0A07-033-SS-0X			AUS-0A07-R33-SS-02			AUS-0A07-034-SS-0X			AUS-0A07-035-SS-0X		
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			May 22, 2001			March 21, 2001			March 21, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	15 J	1 / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCILORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	5.6	3.1		2.5	3.1	J	4.4	3.1		160000	6200		220	32		240	31		84	30	
Alpha-BHC	ND	0 / 105	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
Alpha-Chlordane	490	4 / 104	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
beta-BHC	ND	0 / 104	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
delta-BHC	ND	0 / 104	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
Dieldrin	190000 J	92 / 104	80	6.4		<	6.3	U	<	6.4	U	22000	6400		2000	66		1500	64		560	61	
Endosulfan I	ND	0 / 104	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
Endosulfan II	5.3 J	1 / 104	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	<	66	U	<	64	U	<	61	U
Endosulfan sulfate	ND	0 / 104	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	<	66	U	<	64	U	<	61	U
Endrin	12000	30 / 105	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	<	66	U	<	64	U	<	61	U
Endrin aldehyde	9000	16 / 104	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	<	66	U	<	64	U	<	61	U
Endrin ketone	20000	29 / 102	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	93	66		<	64	U	<	61	U
gamma-BHC (Lindane)	ND	0 / 105	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
gamma-Chlordane	1600	11 / 104	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
Heptachlor	ND	0 / 104	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
Heptachlor epoxide	ND	0 / 105	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
Hexachlorobenzene	2700	11 / 105	<	3.1	U	<	3.1	U	<	3.1	U	<	3100	U	<	32	U	<	31	U	<	30	U
Isodrin	49000 J	29 / 103	<	6.4	U	<	6.3	U	<	6.4	U	4700	6400	J	<	66	U	34	64	J	<	61	U
Methoxychlor	ND	0 / 105	<	31	U	<	31	U	<	31	U	<	31000	U	<	320	U	<	310	U	<	300	U
4,4-DDD	12000	30 / 104	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	<	66	U	<	64	U	<	61	U
4,4-DDE	4800	14 / 104	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	<	66	U	<	64	U	<	61	U
4,4-DDT	100000	38 / 103	<	6.4	U	<	6.3	U	<	6.4	U	<	6400	U	<	66	U	<	64	U	<	61	U
Technical Chlordane	ND	0 / 104	<	12	U	<	12	U	<	12	U	<	12000	U	<	130	U	<	130	U	<	120	U
Toxaphene	ND	0 / 104	<	63	U	<	62	U	<	62	U	<	63000	U	<	650	U	<	630	U	<	600	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	Maximum Frequency		AUS-0A07-031-SS-0X			AUS-0A07-032-SS-0X			AUS-0A07-032-SS-02			AUS-0A07-033-SS-0X			AUS-0A07-R33-SS-02			AUS-0A07-034-SS-0X			AUS-0A07-035-SS-0X			
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			May 22, 2001			March 21, 2001			March 21, 2001			
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																								
Aroclor 1016	ND	0/3																						
Aroclor 1221	ND	0/3																						
Aroclor 1232	ND	0/3																						
Aroclor 1242	ND	0/3																						
Aroclor 1248	ND	0/3																						
Aroclor 1254	ND	0/3																						
Aroclor 1260	ND	0/3																						
DIOXINS/FURANS (ng/kg)																								
1,2,3,4,6,7,8-HpCDD	55.5	3/3																						
1,2,3,4,6,7,8-HpCDF	7.31	3/3																						
1,2,3,4,7,8,9-HpCDF	1.42	2/3																						
1,2,3,4,7,8-HxCDD	0.59	3/3																						
1,2,3,4,7,8-HxCDF	2.29	3/3																						
1,2,3,6,7,8-HxCDD	1.3	3/3																						
1,2,3,6,7,8-HxCDF	0.98	3/3																						
1,2,3,7,8,9-HxCDD	0.997	3/3																						
1,2,3,7,8,9-HxCDF	1.14	1/3																						
1,2,3,7,8-PeCDD	0.373	3/3																						
1,2,3,7,8-PeCDF	3.5	3/3																						
2,3,4,6,7,8-HxCDF	0.765	2/3																						
2,3,4,7,8-PeCDF	3.35	3/3																						
2,3,7,8-TCDD	0.289	1/3																						
2,3,7,8-TCDF	4.16	2/3																						
OCDD	1250	3/3																						
OCDF	33.4	3/3																						
Total HpCDDs	166	3/3																						
Total HpCDFs	21.4	3/3																						
Total HxCDDs	14.9	3/3																						
Total HxCDFs	9.98	3/3																						
Total PeCDDs	3.55	3/3																						
Total PeCDFs	15.6	3/3																						
Total TCDDs	0.351	1/3																						
Total TCDFs	15.2	2/3																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-031-SS-0X			AUS-0A07-032-SS-0X			AUS-0A07-032-SS-02			AUS-0A07-033-SS-0X			AUS-0A07-R33-SS-02			AUS-0A07-034-SS-0X			AUS-0A07-035-SS-0X		
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			May 22, 2001			March 21, 2001			March 21, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18																					
Antimony	0.63	7 / 18																					
Arsenic	9.6	18 / 18																					
Barium	153	18 / 18																					
Beryllium	1.2	17 / 18																					
Boron	6.2	10 / 18																					
Cadmium	0.39	5 / 18																					
Calcium	217000	18 / 18																					
Chromium	25.6	18 / 18																					
Cobalt	15.1	18 / 18																					
Copper	23.5	18 / 18																					
Iron	34000	18 / 18																					
Lead	58.1	18 / 18																					
Magnesium	19700	18 / 18																					
Manganese	1370	18 / 18																					
Mercury	0.053	3 / 18																					
Nickel	22.9	18 / 18																					
Potassium	930	18 / 18																					
Selenium	0.78	1 / 18																					
Silver	ND	0 / 18																					
Sodium	1360	18 / 18																					
Thallium	ND	0 / 18																					
Vanadium	38.1	18 / 18																					
Zinc	95.4	18 / 18																					

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R35-SS-02	AUS-0A07-036-SS-0X	AUS-0A07-036-SS-02	AUS-0A07-037-SS-0X	AUS-0A07-R37-SS-02	AUS-0A07-038-SS-0X	AUS-0A07-038-SS-02																	
			May 22, 2001			March 21, 2001			March 21, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001					
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
VOLATILE ORGANIC COMPOUNDS (µg/kg)																										
1,1,1-Trichloroethane	ND	0 / 17																			<	6	U			
1,1,2,2-Tetrachloroethane	ND	0 / 17																			<	6	U			
1,1,2-Trichloroethane	ND	0 / 17																			<	6	U			
1,1-Dichloroethane	ND	0 / 17																			<	6	U			
1,1-Dichloroethene	ND	0 / 17																			<	6	U			
1,2-Dichloroethane	ND	0 / 17																			<	6	U			
1,2-Dichloropropane	660	5 / 17																			<	6	U			
2-Butanone	ND	0 / 17																			<	6	U			
2-Hexanone	ND	0 / 17																			<	6	U			
4-Methyl-2-Pentanone	ND	0 / 17																			<	6	U			
Acetone	24	8 / 17																			24	6				
Benzene	8	3 / 17																			<	6	U			
Bromodichloromethane	ND	0 / 17																			<	6	U			
Bromoform	ND	0 / 17																			<	6	U			
Bromomethane	ND	0 / 17																			<	6	U			
Carbon Disulfide	ND	0 / 17																			<	6	U			
Carbon Tetrachloride	ND	0 / 17																			<	6	U			
Chlorobenzene	48	3 / 17																			<	6	U			
Chloroethane	ND	0 / 17																			<	6	U			
Chloroform	ND	0 / 17																			<	6	U			
Chloromethane	ND	0 / 17																			<	6	U			
cis-1,2-Dichloroethene	ND	0 / 17																			<	6	U			
cis-1,3-Dichloropropene	ND	0 / 17																			<	6	U			
Dibromochloromethane	ND	0 / 17																			<	6	U			
Ethylbenzene	41	2 / 17																			<	6	U			
Methylene Chloride	ND	0 / 17																			<	6	U			
n-Hexane	ND	0 / 17																			<	6	U			
Styrene	28	2 / 17																			<	6	U			
Tetrachloroethene	48	2 / 17																			<	6	U			
Toluene	11	3 / 17																			<	6	U			
trans-1,2-Dichloroethene	ND	0 / 17																			<	6	U			
trans-1,3-Dichloropropene	ND	0 / 17																			<	6	U			
Trichloroethene	ND	0 / 17																			<	6	U			
Vinyl Chloride	ND	0 / 17																			<	6	U			
Xylene (total)	4500	3 / 17																			<	6	U			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	Maximum Frequency		AUS-0A07-R35-SS-02			AUS-0A07-036-SS-0X			AUS-0A07-036-SS-02			AUS-0A07-037-SS-0X			AUS-0A07-R37-SS-02			AUS-0A07-038-SS-0X			AUS-0A07-038-SS-02					
			May 22, 2001			March 21, 2001			March 21, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001					
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																										
1,2,4-Trichlorobenzene	ND	0 / 14																<	1300	U						
1,2-Dichlorobenzene	ND	0 / 14																<	1300	U						
1,3-Dichlorobenzene	ND	0 / 14																<	1300	U						
1,4-Dichlorobenzene	ND	0 / 14																<	1300	U						
2,2-Oxybis(1-chloro)propane	ND	0 / 14																<	1300	U						
2,4,5-Trichlorophenol	ND	0 / 14																<	6600	U						
2,4,6-Trichlorophenol	ND	0 / 14																<	1300	U						
2,4-Dichlorophenol	ND	0 / 14																<	1300	U						
2,4-Dimethylphenol	ND	0 / 14																<	1300	U						
2,4-Dinitrophenol	ND	0 / 14																<	6600	U						
2,4-Dinitrotoluene	ND	0 / 14																<	1300	U						
2,6-Dinitrotoluene	ND	0 / 14																<	1300	U						
2-Chloronaphthalene	ND	0 / 14																<	1300	U						
2-Chlorophenol	ND	0 / 14																<	1300	U						
2-Methylnaphthalene	ND	0 / 14																<	1300	U						
2-Methylphenol (o-cresol)	ND	0 / 14																<	1300	U						
2-Nitroaniline	ND	0 / 14																<	6600	U						
2-Nitrophenol	ND	0 / 14																<	1300	U						
3,3-Dichlorobenzidine	ND	0 / 14																<	2600	U						
3-Nitroaniline	ND	0 / 14																<	6600	U						
4,6-Dinitro-2-methylphenol	ND	0 / 14																<	6600	U						
4-Bromophenyl-phenylether	ND	0 / 14																<	1300	U						
4-Chloro-3-methylphenol	ND	0 / 14																<	1300	U						
4-Chloroaniline	ND	0 / 14																<	1300	U						
4-Chlorophenyl-phenylether	ND	0 / 14																<	1300	U						
4-Methylphenol (p-cresol)	ND	0 / 14																<	1300	U						
4-Nitroaniline	ND	0 / 14																<	6600	U						
4-Nitrophenol	ND	0 / 14																<	6600	U						
Acenaphthene	ND	0 / 14																<	1300	U						
Acenaphthylene	ND	0 / 14																<	1300	U						
Anthracene	ND	0 / 14																<	1300	U						
Benzo(a)anthracene	ND	0 / 14																<	1300	U						
Benzo(a)pyrene	ND	0 / 14																<	1300	U						
Benzo(b)fluoranthene	ND	0 / 14																<	1300	U						
Benzo(g,h,i)perylene	ND	0 / 14																<	1300	U						

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-R35-SS-02			AUS-0A07-036-SS-0X			AUS-0A07-036-SS-02			AUS-0A07-037-SS-0X			AUS-0A07-R37-SS-02			AUS-0A07-038-SS-0X			AUS-0A07-038-SS-02		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
DATE COLLECTED			May 22, 2001			March 21, 2001			March 21, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
	Maximum	Frequency																					
Benzo(k)fluoranthene	ND	0 / 14																<	1300	U			
bis(2-Chloroethoxy)methane	ND	0 / 14																<	1300	U			
bis(2-Chloroethyl)ether	ND	0 / 14																<	1300	U			
bis(2-Ethylhexyl)phthalate	2500	1 / 14																<	1300	U			
Butylbenzylphthalate	ND	0 / 14																<	1300	U			
Carbazole	ND	0 / 14																<	1300	U			
Chrysene	ND	0 / 14																<	1300	U			
Di-n-butylphthalate	ND	0 / 14																<	1300	U			
Di-n-octylphthalate	ND	0 / 14																<	1300	U			
Dibenz(a,h)anthracene	ND	0 / 14																<	1300	U			
Dibenzofuran	ND	0 / 14																<	1300	U			
Diethylphthalate	ND	0 / 14																<	1300	U			
Dimethylphthalate	ND	0 / 14																<	1300	U			
Fluoranthene	ND	0 / 14																<	1300	U			
Fluorene	ND	0 / 14																<	1300	U			
Hexachlorobenzene	ND	0 / 14																<	1300	U			
Hexachlorobutadiene	ND	0 / 14																<	1300	U			
Hexachlorocyclopentadiene	ND	0 / 14																<	1300	U			
Hexachloroethane	ND	0 / 14																<	1300	U			
Indeno(1,2,3-cd)pyrene	ND	0 / 14																<	1300	U			
Isophorone	ND	0 / 14																<	1300	U			
N-Nitroso-di-n-propylamine	ND	0 / 14																<	1300	U			
N-Nitrosodiphenylamine	ND	0 / 14																<	1300	U			
Naphthalene	ND	0 / 14																<	1300	U			
Nitrobenzene	ND	0 / 14																<	1300	U			
Pentachlorophenol	ND	0 / 14																<	6600	U			
Phenanthrene	ND	0 / 14																<	1300	U			
Phenol	ND	0 / 14																<	1300	U			
Pyrene	ND	0 / 14																<	1300	U			
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R35-SS-02			AUS-0A07-036-SS-0X			AUS-0A07-036-SS-02			AUS-0A07-037-SS-0X			AUS-0A07-R37-SS-02			AUS-0A07-038-SS-0X			AUS-0A07-038-SS-02					
			May 22, 2001			March 21, 2001			March 21, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001					
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
Benzo(g,h,i)perylene	15	J	1	4																						
Benzo(k)fluoranthene	11		4	4																						
Chrysene	81		4	4																						
Dibenz(a,h)anthracene	ND		0	4																						
Fluoranthene	620		4	4																						
Fluorene	210		2	4																						
Indeno(1,2,3-cd)pyrene	14	J	2	4																						
Naphthalene	330		2	4																						
Phenanthrene	360		4	4																						
Pyrene	330		4	4																						
PESTICIDES (ORGANOCHLORINE) (µg/kg)																										
Aldrin	1300000		75	/ 103	240	28		<	3000	U	12000	1400		29	3		1400	300	J	54000	3200	J	43000	3300	J	
Alpha-BHC	ND		0	/ 105	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
Alpha-Chlordane	490		4	/ 104	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	54	32		<	330	U	
beta-BHC	ND		0	/ 104	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
delta-BHC	ND		0	/ 104	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
Dieldrin	190000	J	92	/ 104	940	58		13000	6100		48000	2800		150	6.1		750	62	J	2100	66		190000	6800	J	
Endosulfan I	ND		0	/ 104	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
Endosulfan II	5.3	J	1	/ 104	<	58	U	<	6100	U	<	570	U	5.3	6.1	J	<	62	U	<	66	U	<	680	U	
Endosulfan sulfate	ND		0	/ 104	<	58	U	<	6100	U	<	570	U	<	6.1	U	<	62	U	<	66	U	<	680	U	
Endrin	12000		30	/ 105	<	58	U	<	6100	U	450	570	J	6.9	6.1		<	62	U	900	66		12000	680		
Endrin aldehyde	9000		16	/ 104	15	58	J	<	6100	U	<	570	U	<	6.1	U	<	62	U	1200	66		7000	680	J	
Endrin ketone	20000		29	/ 102	73	58		<	6100	U	790	570		17	6.1		120	62	J	1600	66		9000	680	J	
gamma-BHC (Lindane)	ND		0	/ 105	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
gamma-Chlordane	1600		11	/ 104	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
Heptachlor	ND		0	/ 104	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
Heptachlor epoxide	ND		0	/ 105	<	28	U	<	3000	U	<	280	U	<	3	U	<	30	U	<	32	U	<	330	U	
Hexachlorobenzene	2700		11	/ 105	<	28	U	<	3000	U	310	280		<	3	U	<	30	U	120	32		1600	330	J	
Isodrin	49000	J	29	/ 103	15	58	J	<	6100	U	320	570	J	<	6.1	U	170	62	J	1600	1300		1500	680	J	
Methoxychlor	ND		0	/ 105	<	280	U	<	30000	U	<	2800	U	<	30	U	<	300	U	<	320	U	<	3300	U	
4,4-DDD	12000		30	/ 104	<	58	U	<	6100	U	<	570	U	6.4	6.1		<	62	U	<	66	U	2300	680		
4,4-DDE	4800		14	/ 104	<	58	U	<	6100	U	<	570	U	<	6.1	U	<	62	U	<	66	U	<	680	U	
4,4-DDT	100000		38	/ 103	<	58	U	<	6100	U	<	570	U	1.9	6.1	J	<	62	U	<	66	U	1800	680	J	
Technical Chlordane	ND		0	/ 104	<	110	U	<	12000	U	<	1100	U	<	12	U	<	120	U	<	130	U	<	1300	U	
Toxaphene	ND		0	/ 104	<	570	U	<	60000	U	<	5600	U	<	60	U	<	610	U	<	650	U	<	6700	U	

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-R35-SS-02			AUS-0A07-036-SS-0X			AUS-0A07-036-SS-02			AUS-0A07-037-SS-0X			AUS-0A07-R37-SS-02			AUS-0A07-038-SS-0X			AUS-0A07-038-SS-02		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
DATE COLLECTED	Maximum	Frequency	May 22, 2001			March 21, 2001			March 21, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																							
Aroclor 1016	ND	0 / 3																					
Aroclor 1221	ND	0 / 3																					
Aroclor 1232	ND	0 / 3																					
Aroclor 1242	ND	0 / 3																					
Aroclor 1248	ND	0 / 3																					
Aroclor 1254	ND	0 / 3																					
Aroclor 1260	ND	0 / 3																					
DIOXINS/FURANS (ng/kg)																							
1,2,3,4,6,7,8-HpCDD	55.5	3 / 3																					
1,2,3,4,6,7,8-HpCDF	7.31	3 / 3																					
1,2,3,4,7,8,9-HpCDF	1.42	2 / 3																					
1,2,3,4,7,8-HxCDD	0.59	3 / 3																					
1,2,3,4,7,8-HxCDF	2.29	3 / 3																					
1,2,3,6,7,8-HxCDD	1.3	3 / 3																					
1,2,3,6,7,8-HxCDF	0.98	3 / 3																					
1,2,3,7,8,9-HxCDD	0.997	3 / 3																					
1,2,3,7,8,9-HxCDF	1.14	1 / 3																					
1,2,3,7,8-PeCDD	0.373	3 / 3																					
1,2,3,7,8-PeCDF	3.5	3 / 3																					
2,3,4,6,7,8-HxCDF	0.765	2 / 3																					
2,3,4,7,8-PeCDF	3.35	3 / 3																					
2,3,7,8-TCDD	0.289	1 / 3																					
2,3,7,8-TCDF	4.16	2 / 3																					
OCDD	1250	3 / 3																					
OCDF	33.4	3 / 3																					
Total HpCDDs	166	3 / 3																					
Total HpCDFs	21.4	3 / 3																					
Total HxCDDs	14.9	3 / 3																					
Total HxCDFs	9.98	3 / 3																					
Total PeCDDs	3.55	3 / 3																					
Total PeCDFs	15.6	3 / 3																					
Total TCDDs	0.351	1 / 3																					
Total TCDFs	15.2	2 / 3																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R35-SS-02			AUS-0A07-036-SS-0X			AUS-0A07-036-SS-02			AUS-0A07-037-SS-0X			AUS-0A07-R37-SS-02			AUS-0A07-038-SS-0X			AUS-0A07-038-SS-02		
			May 22, 2001			March 21, 2001			March 21, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18																14300	19.8				
Antimony	0.63	7 / 18																<	0.29	U			
Arsenic	9.6	18 / 18																7.6	0.99				
Barium	153	18 / 18																92.9	0.99				
Beryllium	1.2	17 / 18																1.1	0.4				
Boron	6.2	10 / 18																<	4.9	U			
Cadmium	0.39	5 / 18																<	0.2	U			
Calcium	217000	18 / 18																5060	9.9				
Chromium	25.6	18 / 18																25.6	0.99				
Cobalt	15.1	18 / 18																9.3	0.49				
Copper	23.5	18 / 18																23.5	0.99				
Iron	34000	18 / 18																24100	4.9				
Lead	58.1	18 / 18																22	0.49				
Magnesium	19700	18 / 18																3890	9.9				
Manganese	1370	18 / 18																628	0.99				
Mercury	0.053	3 / 18																<	0.044	U			
Nickel	22.9	18 / 18																22.9	0.99				
Potassium	930	18 / 18																652	49.4				
Selenium	0.78	1 / 18																<	0.49	U			
Silver	ND	0 / 18																<	0.49	U			
Sodium	1360	18 / 18																883	98.8				
Thallium	ND	0 / 18																<	0.99	U			
Vanadium	38.1	18 / 18																29.7	0.49				
Zinc	95.4	18 / 18																54.2	0.99				

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-039-SS-0X			AUS-0A07-R39-SS-02			AUS-0A07-040-SS-0X			AUS-0A07-R40-SS-02			AUS-0A07-041-SS-0X			AUS-0A07-042-SS-0X			AUS-0A07-R42-SS-02		
			March 21, 2001			May 22, 2001			March 23, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,1,1-Trichloroethane	ND	0 / 17																					
1,1,2,2-Tetrachloroethane	ND	0 / 17																					
1,1,2-Trichloroethane	ND	0 / 17																					
1,1-Dichloroethane	ND	0 / 17																					
1,1-Dichloroethene	ND	0 / 17																					
1,2-Dichloroethane	ND	0 / 17																					
1,2-Dichloropropane	660	5 / 17																					
2-Butanone	ND	0 / 17																					
2-Hexanone	ND	0 / 17																					
4-Methyl-2-Pentanone	ND	0 / 17																					
Acetone	24	8 / 17																					
Benzene	8	3 / 17																					
Bromodichloromethane	ND	0 / 17																					
Bromoform	ND	0 / 17																					
Bromomethane	ND	0 / 17																					
Carbon Disulfide	ND	0 / 17																					
Carbon Tetrachloride	ND	0 / 17																					
Chlorobenzene	48	3 / 17																					
Chloroethane	ND	0 / 17																					
Chloroform	ND	0 / 17																					
Chloromethane	ND	0 / 17																					
cis-1,2-Dichloroethene	ND	0 / 17																					
cis-1,3-Dichloropropene	ND	0 / 17																					
Dibromochloromethane	ND	0 / 17																					
Ethylbenzene	41	2 / 17																					
Methylene Chloride	ND	0 / 17																					
n-Hexane	ND	0 / 17																					
Styrene	28	2 / 17																					
Tetrachloroethene	48	2 / 17																					
Toluene	11	3 / 17																					
trans-1,2-Dichloroethene	ND	0 / 17																					
trans-1,3-Dichloropropene	ND	0 / 17																					
Trichloroethene	ND	0 / 17																					
Vinyl Chloride	ND	0 / 17																					
Xylene (total)	4500	3 / 17																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-039-SS-0X			AUS-0A07-R39-SS-02			AUS-0A07-040-SS-0X			AUS-0A07-R40-SS-02			AUS-0A07-041-SS-0X			AUS-0A07-042-SS-0X			AUS-0A07-R42-SS-02			
	DATE COLLECTED	Maximum Frequency	March 21, 2001			May 22, 2001			March 23, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,2,4-Trichlorobenzene	ND	0 / 14																						
1,2-Dichlorobenzene	ND	0 / 14																						
1,3-Dichlorobenzene	ND	0 / 14																						
1,4-Dichlorobenzene	ND	0 / 14																						
2,2-Oxybis(1-chloro)propane	ND	0 / 14																						
2,4,5-Trichlorophenol	ND	0 / 14																						
2,4,6-Trichlorophenol	ND	0 / 14																						
2,4-Dichlorophenol	ND	0 / 14																						
2,4-Dimethylphenol	ND	0 / 14																						
2,4-Dinitrophenol	ND	0 / 14																						
2,4-Dinitrotoluene	ND	0 / 14																						
2,6-Dinitrotoluene	ND	0 / 14																						
2-Chloronaphthalene	ND	0 / 14																						
2-Chlorophenol	ND	0 / 14																						
2-Methylnaphthalene	ND	0 / 14																						
2-Methylphenol (o-cresol)	ND	0 / 14																						
2-Nitroaniline	ND	0 / 14																						
2-Nitrophenol	ND	0 / 14																						
3,3-Dichlorobenzidine	ND	0 / 14																						
3-Nitroaniline	ND	0 / 14																						
4,6-Dinitro-2-methylphenol	ND	0 / 14																						
4-Bromophenyl-phenylether	ND	0 / 14																						
4-Chloro-3-methylphenol	ND	0 / 14																						
4-Chloroaniline	ND	0 / 14																						
4-Chlorophenyl-phenylether	ND	0 / 14																						
4-Methylphenol (p-cresol)	ND	0 / 14																						
4-Nitroaniline	ND	0 / 14																						
4-Nitrophenol	ND	0 / 14																						
Acenaphthene	ND	0 / 14																						
Acenaphthylene	ND	0 / 14																						
Anthracene	ND	0 / 14																						
Benzo(a)anthracene	ND	0 / 14																						
Benzo(a)pyrene	ND	0 / 14																						
Benzo(b)fluoranthene	ND	0 / 14																						
Benzo(g,h,i)perylene	ND	0 / 14																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-039-SS-0X			AUS-0A07-R39-SS-02			AUS-0A07-040-SS-0X			AUS-0A07-R40-SS-02			AUS-0A07-041-SS-0X			AUS-0A07-042-SS-0X			AUS-0A07-R42-SS-02		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
DATE COLLECTED	Maximum	Frequency	March 21, 2001			May 22, 2001			March 23, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001		
Benzo(k)fluoranthene	ND	0 / 14																					
bis(2-Chloroethoxy)methane	ND	0 / 14																					
bis(2-Chloroethyl)ether	ND	0 / 14																					
bis(2-Ethylhexyl)phthalate	2500	1 / 14																					
Butylbenzylphthalate	ND	0 / 14																					
Carbazole	ND	0 / 14																					
Chrysene	ND	0 / 14																					
Di-n-butylphthalate	ND	0 / 14																					
Di-n-octylphthalate	ND	0 / 14																					
Dibenz(a,h)anthracene	ND	0 / 14																					
Dibenzofuran	ND	0 / 14																					
Diethylphthalate	ND	0 / 14																					
Dimethylphthalate	ND	0 / 14																					
Fluoranthene	ND	0 / 14																					
Fluorene	ND	0 / 14																					
Hexachlorobenzene	ND	0 / 14																					
Hexachlorobutadiene	ND	0 / 14																					
Hexachlorocyclopentadiene	ND	0 / 14																					
Hexachloroethane	ND	0 / 14																					
Indeno(1,2,3-cd)pyrene	ND	0 / 14																					
Isophorone	ND	0 / 14																					
N-Nitroso-di-n-propylamine	ND	0 / 14																					
N-Nitrosodiphenylamine	ND	0 / 14																					
Naphthalene	ND	0 / 14																					
Nitrobenzene	ND	0 / 14																					
Pentachlorophenol	ND	0 / 14																					
Phenanthrene	ND	0 / 14																					
Phenol	ND	0 / 14																					
Pyrene	ND	0 / 14																					
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-039-SS-0X			AUS-0A07-R39-SS-02			AUS-0A07-040-SS-0X			AUS-0A07-R40-SS-02			AUS-0A07-041-SS-0X			AUS-0A07-042-SS-0X			AUS-0A07-R42-SS-02		
			March 21, 2001			May 22, 2001			March 23, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
Benzo(g,h,i)perylene	15 J	1 / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	3200	300		240	28	J	170	30		1.7	2.9	J	26	30	J	120	29	J	8	2.9	
Alpha-BHC	ND	0 / 105	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
Alpha-Chlordane	490	4 / 104	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
beta-BHC	ND	0 / 104	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
delta-BHC	ND	0 / 104	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
Dieldrin	190000 J	92 / 104	49000	3100		4300	580	J	920	62		140	5.9		50	62	J	570	59		91	5.8	
Endosulfan I	ND	0 / 104	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
Endosulfan II	5.3 J	1 / 104	<	620	U	<	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
Endosulfan sulfate	ND	0 / 104	<	620	U	<	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
Endrin	12000	30 / 105	5400	620		380	58	J	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
Endrin aldehyde	9000	16 / 104	1700	620		<	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
Endrin ketone	20000	29 / 102	8000	620		160	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
gamma-BHC (Lindane)	ND	0 / 105	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
gamma-Chlordane	1600	11 / 104	<	300	U	16	28	J	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
Heptachlor	ND	0 / 104	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
Heptachlor epoxide	ND	0 / 105	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
Hexachlorobenzene	2700	11 / 105	<	300	U	<	28	UJ	<	30	U	<	2.9	U	<	30	U	<	29	U	<	2.9	U
Isodrin	49000 J	29 / 103	150	620	J	<	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
Methoxychlor	ND	0 / 105	<	3000	U	<	280	UJ	<	300	U	<	29	U	<	300	U	<	290	U	<	29	U
4,4-DDD	12000	30 / 104	<	620	U	<	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	1.8	5.8	J
4,4-DDE	4800	14 / 104	<	620	U	<	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
4,4-DDT	100000	38 / 103	180	620	J	<	58	UJ	<	62	U	<	5.9	U	<	62	U	<	59	U	<	5.8	U
Technical Chlordane	ND	0 / 104	<	1200	U	<	110	UJ	<	120	U	<	11	U	<	120	U	<	110	U	<	11	U
Toxaphene	ND	0 / 104	<	6100	U	<	570	UJ	<	610	U	<	58	U	<	610	U	<	580	U	<	57	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-039-SS-0X	AUS-0A07-R39-SS-02	AUS-0A07-040-SS-0X	AUS-0A07-R40-SS-02	AUS-0A07-041-SS-0X	AUS-0A07-042-SS-0X	AUS-0A07-R42-SS-02	
			March 21, 2001	May 22, 2001	March 23, 2001	May 22, 2001	March 22, 2001	March 22, 2001	May 22, 2001	
DATE COLLECTED	Maximum	Frequency	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual	
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)										
Aroclor 1016	ND	0/3								
Aroclor 1221	ND	0/3								
Aroclor 1232	ND	0/3								
Aroclor 1242	ND	0/3								
Aroclor 1248	ND	0/3								
Aroclor 1254	ND	0/3								
Aroclor 1260	ND	0/3								
DIOXINS/FURANS (ng/kg)										
1,2,3,4,6,7,8-HpCDD	55.5	3/3								
1,2,3,4,6,7,8-HpCDF	7.31	3/3								
1,2,3,4,7,8,9-HpCDF	1.42	2/3								
1,2,3,4,7,8-HxCDD	0.59	3/3								
1,2,3,4,7,8-HxCDF	2.29	3/3								
1,2,3,6,7,8-HxCDD	1.3	3/3								
1,2,3,6,7,8-HxCDF	0.98	3/3								
1,2,3,7,8,9-HxCDD	0.997	3/3								
1,2,3,7,8,9-HxCDF	1.14	1/3								
1,2,3,7,8-PeCDD	0.373	3/3								
1,2,3,7,8-PeCDF	3.5	3/3								
2,3,4,6,7,8-HxCDF	0.765	2/3								
2,3,4,7,8-PeCDF	3.35	3/3								
2,3,7,8-TCDD	0.289	1/3								
2,3,7,8-TCDF	4.16	2/3								
OCDD	1250	3/3								
OCDF	33.4	3/3								
Total HpCDDs	166	3/3								
Total HpCDFs	21.4	3/3								
Total HxCDDs	14.9	3/3								
Total HxCDFs	9.98	3/3								
Total PeCDDs	3.55	3/3								
Total PeCDFs	15.6	3/3								
Total TCDDs	0.351	1/3								
Total TCDFs	15.2	2/3								

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-039-SS-0X			AUS-0A07-R39-SS-02			AUS-0A07-040-SS-0X			AUS-0A07-R40-SS-02			AUS-0A07-041-SS-0X			AUS-0A07-042-SS-0X			AUS-0A07-R42-SS-02		
			March 21, 2001			May 22, 2001			March 23, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18																					
Antimony	0.63	7 / 18																					
Arsenic	9.6	18 / 18																					
Barium	153	18 / 18																					
Beryllium	1.2	17 / 18																					
Boron	6.2	10 / 18																					
Cadmium	0.39	5 / 18																					
Calcium	217000	18 / 18																					
Chromium	25.6	18 / 18																					
Cobalt	15.1	18 / 18																					
Copper	23.5	18 / 18																					
Iron	34000	18 / 18																					
Lead	58.1	18 / 18																					
Magnesium	19700	18 / 18																					
Manganese	1370	18 / 18																					
Mercury	0.053	3 / 18																					
Nickel	22.9	18 / 18																					
Potassium	930	18 / 18																					
Selenium	0.78	1 / 18																					
Silver	ND	0 / 18																					
Sodium	1360	18 / 18																					
Thallium	ND	0 / 18																					
Vanadium	38.1	18 / 18																					
Zinc	95.4	18 / 18																					

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES ON
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-042-SS-04			AUS-0A07-R42-SS-04			AUS-0A07-043-SS-0X			AUS-0A07-043-SS-02			AUS-0A07-R43-SS-02			AUS-0A07-R43-SS-04			AUS-0A07-044-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			May 22, 2001			March 23, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
VOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,1,1-Trichloroethane	ND	0 / 17	<	5	U							<	5	U										
1,1,2,2-Tetrachloroethane	ND	0 / 17	<	5	U							<	5	U										
1,1,2-Trichloroethane	ND	0 / 17	<	5	U							<	5	U										
1,1-Dichloroethane	ND	0 / 17	<	5	U							<	5	U										
1,1-Dichloroethene	ND	0 / 17	<	5	U							<	5	U										
1,2-Dichloroethane	ND	0 / 17	<	5	U							<	5	U										
1,2-Dichloropropane	660	5 / 17	20	5								150	5											
2-Butanone	ND	0 / 17	<	5	U							<	5	U										
2-Hexanone	ND	0 / 17	<	5	U							<	5	U										
4-Methyl-2-Pentanone	ND	0 / 17	<	5	U							<	5	U										
Acetone	24	8 / 17	<	5	U							15	5											
Benzene	8	3 / 17	<	5	U							<	5	U										
Bromodichloromethane	ND	0 / 17	<	5	U							<	5	U										
Bromoform	ND	0 / 17	<	5	U							<	5	U										
Bromomethane	ND	0 / 17	<	5	U							<	5	U										
Carbon Disulfide	ND	0 / 17	<	5	U							<	5	U										
Carbon Tetrachloride	ND	0 / 17	<	5	U							<	5	U										
Chlorobenzene	48	3 / 17	<	5	U							<	5	U										
Chloroethane	ND	0 / 17	<	5	U							<	5	U										
Chloroform	ND	0 / 17	<	5	U							<	5	U										
Chloromethane	ND	0 / 17	<	5	U							<	5	U										
cis-1,2-Dichloroethene	ND	0 / 17	<	5	U							<	5	U										
cis-1,3-Dichloropropene	ND	0 / 17	<	5	U							<	5	U										
Dibromochloromethane	ND	0 / 17	<	5	U							<	5	U										
Ethylbenzene	41	2 / 17	<	5	U							<	5	U										
Methylene Chloride	ND	0 / 17	<	5	U							<	5	U										
n-Hexane	ND	0 / 17	<	5	U							<	5	U										
Styrene	28	2 / 17	<	5	U							<	5	U										
Tetrachloroethene	48	2 / 17	<	5	U							<	5	U										
Toluene	11	3 / 17	<	5	U							<	5	U										
trans-1,2-Dichloroethene	ND	0 / 17	<	5	U							<	5	U										
trans-1,3-Dichloropropene	ND	0 / 17	<	5	U							<	5	U										
Trichloroethene	ND	0 / 17	<	5	U							<	5	U										
Vinyl Chloride	ND	0 / 17	<	5	U							<	5	U										
Xylene (total)	4500	3 / 17	<	5	U							<	5	U										

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-042-SS-04			AUS-0A07-R42-SS-04			AUS-0A07-043-SS-0X			AUS-0A07-043-SS-02			AUS-0A07-R43-SS-02			AUS-0A07-R43-SS-04			AUS-0A07-044-SS-0X				
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			May 22, 2001			March 23, 2001				
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual		
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																									
1,2,4-Trichlorobenzene	ND	0 / 14							<	1100	U														
1,2-Dichlorobenzene	ND	0 / 14							<	1100	U														
1,3-Dichlorobenzene	ND	0 / 14							<	1100	U														
1,4-Dichlorobenzene	ND	0 / 14							<	1100	U														
2,2-Oxybis(1-chloro)propane	ND	0 / 14							<	1100	U														
2,4,5-Trichlorophenol	ND	0 / 14							<	5900	U														
2,4,6-Trichlorophenol	ND	0 / 14							<	1100	U														
2,4-Dichlorophenol	ND	0 / 14							<	1100	U														
2,4-Dimethylphenol	ND	0 / 14							<	1100	U														
2,4-Dinitrophenol	ND	0 / 14							<	5900	U														
2,4-Dinitrotoluene	ND	0 / 14							<	1100	U														
2,6-Dinitrotoluene	ND	0 / 14							<	1100	U														
2-Chloronaphthalene	ND	0 / 14							<	1100	U														
2-Chlorophenol	ND	0 / 14							<	1100	U														
2-Methylnaphthalene	ND	0 / 14							<	1100	U														
2-Methylphenol (o-cresol)	ND	0 / 14							<	1100	U														
2-Nitroaniline	ND	0 / 14							<	5900	U														
2-Nitrophenol	ND	0 / 14							<	1100	U														
3,3-Dichlorobenzidine	ND	0 / 14							<	2300	U														
3-Nitroaniline	ND	0 / 14							<	5900	U														
4,6-Dinitro-2-methylphenol	ND	0 / 14							<	5900	U														
4-Bromophenyl-phenylether	ND	0 / 14							<	1100	U														
4-Chloro-3-methylphenol	ND	0 / 14							<	1100	U														
4-Chloroaniline	ND	0 / 14							<	1100	U														
4-Chlorophenyl-phenylether	ND	0 / 14							<	1100	U														
4-Methylphenol (p-cresol)	ND	0 / 14							<	1100	U														
4-Nitroaniline	ND	0 / 14							<	5900	U														
4-Nitrophenol	ND	0 / 14							<	5900	U														
Acenaphthene	ND	0 / 14							<	1100	U														
Acenaphthylene	ND	0 / 14							<	1100	U														
Anthracene	ND	0 / 14							<	1100	U														
Benzo(a)anthracene	ND	0 / 14							<	1100	U														
Benzo(a)pyrene	ND	0 / 14							<	1100	U														
Benzo(b)fluoranthene	ND	0 / 14							<	1100	U														
Benzo(g,h,i)perylene	ND	0 / 14							<	1100	U														

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-042-SS-04			AUS-0A07-R42-SS-04			AUS-0A07-043-SS-0X			AUS-0A07-043-SS-02			AUS-0A07-R43-SS-02			AUS-0A07-R43-SS-04			AUS-0A07-044-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			May 22, 2001			March 23, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
Benzo(k)fluoranthene	ND	0 / 14							<	1100	U													
bis(2-Chloroethoxy)methane	ND	0 / 14							<	1100	U													
bis(2-Chloroethyl)ether	ND	0 / 14							<	1100	U													
bis(2-Ethylhexyl)phthalate	2500	1 / 14							<	1100	U													
Butylbenzylphthalate	ND	0 / 14							<	1100	U													
Carbazole	ND	0 / 14							<	1100	U													
Chrysene	ND	0 / 14							<	1100	U													
Di-n-butylphthalate	ND	0 / 14							<	1100	U													
Di-n-octylphthalate	ND	0 / 14							<	1100	U													
Dibenz(a,h)anthracene	ND	0 / 14							<	1100	U													
Dibenzofuran	ND	0 / 14							<	1100	U													
Diethylphthalate	ND	0 / 14							<	1100	U													
Dimethylphthalate	ND	0 / 14							<	1100	U													
Fluoranthene	ND	0 / 14							<	1100	U													
Fluorene	ND	0 / 14							<	1100	U													
Hexachlorobenzene	ND	0 / 14							<	1100	U													
Hexachlorobutadiene	ND	0 / 14							<	1100	U													
Hexachlorocyclopentadiene	ND	0 / 14							<	1100	U													
Hexachloroethane	ND	0 / 14							<	1100	U													
Indeno(1,2,3-cd)pyrene	ND	0 / 14							<	1100	U													
Isophorone	ND	0 / 14							<	1100	U													
N-Nitroso-di-n-propylamine	ND	0 / 14							<	1100	U													
N-Nitrosodiphenylamine	ND	0 / 14							<	1100	U													
Naphthalene	ND	0 / 14							<	1100	U													
Nitrobenzene	ND	0 / 14							<	1100	U													
Pentachlorophenol	ND	0 / 14							<	5900	U													
Phenanthrene	ND	0 / 14							<	1100	U													
Phenol	ND	0 / 14							<	1100	U													
Pyrene	ND	0 / 14							<	1100	U													
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																								
(µg/kg)																								
Acenaphthene	320	2 / 4	<	310	U																			
Acenaphthylene	420	3 / 4	95	150	J																			
Anthracene	87	3 / 4	87	31																				
Benzo(a)anthracene	100	4 / 4	100	15																				
Benzo(a)pyrene	17	2 / 4	<	15	U																			
Benzo(b)fluoranthene	21	4 / 4	6.8	6.3																				

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-042-SS-04			AUS-0A07-R42-SS-04			AUS-0A07-043-SS-0X			AUS-0A07-043-SS-02			AUS-0A07-R43-SS-02			AUS-0A07-R43-SS-04			AUS-0A07-044-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			May 22, 2001			March 23, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
Benzo(g,h,i)perylene	15	J / 4	<	25	U																		
Benzo(k)fluoranthene	11	4 / 4	4.5	6.3	J																		
Chrysene	81	4 / 4	81	15																			
Dibenz(a,h)anthracene	ND	0 / 4	<	62	U																		
Fluoranthene	620	4 / 4	620	77																			
Fluorene	210	2 / 4	210	31																			
Indeno(1,2,3-cd)pyrene	14	J / 4	<	15	U																		
Naphthalene	330	2 / 4	<	150	U																		
Phenanthrene	360	4 / 4	360	61																			
Pyrene	330	4 / 4	330	31																			
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	130000	75 / 103				2	2.7	J	200	29	J				230	29	J	2.8	2.9	J	<	2.8	U
Alpha-BHC	ND	0 / 105	<			<	2.7	U	<	29	U				<	29	U	<	2.9	U	<	2.8	U
Alpha-Chlordane	490	4 / 104	<			<	2.7	U	<	29	U				<	29	U	<	2.9	U	<	2.8	U
beta-BHC	ND	0 / 104	<			<	2.7	U	<	29	U				<	29	U	<	2.9	U	<	2.8	U
delta-BHC	ND	0 / 104	<			<	2.7	U	<	29	U				<	29	U	<	2.9	U	<	2.8	U
Dieldrin	190000	J / 104	2.6	5.6	J	1400	59							2200	300	J	2.7	5.9	J	81	5.8		
Endosulfan I	ND	0 / 104	<			<	2.7	U	<	29	U				<	29	U	<	2.9	U	<	2.8	U
Endosulfan II	5.3	J / 104	<			<	5.6	U	<	59	U				<	60	U	<	5.9	U	<	5.8	U
Endosulfan sulfate	ND	0 / 104	<			<	5.6	U	<	59	U				<	60	U	<	5.9	U	<	5.8	U
Endrin	12000	30 / 105	<			<	5.6	U	77	59	J			2300	300	J	<	5.9	U	<	5.8	U	
Endrin aldehyde	9000	16 / 104	<			<	5.6	U	<	59	U			110	60		<	5.9	U	<	5.8	U	
Endrin ketone	20000	29 / 102	<			<	5.6	U	<	59	U			700	60	J	<	5.9	U	<	5.8	U	
gamma-BHC (Lindane)	ND	0 / 105	<			<	2.7	U	<	29	U			<	29	U	<	2.9	U	<	2.8	U	
gamma-Chlordane	1600	11 / 104	<			<	2.7	U	<	29	U			<	29	U	<	2.9	U	<	2.8	U	
Heptachlor	ND	0 / 104	<			<	2.7	U	<	29	U			<	29	U	<	2.9	U	<	2.8	U	
Heptachlor epoxide	ND	0 / 105	<			<	2.7	U	<	29	U			<	29	U	<	2.9	U	<	2.8	U	
Hexachlorobenzene	2700	11 / 105	<			<	2.7	U	<	29	U			<	29	U	<	2.9	U	<	2.8	U	
Isodrin	49000	J / 103	<			<	5.6	U	<	59	U			72	60		<	5.9	U	<	5.8	U	
Methoxychlor	ND	0 / 105	<			<	27	U	<	290	U			<	290	U	<	29	U	<	28	U	
4,4-DDD	12000	30 / 104	<			<	5.6	U	37	59	J			<	60	U	<	5.9	U	<	5.8	U	
4,4-DDE	4800	14 / 104	<			<	5.6	U	<	59	U			<	60	U	<	5.9	U	<	5.8	U	
4,4-DDT	100000	38 / 103	<			<	5.6	U	77	59	J			78	60		<	5.9	U	4.4	5.8	J	
Technical Chlordane	ND	0 / 104	<			<	11	U	<	110	U			<	120	U	<	11	U	<	11	U	
Toxaphene	ND	0 / 104	<			<	55	U	<	580	U			<	580	U	<	58	U	<	57	U	

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-042-SS-04			AUS-0A07-R42-SS-04			AUS-0A07-043-SS-0X			AUS-0A07-043-SS-02			AUS-0A07-R43-SS-02			AUS-0A07-R43-SS-04			AUS-0A07-044-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			May 22, 2001			March 23, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																								
Aroclor 1016	ND	0/3																						
Aroclor 1221	ND	0/3																						
Aroclor 1232	ND	0/3																						
Aroclor 1242	ND	0/3																						
Aroclor 1248	ND	0/3																						
Aroclor 1254	ND	0/3																						
Aroclor 1260	ND	0/3																						
DIOXINS/FURANS (ng/kg)																								
1,2,3,4,6,7,8-HpCDD	55.5	3/3																						
1,2,3,4,6,7,8-HpCDF	7.31	3/3																						
1,2,3,4,7,8,9-HpCDF	1.42	2/3																						
1,2,3,4,7,8-HxCDD	0.59	3/3																						
1,2,3,4,7,8-HxCDF	2.29	3/3																						
1,2,3,6,7,8-HxCDD	1.3	3/3																						
1,2,3,6,7,8-HxCDF	0.98	3/3																						
1,2,3,7,8,9-HxCDD	0.997	3/3																						
1,2,3,7,8,9-HxCDF	1.14	1/3																						
1,2,3,7,8-PeCDD	0.373	3/3																						
1,2,3,7,8-PeCDF	3.5	3/3																						
2,3,4,6,7,8-HxCDF	0.765	2/3																						
2,3,4,7,8-PeCDF	3.35	3/3																						
2,3,7,8-TCDD	0.289	1/3																						
2,3,7,8-TCDF	4.16	2/3																						
OCDD	1250	3/3																						
OCDF	33.4	3/3																						
Total HpCDDs	166	3/3																						
Total HpCDFs	21.4	3/3																						
Total HxCDDs	14.9	3/3																						
Total HxCDFs	9.98	3/3																						
Total PeCDDs	3.55	3/3																						
Total PeCDFs	15.6	3/3																						
Total TCDDs	0.351	1/3																						
Total TCDFs	15.2	2/3																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID DATE COLLECTED	Maximum Frequency		AUS-0A07-042-SS-04			AUS-0A07-R42-SS-04			AUS-0A07-043-SS-0X			AUS-0A07-043-SS-02			AUS-0A07-R43-SS-02			AUS-0A07-R43-SS-04			AUS-0A07-044-SS-0X		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18	9000	20.8				12500	19.5														
Antimony	0.63	7 / 18	<	0.3	U			0.51	0.29														
Arsenic	9.6	18 / 18	9.6	1				8.8	0.97														
Barium	153	18 / 18	40.8	1				71.2	0.97														
Beryllium	1.2	17 / 18	0.99	0.42				0.66	0.39														
Boron	6.2	10 / 18	<	5.2	U			<	4.9	U													
Cadmium	0.39	5 / 18	<	0.21	U			<	0.19	U													
Calcium	217000	18 / 18	1010	10.4				1600	9.7														
Chromium	25.6	18 / 18	20.4	1				16.2	0.97														
Cobalt	15.1	18 / 18	7.8	0.52				8.1	0.49	J													
Copper	23.5	18 / 18	16.4	1				12.4	0.97														
Iron	34000	18 / 18	34000	5.2				20000	4.9														
Lead	58.1	18 / 18	18.3	0.52				11.5	0.49														
Magnesium	19700	18 / 18	1650	10.4				2370	9.7														
Manganese	1370	18 / 18	414	1				364	0.97														
Mercury	0.053	3 / 18	<	0.041	U			0.036	0.04														
Nickel	22.9	18 / 18	18.6	1				12.5	0.97														
Potassium	930	18 / 18	689	52.1				930	48.6														
Selenium	0.78	1 / 18	<	0.52	U			<	0.49	U													
Silver	ND	0 / 18	<	0.52	U			<	0.49	U													
Sodium	1360	18 / 18	700	104				874	97.3														
Thallium	ND	0 / 18	<	1	U			<	0.97	U													
Vanadium	38.1	18 / 18	25.2	0.52				29.3	0.49														
Zinc	95.4	18 / 18	55.2	1				35.2	0.97														

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	Maximum Frequency		AUS-0A07-044-SS-02			AUS-0A07-R44-SS-04			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-02			AUS-0A07-R45-SS-02			AUS-0A07-045-SS-03				
			March 23, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 23, 2001			May 22, 2001			March 23, 2001				
DATE COLLECTED	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
VOLATILE ORGANIC COMPOUNDS (µg/kg)																									
1,1,1-Trichloroethane	ND		0 / 17													<	5	U							
1,1,2,2-Tetrachloroethane	ND		0 / 17													<	5	U							
1,1,2-Trichloroethane	ND		0 / 17													<	5	U							
1,1-Dichloroethane	ND		0 / 17													<	5	U							
1,1-Dichloroethene	ND		0 / 17													<	5	U							
1,2-Dichloroethane	ND		0 / 17													<	5	U							
1,2-Dichloropropane	660		5 / 17													<	5	U							
2-Butanone	ND		0 / 17													<	5	U							
2-Hexanone	ND		0 / 17													<	5	U							
4-Methyl-2-Pentanone	ND		0 / 17													<	5	U							
Acetone	24		8 / 17													<	14	U							
Benzene	8		3 / 17													<	5	U							
Bromodichloromethane	ND		0 / 17													<	5	U							
Bromoform	ND		0 / 17													<	5	U							
Bromomethane	ND		0 / 17													<	5	UJ							
Carbon Disulfide	ND		0 / 17													<	5	U							
Carbon Tetrachloride	ND		0 / 17													<	5	U							
Chlorobenzene	48		3 / 17													<	5	U							
Chloroethane	ND		0 / 17													<	5	U							
Chloroform	ND		0 / 17													<	5	U							
Chloromethane	ND		0 / 17													<	5	U							
cis-1,2-Dichloroethene	ND		0 / 17													<	5	U							
cis-1,3-Dichloropropene	ND		0 / 17													<	5	U							
Dibromochloromethane	ND		0 / 17													<	5	U							
Ethylbenzene	41		2 / 17													<	5	U							
Methylene Chloride	ND		0 / 17													<	5	U							
n-Hexane	ND		0 / 17													<	5	U							
Styrene	28		2 / 17													<	5	U							
Tetrachloroethene	48		2 / 17													<	5	U							
Toluene	11		3 / 17													<	5	U							
trans-1,2-Dichloroethene	ND		0 / 17													<	5	U							
trans-1,3-Dichloropropene	ND		0 / 17													<	5	U							
Trichloroethene	ND		0 / 17													<	5	U							
Vinyl Chloride	ND		0 / 17													<	5	U							
Xylene (total)	4500		3 / 17													<	5	U							

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-044-SS-02			AUS-0A07-R44-SS-04			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-02			AUS-0A07-R45-SS-02			AUS-0A07-045-SS-03				
	DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																									
1,2,4-Trichlorobenzene		ND	0 / 14										<	1500	U										
1,2-Dichlorobenzene		ND	0 / 14										<	1500	U										
1,3-Dichlorobenzene		ND	0 / 14										<	1500	U										
1,4-Dichlorobenzene		ND	0 / 14										<	1500	U										
2,2-Oxybis(1-chloro)propane		ND	0 / 14										<	1500	U										
2,4,5-Trichlorophenol		ND	0 / 14										<	7700	U										
2,4,6-Trichlorophenol		ND	0 / 14										<	1500	U										
2,4-Dichlorophenol		ND	0 / 14										<	1500	U										
2,4-Dimethylphenol		ND	0 / 14										<	1500	U										
2,4-Dinitrophenol		ND	0 / 14										<	7700	U										
2,4-Dinitrotoluene		ND	0 / 14										<	1500	U										
2,6-Dinitrotoluene		ND	0 / 14										<	1500	U										
2-Chloronaphthalene		ND	0 / 14										<	1500	U										
2-Chlorophenol		ND	0 / 14										<	1500	U										
2-Methylnaphthalene		ND	0 / 14										<	1500	U										
2-Methylphenol (o-cresol)		ND	0 / 14										<	1500	U										
2-Nitroaniline		ND	0 / 14										<	7700	U										
2-Nitrophenol		ND	0 / 14										<	1500	U										
3,3-Dichlorobenzidine		ND	0 / 14										<	3000	U										
3-Nitroaniline		ND	0 / 14										<	7700	U										
4,6-Dinitro-2-methylphenol		ND	0 / 14										<	7700	U										
4-Bromophenyl-phenylether		ND	0 / 14										<	1500	U										
4-Chloro-3-methylphenol		ND	0 / 14										<	1500	U										
4-Chloroaniline		ND	0 / 14										<	1500	U										
4-Chlorophenyl-phenylether		ND	0 / 14										<	1500	U										
4-Methylphenol (p-cresol)		ND	0 / 14										<	1500	U										
4-Nitroaniline		ND	0 / 14										<	7700	U										
4-Nitrophenol		ND	0 / 14										<	7700	U										
Acenaphthene		ND	0 / 14										<	1500	U										
Acenaphthylene		ND	0 / 14										<	1500	U										
Anthracene		ND	0 / 14										<	1500	U										
Benzo(a)anthracene		ND	0 / 14										<	1500	U										
Benzo(a)pyrene		ND	0 / 14										<	1500	U										
Benzo(b)fluoranthene		ND	0 / 14										<	1500	U										
Benzo(g,h,i)perylene		ND	0 / 14										<	1500	U										

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-044-SS-02	AUS-0A07-R44-SS-04	AUS-0A07-045-SS-0X	AUS-0A07-045-SS-0X	AUS-0A07-045-SS-02	AUS-0A07-R45-SS-02	AUS-0A07-045-SS-03								
			March 23, 2001	May 22, 2001	March 23, 2001	March 23, 2001	March 23, 2001	May 22, 2001	March 23, 2001								
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14				<	1500	U									
bis(2-Chloroethoxy)methane	ND	0 / 14				<	1500	U									
bis(2-Chloroethyl)ether	ND	0 / 14				<	1500	U									
bis(2-Ethylhexyl)phthalate	2500	1 / 14				<	1500	U									
Butylbenzylphthalate	ND	0 / 14				<	1500	U									
Carbazole	ND	0 / 14				<	1500	U									
Chrysene	ND	0 / 14				<	1500	U									
Di-n-butylphthalate	ND	0 / 14				<	1500	U									
Di-n-octylphthalate	ND	0 / 14				<	1500	U									
Dibenz(a,h)anthracene	ND	0 / 14				<	1500	U									
Dibenzofuran	ND	0 / 14				<	1500	U									
Diethylphthalate	ND	0 / 14				<	1500	U									
Dimethylphthalate	ND	0 / 14				<	1500	U									
Fluoranthene	ND	0 / 14				<	1500	U									
Fluorene	ND	0 / 14				<	1500	U									
Hexachlorobenzene	ND	0 / 14				<	1500	U									
Hexachlorobutadiene	ND	0 / 14				<	1500	U									
Hexachlorocyclopentadiene	ND	0 / 14				<	1500	U									
Hexachloroethane	ND	0 / 14				<	1500	U									
Indeno(1,2,3-cd)pyrene	ND	0 / 14				<	1500	U									
Isophorone	ND	0 / 14				<	1500	U									
N-Nitroso-di-n-propylamine	ND	0 / 14				<	1500	U									
N-Nitrosodiphenylamine	ND	0 / 14				<	1500	U									
Naphthalene	ND	0 / 14				<	1500	U									
Nitrobenzene	ND	0 / 14				<	1500	U									
Pentachlorophenol	ND	0 / 14				<	7700	U									
Phenanthrene	ND	0 / 14				<	1500	U									
Phenol	ND	0 / 14				<	1500	U									
Pyrene	ND	0 / 14				<	1500	U									
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																	
(µg/kg)																	
Acenaphthene	320	2 / 4															
Acenaphthylene	420	3 / 4															
Anthracene	87	3 / 4															
Benzo(a)anthracene	100	4 / 4															
Benzo(a)pyrene	17	2 / 4															
Benzo(b)fluoranthene	21	4 / 4															

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-044-SS-02			AUS-0A07-R44-SS-04			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-02			AUS-0A07-R45-SS-02			AUS-0A07-045-SS-03		
			March 23, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 23, 2001			May 22, 2001			March 23, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	15 J	1 / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	<	28	U	<	2.9	UJ				<	38	U				5.6	2.9		350	29	
Alpha-BHC	ND	0 / 105	<	28	U	<	2.9	U				<	38	U				<	2.9	U	<	29	U
Alpha-Chlordane	490	4 / 104	<	28	U	<	2.9	U				<	38	U				<	2.9	U	<	29	U
beta-BHC	ND	0 / 104	<	28	U	<	2.9	U				<	38	U				<	2.9	U	<	29	U
delta-BHC	ND	0 / 104	<	28	U	<	2.9	U				<	38	U				<	2.9	U	<	29	U
Dieldrin	190000 J	92 / 104	1600	58		9.3	6		36	77	J				4.2	5.9	J	580	59				
Endosulfan I	ND	0 / 104	<	28	U	<	2.9	UJ				<	38	U				<	2.9	U	<	29	U
Endosulfan II	5.3 J	1 / 104	<	58	U	<	6	U				<	77	U				<	5.9	U	<	59	U
Endosulfan sulfate	ND	0 / 104	<	58	U	<	6	U				<	77	U				<	5.9	U	<	59	U
Endrin	12000	30 / 105	<	58	U	<	6	UJ				<	77	U				<	5.9	U	180	59	
Endrin aldehyde	9000	16 / 104	<	58	U	<	6	U				<	77	U				<	5.9	U	<	59	U
Endrin ketone	20000	29 / 102	<	58	U	<	6	U				<	77	U				<	5.9	U	60	59	
gamma-BHC (Lindane)	ND	0 / 105	<	28	U	<	2.9	U				<	38	U				<	2.9	U	<	29	U
gamma-Chlordane	1600	11 / 104	<	28	U	<	2.9	UJ				<	38	U				<	2.9	U	<	29	U
Heptachlor	ND	0 / 104	<	28	U	<	2.9	UJ				<	38	U				<	2.9	U	<	29	U
Heptachlor epoxide	ND	0 / 105	<	28	U	<	2.9	UJ				<	38	U				<	2.9	U	<	29	U
Hexachlorobenzene	2700	11 / 105	<	28	U	<	2.9	U				<	38	U				<	2.9	U	<	29	U
Isodrin	49000 J	29 / 103	<	58	U	<	6	U				<	77	U				<	5.9	U	<	59	U
Methoxychlor	ND	0 / 105	<	280	U	<	29	U				<	380	U				<	29	U	<	290	U
4,4-DDD	12000	30 / 104	<	58	U	<	6	U				<	77	U				<	5.9	U	69	59	
4,4-DDE	4800	14 / 104	<	58	U	<	6	U				<	77	U				<	5.9	U	100	59	
4,4-DDT	100000	38 / 103	<	58	U	<	6	U				<	77	U				<	5.9	U	39	59	J
Technical Chlordane	ND	0 / 104	<	110	U	<	12	U				<	150	U				<	11	U	<	120	U
Toxaphene	ND	0 / 104	<	570	U	<	58	U				<	760	U				<	58	U	<	580	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-044-SS-02			AUS-0A07-R44-SS-04			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-02			AUS-0A07-R45-SS-02			AUS-0A07-045-SS-03		
			March 23, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 23, 2001			May 22, 2001			March 23, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) ($\mu\text{g}/\text{kg}$)																							
Aroclor 1016	ND	0/3																					
Aroclor 1221	ND	0/3																					
Aroclor 1232	ND	0/3																					
Aroclor 1242	ND	0/3																					
Aroclor 1248	ND	0/3																					
Aroclor 1254	ND	0/3																					
Aroclor 1260	ND	0/3																					
DIOXINS/FURANS (ng/kg)																							
1,2,3,4,6,7,8-HpCDD	55.5	3/3							55.5	0.1339													
1,2,3,4,6,7,8-HpCDF	7.31	3/3							7.31	0.1028													
1,2,3,4,7,8,9-HpCDF	1.42	2/3							0.597	0.1254													
1,2,3,4,7,8-HxCDD	0.59	3/3							0.59	0.1004													
1,2,3,4,7,8-HxCDF	2.29	3/3							0.289	0.1252													
1,2,3,6,7,8-HxCDD	1.3	3/3							1.3	0.1057													
1,2,3,6,7,8-HxCDF	0.98	3/3							0.412	0.1194													
1,2,3,7,8,9-HxCDD	0.997	3/3							0.997	0.0951													
1,2,3,7,8,9-HxCDF	1.14	1/3							<	0.146	U												
1,2,3,7,8-PeCDD	0.373	3/3							0.373	0.0831													
1,2,3,7,8-PeCDF	3.5	3/3							0.106	0.0544													
2,3,4,6,7,8-HxCDF	0.765	2/3							0.638	0.1329													
2,3,4,7,8-PeCDF	3.35	3/3							0.583	0.0532													
2,3,7,8-TCDD	0.289	1/3							0.289	0.106													
2,3,7,8-TCDF	4.16	2/3							0.13	0.097													
OCDD	1250	3/3							1250	0.2123													
OCDF	33.4	3/3							25.7	0.1327													
Total HpCDDs	166	3/3							166	0.1339													
Total HpCDFs	21.4	3/3							21.4	0.1129													
Total HxCDDs	14.9	3/3							14.9	0.1002													
Total HxCDFs	9.98	3/3							9.98	0.1307													
Total PeCDDs	3.55	3/3							3.55	0.4719													
Total PeCDFs	15.6	3/3							6.42	0.0537													
Total TCDDs	0.351	1/3							0.351	0.3346													
Total TCDFs	15.2	2/3							1.07	0.097													

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-044-SS-02		AUS-0A07-R44-SS-04			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-0X			AUS-0A07-045-SS-02			AUS-0A07-R45-SS-02			AUS-0A07-045-SS-03						
			March 23, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 23, 2001			May 22, 2001			March 23, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
METALS (mg/kg)																								
Aluminum	17900	18 / 18										3750	25.6											
Antimony	0.63	7 / 18										<	0.38	U										
Arsenic	9.6	18 / 18										4.3	1.3											
Barium	153	18 / 18										72.8	1.3											
Beryllium	1.2	17 / 18										0.13	0.51											
Boron	6.2	10 / 18										6.2	6.4											
Cadmium	0.39	5 / 18										0.39	0.26											
Calcium	217000	18 / 18										146000	64.1											
Chromium	25.6	18 / 18										6.2	1.3											
Cobalt	15.1	18 / 18										6	0.64											
Copper	23.5	18 / 18										10.2	1.3											
Iron	34000	18 / 18										6550	6.4											
Lead	58.1	18 / 18										15.7	0.64											
Magnesium	19700	18 / 18										16200	12.8											
Manganese	1370	18 / 18										1370	6.4											
Mercury	0.053	3 / 18										<	0.053	U										
Nickel	22.9	18 / 18										9.2	1.3											
Potassium	930	18 / 18										796	64.1											
Selenium	0.78	1 / 18										<	0.64	U										
Silver	ND	0 / 18										<	0.64	U										
Sodium	1360	18 / 18										566	128											
Thallium	ND	0 / 18										<	1.3	U										
Vanadium	38.1	18 / 18										10.1	0.64											
Zinc	95.4	18 / 18										46.1	1.3											

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-045-SS-04			AUS-0A07-R45-SS-04			AUS-0A07-R45-SS-05			AUS-0A07-046-SS-0X			AUS-0A07-046-SS-02			AUS-0A07-047-SS-0X			AUS-0A07-R47-SS-02		
			March 23, 2001			May 22, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			May 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,1,1-Trichloroethane	ND	0 / 17	<	5	U																		
1,1,2,2-Tetrachloroethane	ND	0 / 17	<	5	U																		
1,1,2-Trichloroethane	ND	0 / 17	<	5	U																		
1,1-Dichloroethane	ND	0 / 17	<	5	U																		
1,1-Dichloroethene	ND	0 / 17	<	5	U																		
1,2-Dichloroethane	ND	0 / 17	<	5	U																		
1,2-Dichloropropane	660	5 / 17	<	5	U																		
2-Butanone	ND	0 / 17	<	5	U																		
2-Hexanone	ND	0 / 17	<	5	U																		
4-Methyl-2-Pentanone	ND	0 / 17	<	5	U																		
Acetone	24	8 / 17	<	7	U																		
Benzene	8	3 / 17	<	5	U																		
Bromodichloromethane	ND	0 / 17	<	5	U																		
Bromoform	ND	0 / 17	<	5	U																		
Bromomethane	ND	0 / 17	<	5	U																		
Carbon Disulfide	ND	0 / 17	<	5	U																		
Carbon Tetrachloride	ND	0 / 17	<	5	U																		
Chlorobenzene	48	3 / 17	<	5	U																		
Chloroethane	ND	0 / 17	<	5	U																		
Chloroform	ND	0 / 17	<	5	U																		
Chloromethane	ND	0 / 17	<	5	U																		
cis-1,2-Dichloroethene	ND	0 / 17	<	5	U																		
cis-1,3-Dichloropropene	ND	0 / 17	<	5	U																		
Dibromochloromethane	ND	0 / 17	<	5	U																		
Ethylbenzene	41	2 / 17	<	5	U																		
Methylene Chloride	ND	0 / 17	<	5	U																		
n-Hexane	ND	0 / 17	<	5	U																		
Styrene	28	2 / 17	<	5	U																		
Tetrachloroethene	48	2 / 17	<	5	U																		
Toluene	11	3 / 17	<	5	U																		
trans-1,2-Dichloroethene	ND	0 / 17	<	5	U																		
trans-1,3-Dichloropropene	ND	0 / 17	<	5	U																		
Trichloroethene	ND	0 / 17	<	5	U																		
Vinyl Chloride	ND	0 / 17	<	5	U																		
Xylene (total)	4500	3 / 17	<	5	U																		

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-045-SS-04		AUS-0A07-R45-SS-04			AUS-0A07-R45-SS-05			AUS-0A07-046-SS-0X			AUS-0A07-046-SS-02			AUS-0A07-047-SS-0X			AUS-0A07-R47-SS-02					
			March 23, 2001			May 22, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			May 22, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,2,4-Trichlorobenzene	ND	0 / 14	<	1100	U																		
1,2-Dichlorobenzene	ND	0 / 14	<	1100	U																		
1,3-Dichlorobenzene	ND	0 / 14	<	1100	U																		
1,4-Dichlorobenzene	ND	0 / 14	<	1100	U																		
2,2-Oxybis(1-chloro)propane	ND	0 / 14	<	1100	U																		
2,4,5-Trichlorophenol	ND	0 / 14	<	5900	U																		
2,4,6-Trichlorophenol	ND	0 / 14	<	1100	U																		
2,4-Dichlorophenol	ND	0 / 14	<	1100	U																		
2,4-Dimethylphenol	ND	0 / 14	<	1100	U																		
2,4-Dinitrophenol	ND	0 / 14	<	5900	U																		
2,4-Dinitrotoluene	ND	0 / 14	<	1100	U																		
2,6-Dinitrotoluene	ND	0 / 14	<	1100	U																		
2-Chloronaphthalene	ND	0 / 14	<	1100	U																		
2-Chlorophenol	ND	0 / 14	<	1100	U																		
2-Methylnaphthalene	ND	0 / 14	<	1100	U																		
2-Methylphenol (o-cresol)	ND	0 / 14	<	1100	U																		
2-Nitroaniline	ND	0 / 14	<	5900	U																		
2-Nitrophenol	ND	0 / 14	<	1100	U																		
3,3-Dichlorobenzidine	ND	0 / 14	<	2300	U																		
3-Nitroaniline	ND	0 / 14	<	5900	U																		
4,6-Dinitro-2-methylphenol	ND	0 / 14	<	5900	U																		
4-Bromophenyl-phenylether	ND	0 / 14	<	1100	U																		
4-Chloro-3-methylphenol	ND	0 / 14	<	1100	U																		
4-Chloroaniline	ND	0 / 14	<	1100	U																		
4-Chlorophenyl-phenylether	ND	0 / 14	<	1100	U																		
4-Methylphenol (p-cresol)	ND	0 / 14	<	1100	U																		
4-Nitroaniline	ND	0 / 14	<	5900	U																		
4-Nitrophenol	ND	0 / 14	<	5900	U																		
Acenaphthene	ND	0 / 14	<	1100	U																		
Acenaphthylene	ND	0 / 14	<	1100	U																		
Anthracene	ND	0 / 14	<	1100	U																		
Benzo(a)anthracene	ND	0 / 14	<	1100	U																		
Benzo(a)pyrene	ND	0 / 14	<	1100	U																		
Benzo(b)fluoranthene	ND	0 / 14	<	1100	U																		
Benzo(g,h,i)perylene	ND	0 / 14	<	1100	U																		

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-045-SS-04			AUS-0A07-R45-SS-04			AUS-0A07-R45-SS-05			AUS-0A07-046-SS-0X			AUS-0A07-046-SS-02			AUS-0A07-047-SS-0X			AUS-0A07-R47-SS-02		
			March 23, 2001			May 22, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			May 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14	<	1100	U																		
bis(2-Chloroethoxy)methane	ND	0 / 14	<	1100	U																		
bis(2-Chloroethyl)ether	ND	0 / 14	<	1100	U																		
bis(2-Ethylhexyl)phthalate	2500	1 / 14	2500	1100																			
Butylbenzylphthalate	ND	0 / 14	<	1100	U																		
Carbazole	ND	0 / 14	<	1100	U																		
Chrysene	ND	0 / 14	<	1100	U																		
Di-n-butylphthalate	ND	0 / 14	<	1100	U																		
Di-n-octylphthalate	ND	0 / 14	<	1100	U																		
Dibenz(a,h)anthracene	ND	0 / 14	<	1100	U																		
Dibenzofuran	ND	0 / 14	<	1100	U																		
Diethylphthalate	ND	0 / 14	<	1100	U																		
Dimethylphthalate	ND	0 / 14	<	1100	U																		
Fluoranthene	ND	0 / 14	<	1100	U																		
Fluorene	ND	0 / 14	<	1100	U																		
Hexachlorobenzene	ND	0 / 14	<	1100	U																		
Hexachlorobutadiene	ND	0 / 14	<	1100	U																		
Hexachlorocyclopentadiene	ND	0 / 14	<	1100	U																		
Hexachloroethane	ND	0 / 14	<	1100	U																		
Indeno(1,2,3-cd)pyrene	ND	0 / 14	<	1100	U																		
Isophorone	ND	0 / 14	<	1100	U																		
N-Nitroso-di-n-propylamine	ND	0 / 14	<	1100	U																		
N-Nitrosodiphenylamine	ND	0 / 14	<	1100	U																		
Naphthalene	ND	0 / 14	<	1100	U																		
Nitrobenzene	ND	0 / 14	<	1100	U																		
Pentachlorophenol	ND	0 / 14	<	5900	U																		
Phenanthrene	ND	0 / 14	<	1100	U																		
Phenol	ND	0 / 14	<	1100	U																		
Pyrene	ND	0 / 14	<	1100	U																		
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
<i>(µg/kg)</i>																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-045-SS-04			AUS-0A07-R45-SS-04			AUS-0A07-R45-SS-05			AUS-0A07-046-SS-0X			AUS-0A07-046-SS-02			AUS-0A07-047-SS-0X			AUS-0A07-R47-SS-02					
			March 23, 2001			May 22, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			May 22, 2001					
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
Benzo(g,h,i)perylene	15 J	1 / 4																								
Benzo(k)fluoranthene	11	4 / 4																								
Chrysene	81	4 / 4																								
Dibenz(a,h)anthracene	ND	0 / 4																								
Fluoranthene	620	4 / 4																								
Fluorene	210	2 / 4																								
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																								
Naphthalene	330	2 / 4																								
Phenanthrene	360	4 / 4																								
Pyrene	330	4 / 4																								
PESTICIDES (ORGANOCHLORINE) (µg/kg)																										
Aldrin	1300000	75 / 103				<	3	U	<	2.9	U	<	2.5	U	17	2.8		71000	16000		1E+06	150000				
Alpha-BHC	ND	0 / 105				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	<	310	U	<	30000	U			
Alpha-Chlordane	490	4 / 104				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	450	310		<	30000	UJ			
beta-BHC	ND	0 / 104				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	<	310	U	<	30000	U			
delta-BHC	ND	0 / 104				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	<	310	U	<	30000	U			
Dieldrin	190000 J	92 / 104				<	6	U	<	5.9	U	<	5.2	U	13	5.8		120000	32000		99000	61000				
Endosulfan I	ND	0 / 104				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	<	310	U	<	30000	UJ			
Endosulfan II	5.3 J	1 / 104				<	6	U	<	5.9	U	<	5.2	U	<	5.8	U	<	640	U	<	61000	U			
Endosulfan sulfate	ND	0 / 104				<	6	U	<	5.9	U	<	5.2	U	<	5.8	U	<	640	U	<	61000	U			
Endrin	12000	30 / 105				<	6	U	<	5.9	U	<	5.2	U	<	5.8	U	1100	640		<	61000	UJ			
Endrin aldehyde	9000	16 / 104				<	6	U	<	5.9	U	<	5.2	U	<	5.8	U	1800	640		<	61000	U			
Endrin ketone	20000	29 / 102				<	6	U	<	5.9	U	<	5.2	U	<	5.8	U	4700	640		<	61000	U			
gamma-BHC (Lindane)	ND	0 / 105				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	<	310	U	<	30000	U			
gamma-Chlordane	1600	11 / 104				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	1600	310		<	30000	UJ			
Heptachlor	ND	0 / 104				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	<	310	U	<	30000	UJ			
Heptachlor epoxide	ND	0 / 105				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	<	310	U	<	30000	UJ			
Hexachlorobenzene	2700	11 / 105				<	3	U	<	2.9	U	<	2.5	U	<	2.8	U	2700	310		<	30000	U			
Isodrin	49000 J	29 / 103				<	6	U	<	5.9	U	7.1	5.2		<	5.8	U	910	640		49000	61000	J			
Methoxychlor	ND	0 / 105				<	30	U	<	29	U	<	25	U	<	28	U	<	3100	U	<	300000	U			
4,4-DDD	12000	30 / 104				<	6	U	<	5.9	U	<	5.2	U	2.2	5.8	J	11000	640		<	61000	U			
4,4-DDE	4800	14 / 104				<	6	U	<	5.9	U	<	5.2	U	3	5.8	J	2000	640		<	61000	U			
4,4-DDT	100000	38 / 103				<	6	U	<	5.9	U	<	5.2	U	6.5	5.8		14000	640		<	61000	U			
Technical Chlordane	ND	0 / 104				<	12	U	<	11	U	<	10	U	<	11	U	<	1200	U	<	120000	U			
Toxaphene	ND	0 / 104				<	59	U	<	58	U	<	51	U	<	57	U	<	6200	U	<	600000	U			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	Maximum Frequency		AUS-0A07-045-SS-04			AUS-0A07-R45-SS-04			AUS-0A07-R45-SS-05			AUS-0A07-046-SS-0X			AUS-0A07-046-SS-02			AUS-0A07-047-SS-0X			AUS-0A07-R47-SS-02			
			March 23, 2001			May 22, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			May 22, 2001			
DATE COLLECTED	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																								
Aroclor 1016	ND		0/3																					
Aroclor 1221	ND		0/3																					
Aroclor 1232	ND		0/3																					
Aroclor 1242	ND		0/3																					
Aroclor 1248	ND		0/3																					
Aroclor 1254	ND		0/3																					
Aroclor 1260	ND		0/3																					
DIOXINS/FURANS (ng/kg)																								
1,2,3,4,6,7,8-HpCDD	55.5		3/3																					
1,2,3,4,6,7,8-HpCDF	7.31		3/3																					
1,2,3,4,7,8,9-HpCDF	1.42		2/3																					
1,2,3,4,7,8-HxCDD	0.59		3/3																					
1,2,3,4,7,8-HxCDF	2.29		3/3																					
1,2,3,6,7,8-IxCDD	1.3		3/3																					
1,2,3,6,7,8-HxCDF	0.98		3/3																					
1,2,3,7,8,9-HxCDD	0.997		3/3																					
1,2,3,7,8,9-HxCDF	1.14		1/3																					
1,2,3,7,8-PeCDD	0.373		3/3																					
1,2,3,7,8-PeCDF	3.5		3/3																					
2,3,4,6,7,8-HxCDF	0.765		2/3																					
2,3,4,7,8-PeCDF	3.35		3/3																					
2,3,7,8-TCDD	0.289		1/3																					
2,3,7,8-TCDF	4.16		2/3																					
OCDD	1250		3/3																					
OCDF	33.4		3/3																					
Total HpCDDs	166		3/3																					
Total HpCDFs	21.4		3/3																					
Total HxCDDs	14.9		3/3																					
Total HxCDFs	9.98		3/3																					
Total PeCDDs	3.55		3/3																					
Total PeCDFs	15.6		3/3																					
Total TCDDs	0.351		1/3																					
Total TCDFs	15.2		2/3																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-045-SS-04			AUS-0A07-R45-SS-04			AUS-0A07-R45-SS-05			AUS-0A07-046-SS-0X			AUS-0A07-046-SS-02			AUS-0A07-047-SS-0X			AUS-0A07-R47-SS-02			
			March 23, 2001			May 22, 2001			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			May 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
METALS (mg/kg)																								
Aluminum	17900	18 / 18	12800	19.3																				
Antimony	0.63	7 / 18	0.38	0.27																				
Arsenic	9.6	18 / 18	6.8	0.97																				
Barium	153	18 / 18	54.7	0.97																				
Beryllium	1.2	17 / 18	0.66	0.39																				
Boron	6.2	10 / 18	<	4.8																				U
Cadmium	0.39	5 / 18	<	0.19																				U
Calcium	217000	18 / 18	14800	9.7																				
Chromium	25.6	18 / 18	11.5	0.97																				
Cobalt	15.1	18 / 18	5.4	0.48																				
Copper	23.5	18 / 18	13.4	0.97																				
Iron	34000	18 / 18	20200	4.8																				
Lead	58.1	18 / 18	15.6	0.48																				
Magnesium	19700	18 / 18	8340	9.7																				
Manganese	1370	18 / 18	556	0.97																				
Mercury	0.053	3 / 18	0.038	0.04																				
Nickel	22.9	18 / 18	13.3	0.97																				
Potassium	930	18 / 18	826	48.3																				
Selenium	0.78	1 / 18	<	0.48																				U
Silver	ND	0 / 18	<	0.48																				U
Sodium	1360	18 / 18	733	96.6																				
Thallium	ND	0 / 18	<	0.97																				U
Vanadium	38.1	18 / 18	21.2	0.48																				
Zinc	95.4	18 / 18	43.6	0.97																				

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-047-SS-03			AUS-0A07-R47-SS-03			AUS-0A07-047-SS-04			AUS-0A07-R47-SS-04			AUS-0A07-047-SS-05			AUS-0A07-R47-SS-05			AUS-0A07-048-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 23, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
VOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,1,1-Trichloroethane	ND	0/17	<	5	U				<	5	U				<	5	U							
1,1,2,2-Tetrachloroethane	ND	0/17	<	5	U				<	5	U				<	5	U							
1,1,2-Trichloroethane	ND	0/17	<	5	U				<	5	U				<	5	U							
1,1-Dichloroethane	ND	0/17	<	5	U				<	5	U				<	5	U							
1,1-Dichloroethene	ND	0/17	<	5	U				<	5	U				<	5	U							
1,2-Dichloroethane	ND	0/17	<	5	U				<	5	U				<	5	U							
1,2-Dichloropropane	660	5/17	660	210					480	110					380	110								
2-Butanone	ND	0/17	<	5	U				<	5	U				<	5	U							
2-Hexanone	ND	0/17	<	5	U				<	5	U				<	5	U							
4-Methyl-2-Pentanone	ND	0/17	<	5	U				<	5	U				<	5	U							
Acetone	24	8/17	14	5					14	5					<	5	U							
Benzene	8	3/17	7	5					8	5					7	5								
Bromodichloromethane	ND	0/17	<	5	U				<	5	U				<	5	U							
Bromoform	ND	0/17	<	5	U				<	5	U				<	5	U							
Bromomethane	ND	0/17	<	5	U				<	5	U				<	5	U							
Carbon Disulfide	ND	0/17	<	5	U				<	5	U				<	5	U							
Carbon Tetrachloride	ND	0/17	<	5	U				<	5	U				<	5	U							
Chlorobenzene	48	3/17	48	5					39	5					13	5								
Chloroethane	ND	0/17	<	5	U				<	5	U				<	5	U							
Chloroform	ND	0/17	<	5	U				<	5	U				<	5	U							
Chloromethane	ND	0/17	<	5	U				<	5	U				<	5	U							
cis-1,2-Dichloroethene	ND	0/17	<	5	U				<	5	U				<	5	U							
cis-1,3-Dichloropropene	ND	0/17	<	5	U				<	5	U				<	5	U							
Dibromochloromethane	ND	0/17	<	5	U				<	5	U				<	5	U							
Ethylbenzene	41	2/17	41	5					27	5					<	5	U							
Methylene Chloride	ND	0/17	<	5	UJ				<	5	UJ				<	5	UJ							
n-Hexane	ND	0/17			R						R						R							
Styrene	28	2/17	28	5					21	5					<	5	U							
Tetrachloroethene	48	2/17	48	5					15	5					<	5	U							
Toluene	11	3/17	11	5					10	5					4	5	J							
trans-1,2-Dichloroethene	ND	0/17	<	5	U				<	5	U				<	5	U							
trans-1,3-Dichloropropene	ND	0/17	<	5	U				<	5	U				<	5	U							
Trichloroethene	ND	0/17	<	5	U				<	5	U				<	5	U							
Vinyl Chloride	ND	0/17	<	5	U				<	5	U				<	5	U							
Xylene (total)	4500	3/17	4500	210					2500	110					200	5								

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-047-SS-03			AUS-0A07-R47-SS-03			AUS-0A07-047-SS-04			AUS-0A07-R47-SS-04			AUS-0A07-047-SS-05			AUS-0A07-R47-SS-05			AUS-0A07-048-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 23, 2001			
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,2,4-Trichlorobenzene	ND	0 / 14																						
1,2-Dichlorobenzene	ND	0 / 14																						
1,3-Dichlorobenzene	ND	0 / 14																						
1,4-Dichlorobenzene	ND	0 / 14																						
2,2-Oxybis(1-chloro)propane	ND	0 / 14																						
2,4,5-Trichlorophenol	ND	0 / 14																						
2,4,6-Trichlorophenol	ND	0 / 14																						
2,4-Dichlorophenol	ND	0 / 14																						
2,4-Dimethylphenol	ND	0 / 14																						
2,4-Dinitrophenol	ND	0 / 14																						
2,4-Dinitrotoluene	ND	0 / 14																						
2,6-Dinitrotoluene	ND	0 / 14																						
2-Chloronaphthalene	ND	0 / 14																						
2-Chlorophenol	ND	0 / 14																						
2-Methylnaphthalene	ND	0 / 14																						
2-Methylphenol (o-cresol)	ND	0 / 14																						
2-Nitroaniline	ND	0 / 14																						
2-Nitrophenol	ND	0 / 14																						
3,3-Dichlorobenzidine	ND	0 / 14																						
3-Nitroaniline	ND	0 / 14																						
4,6-Dinitro-2-methylphenol	ND	0 / 14																						
4-Bromophenyl-phenylether	ND	0 / 14																						
4-Chloro-3-methylphenol	ND	0 / 14																						
4-Chloroaniline	ND	0 / 14																						
4-Chlorophenyl-phenylether	ND	0 / 14																						
4-Methylphenol (p-cresol)	ND	0 / 14																						
4-Nitroaniline	ND	0 / 14																						
4-Nitrophenol	ND	0 / 14																						
Acenaphthene	ND	0 / 14																						
Acenaphthylene	ND	0 / 14																						
Anthracene	ND	0 / 14																						
Benzo(a)anthracene	ND	0 / 14																						
Benzo(a)pyrene	ND	0 / 14																						
Benzo(b)fluoranthene	ND	0 / 14																						
Benzo(g,h,i)perylene	ND	0 / 14																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-047-SS-03			AUS-0A07-R47-SS-03			AUS-0A07-047-SS-04			AUS-0A07-R47-SS-04			AUS-0A07-047-SS-05			AUS-0A07-R47-SS-05			AUS-0A07-048-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 23, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14																					
bis(2-Chloroethoxy)methane	ND	0 / 14																					
bis(2-Chloroethyl)ether	ND	0 / 14																					
bis(2-Ethylhexyl)phthalate	2500	1 / 14																					
Butylbenzylphthalate	ND	0 / 14																					
Carbazole	ND	0 / 14																					
Chrysene	ND	0 / 14																					
Di-n-butylphthalate	ND	0 / 14																					
Di-n-octylphthalate	ND	0 / 14																					
Dibenz(a,h)anthracene	ND	0 / 14																					
Dibenzofuran	ND	0 / 14																					
Diethylphthalate	ND	0 / 14																					
Dimethylphthalate	ND	0 / 14																					
Fluoranthene	ND	0 / 14																					
Fluorene	ND	0 / 14																					
Hexachlorobenzene	ND	0 / 14																					
Hexachlorobutadiene	ND	0 / 14																					
Hexachlorocyclopentadiene	ND	0 / 14																					
Hexachloroethane	ND	0 / 14																					
Indeno(1,2,3-cd)pyrene	ND	0 / 14																					
Isophorone	ND	0 / 14																					
N-Nitroso-di-n-propylamine	ND	0 / 14																					
N-Nitrosodiphenylamine	ND	0 / 14																					
Naphthalene	ND	0 / 14																					
Nitrobenzene	ND	0 / 14																					
Pentachlorophenol	ND	0 / 14																					
Phenanthrene	ND	0 / 14																					
Phenol	ND	0 / 14																					
Pyrene	ND	0 / 14																					
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4	<	310	U				320	310					150	310	J						
Acenaphthylene	420	3 / 4	<	160	U				420	160					190	160							
Anthracene	87	3 / 4	<	6.3	U				11	6.3					2.8	6.4	J						
Benzo(a)anthracene	100	4 / 4	18	16					25	16					8.2	16	J						
Benzo(a)pyrene	17	2 / 4	17	16					10	16	J				<	16	U						
Benzo(b)fluoranthene	21	4 / 4	21	6.3					12	6.3					5	6.4	J						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-047-SS-03			AUS-0A07-R47-SS-03			AUS-0A07-047-SS-04			AUS-0A07-R47-SS-04			AUS-0A07-047-SS-05			AUS-0A07-R47-SS-05			AUS-0A07-048-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 23, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
Benzo(g,h,i)perylene	15	J / 4	15	25	J				<	25	U				<	25	U							
Benzo(k)fluoranthene	11	4 / 4	11	6.3				6	6.3	J				2.7	6.4	J								
Chrysene	81	4 / 4	18	16				23	16					10	16	J								
Dibenz(a,h)anthracene	ND	0 / 4	<	62	U			<	62	U				<	63	U								
Fluoranthene	620	4 / 4	38	16				87	16					28	16									
Fluorene	210	2 / 4	<	31	U			55	31					<	31	U								
Indeno(1,2,3-cd)pyrene	14	J / 4	14	16	J			10	16	J				<	16	U								
Naphthalene	330	2 / 4	<	160	U			330	160					150	160	J								
Phenanthrene	360	4 / 4	24	12				170	12					44	12									
Pyrene	330	4 / 4	39	31				110	31					20	31	J								
PESTICIDES (ORGANOCHLORINE) (µg/kg)																								
Aldrin	1300000	75 / 103				120000	29000	J				13000	3000	J			2400	290						R
Alpha-BHC	ND	0 / 105				<	2900	U				<	300	U			<	290	U		<	26	UJ	
Alpha-Chlordane	490	4 / 104				<	2900	UJ				<	300	UJ			<	290	UJ		<	26	UJ	
beta-BHC	ND	0 / 104				<	2900	U				<	300	U			<	290	U		<	26	UJ	
delta-BHC	ND	0 / 104				<	2900	U				<	300	U			<	290	U		<	26	UJ	
Dieldrin	190000	J / 104				15000	5900					3500	610				6700	600						R
Endosulfan I	ND	0 / 104				<	2900	UJ				<	300	UJ			<	290	UJ		<	26	UJ	
Endosulfan II	5.3	J / 104				<	5900	U				<	610	U			<	600	U		<	53	UJ	
Endosulfan sulfate	ND	0 / 104				<	5900	U				<	610	U			<	600	U		<	53	UJ	
Endrin	12000	30 / 105				<	5900	UJ				<	610	UJ			<	600	UJ					R
Endrin aldehyde	9000	16 / 104				<	5900	U				<	610	U			<	600	U		<	53	UJ	
Endrin ketone	20000	29 / 102				<	5900	U				<	610	U			<	600	U					R
gamma-BHC (Lindane)	ND	0 / 105				<	2900	U				<	300	U			<	290	U		<	26	UJ	
gamma-Chlordane	1600	11 / 104				<	2900	UJ				400	300	J			920	290						R
Heptachlor	ND	0 / 104				<	2900	UJ				<	300	UJ			<	290	UJ		<	26	UJ	
Heptachlor epoxide	ND	0 / 105				<	2900	UJ				<	300	UJ			<	290	UJ		<	26	UJ	
Hexachlorobenzene	2700	11 / 105				<	2900	U				<	300	U			<	290	U		<	26	UJ	
Isodrin	49000	J / 103				4600	5900	J				480	610	J			<	600	U		<	53	UJ	
Methoxychlor	ND	0 / 105				<	29000	U				<	3000	U			<	2900	U		<	260	UJ	
4,4-DDD	12000	30 / 104				<	5900	U				290	610	J			1100	600						R
4,4-DDE	4800	14 / 104				<	5900	U				<	610	U			<	600	U					R
4,4-DDT	100000	38 / 103				3900	5900	J				1700	610				4400	600						R
Technical Chlordane	ND	0 / 104				<	11000	U				<	1200	U			<	1200	U		<	100	UJ	
Toxaphene	ND	0 / 104				<	58000	U				<	6000	U			<	5900	U		<	520	UJ	

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-047-SS-03	AUS-0A07-R47-SS-03	AUS-0A07-047-SS-04	AUS-0A07-R47-SS-04	AUS-0A07-047-SS-05	AUS-0A07-R47-SS-05	AUS-0A07-048-SS-0X								
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 23, 2001		
			Maximum	Frequency	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual	Result RL Qual						
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																	
Aroclor 1016	ND	0/3															
Aroclor 1221	ND	0/3															
Aroclor 1232	ND	0/3															
Aroclor 1242	ND	0/3															
Aroclor 1248	ND	0/3															
Aroclor 1254	ND	0/3															
Aroclor 1260	ND	0/3															
DIOXINS/FURANS (ng/kg)																	
1,2,3,4,6,7,8-HpCDD	55.5	3/3															
1,2,3,4,6,7,8-HpCDF	7.31	3/3															
1,2,3,4,7,8,9-HpCDF	1.42	2/3															
1,2,3,4,7,8-HxCDD	0.59	3/3															
1,2,3,4,7,8-HxCDF	2.29	3/3															
1,2,3,6,7,8-HxCDD	1.3	3/3															
1,2,3,6,7,8-HxCDF	0.98	3/3															
1,2,3,7,8,9-HxCDD	0.997	3/3															
1,2,3,7,8,9-HxCDF	1.14	1/3															
1,2,3,7,8-PeCDD	0.373	3/3															
1,2,3,7,8-PeCDF	3.5	3/3															
2,3,4,6,7,8-HxCDF	0.765	2/3															
2,3,4,7,8-PeCDF	3.35	3/3															
2,3,7,8-TCDD	0.289	1/3															
2,3,7,8-TCDF	4.16	2/3															
OCDD	1250	3/3															
OCDF	33.4	3/3															
Total HpCDDs	166	3/3															
Total HpCDFs	21.4	3/3															
Total HxCDDs	14.9	3/3															
Total HxCDFs	9.98	3/3															
Total PeCDDs	3.55	3/3															
Total PeCDFs	15.6	3/3															
Total TCDDs	0.351	1/3															
Total TCDFs	15.2	2/3															

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID DATE COLLECTED			AUS-0A07-047-SS-03			AUS-0A07-R47-SS-03			AUS-0A07-047-SS-04			AUS-0A07-R47-SS-04			AUS-0A07-047-SS-05			AUS-0A07-R47-SS-05			AUS-0A07-048-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 23, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18	7010	19.1				9710	18.2					9360	20.6								
Antimony	0.63	7 / 18	<	0.28	U			<	0.27	U				<	0.29	U							
Arsenic	9.6	18 / 18	9.6	0.96				7.1	0.91					7.5	1								
Barium	153	18 / 18	60.7	0.96				69.8	0.91					70	1								
Beryllium	1.2	17 / 18	0.64	0.38				0.78	0.36					0.82	0.41								
Boron	6.2	10 / 18	<	4.8	U			4	4.6					4.1	5.2								
Cadmium	0.39	5 / 18	<	0.19	U			0.18	0.18					0.1	0.21								
Calcium	217000	18 / 18	2550	9.6				2050	9.1					2060	10.3								
Chromium	25.6	18 / 18	17.4	0.96				17.1	0.91					17.9	1								
Cobalt	15.1	18 / 18	7.8	0.48				10.5	0.46					10.2	0.52								
Copper	23.5	18 / 18	14.9	0.96				16	0.91					17.3	1								
Iron	34000	18 / 18	19800	4.8				23500	4.6					27800	5.2								
Lead	58.1	18 / 18	14.3	0.48				13.4	0.46					15.2	0.52								
Magnesium	19700	18 / 18	2550	9.6				2600	9.1					2610	10.3								
Manganese	1370	18 / 18	427	0.96				597	0.91					635	1								
Mercury	0.053	3 / 18	<	0.041	U			<	0.041	U				<	0.042	U							
Nickel	22.9	18 / 18	18.8	0.96				21.9	0.91					22.5	1								
Potassium	930	18 / 18	524	47.9				910	45.5					808	51.6								
Selenium	0.78	1 / 18	<	0.92	U			<	0.97	U				<	0.72	U							
Silver	ND	0 / 18	<	0.48	U			<	0.46	U				<	0.52	U							
Sodium	1360	18 / 18	828	95.7				1100	91					1040	103								
Thallium	ND	0 / 18	<	0.96	U			<	0.91	U				<	1	U							
Vanadium	38.1	18 / 18	20.8	0.48				22.6	0.46					23.2	0.52								
Zinc	95.4	18 / 18	55.1	0.96				58.2	0.91					59.3	1								

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-048-SS-02			AUS-0A07-049-SS-0X			AUS-0A07-049-SS-02			AUS-0A07-050-SS-0X		
			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS ($\mu\text{g}/\text{kg}$)														
1,1,1-Trichloroethane	ND	0 / 17												
1,1,2,2-Tetrachloroethane	ND	0 / 17												
1,1,2-Trichloroethane	ND	0 / 17												
1,1-Dichloroethane	ND	0 / 17												
1,1-Dichloroethene	ND	0 / 17												
1,2-Dichloroethane	ND	0 / 17												
1,2-Dichloropropane	660	5 / 17												
2-Butanone	ND	0 / 17												
2-Hexanone	ND	0 / 17												
4-Methyl-2-Pentanone	ND	0 / 17												
Acetone	24	8 / 17												
Benzene	8	3 / 17												
Bromodichloromethane	ND	0 / 17												
Bromoform	ND	0 / 17												
Bromomethane	ND	0 / 17												
Carbon Disulfide	ND	0 / 17												
Carbon Tetrachloride	ND	0 / 17												
Chlorobenzene	48	3 / 17												
Chloroethane	ND	0 / 17												
Chloroform	ND	0 / 17												
Chloromethane	ND	0 / 17												
cis-1,2-Dichloroethene	ND	0 / 17												
cis-1,3-Dichloropropene	ND	0 / 17												
Dibromochloromethane	ND	0 / 17												
Ethylbenzene	41	2 / 17												
Methylene Chloride	ND	0 / 17												
n-Hexane	ND	0 / 17												
Styrene	28	2 / 17												
Tetrachloroethene	48	2 / 17												
Toluene	11	3 / 17												
trans-1,2-Dichloroethene	ND	0 / 17												
trans-1,3-Dichloropropene	ND	0 / 17												
Trichloroethene	ND	0 / 17												
Vinyl Chloride	ND	0 / 17												
Xylene (total)	4500	3 / 17												

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-048-SS-02			AUS-0A07-049-SS-0X			AUS-0A07-049-SS-02			AUS-0A07-050-SS-0X		
			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)														
1,2,4-Trichlorobenzene	ND	0 / 14												
1,2-Dichlorobenzene	ND	0 / 14												
1,3-Dichlorobenzene	ND	0 / 14												
1,4-Dichlorobenzene	ND	0 / 14												
2,2-Oxybis(1-chloro)propane	ND	0 / 14												
2,4,5-Trichlorophenol	ND	0 / 14												
2,4,6-Trichlorophenol	ND	0 / 14												
2,4-Dichlorophenol	ND	0 / 14												
2,4-Dimethylphenol	ND	0 / 14												
2,4-Dinitrophenol	ND	0 / 14												
2,4-Dinitrotoluene	ND	0 / 14												
2,6-Dinitrotoluene	ND	0 / 14												
2-Chloronaphthalene	ND	0 / 14												
2-Chlorophenol	ND	0 / 14												
2-Methylnaphthalene	ND	0 / 14												
2-Methylphenol (o-cresol)	ND	0 / 14												
2-Nitroaniline	ND	0 / 14												
2-Nitrophenol	ND	0 / 14												
3,3-Dichlorobenzidine	ND	0 / 14												
3-Nitroaniline	ND	0 / 14												
4,6-Dinitro-2-methylphenol	ND	0 / 14												
4-Bromophenyl-phenylether	ND	0 / 14												
4-Chloro-3-methylphenol	ND	0 / 14												
4-Chloroaniline	ND	0 / 14												
4-Chlorophenyl-phenylether	ND	0 / 14												
4-Methylphenol (p-cresol)	ND	0 / 14												
4-Nitroaniline	ND	0 / 14												
4-Nitrophenol	ND	0 / 14												
Acenaphthene	ND	0 / 14												
Acenaphthylene	ND	0 / 14												
Anthracene	ND	0 / 14												
Benzo(a)anthracene	ND	0 / 14												
Benzo(a)pyrene	ND	0 / 14												
Benzo(b)fluoranthene	ND	0 / 14												
Benzo(g,h,i)perylene	ND	0 / 14												

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-048-SS-02			AUS-0A07-049-SS-0X			AUS-0A07-049-SS-02			AUS-0A07-050-SS-0X		
			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14												
bis(2-Chloroethoxy)methane	ND	0 / 14												
bis(2-Chloroethyl)ether	ND	0 / 14												
bis(2-Ethylhexyl)phthalate	2500	1 / 14												
Butylbenzylphthalate	ND	0 / 14												
Carbazole	ND	0 / 14												
Chrysene	ND	0 / 14												
Di-n-butylphthalate	ND	0 / 14												
Di-n-octylphthalate	ND	0 / 14												
Dibenz(a,h)anthracene	ND	0 / 14												
Dibenzofuran	ND	0 / 14												
Diethylphthalate	ND	0 / 14												
Dimethylphthalate	ND	0 / 14												
Fluoranthene	ND	0 / 14												
Fluorene	ND	0 / 14												
Hexachlorobenzene	ND	0 / 14												
Hexachlorobutadiene	ND	0 / 14												
Hexachlorocyclopentadiene	ND	0 / 14												
Hexachloroethane	ND	0 / 14												
Indeno(1,2,3-cd)pyrene	ND	0 / 14												
Isophorone	ND	0 / 14												
N-Nitroso-di-n-propylamine	ND	0 / 14												
N-Nitrosodiphenylamine	ND	0 / 14												
Naphthalene	ND	0 / 14												
Nitrobenzene	ND	0 / 14												
Pentachlorophenol	ND	0 / 14												
Phenanthrene	ND	0 / 14												
Phenol	ND	0 / 14												
Pyrene	ND	0 / 14												
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)														
(µg/kg)														
Acenaphthene	320	2 / 4												
Acenaphthylene	420	3 / 4												
Anthracene	87	3 / 4												
Benzo(a)anthracene	100	4 / 4												
Benzo(a)pyrene	17	2 / 4												
Benzo(b)fluoranthene	21	4 / 4												

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-048-SS-02			AUS-0A07-049-SS-0X			AUS-0A07-049-SS-02			AUS-0A07-050-SS-0X		
			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	15 J	1 / 4												
Benzo(k)fluoranthene	11	4 / 4												
Chrysene	81	4 / 4												
Dibenz(a,h)anthracene	ND	0 / 4												
Fluoranthene	620	4 / 4												
Fluorene	210	2 / 4												
Indeno(1,2,3-cd)pyrene	14 J	2 / 4												
Naphthalene	330	2 / 4												
Phenanthrene	360	4 / 4												
Pyrene	330	4 / 4												
PESTICIDES (ORGANOCHLORINE) (µg/kg)														
Aldrin	1300000	75 / 103			R	290	31	J	76	31				R
Alpha-BHC	ND	0 / 105			R	<	31	U	<	31	U	<	32	UJ
Alpha-Chlordane	490	4 / 104			R	<	31	U	<	31	U			R
beta-BHC	ND	0 / 104			R	<	31	U	<	31	U			R
delta-BHC	ND	0 / 104			R	<	31	U	<	31	U			R
Dieldrin	190000 J	92 / 104	4900	630	UJ	550	63		810	63				R
Endosulfan I	ND	0 / 104			R	<	31	U	<	31	U			R
Endosulfan II	5.3 J	1 / 104			R	<	63	U	<	63	U			R
Endosulfan sulfate	ND	0 / 104			R	<	63	U	<	63	U			R
Endrin	12000	30 / 105	330	630	UJ	<	63	U	42	63	J			R
Endrin aldehyde	9000	16 / 104			R	<	63	U	<	63	U			R
Endrin ketone	20000	29 / 102			R	<	63	U	<	63	U			R
gamma-BHC (Lindane)	ND	0 / 105			R	<	31	U	<	31	U	<	32	UJ
gamma-Chlordane	1600	11 / 104			R	<	31	U	<	31	U	<	32	UJ
Heptachlor	ND	0 / 104			R	<	31	U	<	31	U			R
Heptachlor epoxide	ND	0 / 105			R	<	31	U	<	31	U	<	32	UJ
Hexachlorobenzene	2700	11 / 105			R	<	31	U	<	31	U	<	32	UJ
Isodrin	49000 J	29 / 103			R	<	63	U	<	63	U			R
Methoxychlor	ND	0 / 105			R	<	310	U	<	310	U	<	320	UJ
4,4-DDD	12000	30 / 104	2200	630	UJ	19	63	J	100	63				R
4,4-DDE	4800	14 / 104	2900	630	UJ	78	63		120	63				R
4,4-DDT	100000	38 / 103	9300	630	UJ	57	63	J	260	63				R
Technical Chlordane	ND	0 / 104			R	<	120	U	<	120	U			R
Toxaphene	ND	0 / 104			R	<	620	U	<	610	U			R

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-048-SS-02			AUS-0A07-049-SS-0X			AUS-0A07-049-SS-02			AUS-0A07-050-SS-0X		
			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)														
Aroclor 1016	ND	0/3												
Aroclor 1221	ND	0/3												
Aroclor 1232	ND	0/3												
Aroclor 1242	ND	0/3												
Aroclor 1248	ND	0/3												
Aroclor 1254	ND	0/3												
Aroclor 1260	ND	0/3												
DIOXINS/FURANS (ng/kg)														
1,2,3,4,6,7,8-HpCDD	55.5	3/3												
1,2,3,4,6,7,8-HpCDF	7.31	3/3												
1,2,3,4,7,8,9-HpCDF	1.42	2/3												
1,2,3,4,7,8-HxCDD	0.59	3/3												
1,2,3,4,7,8-HxCDF	2.29	3/3												
1,2,3,6,7,8-HxCDD	1.3	3/3												
1,2,3,6,7,8-HxCDF	0.98	3/3												
1,2,3,7,8,9-HxCDD	0.997	3/3												
1,2,3,7,8,9-HxCDF	1.14	1/3												
1,2,3,7,8-PeCDD	0.373	3/3												
1,2,3,7,8-PeCDF	3.5	3/3												
2,3,4,6,7,8-HxCDF	0.765	2/3												
2,3,4,7,8-PeCDF	3.35	3/3												
2,3,7,8-TCDD	0.289	1/3												
2,3,7,8-TCDF	4.16	2/3												
OCDD	1250	3/3												
OCDF	33.4	3/3												
Total HpCDDs	166	3/3												
Total HpCDFs	21.4	3/3												
Total HxCDDs	14.9	3/3												
Total HxCDFs	9.98	3/3												
Total PeCDDs	3.55	3/3												
Total PeCDFs	15.6	3/3												
Total TCDDs	0.351	1/3												
Total TCDFs	15.2	2/3												

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-048-SS-02			AUS-0A07-049-SS-0X			AUS-0A07-049-SS-02			AUS-0A07-050-SS-0X		
			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)														
Aluminum	17900	18 / 18												
Antimony	0.63	7 / 18												
Arsenic	9.6	18 / 18												
Barium	153	18 / 18												
Beryllium	1.2	17 / 18												
Boron	6.2	10 / 18												
Cadmium	0.39	5 / 18												
Calcium	217000	18 / 18												
Chromium	25.6	18 / 18												
Cobalt	15.1	18 / 18												
Copper	23.5	18 / 18												
Iron	34000	18 / 18												
Lead	58.1	18 / 18												
Magnesium	19700	18 / 18												
Manganese	1370	18 / 18												
Mercury	0.053	3 / 18												
Nickel	22.9	18 / 18												
Potassium	930	18 / 18												
Selenium	0.78	1 / 18												
Silver	ND	0 / 18												
Sodium	1360	18 / 18												
Thallium	ND	0 / 18												
Vanadium	38.1	18 / 18												
Zinc	95.4	18 / 18												

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R50-SS-02	AUS-0A07-051-SS-0X	AUS-0A07-051-SS-02	AUS-0A07-052-SS-0X	AUS-0A07-052-SS-02	AUS-0A07-053-SS-0X	AUS-0A07-053-SS-02												
			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
VOLATILE ORGANIC COMPOUNDS (µg/kg)																					
1,1,1-Trichloroethane	ND	0 / 17																<	5	U	
1,1,2,2-Tetrachloroethane	ND	0 / 17																<	5	U	
1,1,2-Trichloroethane	ND	0 / 17																<	5	U	
1,1-Dichloroethane	ND	0 / 17																<	5	U	
1,1-Dichloroethene	ND	0 / 17																<	5	U	
1,2-Dichloroethane	ND	0 / 17																<	5	U	
1,2-Dichloropropane	660	5 / 17																<	5	U	
2-Butanone	ND	0 / 17																<	5	U	
2-Hexanone	ND	0 / 17																<	5	U	
4-Methyl-2-Pentanone	ND	0 / 17																<	5	U	
Acetone	24	8 / 17																<	5	U	
Benzene	8	3 / 17																<	5	U	
Bromodichloromethane	ND	0 / 17																<	5	U	
Bromoform	ND	0 / 17																<	5	U	
Bromomethane	ND	0 / 17																<	5	U	
Carbon Disulfide	ND	0 / 17																<	5	U	
Carbon Tetrachloride	ND	0 / 17																<	5	U	
Chlorobenzene	48	3 / 17																<	5	U	
Chloroethane	ND	0 / 17																<	5	U	
Chloroform	ND	0 / 17																<	5	U	
Chloromethane	ND	0 / 17																<	5	U	
cis-1,2-Dichloroethene	ND	0 / 17																<	5	U	
cis-1,3-Dichloropropene	ND	0 / 17																<	5	U	
Dibromochloromethane	ND	0 / 17																<	5	U	
Ethylbenzene	41	2 / 17																<	5	U	
Methylene Chloride	ND	0 / 17																<	5	U	
n-Hexane	ND	0 / 17																<	5	U	
Styrene	28	2 / 17																<	5	U	
Tetrachloroethene	48	2 / 17																<	5	U	
Toluene	11	3 / 17																<	5	U	
trans-1,2-Dichloroethene	ND	0 / 17																<	5	U	
trans-1,3-Dichloropropene	ND	0 / 17																<	5	U	
Trichloroethene	ND	0 / 17																<	5	U	
Vinyl Chloride	ND	0 / 17																<	5	U	
Xylene (total)	4500	3 / 17																<	5	U	

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-R50-SS-02		AUS-0A07-051-SS-0X			AUS-0A07-051-SS-02			AUS-0A07-052-SS-0X			AUS-0A07-052-SS-02			AUS-0A07-053-SS-0X			AUS-0A07-053-SS-02			
			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																					
1,2,4-Trichlorobenzene	ND	0 / 14													<	1100	U				
1,2-Dichlorobenzene	ND	0 / 14													<	1100	U				
1,3-Dichlorobenzene	ND	0 / 14													<	1100	U				
1,4-Dichlorobenzene	ND	0 / 14													<	1100	U				
2,2-Oxybis(1-chloro)propane	ND	0 / 14													<	1100	U				
2,4,5-Trichlorophenol	ND	0 / 14													<	5900	U				
2,4,6-Trichlorophenol	ND	0 / 14													<	1100	U				
2,4-Dichlorophenol	ND	0 / 14													<	1100	U				
2,4-Dimethylphenol	ND	0 / 14													<	1100	U				
2,4-Dinitrophenol	ND	0 / 14													<	5900	U				
2,4-Dinitrotoluene	ND	0 / 14													<	1100	U				
2,6-Dinitrotoluene	ND	0 / 14													<	1100	U				
2-Chloronaphthalene	ND	0 / 14													<	1100	U				
2-Chlorophenol	ND	0 / 14													<	1100	U				
2-Methylnaphthalene	ND	0 / 14													<	1100	U				
2-Methylphenol (o-cresol)	ND	0 / 14													<	1100	U				
2-Nitroaniline	ND	0 / 14													<	5900	U				
2-Nitrophenol	ND	0 / 14													<	1100	U				
3,3-Dichlorobenzidine	ND	0 / 14													<	2300	U				
3-Nitroaniline	ND	0 / 14													<	5900	U				
4,6-Dinitro-2-methylphenol	ND	0 / 14													<	5900	U				
4-Bromophenyl-phenylether	ND	0 / 14													<	1100	U				
4-Chloro-3-methylphenol	ND	0 / 14													<	1100	U				
4-Chloroaniline	ND	0 / 14													<	1100	U				
4-Chlorophenyl-phenylether	ND	0 / 14													<	1100	U				
4-Methylphenol (p-cresol)	ND	0 / 14													<	1100	U				
4-Nitroaniline	ND	0 / 14													<	5900	U				
4-Nitrophenol	ND	0 / 14													<	5900	U				
Acenaphthene	ND	0 / 14													<	1100	U				
Acenaphthylene	ND	0 / 14													<	1100	U				
Anthracene	ND	0 / 14													<	1100	U				
Benzo(a)anthracene	ND	0 / 14													<	1100	U				
Benzo(a)pyrene	ND	0 / 14													<	1100	U				
Benzo(b)fluoranthene	ND	0 / 14													<	1100	U				
Benzo(g,h,i)perylene	ND	0 / 14													<	1100	U				

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R50-SS-02			AUS-0A07-051-SS-0X			AUS-0A07-051-SS-02			AUS-0A07-052-SS-0X			AUS-0A07-052-SS-02			AUS-0A07-053-SS-0X			AUS-0A07-053-SS-02		
			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14																<	1100	U			
bis(2-Chloroethoxy)methane	ND	0 / 14																<	1100	U			
bis(2-Chloroethyl)ether	ND	0 / 14																<	1100	U			
bis(2-Ethylhexyl)phthalate	2500	1 / 14																<	1100	U			
Butylbenzylphthalate	ND	0 / 14																<	1100	U			
Carbazole	ND	0 / 14																<	1100	U			
Chrysene	ND	0 / 14																<	1100	U			
Di-n-butylphthalate	ND	0 / 14																<	1100	U			
Di-n-octylphthalate	ND	0 / 14																<	1100	U			
Dibenz(a,h)anthracene	ND	0 / 14																<	1100	U			
Dibenzofuran	ND	0 / 14																<	1100	U			
Diethylphthalate	ND	0 / 14																<	1100	U			
Dimethylphthalate	ND	0 / 14																<	1100	U			
Fluoranthene	ND	0 / 14																<	1100	U			
Fluorene	ND	0 / 14																<	1100	U			
Hexachlorobenzene	ND	0 / 14																<	1100	U			
Hexachlorobutadiene	ND	0 / 14																<	1100	U			
Hexachlorocyclopentadiene	ND	0 / 14																<	1100	U			
Hexachloroethane	ND	0 / 14																<	1100	U			
Indeno(1,2,3-cd)pyrene	ND	0 / 14																<	1100	U			
Isophorone	ND	0 / 14																<	1100	U			
N-Nitroso-di-n-propylamine	ND	0 / 14																<	1100	U			
N-Nitrosodiphenylamine	ND	0 / 14																<	1100	U			
Naphthalene	ND	0 / 14																<	1100	U			
Nitrobenzene	ND	0 / 14																<	1100	U			
Pentachlorophenol	ND	0 / 14																<	5900	U			
Phenanthrene	ND	0 / 14																<	1100	U			
Phenol	ND	0 / 14																<	1100	U			
Pyrene	ND	0 / 14																<	1100	U			
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R50-SS-02			AUS-0A07-051-SS-0X			AUS-0A07-051-SS-02			AUS-0A07-052-SS-0X			AUS-0A07-052-SS-02			AUS-0A07-053-SS-0X			AUS-0A07-053-SS-02		
	DATE COLLECTED		May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	15 J	1 / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	5.1	2.8		39	32		<	590	U	<	30	U	<	29	U	7.9	2.9	J	2.8	3	J
Alpha-BHC	ND	0 / 105	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
Alpha-Chlordane	490	4 / 104	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
beta-BHC	ND	0 / 104	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
delta-BHC	ND	0 / 104	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
Dieldrin	190000 J	92 / 104	19	5.8		1300	65		13000	1200		<	61	U	<	60	U	12	6	J	19	6.2	
Endosulfan I	ND	0 / 104	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
Endosulfan II	5.3 J	1 / 104	<	5.8	U	<	65	U	<	1200	U	<	61	U	<	60	U	<	6	U	<	6.2	U
Endosulfan sulfate	ND	0 / 104	<	5.8	U	<	65	U	<	1200	U	<	61	U	<	60	U	<	6	U	<	6.2	U
Endrin	12000	30 / 105	<	5.8	U	1300	65		1800	1200		<	61	U	<	60	U	<	6	U	<	6.2	U
Endrin aldehyde	9000	16 / 104	<	5.8	U	<	65	U	<	1200	U	<	61	U	<	60	U	<	6	U	<	6.2	U
Endrin ketone	20000	29 / 102	<	5.8	U	<	65	U	<	1200	U	<	61	U	<	60	U	<	6	U	<	6.2	U
gamma-BHC (Lindane)	ND	0 / 105	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
gamma-Chlordane	1600	11 / 104	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
Heptachlor	ND	0 / 104	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
Heptachlor epoxide	ND	0 / 105	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
Hexachlorobenzene	2700	11 / 105	<	2.8	U	<	32	U	<	590	U	<	30	U	<	29	U	<	2.9	U	<	3	U
Isodrin	49000 J	29 / 103	<	5.8	U	<	65	U	<	1200	U	<	61	U	<	60	U	<	6	U	<	6.2	U
Methoxychlor	ND	0 / 105	<	2.8	U	<	320	U	<	5900	U	<	300	U	<	290	U	<	29	U	<	30	U
4,4-DDD	12000	30 / 104	1.5	5.8	J	320	65		12000	1200		<	61	U	<	60	U	<	6	U	<	6.2	U
4,4-DDE	4800	14 / 104	<	5.8	U	890	65		4800	1200		<	61	U	<	60	U	<	6	U	<	6.2	U
4,4-DDT	100000	38 / 103	<	5.8	U	2100	320		100000	12000		<	61	U	<	60	U	<	6	U	2	6.2	J
Technical Chlordane	ND	0 / 104	<	11	U	<	130	U	<	2300	U	<	120	U	<	120	U	<	12	U	<	12	U
Toxaphene	ND	0 / 104	<	57	U	<	640	U	<	12000	U	<	600	U	<	590	U	<	58	U	<	61	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R50-SS-02			AUS-0A07-051-SS-0X			AUS-0A07-051-SS-02			AUS-0A07-052-SS-0X			AUS-0A07-052-SS-02			AUS-0A07-053-SS-0X			AUS-0A07-053-SS-02		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
DATE COLLECTED			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
	Maximum	Frequency																					
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																							
Aroclor 1016	ND	0/3																					
Aroclor 1221	ND	0/3																					
Aroclor 1232	ND	0/3																					
Aroclor 1242	ND	0/3																					
Aroclor 1248	ND	0/3																					
Aroclor 1254	ND	0/3																					
Aroclor 1260	ND	0/3																					
DIOXINS/FURANS (ng/kg)																							
1,2,3,4,6,7,8-HpCDD	55.5	3/3																					
1,2,3,4,6,7,8-HpCDF	7.31	3/3																					
1,2,3,4,7,8,9-HpCDF	1.42	2/3																					
1,2,3,4,7,8-HxCDD	0.59	3/3																					
1,2,3,4,7,8-HxCDF	2.29	3/3																					
1,2,3,6,7,8-HxCDD	1.3	3/3																					
1,2,3,6,7,8-HxCDF	0.98	3/3																					
1,2,3,7,8,9-HxCDD	0.997	3/3																					
1,2,3,7,8,9-HxCDF	1.14	1/3																					
1,2,3,7,8-PeCDD	0.373	3/3																					
1,2,3,7,8-PeCDF	3.5	3/3																					
2,3,4,6,7,8-HxCDF	0.765	2/3																					
2,3,4,7,8-PeCDF	3.35	3/3																					
2,3,7,8-TCDD	0.289	1/3																					
2,3,7,8-TCDF	4.16	2/3																					
OCDD	1250	3/3																					
OCDF	33.4	3/3																					
Total HpCDDs	166	3/3																					
Total HpCDFs	21.4	3/3																					
Total HxCDDs	14.9	3/3																					
Total HxCDFs	9.98	3/3																					
Total PeCDDs	3.55	3/3																					
Total PeCDFs	15.6	3/3																					
Total TCDDs	0.351	1/3																					
Total TCDFs	15.2	2/3																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-R50-SS-02			AUS-0A07-051-SS-0X			AUS-0A07-051-SS-02			AUS-0A07-052-SS-0X			AUS-0A07-052-SS-02			AUS-0A07-053-SS-0X			AUS-0A07-053-SS-02		
			May 22, 2001			March 23, 2001			March 23, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18																10300	17.6				
Antimony	0.63	7 / 18																<	0.27	U			
Arsenic	9.6	18 / 18																5.5	0.88				
Barium	153	18 / 18																153	0.88				
Beryllium	1.2	17 / 18																0.77	0.35				
Boron	6.2	10 / 18																3.7	4.4				
Cadmium	0.39	5 / 18																<	0.18	U			
Calcium	217000	18 / 18																2340	8.8				
Chromium	25.6	18 / 18																16.6	0.88				
Cobalt	15.1	18 / 18																6.1	0.44				
Copper	23.5	18 / 18																12.9	0.88				
Iron	34000	18 / 18																16600	4.4				
Lead	58.1	18 / 18																8	0.44				
Magnesium	19700	18 / 18																2360	8.8				
Manganese	1370	18 / 18																574	0.88				
Mercury	0.053	3 / 18																<	0.04	U			
Nickel	22.9	18 / 18																17.8	0.88				
Potassium	930	18 / 18																727	44.1				
Selenium	0.78	1 / 18																<	0.65	U			
Silver	ND	0 / 18																<	0.44	U			
Sodium	1360	18 / 18																1360	88.2				
Thallium	ND	0 / 18																<	0.94	U			
Vanadium	38.1	18 / 18																27.6	0.44				
Zinc	95.4	18 / 18																39.9	0.88				

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-054-SS-0X			AUS-0A07-R54-SS-02			AUS-0A07-055-SS-0X			AUS-0A07-R55-SS-02			AUS-0A07-056-SS-0X			AUS-0A07-R56-SS-02			AUS-0A07-057-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,1,1-Trichloroethane	ND	0 / 17																					
1,1,2,2-Tetrachloroethane	ND	0 / 17																					
1,1,2-Trichloroethane	ND	0 / 17																					
1,1-Dichloroethane	ND	0 / 17																					
1,1-Dichloroethene	ND	0 / 17																					
1,2-Dichloroethane	ND	0 / 17																					
1,2-Dichloropropane	660	5 / 17																					
2-Butanone	ND	0 / 17																					
2-Hexanone	ND	0 / 17																					
4-Methyl-2-Pentanone	ND	0 / 17																					
Acetone	24	8 / 17																					
Benzene	8	3 / 17																					
Bromodichloromethane	ND	0 / 17																					
Bromoform	ND	0 / 17																					
Bromomethane	ND	0 / 17																					
Carbon Disulfide	ND	0 / 17																					
Carbon Tetrachloride	ND	0 / 17																					
Chlorobenzene	48	3 / 17																					
Chloroethane	ND	0 / 17																					
Chloroform	ND	0 / 17																					
Chloromethane	ND	0 / 17																					
cis-1,2-Dichloroethene	ND	0 / 17																					
cis-1,3-Dichloropropene	ND	0 / 17																					
Dibromochloromethane	ND	0 / 17																					
Ethylbenzene	41	2 / 17																					
Methylene Chloride	ND	0 / 17																					
n-Hexane	ND	0 / 17																					
Styrene	28	2 / 17																					
Tetrachloroethene	48	2 / 17																					
Toluene	11	3 / 17																					
trans-1,2-Dichloroethene	ND	0 / 17																					
trans-1,3-Dichloropropene	ND	0 / 17																					
Trichloroethene	ND	0 / 17																					
Vinyl Chloride	ND	0 / 17																					
Xylene (total)	4500	3 / 17																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-054-SS-0X			AUS-0A07-R54-SS-02			AUS-0A07-055-SS-0X			AUS-0A07-R55-SS-02			AUS-0A07-056-SS-0X			AUS-0A07-R56-SS-02			AUS-0A07-057-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,2,4-Trichlorobenzene	ND	0 / 14																			<	1000	U
1,2-Dichlorobenzene	ND	0 / 14																			<	1000	U
1,3-Dichlorobenzene	ND	0 / 14																			<	1000	U
1,4-Dichlorobenzene	ND	0 / 14																			<	1000	U
2,2-Oxybis(1-chloro)propane	ND	0 / 14																			<	1000	U
2,4,5-Trichlorophenol	ND	0 / 14																			<	5300	U
2,4,6-Trichlorophenol	ND	0 / 14																			<	1000	U
2,4-Dichlorophenol	ND	0 / 14																			<	1000	U
2,4-Dimethylphenol	ND	0 / 14																			<	1000	U
2,4-Dinitrophenol	ND	0 / 14																			<	5300	U
2,4-Dinitrotoluene	ND	0 / 14																			<	1000	U
2,6-Dinitrotoluene	ND	0 / 14																			<	1000	U
2-Chloronaphthalene	ND	0 / 14																			<	1000	U
2-Chlorophenol	ND	0 / 14																			<	1000	U
2-Methylnaphthalene	ND	0 / 14																			<	1000	U
2-Methylphenol (o-cresol)	ND	0 / 14																			<	1000	U
2-Nitroaniline	ND	0 / 14																			<	5300	U
2-Nitrophenol	ND	0 / 14																			<	1000	U
3,3-Dichlorobenzidine	ND	0 / 14																			<	2100	U
3-Nitroaniline	ND	0 / 14																			<	5300	U
4,6-Dinitro-2-methylphenol	ND	0 / 14																			<	5300	U
4-Bromophenyl-phenylether	ND	0 / 14																			<	1000	U
4-Chloro-3-methylphenol	ND	0 / 14																			<	1000	U
4-Chloroaniline	ND	0 / 14																			<	1000	U
4-Chlorophenyl-phenylether	ND	0 / 14																			<	1000	U
4-Methylphenol (p-cresol)	ND	0 / 14																			<	1000	U
4-Nitroaniline	ND	0 / 14																			<	5300	U
4-Nitrophenol	ND	0 / 14																			<	5300	U
Acenaphthene	ND	0 / 14																			<	1000	U
Acenaphthylene	ND	0 / 14																			<	1000	U
Anthracene	ND	0 / 14																			<	1000	U
Benzo(a)anthracene	ND	0 / 14																			<	1000	U
Benzo(a)pyrene	ND	0 / 14																			<	1000	U
Benzo(b)fluoranthene	ND	0 / 14																			<	1000	U
Benzo(g,h,i)perylene	ND	0 / 14																			<	1000	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-054-SS-0X			AUS-0A07-R54-SS-02			AUS-0A07-055-SS-0X			AUS-0A07-R55-SS-02			AUS-0A07-056-SS-0X			AUS-0A07-R56-SS-02			AUS-0A07-057-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14																			<	1000	U
bis(2-Chloroethoxy)methane	ND	0 / 14																			<	1000	U
bis(2-Chloroethyl)ether	ND	0 / 14																			<	1000	U
bis(2-Ethylhexyl)phthalate	2500	1 / 14																			<	1000	U
Butylbenzylphthalate	ND	0 / 14																			<	1000	U
Carbazole	ND	0 / 14																			<	1000	U
Chrysene	ND	0 / 14																			<	1000	U
Di-n-butylphthalate	ND	0 / 14																			<	1000	U
Di-n-octylphthalate	ND	0 / 14																			<	1000	U
Dibenz(a,h)anthracene	ND	0 / 14																			<	1000	U
Dibenzofuran	ND	0 / 14																			<	1000	U
Diethylphthalate	ND	0 / 14																			<	1000	U
Dimethylphthalate	ND	0 / 14																			<	1000	U
Fluoranthene	ND	0 / 14																			<	1000	U
Fluorene	ND	0 / 14																			<	1000	U
Hexachlorobenzene	ND	0 / 14																			<	1000	U
Hexachlorobutadiene	ND	0 / 14																			<	1000	U
Hexachlorocyclopentadiene	ND	0 / 14																			<	1000	U
Hexachloroethane	ND	0 / 14																			<	1000	U
Indeno(1,2,3-cd)pyrene	ND	0 / 14																			<	1000	U
Isophorone	ND	0 / 14																			<	1000	U
N-Nitroso-di-n-propylamine	ND	0 / 14																			<	1000	U
N-Nitrosodiphenylamine	ND	0 / 14																			<	1000	U
Naphthalene	ND	0 / 14																			<	1000	U
Nitrobenzene	ND	0 / 14																			<	1000	U
Pentachlorophenol	ND	0 / 14																			<	5300	U
Phenanthrene	ND	0 / 14																			<	1000	U
Phenol	ND	0 / 14																			<	1000	U
Pyrene	ND	0 / 14																			<	1000	U
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-054-SS-0X			AUS-0A07-R54-SS-02			AUS-0A07-055-SS-0X			AUS-0A07-R55-SS-02			AUS-0A07-056-SS-0X			AUS-0A07-R56-SS-02			AUS-0A07-057-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
Benzo(g,h,i)perylene	15 J	1 / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	<	31	U	2.2	3	J	<	31	U	<	2.9	U	57	30		110	30		26	25	
Alpha-BHC	ND	0 / 105	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
Alpha-Chlordane	490	4 / 104	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
beta-BHC	ND	0 / 104	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
delta-BHC	ND	0 / 104	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
Dieldrin	190000 J	92 / 104	140	64		5.9	6.1	J	440	64		<	6	U	580	61		10	6.1		3800	260	
Endosulfan I	ND	0 / 104	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
Endosulfan II	5.3 J	1 / 104	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	<	51	U
Endosulfan sulfate	ND	0 / 104	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	<	51	U
Endrin	12000	30 / 105	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	97	51	
Endrin aldehyde	9000	16 / 104	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	<	51	U
Endrin ketone	20000	29 / 102	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	81	51	
gamma-BHC (Lindane)	ND	0 / 105	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
gamma-Chlordane	1600	11 / 104	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
Heptachlor	ND	0 / 104	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
Heptachlor epoxide	ND	0 / 105	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	<	25	U
Hexachlorobenzene	2700	11 / 105	<	31	U	<	3	U	<	31	U	<	2.9	U	<	30	U	<	3	U	23	25	J
Isodrin	49000 J	29 / 103	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	3.9	6.1	J	<	51	U
Methoxychlor	ND	0 / 105	<	310	U	<	30	U	<	310	U	<	29	U	<	300	U	<	30	U	<	250	U
4,4-DDD	12000	30 / 104	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	120	51	
4,4-DDE	4800	14 / 104	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	510	51	
4,4-DDT	100000	38 / 103	<	64	U	<	6.1	U	<	64	U	<	6	U	<	61	U	<	6.1	U	410	51	
Technical Chlordane	ND	0 / 104	<	130	U	<	12	U	<	120	U	<	12	U	<	120	U	<	12	U	<	100	U
Toxaphene	ND	0 / 104	<	630	U	<	60	U	<	620	U	<	59	U	<	600	U	<	60	U	<	500	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-054-SS-0X			AUS-0A07-R54-SS-02			AUS-0A07-055-SS-0X			AUS-0A07-R55-SS-02			AUS-0A07-056-SS-0X			AUS-0A07-R56-SS-02			AUS-0A07-057-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																								
Aroclor 1016	ND	0/3																						
Aroclor 1221	ND	0/3																						
Aroclor 1232	ND	0/3																						
Aroclor 1242	ND	0/3																						
Aroclor 1248	ND	0/3																						
Aroclor 1254	ND	0/3																						
Aroclor 1260	ND	0/3																						
DIOXINS/FURANS (ng/kg)																								
1,2,3,4,6,7,8-HpCDD	55.5	3/3																						
1,2,3,4,6,7,8-HpCDF	7.31	3/3																						
1,2,3,4,7,8,9-HpCDF	1.42	2/3																						
1,2,3,4,7,8-HxCDD	0.59	3/3																						
1,2,3,4,7,8-HxCDF	2.29	3/3																						
1,2,3,6,7,8-HxCDD	1.3	3/3																						
1,2,3,6,7,8-HxCDF	0.98	3/3																						
1,2,3,7,8,9-HxCDD	0.997	3/3																						
1,2,3,7,8,9-HxCDF	1.14	1/3																						
1,2,3,7,8-PeCDD	0.373	3/3																						
1,2,3,7,8-PeCDF	3.5	3/3																						
2,3,4,6,7,8-HxCDF	0.765	2/3																						
2,3,4,7,8-PeCDF	3.35	3/3																						
2,3,7,8-TCDD	0.289	1/3																						
2,3,7,8-TCDF	4.16	2/3																						
OCDD	1250	3/3																						
OCDF	33.4	3/3																						
Total HpCDDs	166	3/3																						
Total HpCDFs	21.4	3/3																						
Total HxCDDs	14.9	3/3																						
Total HxCDFs	9.98	3/3																						
Total PeCDDs	3.55	3/3																						
Total PeCDFs	15.6	3/3																						
Total TCDDs	0.351	1/3																						
Total TCDFs	15.2	2/3																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-054-SS-0X		AUS-0A07-R54-SS-02			AUS-0A07-055-SS-0X			AUS-0A07-R55-SS-02			AUS-0A07-056-SS-0X			AUS-0A07-R56-SS-02			AUS-0A07-057-SS-0X					
			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18																2720	83.3				
Antimony	0.63	7 / 18																<	0.24		U		
Arsenic	9.6	18 / 18																4.3	4.2				
Barium	153	18 / 18																18.8	4.2				
Beryllium	1.2	17 / 18																<	1.7		U		
Boron	6.2	10 / 18																5.5	20.8				
Cadmium	0.39	5 / 18																0.34	0.83				
Calcium	217000	18 / 18																217000	41.7				
Chromium	25.6	18 / 18																6.1	4.2				
Cobalt	15.1	18 / 18																2.4	2.1				
Copper	23.5	18 / 18																8.6	4.2				
Iron	34000	18 / 18																6170	20.8				
Lead	58.1	18 / 18																58.1	2.1				
Magnesium	19700	18 / 18																18500	41.7				
Manganese	1370	18 / 18																209	4.2				
Mercury	0.053	3 / 18																<	0.035		U		
Nickel	22.9	18 / 18																10.6	4.2				
Potassium	930	18 / 18																859	208				
Selenium	0.78	1 / 18																<	2.1		U		
Silver	ND	0 / 18																<	2.1		U		
Sodium	1360	18 / 18																416	417				
Thallium	ND	0 / 18																<	4.2		U		
Vanadium	38.1	18 / 18																5.7	2.1				
Zinc	95.4	18 / 18																95.4	4.2				

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-057-SS-02			AUS-0A07-058-SS-0X			AUS-0A07-059-SS-0X			AUS-0A07-059-SS-02			AUS-0A07-R59-SS-02			AUS-0A07-060-SS-0X			AUS-0A07-060-SS-02		
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,1,1-Trichloroethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
1,1,2,2-Tetrachloroethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
1,1,2-Trichloroethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
1,1-Dichloroethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
1,1-Dichloroethene	ND	0 / 17	<	4	U							<	5	U							<	5	U
1,2-Dichloroethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
1,2-Dichloropropane	660	5 / 17	<	4	U							<	5	U							<	5	U
2-Butanone	ND	0 / 17	<	4	U							<	5	U							<	5	U
2-Hexanone	ND	0 / 17	<	4	U							<	5	U							<	5	U
4-Methyl-2-Pentanone	ND	0 / 17	<	4	U							<	5	U							<	5	U
Acetone	24	8 / 17	<	4	U							9	5								10	5	
Benzene	8	3 / 17	<	4	U							<	5	U							<	5	U
Bromodichloromethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
Bromoform	ND	0 / 17	<	4	U							<	5	U							<	5	U
Bromomethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
Carbon Disulfide	ND	0 / 17	<	4	U							<	5	U							<	5	U
Carbon Tetrachloride	ND	0 / 17	<	4	U							<	5	U							<	5	U
Chlorobenzene	48	3 / 17	<	4	U							<	5	U							<	5	U
Chloroethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
Chloroform	ND	0 / 17	<	4	U							<	5	U							<	5	U
Chloromethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
cis-1,2-Dichloroethene	ND	0 / 17	<	4	U							<	5	U							<	5	U
cis-1,3-Dichloropropene	ND	0 / 17	<	4	U							<	5	U							<	5	U
Dibromochloromethane	ND	0 / 17	<	4	U							<	5	U							<	5	U
Ethylbenzene	41	2 / 17	<	4	U							<	5	U							<	5	U
Methylene Chloride	ND	0 / 17	<	4	U							<	5	U							<	5	U
n-Hexane	ND	0 / 17	<	4	U							<	5	U							<	5	U
Styrene	28	2 / 17	<	4	U							<	5	U							<	5	U
Tetrachloroethene	48	2 / 17	<	4	U							<	5	U							<	5	U
Toluene	11	3 / 17	<	4	U							<	5	U							<	5	U
trans-1,2-Dichloroethene	ND	0 / 17	<	4	U							<	5	U							<	5	U
trans-1,3-Dichloropropene	ND	0 / 17	<	4	U							<	5	U							<	5	U
Trichloroethene	ND	0 / 17	<	4	U							<	5	U							<	5	U
Vinyl Chloride	ND	0 / 17	<	4	U							<	5	U							<	5	U
Xylene (total)	4500	3 / 17	<	4	U							<	5	U							<	5	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-057-SS-02			AUS-0A07-058-SS-0X			AUS-0A07-059-SS-0X			AUS-0A07-059-SS-02			AUS-0A07-R59-SS-02			AUS-0A07-060-SS-0X			AUS-0A07-060-SS-02		
	DATE COLLECTED		March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,2,4-Trichlorobenzene	ND	0 / 14						<	1200	U										<	1100	U	
1,2-Dichlorobenzene	ND	0 / 14						<	1200	U										<	1100	U	
1,3-Dichlorobenzene	ND	0 / 14						<	1200	U										<	1100	U	
1,4-Dichlorobenzene	ND	0 / 14						<	1200	U										<	1100	U	
2,2-Oxybis(1-chloro)propane	ND	0 / 14						<	1200	U										<	1100	U	
2,4,5-Trichlorophenol	ND	0 / 14						<	6000	U										<	5900	U	
2,4,6-Trichlorophenol	ND	0 / 14						<	1200	U										<	1100	U	
2,4-Dichlorophenol	ND	0 / 14						<	1200	U										<	1100	U	
2,4-Dimethylphenol	ND	0 / 14						<	1200	U										<	1100	U	
2,4-Dinitrophenol	ND	0 / 14						<	6000	U										<	5900	U	
2,4-Dinitrotoluene	ND	0 / 14						<	1200	U										<	1100	U	
2,6-Dinitrotoluene	ND	0 / 14						<	1200	U										<	1100	U	
2-Chloronaphthalene	ND	0 / 14						<	1200	U										<	1100	U	
2-Chlorophenol	ND	0 / 14						<	1200	U										<	1100	U	
2-Methylnaphthalene	ND	0 / 14						<	1200	U										<	1100	U	
2-Methylphenol (o-cresol)	ND	0 / 14						<	1200	U										<	1100	U	
2-Nitroaniline	ND	0 / 14						<	6000	U										<	5900	U	
2-Nitrophenol	ND	0 / 14						<	1200	U										<	1100	U	
3,3-Dichlorobenzidine	ND	0 / 14						<	2400	U										<	2300	U	
3-Nitroaniline	ND	0 / 14						<	6000	U										<	5900	U	
4,6-Dinitro-2-methylphenol	ND	0 / 14						<	6000	U										<	5900	U	
4-Bromophenyl-phenylether	ND	0 / 14						<	1200	U										<	1100	U	
4-Chloro-3-methylphenol	ND	0 / 14						<	1200	U										<	1100	U	
4-Chloroaniline	ND	0 / 14						<	1200	U										<	1100	U	
4-Chlorophenyl-phenylether	ND	0 / 14						<	1200	U										<	1100	U	
4-Methylphenol (p-cresol)	ND	0 / 14						<	1200	U										<	1100	U	
4-Nitroaniline	ND	0 / 14						<	6000	U										<	5900	U	
4-Nitrophenol	ND	0 / 14						<	6000	U										<	5900	U	
Acenaphthene	ND	0 / 14						<	1200	U										<	1100	U	
Acenaphthylene	ND	0 / 14						<	1200	U										<	1100	U	
Anthracene	ND	0 / 14						<	1200	U										<	1100	U	
Benzo(a)anthracene	ND	0 / 14						<	1200	U										<	1100	U	
Benzo(a)pyrene	ND	0 / 14						<	1200	U										<	1100	U	
Benzo(b)fluoranthene	ND	0 / 14						<	1200	U										<	1100	U	
Benzo(g,h,i)perylene	ND	0 / 14						<	1200	U										<	1100	U	

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	Maximum Frequency		AUS-0A07-057-SS-02			AUS-0A07-058-SS-0X			AUS-0A07-059-SS-0X			AUS-0A07-059-SS-02			AUS-0A07-R59-SS-02			AUS-0A07-060-SS-0X			AUS-0A07-060-SS-02			
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			
DATE COLLECTED	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14					<	1200	U							<	1100	U						
bis(2-Chloroethoxy)methane	ND	0 / 14					<	1200	U							<	1100	U						
bis(2-Chloroethyl)ether	ND	0 / 14					<	1200	U							<	1100	U						
bis(2-Ethylhexyl)phthalate	2500	1 / 14					<	1200	U							<	1100	U						
Butylbenzylphthalate	ND	0 / 14					<	1200	U							<	1100	U						
Carbazole	ND	0 / 14					<	1200	U							<	1100	U						
Chrysene	ND	0 / 14					<	1200	U							<	1100	U						
Di-n-butylphthalate	ND	0 / 14					<	1200	U							<	1100	U						
Di-n-octylphthalate	ND	0 / 14					<	1200	U							<	1100	U						
Dibenz(a,h)anthracene	ND	0 / 14					<	1200	U							<	1100	U						
Dibenzofuran	ND	0 / 14					<	1200	U							<	1100	U						
Diethylphthalate	ND	0 / 14					<	1200	U							<	1100	U						
Dimethylphthalate	ND	0 / 14					<	1200	U							<	1100	U						
Fluoranthene	ND	0 / 14					<	1200	U							<	1100	U						
Fluorene	ND	0 / 14					<	1200	U							<	1100	U						
Hexachlorobenzene	ND	0 / 14					<	1200	U							<	1100	U						
Hexachlorobutadiene	ND	0 / 14					<	1200	U							<	1100	U						
Hexachlorocyclopentadiene	ND	0 / 14					<	1200	U							<	1100	U						
Hexachloroethane	ND	0 / 14					<	1200	U							<	1100	U						
Indeno(1,2,3-cd)pyrene	ND	0 / 14					<	1200	U							<	1100	U						
Isophorone	ND	0 / 14					<	1200	U							<	1100	U						
N-Nitroso-di-n-propylamine	ND	0 / 14					<	1200	U							<	1100	U						
N-Nitrosodiphenylamine	ND	0 / 14					<	1200	U							<	1100	U						
Naphthalene	ND	0 / 14					<	1200	U							<	1100	U						
Nitrobenzene	ND	0 / 14					<	1200	U							<	1100	U						
Pentachlorophenol	ND	0 / 14					<	6000	U							<	5900	U						
Phenanthrene	ND	0 / 14					<	1200	U							<	1100	U						
Phenol	ND	0 / 14					<	1200	U							<	1100	U						
Pyrene	ND	0 / 14					<	1200	U							<	1100	U						
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																								
(µg/kg)																								
Acenaphthene	320	2 / 4																						
Acenaphthylene	420	3 / 4																						
Anthracene	87	3 / 4																						
Benzo(a)anthracene	100	4 / 4																						
Benzo(a)pyrene	17	2 / 4																						
Benzo(b)fluoranthene	21	4 / 4																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-057-SS-02			AUS-0A07-058-SS-0X			AUS-0A07-059-SS-0X			AUS-0A07-059-SS-02			AUS-0A07-R59-SS-02			AUS-0A07-060-SS-0X			AUS-0A07-060-SS-02		
	DATE COLLECTED		March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	15 J	1 / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	390	260		650	34		<	3	U						<	3.1	U	240	30		
Alpha-BHC	ND	0 / 105	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
Alpha-Chlordane	490	4 / 104	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
beta-BHC	ND	0 / 104	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
delta-BHC	ND	0 / 104	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
Dieldrin	190000 J	92 / 104	7200	540		7400	340		20	6							8.2	6.3		4100	610		
Endosulfan I	ND	0 / 104	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
Endosulfan II	5.3 J	1 / 104	<	540	U	<	69	U	<	6	U						<	6.3	U	<	61	U	
Endosulfan sulfate	ND	0 / 104	<	540	U	<	69	U	<	6	U						<	6.3	U	<	61	U	
Endrin	12000	30 / 105	800	540		90	69		<	6	U						<	6.3	U	<	61	U	
Endrin aldehyde	9000	16 / 104	<	540	U	<	69	U	<	6	U						<	6.3	U	<	61	U	
Endrin ketone	20000	29 / 102	1100	540		150	69		<	6	U						<	6.3	U	<	61	U	
gamma-BHC (Lindane)	ND	0 / 105	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
gamma-Chlordane	1600	11 / 104	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
Heptachlor	ND	0 / 104	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
Heptachlor epoxide	ND	0 / 105	<	260	U	<	34	U	<	3	U						<	3.1	U	<	30	U	
Hexachlorobenzene	2700	11 / 105	<	260	U	<	34	U	5.8	3							<	3.1	U	<	30	U	
Isodrin	49000 J	29 / 103	<	540	U	95	69		<	6	U						<	6.3	U	<	61	U	
Methoxychlor	ND	0 / 105	<	2600	U	<	340	U	<	30	U						<	31	U	<	300	U	
4,4-DDD	12000	30 / 104	<	540	U	440	69		<	6	U						<	6.3	U	1800	61		
4,4-DDE	4800	14 / 104	<	540	U	710	69		<	6	U						<	6.3	U	<	61	U	
4,4-DDT	100000	38 / 103	230	540	J	2100	69		4.4	6	J						<	6.3	U	91	61		
Technical Chlordane	ND	0 / 104	<	1000	U	<	130	U	<	12	U						<	12	U	<	120	U	
Toxaphene	ND	0 / 104	<	5300	U	<	680	U	<	59	U						<	62	U	<	600	U	

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-057-SS-02			AUS-0A07-058-SS-0X			AUS-0A07-059-SS-0X			AUS-0A07-059-SS-02			AUS-0A07-R59-SS-02			AUS-0A07-060-SS-0X			AUS-0A07-060-SS-02		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
DATE COLLECTED	Maximum	Frequency	March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																							
Aroclor 1016	ND	0/3																					
Aroclor 1221	ND	0/3																					
Aroclor 1232	ND	0/3																					
Aroclor 1242	ND	0/3																					
Aroclor 1248	ND	0/3																					
Aroclor 1254	ND	0/3																					
Aroclor 1260	ND	0/3																					
DIOXINS/FURANS (ng/kg)																							
1,2,3,4,6,7,8-HpCDD	55.5	3/3																					
1,2,3,4,6,7,8-HpCDF	7.31	3/3																					
1,2,3,4,7,8,9-HpCDF	1.42	2/3																					
1,2,3,4,7,8-HxCDD	0.59	3/3																					
1,2,3,4,7,8-HxCDF	2.29	3/3																					
1,2,3,6,7,8-HxCDD	1.3	3/3																					
1,2,3,6,7,8-HxCDF	0.98	3/3																					
1,2,3,7,8,9-HxCDD	0.997	3/3																					
1,2,3,7,8,9-HxCDF	1.14	1/3																					
1,2,3,7,8-PeCDD	0.373	3/3																					
1,2,3,7,8-PeCDF	3.5	3/3																					
2,3,4,6,7,8-HxCDF	0.765	2/3																					
2,3,4,7,8-PeCDF	3.35	3/3																					
2,3,7,8-TCDD	0.289	1/3																					
2,3,7,8-TCDF	4.16	2/3																					
OCDD	1250	3/3																					
OCDF	33.4	3/3																					
Total HpCDDs	166	3/3																					
Total HpCDFs	21.4	3/3																					
Total HxCDDs	14.9	3/3																					
Total HxCDFs	9.98	3/3																					
Total PeCDDs	3.55	3/3																					
Total PeCDFs	15.6	3/3																					
Total TCDDs	0.351	1/3																					
Total TCDFs	15.2	2/3																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-057-SS-02			AUS-0A07-058-SS-0X			AUS-0A07-059-SS-0X			AUS-0A07-059-SS-02			AUS-0A07-R59-SS-02			AUS-0A07-060-SS-0X			AUS-0A07-060-SS-02		
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18							11800	19.4											11700	19.5	
Antimony	0.63	7 / 18							0.35	0.27											<	0.28	U
Arsenic	9.6	18 / 18							6.8	0.97											8.5	0.97	
Barium	153	18 / 18							129	0.97											108	0.97	
Beryllium	1.2	17 / 18							0.61	0.39											0.66	0.39	
Boron	6.2	10 / 18							<	4.9	U										3.3	4.9	
Cadmium	0.39	5 / 18							<	0.19	U										<	0.19	U
Calcium	217000	18 / 18							1620	9.7											3090	9.7	
Chromium	25.6	18 / 18							16.6	0.97											17.3	0.97	
Cobalt	15.1	18 / 18							15.1	0.49											8.1	0.49	
Copper	23.5	18 / 18							13.4	0.97											11.3	0.97	
Iron	34000	18 / 18							18700	4.9											18300	4.9	
Lead	58.1	18 / 18							11.8	0.49											54.5	0.49	
Magnesium	19700	18 / 18							2530	9.7											2850	9.7	
Manganese	1370	18 / 18							921	0.97											565	0.97	
Mercury	0.053	3 / 18							<	0.041	U										<	0.04	U
Nickel	22.9	18 / 18							13.1	0.97											12.1	0.97	
Potassium	930	18 / 18							744	48.5											680	48.6	
Selenium	0.78	1 / 18							<	0.49	U										<	0.92	U
Silver	ND	0 / 18							<	0.49	U										<	0.49	U
Sodium	1360	18 / 18							1250	97.1											1090	97.3	
Thallium	ND	0 / 18							<	0.97	U										<	0.97	U
Vanadium	38.1	18 / 18							30.6	0.49											30.4	0.49	
Zinc	95.4	18 / 18							39.8	0.97											54.3	0.97	

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R60-SS-02	AUS-0A07-060-SS-04	AUS-0A07-R60-SS-04	AUS-0A07-061-SS-0X	AUS-0A07-R61-SS-02	AUS-0A07-062-SS-0X	AUS-0A07-R62-SS-02									
			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
VOLATILE ORGANIC COMPOUNDS (µg/kg)																		
1,1,1-Trichloroethane	ND	0 / 17		<	5	U												
1,1,2,2-Tetrachloroethane	ND	0 / 17		<	5	U												
1,1,2-Trichloroethane	ND	0 / 17		<	5	U												
1,1-Dichloroethane	ND	0 / 17		<	5	U												
1,1-Dichloroethene	ND	0 / 17		<	5	U												
1,2-Dichloroethane	ND	0 / 17		<	5	U												
1,2-Dichloropropane	660	5 / 17		<	5	U												
2-Butanone	ND	0 / 17		<	5	U												
2-Hexanone	ND	0 / 17		<	5	U												
4-Methyl-2-Pentanone	ND	0 / 17		<	5	U												
Acetone	24	8 / 17		11	5													
Benzene	8	3 / 17		<	5	U												
Bromodichloromethane	ND	0 / 17		<	5	U												
Bromoform	ND	0 / 17		<	5	U												
Bromomethane	ND	0 / 17		<	5	U												
Carbon Disulfide	ND	0 / 17		<	5	U												
Carbon Tetrachloride	ND	0 / 17		<	5	U												
Chlorobenzene	48	3 / 17		<	5	U												
Chloroethane	ND	0 / 17		<	5	U												
Chloroform	ND	0 / 17		<	5	U												
Chloromethane	ND	0 / 17		<	5	U												
cis-1,2-Dichloroethene	ND	0 / 17		<	5	U												
cis-1,3-Dichloropropene	ND	0 / 17		<	5	U												
Dibromochloromethane	ND	0 / 17		<	5	U												
Ethylbenzene	41	2 / 17		<	5	U												
Methylene Chloride	ND	0 / 17		<	5	U												
n-Hexane	ND	0 / 17		<	5	U												
Styrene	28	2 / 17		<	5	U												
Tetrachloroethene	48	2 / 17		<	5	U												
Toluene	11	3 / 17		<	5	U												
trans-1,2-Dichloroethene	ND	0 / 17		<	5	U												
trans-1,3-Dichloropropene	ND	0 / 17		<	5	U												
Trichloroethene	ND	0 / 17		<	5	U												
Vinyl Chloride	ND	0 / 17		<	5	U												
Xylene (total)	4500	3 / 17		<	5	U												

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R60-SS-02			AUS-0A07-060-SS-04			AUS-0A07-R60-SS-04			AUS-0A07-061-SS-0X			AUS-0A07-R61-SS-02			AUS-0A07-062-SS-0X			AUS-0A07-R62-SS-02			
			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,2,4-Trichlorobenzene	ND	0 / 14	<	1200	U																			
1,2-Dichlorobenzene	ND	0 / 14	<	1200	U																			
1,3-Dichlorobenzene	ND	0 / 14	<	1200	U																			
1,4-Dichlorobenzene	ND	0 / 14	<	1200	U																			
2,2-Oxybis(1-chloro)propane	ND	0 / 14	<	1200	U																			
2,4,5-Trichlorophenol	ND	0 / 14	<	6300	U																			
2,4,6-Trichlorophenol	ND	0 / 14	<	1200	U																			
2,4-Dichlorophenol	ND	0 / 14	<	1200	U																			
2,4-Dimethylphenol	ND	0 / 14	<	1200	U																			
2,4-Dinitrophenol	ND	0 / 14	<	6300	U																			
2,4-Dinitrotoluene	ND	0 / 14	<	1200	U																			
2,6-Dinitrotoluene	ND	0 / 14	<	1200	U																			
2-Chloronaphthalene	ND	0 / 14	<	1200	U																			
2-Chlorophenol	ND	0 / 14	<	1200	U																			
2-Methylnaphthalene	ND	0 / 14	<	1200	U																			
2-Methylphenol (o-cresol)	ND	0 / 14	<	1200	U																			
2-Nitroaniline	ND	0 / 14	<	6300	U																			
2-Nitrophenol	ND	0 / 14	<	1200	U																			
3,3-Dichlorobenzidine	ND	0 / 14	<	2500	U																			
3-Nitroaniline	ND	0 / 14	<	6300	U																			
4,6-Dinitro-2-methylphenol	ND	0 / 14	<	6300	U																			
4-Bromophenyl-phenylether	ND	0 / 14	<	1200	U																			
4-Chloro-3-methylphenol	ND	0 / 14	<	1200	U																			
4-Chloroaniline	ND	0 / 14	<	1200	U																			
4-Chlorophenyl-phenylether	ND	0 / 14	<	1200	U																			
4-Methylphenol (p-cresol)	ND	0 / 14	<	1200	U																			
4-Nitroaniline	ND	0 / 14	<	6300	U																			
4-Nitrophenol	ND	0 / 14	<	6300	U																			
Acenaphthene	ND	0 / 14	<	1200	U																			
Acenaphthylene	ND	0 / 14	<	1200	U																			
Anthracene	ND	0 / 14	<	1200	U																			
Benzo(a)anthracene	ND	0 / 14	<	1200	U																			
Benzo(a)pyrene	ND	0 / 14	<	1200	U																			
Benzo(b)fluoranthene	ND	0 / 14	<	1200	U																			
Benzo(g,h,i)perylene	ND	0 / 14	<	1200	U																			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-R60-SS-02			AUS-0A07-060-SS-04			AUS-0A07-R60-SS-04			AUS-0A07-061-SS-0X			AUS-0A07-R61-SS-02			AUS-0A07-062-SS-0X			AUS-0A07-R62-SS-02		
			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14				<	1200	U															
bis(2-Chloroethoxy)methane	ND	0 / 14				<	1200	U															
bis(2-Chloroethyl)ether	ND	0 / 14				<	1200	U															
bis(2-Ethylhexyl)phthalate	2500	1 / 14				<	1200	U															
Butylbenzylphthalate	ND	0 / 14				<	1200	U															
Carbazole	ND	0 / 14				<	1200	U															
Chrysene	ND	0 / 14				<	1200	U															
Di-n-butylphthalate	ND	0 / 14				<	1200	U															
Di-n-octylphthalate	ND	0 / 14				<	1200	U															
Dibenz(a,h)anthracene	ND	0 / 14				<	1200	U															
Dibenzofuran	ND	0 / 14				<	1200	U															
Diethylphthalate	ND	0 / 14				<	1200	U															
Dimethylphthalate	ND	0 / 14				<	1200	U															
Fluoranthene	ND	0 / 14				<	1200	U															
Fluorene	ND	0 / 14				<	1200	U															
Hexachlorobenzene	ND	0 / 14				<	1200	U															
Hexachlorobutadiene	ND	0 / 14				<	1200	U															
Hexachlorocyclopentadiene	ND	0 / 14				<	1200	U															
Hexachloroethane	ND	0 / 14				<	1200	U															
Indeno(1,2,3-cd)pyrene	ND	0 / 14				<	1200	U															
Isophorone	ND	0 / 14				<	1200	U															
N-Nitroso-di-n-propylamine	ND	0 / 14				<	1200	U															
N-Nitrosodiphenylamine	ND	0 / 14				<	1200	U															
Naphthalene	ND	0 / 14				<	1200	U															
Nitrobenzene	ND	0 / 14				<	1200	U															
Pentachlorophenol	ND	0 / 14				<	6300	U															
Phenanthrene	ND	0 / 14				<	1200	U															
Phenol	ND	0 / 14				<	1200	U															
Pyrene	ND	0 / 14				<	1200	U															
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-R60-SS-02		AUS-0A07-060-SS-04			AUS-0A07-R60-SS-04			AUS-0A07-061-SS-0X			AUS-0A07-R61-SS-02			AUS-0A07-062-SS-0X			AUS-0A07-R62-SS-02							
			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001				
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual		
Benzo(g,h,i)perylene	15 J	1 / 4																							
Benzo(k)fluoranthene	11	4 / 4																							
Chrysene	81	4 / 4																							
Dibenz(a,h)anthracene	ND	0 / 4																							
Fluoranthene	620	4 / 4																							
Fluorene	210	2 / 4																							
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																							
Naphthalene	330	2 / 4																							
Phenanthrene	360	4 / 4																							
Pyrene	330	4 / 4																							
PESTICIDES (ORGANOCHLORINE) (µg/kg)																									
Aldrin	1300000	75 / 103	15	2.9					<	29	U	<	3100	U	<	31	U					R	<	2.9	U
Alpha-BHC	ND	0 / 105	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
Alpha-Chlordane	490	4 / 104	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
beta-BHC	ND	0 / 104	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
delta-BHC	ND	0 / 104	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
Dieldrin	190000 J	92 / 104	61	6					39	59	J	13000	6400		44	63	J					R	<	6	U
Endosulfan I	ND	0 / 104	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
Endosulfan II	5.3 J	1 / 104	<	6	U				<	59	U	<	6400	U	<	63	U	<	6	UJ			<	6	U
Endosulfan sulfate	ND	0 / 104	<	6	U				<	59	U	<	6400	U	<	63	U	<	6	UJ			<	6	U
Endrin	12000	30 / 105	<	6	U				<	59	U	<	6400	U	<	63	U	<	6	UJ			<	6	U
Endrin aldehyde	9000	16 / 104	<	6	U				<	59	U	4700	6400	J	<	63	U	<	6	UJ			<	6	U
Endrin ketone	20000	29 / 102	<	6	U				<	59	U	<	6400	U	<	63	U					R	<	6	U
gamma-BHC (Lindane)	ND	0 / 105	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
gamma-Chlordane	1600	11 / 104	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
Heptachlor	ND	0 / 104	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
Heptachlor epoxide	ND	0 / 105	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
Hexachlorobenzene	2700	11 / 105	<	2.9	U				<	29	U	<	3100	U	<	31	U	<	2.9	UJ			<	2.9	U
Isodrin	49000 J	29 / 103	<	6	U				<	59	U	<	6400	U	<	63	U					R	<	6	U
Methoxychlor	ND	0 / 105	<	29	U				<	290	U	<	31000	U	<	310	U	<	29	UJ			<	29	U
4,4-DDD	12000	30 / 104	14	6					<	59	U	<	6400	U	<	63	U					R	<	6	U
4,4-DDE	4800	14 / 104	<	6	U				<	59	U	<	6400	U	<	63	U	19	6	UJ			<	6	U
4,4-DDT	100000	38 / 103	<	6	U				<	59	U	<	6400	U	<	63	U					R	<	6	U
Technical Chlordane	ND	0 / 104	<	12	U				<	110	U	<	12000	U	<	120	U	<	12	UJ			<	12	U
Toxaphene	ND	0 / 104	<	59	U				<	580	U	<	62000	U	<	620	U	<	59	UJ			<	59	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-R60-SS-02			AUS-0A07-060-SS-04			AUS-0A07-R60-SS-04			AUS-0A07-061-SS-0X			AUS-0A07-R61-SS-02			AUS-0A07-062-SS-0X			AUS-0A07-R62-SS-02			
			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																								
Aroclor 1016	ND	0 / 3																						
Aroclor 1221	ND	0 / 3																						
Aroclor 1232	ND	0 / 3																						
Aroclor 1242	ND	0 / 3																						
Aroclor 1248	ND	0 / 3																						
Aroclor 1254	ND	0 / 3																						
Aroclor 1260	ND	0 / 3																						
DIOXINS/FURANS (ng/kg)																								
1,2,3,4,6,7,8-HpCDD	55.5	3 / 3																						
1,2,3,4,6,7,8-HpCDF	7.31	3 / 3																						
1,2,3,4,7,8,9-HpCDF	1.42	2 / 3																						
1,2,3,4,7,8-HxCDD	0.59	3 / 3																						
1,2,3,4,7,8-HxCDF	2.29	3 / 3																						
1,2,3,6,7,8-HxCDD	1.3	3 / 3																						
1,2,3,6,7,8-HxCDF	0.98	3 / 3																						
1,2,3,7,8,9-HxCDD	0.997	3 / 3																						
1,2,3,7,8,9-HxCDF	1.14	1 / 3																						
1,2,3,7,8-PeCDD	0.373	3 / 3																						
1,2,3,7,8-PeCDF	3.5	3 / 3																						
2,3,4,6,7,8-HxCDF	0.765	2 / 3																						
2,3,4,7,8-PeCDF	3.35	3 / 3																						
2,3,7,8-TCDD	0.289	1 / 3																						
2,3,7,8-TCDF	4.16	2 / 3																						
OCDD	1250	3 / 3																						
OCDF	33.4	3 / 3																						
Total HpCDDs	166	3 / 3																						
Total HpCDFs	21.4	3 / 3																						
Total HxCDDs	14.9	3 / 3																						
Total HxCDFs	9.98	3 / 3																						
Total PeCDDs	3.55	3 / 3																						
Total PeCDFs	15.6	3 / 3																						
Total TCDDs	0.351	1 / 3																						
Total TCDFs	15.2	2 / 3																						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-R60-SS-02		AUS-0A07-060-SS-04			AUS-0A07-R60-SS-04			AUS-0A07-061-SS-0X			AUS-0A07-R61-SS-02			AUS-0A07-062-SS-0X			AUS-0A07-R62-SS-02								
			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			May 22, 2001					
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual			
METALS (mg/kg)																										
Aluminum	17900	18 / 18				11800	18.1																			
Antimony	0.63	7 / 18				0.63	0.26																			
Arsenic	9.6	18 / 18				5.4	0.91																			
Barium	153	18 / 18				115	0.91																			
Beryllium	1.2	17 / 18				0.59	0.36																			
Boron	6.2	10 / 18				2.7	4.5																			
Cadmium	0.39	5 / 18				<	0.18	U																		
Calcium	217000	18 / 18				1260	9.1																			
Chromium	25.6	18 / 18				17	0.91																			
Cobalt	15.1	18 / 18				9.6	0.45																			
Copper	23.5	18 / 18				13.4	0.91																			
Iron	34000	18 / 18				16400	4.5																			
Lead	58.1	18 / 18				11.9	0.45																			
Magnesium	19700	18 / 18				2180	9.1																			
Manganese	1370	18 / 18				721	0.91																			
Mercury	0.053	3 / 18				<	0.041	U																		
Nickel	22.9	18 / 18				11.8	0.91																			
Potassium	930	18 / 18				668	45.3																			
Selenium	0.78	1 / 18				0.78	0.45																			
Silver	ND	0 / 18				<	0.45	U																		
Sodium	1360	18 / 18				1110	90.6																			
Thallium	ND	0 / 18				<	0.91	U																		
Vanadium	38.1	18 / 18				29.3	0.45																			
Zinc	95.4	18 / 18				33.2	0.91																			

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-071-SS-0X		AUS-0A07-R71-SS-0X			AUS-0A07-071-SS-02			AUS-0A07-073-SS-0X			AUS-0A07-R73-SS-0X			AUS-0A07-073-SS-02			AUS-0A07-076-SS-0X					
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
VOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,1,1-Trichloroethane	ND	0 / 17						<	5	U								<	4	U			
1,1,2,2-Tetrachloroethane	ND	0 / 17						<	5	U								<	4	U			
1,1,2-Trichloroethane	ND	0 / 17						<	5	U								<	4	U			
1,1-Dichloroethane	ND	0 / 17						<	5	U								<	4	U			
1,1-Dichloroethene	ND	0 / 17						<	5	U								<	4	U			
1,2-Dichloroethane	ND	0 / 17						<	5	U								<	4	U			
1,2-Dichloropropane	660	5 / 17						<	5	U								<	4	U			
2-Butanone	ND	0 / 17						<	5	U								<	4	U			
2-Hexanone	ND	0 / 17						<	5	U								<	4	U			
4-Methyl-2-Pentanone	ND	0 / 17						<	5	U								<	4	U			
Acetone	24	8 / 17						11	5									<	4	U			
Benzene	8	3 / 17						<	5	U								<	4	U			
Bromodichloromethane	ND	0 / 17						<	5	U								<	4	U			
Bromoform	ND	0 / 17						<	5	U								<	4	U			
Bromomethane	ND	0 / 17						<	5	U								<	4	U			
Carbon Disulfide	ND	0 / 17						<	5	U								<	4	U			
Carbon Tetrachloride	ND	0 / 17						<	5	U								<	4	U			
Chlorobenzene	48	3 / 17						<	5	U								<	4	U			
Chloroethane	ND	0 / 17						<	5	U								<	4	U			
Chloroform	ND	0 / 17						<	5	U								<	4	U			
Chloromethane	ND	0 / 17						<	5	U								<	4	U			
cis-1,2-Dichloroethene	ND	0 / 17						<	5	U								<	4	U			
cis-1,3-Dichloropropene	ND	0 / 17						<	5	U								<	4	U			
Dibromochloromethane	ND	0 / 17						<	5	U								<	4	U			
Ethylbenzene	41	2 / 17						<	5	U								<	4	U			
Methylene Chloride	ND	0 / 17						<	5	U								<	4	U			
n-Hexane	ND	0 / 17						<	5	U								<	4	U			
Styrene	28	2 / 17						<	5	U								<	4	U			
Tetrachloroethene	48	2 / 17						<	5	U								<	4	U			
Toluene	11	3 / 17						<	5	U								<	4	U			
trans-1,2-Dichloroethene	ND	0 / 17						<	5	U								<	4	U			
trans-1,3-Dichloropropene	ND	0 / 17						<	5	U								<	4	U			
Trichloroethene	ND	0 / 17						<	5	U								<	4	U			
Vinyl Chloride	ND	0 / 17						<	5	U								<	4	U			
Xylene (total)	4500	3 / 17						<	5	U								<	4	U			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-071-SS-0X		AUS-0A07-R71-SS-0X			AUS-0A07-071-SS-02			AUS-0A07-073-SS-0X			AUS-0A07-R73-SS-0X			AUS-0A07-073-SS-02			AUS-0A07-076-SS-0X						
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,2,4-Trichlorobenzene	ND	0 / 14	<	1100	U																			
1,2-Dichlorobenzene	ND	0 / 14	<	1100	U																			
1,3-Dichlorobenzene	ND	0 / 14	<	1100	U																			
1,4-Dichlorobenzene	ND	0 / 14	<	1100	U																			
2,2-Oxybis(1-chloro)propane	ND	0 / 14	<	1100	U																			
2,4,5-Trichlorophenol	ND	0 / 14	<	5900	U																			
2,4,6-Trichlorophenol	ND	0 / 14	<	1100	U																			
2,4-Dichlorophenol	ND	0 / 14	<	1100	U																			
2,4-Dimethylphenol	ND	0 / 14	<	1100	U																			
2,4-Dinitrophenol	ND	0 / 14	<	5900	U																			
2,4-Dinitrotoluene	ND	0 / 14	<	1100	U																			
2,6-Dinitrotoluene	ND	0 / 14	<	1100	U																			
2-Chloronaphthalene	ND	0 / 14	<	1100	U																			
2-Chlorophenol	ND	0 / 14	<	1100	U																			
2-Methylnaphthalene	ND	0 / 14	<	1100	U																			
2-Methylphenol (o-cresol)	ND	0 / 14	<	1100	U																			
2-Nitroaniline	ND	0 / 14	<	5900	U																			
2-Nitrophenol	ND	0 / 14	<	1100	U																			
3,3-Dichlorobenzidine	ND	0 / 14	<	2300	U																			
3-Nitroaniline	ND	0 / 14	<	5900	U																			
4,6-Dinitro-2-methylphenol	ND	0 / 14	<	5900	U																			
4-Bromophenyl-phenylether	ND	0 / 14	<	1100	U																			
4-Chloro-3-methylphenol	ND	0 / 14	<	1100	U																			
4-Chloroaniline	ND	0 / 14	<	1100	U																			
4-Chlorophenyl-phenylether	ND	0 / 14	<	1100	U																			
4-Methylphenol (p-cresol)	ND	0 / 14	<	1100	U																			
4-Nitroaniline	ND	0 / 14	<	5900	U																			
4-Nitrophenol	ND	0 / 14	<	5900	U																			
Acenaphthene	ND	0 / 14	<	1100	U																			
Acenaphthylene	ND	0 / 14	<	1100	U																			
Anthracene	ND	0 / 14	<	1100	U																			
Benzo(a)anthracene	ND	0 / 14	<	1100	U																			
Benzo(a)pyrene	ND	0 / 14	<	1100	U																			
Benzo(b)fluoranthene	ND	0 / 14	<	1100	U																			
Benzo(g,h,i)perylene	ND	0 / 14	<	1100	U																			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-071-SS-0X		AUS-0A07-R71-SS-0X			AUS-0A07-071-SS-02			AUS-0A07-073-SS-0X			AUS-0A07-R73-SS-0X			AUS-0A07-073-SS-02			AUS-0A07-076-SS-0X						
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
Benzo(k)fluoranthene	ND	0 / 14	<	1100	U				<	1100	U													
bis(2-Chloroethoxy)methane	ND	0 / 14	<	1100	U				<	1100	U													
bis(2-Chloroethyl)ether	ND	0 / 14	<	1100	U				<	1100	U													
bis(2-Ethylhexyl)phthalate	2500	1 / 14	<	1100	U				<	1100	U													
Butylbenzylphthalate	ND	0 / 14	<	1100	U				<	1100	U													
Carbazole	ND	0 / 14	<	1100	U				<	1100	U													
Chrysene	ND	0 / 14	<	1100	U				<	1100	U													
Di-n-butylphthalate	ND	0 / 14	<	1100	U				<	1100	U													
Di-n-octylphthalate	ND	0 / 14	<	1100	U				<	1100	U													
Dibenz(a,h)anthracene	ND	0 / 14	<	1100	U				<	1100	U													
Dibenzofuran	ND	0 / 14	<	1100	U				<	1100	U													
Diethylphthalate	ND	0 / 14	<	1100	U				<	1100	U													
Dimethylphthalate	ND	0 / 14	<	1100	U				<	1100	U													
Fluoranthene	ND	0 / 14	<	1100	U				<	1100	U													
Fluorene	ND	0 / 14	<	1100	U				<	1100	U													
Hexachlorobenzene	ND	0 / 14	<	1100	U				<	1100	U													
Hexachlorobutadiene	ND	0 / 14	<	1100	U				<	1100	U													
Hexachlorocyclopentadiene	ND	0 / 14	<	1100	U				<	1100	U													
Hexachloroethane	ND	0 / 14	<	1100	U				<	1100	U													
Indeno(1,2,3-cd)pyrene	ND	0 / 14	<	1100	U				<	1100	U													
Isophorone	ND	0 / 14	<	1100	U				<	1100	U													
N-Nitroso-di-n-propylamine	ND	0 / 14	<	1100	U				<	1100	U													
N-Nitrosodiphenylamine	ND	0 / 14	<	1100	U				<	1100	U													
Naphthalene	ND	0 / 14	<	1100	U				<	1100	U													
Nitrobenzene	ND	0 / 14	<	1100	U				<	1100	U													
Pentachlorophenol	ND	0 / 14	<	5900	U				<	5700	U													
Phenanthrene	ND	0 / 14	<	1100	U				<	1100	U													
Phenol	ND	0 / 14	<	1100	U				<	1100	U													
Pyrene	ND	0 / 14	<	1100	U				<	1100	U													
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																								
(µg/kg)																								
Acenaphthene	320	2 / 4																						
Acenaphthylene	420	3 / 4																						
Anthracene	87	3 / 4																						
Benzo(a)anthracene	100	4 / 4																						
Benzo(a)pyrene	17	2 / 4																						
Benzo(b)fluoranthene	21	4 / 4																						

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-071-SS-0X			AUS-0A07-R71-SS-0X			AUS-0A07-071-SS-02			AUS-0A07-073-SS-0X			AUS-0A07-R73-SS-0X			AUS-0A07-073-SS-02			AUS-0A07-076-SS-0X					
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001					
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
Benzo(g,h,i)perylene	15 J	1 / 4																								
Benzo(k)fluoranthene	11	4 / 4																								
Chrysene	81	4 / 4																								
Dibenz(a,h)anthracene	ND	0 / 4																								
Fluoranthene	620	4 / 4																								
Fluorene	210	2 / 4																								
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																								
Naphthalene	330	2 / 4																								
Phenanthrene	360	4 / 4																								
Pyrene	330	4 / 4																								
PESTICIDES (ORGANOCHLORINE) (µg/kg)																										
Aldrin	1300000	75 / 103	<	3.1	U				<	3.1	U	<	29	U							140	28				
Alpha-BHC	ND	0 / 105	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
Alpha-Chlordane	490	4 / 104	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
beta-BHC	ND	0 / 104	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
delta-BHC	ND	0 / 104	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
Dieldrin	190000 J	92 / 104	<	6.4	U				<	6.3	U	96	58								430	57				
Endosulfan I	ND	0 / 104	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
Endosulfan II	5.3 J	1 / 104	<	6.4	U				<	6.3	U	<	58	U							<	57	U			
Endosulfan sulfate	ND	0 / 104	<	6.4	U				<	6.3	U	<	58	U							<	57	U			
Endrin	12000	30 / 105	<	6.4	U				<	6.3	U	100	58								310	57				
Endrin aldehyde	9000	16 / 104	<	6.4	U				<	6.3	U	320	58								140	57				
Endrin ketone	20000	29 / 102	<	6.4	U				<	6.3	U	2600	580								1700	57				
gamma-BHC (Lindane)	ND	0 / 105	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
gamma-Chlordane	1600	11 / 104	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
Heptachlor	ND	0 / 104	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
Heptachlor epoxide	ND	0 / 105	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
Hexachlorobenzene	2700	11 / 105	<	3.1	U				<	3.1	U	<	29	U							<	28	U			
Isodrin	49000 J	29 / 103	<	6.4	U				<	6.3	U	<	58	U							58	57				
Methoxychlor	ND	0 / 105	<	31	U				<	31	U	<	290	U							<	280	U			
4,4-DDD	12000	30 / 104	<	6.4	U				<	6.3	U	<	58	U							<	57	U			
4,4-DDE	4800	14 / 104	<	6.4	U				<	6.3	U	<	58	U							<	57	U			
4,4-DDT	100000	38 / 103	<	6.4	U				<	6.3	U	<	58	U							<	57	U			
Technical Chlordane	ND	0 / 104	<	12	U				<	12	U	<	110	U							<	110	U			
Toxaphene	ND	0 / 104	<	63	U				<	62	U	<	570	U							<	560	U			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-071-SS-0X			AUS-0A07-R71-SS-0X			AUS-0A07-071-SS-02			AUS-0A07-073-SS-0X			AUS-0A07-R73-SS-0X			AUS-0A07-073-SS-02			AUS-0A07-076-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																							
Aroclor 1016	ND	0/3				<	27	U							<	28	U						
Aroclor 1221	ND	0/3				<	27	U							<	28	U						
Aroclor 1232	ND	0/3				<	27	U							<	28	U						
Aroclor 1242	ND	0/3				<	27	U							<	28	U						
Aroclor 1248	ND	0/3				<	27	U							<	28	U						
Aroclor 1254	ND	0/3				<	27	U							<	28	U						
Aroclor 1260	ND	0/3				<	27	U							<	28	U						
DIOXINS/FURANS (ng/kg)																							
1,2,3,4,6,7,8-HpCDD	55.5	3/3																			22.4	0.144	
1,2,3,4,6,7,8-HpCDF	7.31	3/3																			1.06	0.0828	
1,2,3,4,7,8,9-HpCDF	1.42	2/3																			<	0.101	U
1,2,3,4,7,8-HxCDD	0.59	3/3																			0.154	0.0954	
1,2,3,4,7,8-HxCDF	2.29	3/3																			0.0844	0.0623	
1,2,3,6,7,8-HxCDD	1.3	3/3																			0.363	0.1005	
1,2,3,6,7,8-HxCDF	0.98	3/3																			0.101	0.0595	
1,2,3,7,8,9-HxCDD	0.997	3/3																			0.448	0.0904	
1,2,3,7,8,9-HxCDF	1.14	1/3																			<	0.0726	U
1,2,3,7,8-PeCDD	0.373	3/3																			0.0971	0.0733	
1,2,3,7,8-PeCDF	3.5	3/3																			0.0612	0.0374	
2,3,4,6,7,8-HxCDF	0.765	2/3																			<	0.0663	U
2,3,4,7,8-PeCDF	3.35	3/3																			0.0823	0.0365	
2,3,7,8-TCDD	0.289	1/3																			<	0.0961	U
2,3,7,8-TCDF	4.16	2/3																			<	0.0787	U
OCDD	1250	3/3																			925	0.1839	
OCDF	33.4	3/3																			3.39	0.1243	
Total HpCDDs	166	3/3																			51.9	0.144	
Total HpCDFs	21.4	3/3																			3.6	0.0908	
Total HxCDDs	14.9	3/3																			3.32	0.4686	
Total HxCDFs	9.98	3/3																			1.01	0.065	
Total PeCDDs	3.55	3/3																			0.103	0.4792	
Total PeCDFs	15.6	3/3																			0.435	0.0369	
Total TCDDs	0.351	1/3																			<	0.3082	U
Total TCDFs	15.2	2/3																			<	0.0787	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-071-SS-0X			AUS-0A07-R71-SS-0X			AUS-0A07-071-SS-02			AUS-0A07-073-SS-0X			AUS-0A07-R73-SS-0X			AUS-0A07-073-SS-02			AUS-0A07-076-SS-0X			
	DATE COLLECTED		March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			May 22, 2001			March 22, 2001			March 22, 2001			
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
METALS (mg/kg)																								
Aluminum	17900	18 / 18	14300	20.1								8730	16.3											
Antimony	0.63	7 / 18	<	0.27	U							<	0.28	U										
Arsenic	9.6	18 / 18	5.8	1								4.6	0.81											
Barium	153	18 / 18	112	1								75.6	0.81											
Beryllium	1.2	17 / 18	0.68	0.4								0.42	0.33											
Boron	6.2	10 / 18	4	5								3.8	4.1											
Cadmium	0.39	5 / 18	<	0.2	U							0.22	0.16											
Calcium	217000	18 / 18	2060	10								64100	8.1											
Chromium	25.6	18 / 18	18.9	1								12.1	0.81											
Cobalt	15.1	18 / 18	8.5	0.5								4.2	0.41											
Copper	23.5	18 / 18	12.1	1								10.1	0.81											
Iron	34000	18 / 18	16500	5								11100	4.1											
Lead	58.1	18 / 18	11.8	0.5								18.8	0.41											
Magnesium	19700	18 / 18	2510	10								19700	8.1											
Manganese	1370	18 / 18	440	1								254	0.81											
Mercury	0.053	3 / 18	<	0.042	U							<	0.038	U										
Nickel	22.9	18 / 18	13	1								10.4	0.81											
Potassium	930	18 / 18	849	50.2								662	40.7											
Selenium	0.78	1 / 18	<	0.9	U							<	0.41	U										
Silver	ND	0 / 18	<	0.5	U							<	0.41	U										
Sodium	1360	18 / 18	1170	100								855	81.4											
Thallium	ND	0 / 18	<	1	U							<	0.81	U										
Vanadium	38.1	18 / 18	32.3	0.5								19.6	0.41											
Zinc	95.4	18 / 18	34.2	1								41.5	0.81											

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-076-SS-0X		AUS-0A07-R76-SS-0X			AUS-0A07-076-SS-02			AUS-0A07-051-SS-04			AUS-0A07-088-SS-02			AUS-0A07-088-SS-0X			AUS-0A07-092-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			March 21, 2000			March 22, 2001			March 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
VOLATILE ORGANIC COMPOUNDS (µg/kg)																					
1,1,1-Trichloroethane	ND	0 / 17						<	5	U											
1,1,2,2-Tetrachloroethane	ND	0 / 17						<	5	U											
1,1,2-Trichloroethane	ND	0 / 17						<	5	U											
1,1-Dichloroethane	ND	0 / 17						<	5	U											
1,1-Dichloroethene	ND	0 / 17						<	5	U											
1,2-Dichloroethane	ND	0 / 17						<	5	U											
1,2-Dichloropropane	660	5 / 17						<	5	U											
2-Butanone	ND	0 / 17						<	5	U											
2-Hexanone	ND	0 / 17						<	5	U											
4-Methyl-2-Pentanone	ND	0 / 17						<	5	U											
Acetone	24	8 / 17						<	5	U											
Benzene	8	3 / 17						<	5	U											
Bromodichloromethane	ND	0 / 17						<	5	U											
Bromoform	ND	0 / 17						<	5	U											
Bromomethane	ND	0 / 17						<	5	U											
Carbon Disulfide	ND	0 / 17						<	5	U											
Carbon Tetrachloride	ND	0 / 17						<	5	U											
Chlorobenzene	48	3 / 17						<	5	U											
Chloroethane	ND	0 / 17						<	5	U											
Chloroform	ND	0 / 17						<	5	U											
Chloromethane	ND	0 / 17						<	5	U											
cis-1,2-Dichloroethene	ND	0 / 17						<	5	U											
cis-1,3-Dichloropropene	ND	0 / 17						<	5	U											
Dibromochloromethane	ND	0 / 17						<	5	U											
Ethylbenzene	41	2 / 17						<	5	U											
Methylene Chloride	ND	0 / 17						<	5	U											
n-Hexane	ND	0 / 17						<	5	U											
Styrene	28	2 / 17						<	5	U											
Tetrachloroethene	48	2 / 17						<	5	U											
Toluene	11	3 / 17						<	5	U											
trans-1,2-Dichloroethene	ND	0 / 17						<	5	U											
trans-1,3-Dichloropropene	ND	0 / 17						<	5	U											
Trichloroethene	ND	0 / 17						<	5	U											
Vinyl Chloride	ND	0 / 17						<	5	U											
Xylene (total)	4500	3 / 17						<	5	U											

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-076-SS-0X			AUS-0A07-R76-SS-0X			AUS-0A07-076-SS-02			AUS-0A07-051-SS-04			AUS-0A07-088-SS-02			AUS-0A07-088-SS-0X			AUS-0A07-092-SS-0X			
			March 22, 2001			May 22, 2001			March 22, 2001			March 21, 2000			March 22, 2001			March 22, 2001			March 22, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																								
1,2,4-Trichlorobenzene	ND	0 / 14	<	1200	U													<	1300	U				
1,2-Dichlorobenzene	ND	0 / 14	<	1200	U													<	1300	U				
1,3-Dichlorobenzene	ND	0 / 14	<	1200	U													<	1300	U				
1,4-Dichlorobenzene	ND	0 / 14	<	1200	U													<	1300	U				
2,2-Oxybis(1-chloro)propane	ND	0 / 14	<	1200	U													<	1300	U				
2,4,5-Trichlorophenol	ND	0 / 14	<	6200	U													<	6700	U				
2,4,6-Trichlorophenol	ND	0 / 14	<	1200	U													<	1300	U				
2,4-Dichlorophenol	ND	0 / 14	<	1200	U													<	1300	U				
2,4-Dimethylphenol	ND	0 / 14	<	1200	U													<	1300	U				
2,4-Dinitrophenol	ND	0 / 14	<	6200	U													<	6700	U				
2,4-Dinitrotoluene	ND	0 / 14	<	1200	U													<	1300	U				
2,6-Dinitrotoluene	ND	0 / 14	<	1200	U													<	1300	U				
2-Chloronaphthalene	ND	0 / 14	<	1200	U													<	1300	U				
2-Chlorophenol	ND	0 / 14	<	1200	U													<	1300	U				
2-Methylnaphthalene	ND	0 / 14	<	1200	U													<	1300	U				
2-Methylphenol (o-cresol)	ND	0 / 14	<	1200	U													<	1300	U				
2-Nitroaniline	ND	0 / 14	<	6200	U													<	6700	U				
2-Nitrophenol	ND	0 / 14	<	1200	U													<	1300	U				
3,3-Dichlorobenzidine	ND	0 / 14	<	2500	U													<	2600	U				
3-Nitroaniline	ND	0 / 14	<	6200	U													<	6700	U				
4,6-Dinitro-2-methylphenol	ND	0 / 14	<	6200	U													<	6700	U				
4-Bromophenyl-phenylether	ND	0 / 14	<	1200	U													<	1300	U				
4-Chloro-3-methylphenol	ND	0 / 14	<	1200	U													<	1300	U				
4-Chloroaniline	ND	0 / 14	<	1200	U													<	1300	U				
4-Chlorophenyl-phenylether	ND	0 / 14	<	1200	U													<	1300	U				
4-Methylphenol (p-cresol)	ND	0 / 14	<	1200	U													<	1300	U				
4-Nitroaniline	ND	0 / 14	<	6200	U													<	6700	U				
4-Nitrophenol	ND	0 / 14	<	6200	U													<	6700	U				
Acenaphthene	ND	0 / 14	<	1200	U													<	1300	U				
Acenaphthylene	ND	0 / 14	<	1200	U													<	1300	U				
Anthracene	ND	0 / 14	<	1200	U													<	1300	U				
Benzo(a)anthracene	ND	0 / 14	<	1200	U													<	1300	U				
Benzo(a)pyrene	ND	0 / 14	<	1200	U													<	1300	U				
Benzo(b)fluoranthene	ND	0 / 14	<	1200	U													<	1300	U				
Benzo(g,h,i)perylene	ND	0 / 14	<	1200	U													<	1300	U				

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-076-SS-0X			AUS-0A07-R76-SS-0X			AUS-0A07-076-SS-02			AUS-0A07-051-SS-04			AUS-0A07-088-SS-02			AUS-0A07-088-SS-0X			AUS-0A07-092-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			March 21, 2000			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14	<	1200	U										<	1300	U						
bis(2-Chloroethoxy)methane	ND	0 / 14	<	1200	U										<	1300	U						
bis(2-Chloroethyl)ether	ND	0 / 14	<	1200	U										<	1300	U						
bis(2-Ethylhexyl)phthalate	2500	1 / 14	<	1200	U										<	1300	U						
Butylbenzylphthalate	ND	0 / 14	<	1200	U										<	1300	U						
Carbazole	ND	0 / 14	<	1200	U										<	1300	U						
Chrysene	ND	0 / 14	<	1200	U										<	1300	U						
Di-n-butylphthalate	ND	0 / 14	<	1200	U										<	1300	U						
Di-n-octylphthalate	ND	0 / 14	<	1200	U										<	1300	U						
Dibenz(a,h)anthracene	ND	0 / 14	<	1200	U										<	1300	U						
Dibenzofuran	ND	0 / 14	<	1200	U										<	1300	U						
Diethylphthalate	ND	0 / 14	<	1200	U										<	1300	U						
Dimethylphthalate	ND	0 / 14	<	1200	U										<	1300	U						
Fluoranthene	ND	0 / 14	<	1200	U										<	1300	U						
Fluorene	ND	0 / 14	<	1200	U										<	1300	U						
Hexachlorobenzene	ND	0 / 14	<	1200	U										<	1300	U						
Hexachlorobutadiene	ND	0 / 14	<	1200	U										<	1300	U						
Hexachlorocyclopentadiene	ND	0 / 14	<	1200	U										<	1300	U						
Hexachloroethane	ND	0 / 14	<	1200	U										<	1300	U						
Indeno(1,2,3-cd)pyrene	ND	0 / 14	<	1200	U										<	1300	U						
Isophorone	ND	0 / 14	<	1200	U										<	1300	U						
N-Nitroso-di-n-propylamine	ND	0 / 14	<	1200	U										<	1300	U						
N-Nitrosodiphenylamine	ND	0 / 14	<	1200	U										<	1300	U						
Naphthalene	ND	0 / 14	<	1200	U										<	1300	U						
Nitrobenzene	ND	0 / 14	<	1200	U										<	1300	U						
Pentachlorophenol	ND	0 / 14	<	6200	U										<	6700	U						
Phenanthrene	ND	0 / 14	<	1200	U										<	1300	U						
Phenol	ND	0 / 14	<	1200	U										<	1300	U						
Pyrene	ND	0 / 14	<	1200	U										<	1300	U						
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES ON
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-076-SS-0X			AUS-0A07-R76-SS-0X			AUS-0A07-076-SS-02			AUS-0A07-051-SS-04			AUS-0A07-088-SS-02			AUS-0A07-088-SS-0X			AUS-0A07-092-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			March 21, 2000			March 22, 2001			March 22, 2001			March 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	15	J / 4																					
Benzo(k)fluoranthene	11	4 / 4																					
Chrysene	81	4 / 4																					
Dibenz(a,h)anthracene	ND	0 / 4																					
Fluoranthene	620	4 / 4																					
Fluorene	210	2 / 4																					
Indeno(1,2,3-cd)pyrene	14	J / 4																					
Naphthalene	330	2 / 4																					
Phenanthrene	360	4 / 4																					
Pyrene	330	4 / 4																					
PESTICIDES (ORGANOCHLORINE) (µg/kg)																							
Aldrin	1300000	75 / 103	<	3	U				<	3	U	240	31		19000	1600	J	20000	650	J	220	28	J
Alpha-BHC	ND	0 / 105	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
Alpha-Chlordane	490	4 / 104	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
beta-BHC	ND	0 / 104	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
delta-BHC	ND	0 / 104	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
Dieldrin	190000 J	92 / 104	<	6.2	U			9.7	6.2			320	64		18000	660	J	2000	67		740	58	
Endosulfan I	ND	0 / 104	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
Endosulfan II	5.3 J	1 / 104	<	6.2	U				<	6.2	U	<	6.4	U	<	66	U	<	67	U	<	58	U
Endosulfan sulfate	ND	0 / 104	<	6.2	U				<	6.2	U	<	6.4	U	<	66	U	<	67	U	<	58	U
Endrin	12000	30 / 105	<	6.2	U				<	6.2	U	5.7	6.4	J	390	66	J	920	67		<	58	U
Endrin aldehyde	9000	16 / 104	<	6.2	U				<	6.2	U	<	6.4	U	590	66	J	650	67		<	58	U
Endrin ketone	20000	29 / 102	<	6.2	U				<	6.2	U	11	6.4		700	66	J	980	67		<	58	U
gamma-BHC (Lindane)	ND	0 / 105	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
gamma-Chlordane	1600	11 / 104	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
Heptachlor	ND	0 / 104	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
Heptachlor epoxide	ND	0 / 105	<	3	U				<	3	U	<	3.1	U	<	32	U	<	33	U	<	28	U
Hexachlorobenzene	2700	11 / 105	<	3	U				<	3	U	<	3.1	U	54	32	J	65	33		<	28	U
Isodrin	49000 J	29 / 103	<	6.2	U				<	6.2	U	22	6.4		620	660	J	700	1300	J	<	58	U
Methoxychlor	ND	0 / 105	<	30	U				<	30	U	<	31	U	<	320	U	<	330	U	<	280	U
4,4-DDD	12000	30 / 104	<	6.2	U				<	6.2	U	<	6.4	U	<	66	U	<	67	U	<	58	U
4,4-DDE	4800	14 / 104	<	6.2	U				<	6.2	U	<	6.4	U	<	66	U	<	67	U	<	58	U
4,4-DDT	100000	38 / 103	<	6.2	U				<	6.2	U	<	6.4	U	190	66	J	220	67	J	23	58	J
Technical Chlordane	ND	0 / 104	<	12	U				<	12	U	<	12	U	<	130	U	<	130	U	<	110	U
Toxaphene	ND	0 / 104	<	60	U				<	61	U	<	63	U	<	640	U	<	660	U	<	570	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-076-SS-0X			AUS-0A07-R76-SS-0X			AUS-0A07-076-SS-02			AUS-0A07-051-SS-04			AUS-0A07-088-SS-02			AUS-0A07-088-SS-0X			AUS-0A07-092-SS-0X		
			March 22, 2001			May 22, 2001			March 22, 2001			March 21, 2000			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																							
Aroclor 1016	ND	0/3				<	28	U															
Aroclor 1221	ND	0/3				<	28	U															
Aroclor 1232	ND	0/3				<	28	U															
Aroclor 1242	ND	0/3				<	28	U															
Aroclor 1248	ND	0/3				<	28	U															
Aroclor 1254	ND	0/3				<	28	U															
Aroclor 1260	ND	0/3				<	28	U															
DIOXINS/FURANS (ng/kg)																							
1,2,3,4,6,7,8-HpCDD	55.5	3/3																					
1,2,3,4,6,7,8-HpCDF	7.31	3/3																					
1,2,3,4,7,8,9-HpCDF	1.42	2/3																					
1,2,3,4,7,8-HxCDD	0.59	3/3																					
1,2,3,4,7,8-HxCDF	2.29	3/3																					
1,2,3,6,7,8-HxCDD	1.3	3/3																					
1,2,3,6,7,8-HxCDF	0.98	3/3																					
1,2,3,7,8,9-HxCDD	0.997	3/3																					
1,2,3,7,8,9-HxCDF	1.14	1/3																					
1,2,3,7,8-PeCDD	0.373	3/3																					
1,2,3,7,8-PeCDF	3.5	3/3																					
2,3,4,6,7,8-HxCDF	0.765	2/3																					
2,3,4,7,8-PeCDF	3.35	3/3																					
2,3,7,8-TCDD	0.289	1/3																					
2,3,7,8-TCDF	4.16	2/3																					
OCDD	1250	3/3																					
OCDF	33.4	3/3																					
Total HpCDDs	166	3/3																					
Total HpCDFs	21.4	3/3																					
Total HxCDDs	14.9	3/3																					
Total HxCDFs	9.98	3/3																					
Total PeCDDs	3.55	3/3																					
Total PeCDFs	15.6	3/3																					
Total TCDDs	0.351	1/3																					
Total TCDFs	15.2	2/3																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID DATE COLLECTED			AUS-0A07-076-SS-0X			AUS-0A07-R76-SS-0X			AUS-0A07-076-SS-02			AUS-0A07-051-SS-04			AUS-0A07-088-SS-02			AUS-0A07-088-SS-0X			AUS-0A07-092-SS-0X		
	Maximum	Frequency	March 22, 2001			May 22, 2001			March 22, 2001			March 21, 2000			March 22, 2001			March 22, 2001			March 22, 2001		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Aluminum	17900	18 / 18	12400	18.7														17900	21.1				
Antimony	0.63	7 / 18	0.35	0.3														0.49	0.31				
Arsenic	9.6	18 / 18	4.7	0.93														9.6	1.1				
Barium	153	18 / 18	96.9	0.93														104	1.1				
Beryllium	1.2	17 / 18	0.8	0.37														1.2	0.42				
Boron	6.2	10 / 18	<	4.7	U													<	5.3	U			
Cadmium	0.39	5 / 18	<	0.19	U													<	0.21	U			
Calcium	217000	18 / 18	2450	9.3														3310	10.6				
Chromium	25.6	18 / 18	20.2	0.93														22.9	1.1				
Cobalt	15.1	18 / 18	3.6	0.47														7.8	0.53				
Copper	23.5	18 / 18	10.5	0.93														19.1	1.1				
Iron	34000	18 / 18	16100	4.7														31300	5.3				
Lead	58.1	18 / 18	9.4	0.47														14.4	0.53				
Magnesium	19700	18 / 18	2360	9.3														2750	10.6				
Manganese	1370	18 / 18	225	0.93														521	1.1				
Mercury	0.053	3 / 18	<	0.041	U													0.053	0.044				
Nickel	22.9	18 / 18	10.3	0.93														17.6	1.1				
Potassium	930	18 / 18	613	46.7														766	52.8				
Selenium	0.78	1 / 18	<	0.65	U													<	0.53	U			
Silver	ND	0 / 18	<	0.47	U													<	0.53	U			
Sodium	1360	18 / 18	1200	93.3														898	106				
Thallium	ND	0 / 18	<	0.93	U													<	1.1	U			
Vanadium	38.1	18 / 18	31	0.47														38.1	0.53				
Zinc	95.4	18 / 18	28.9	0.93														35.1	1.1				

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-093-SS-0X			AUS-0A07-097-SS-0X			AUS-0A07-099-SS-0X			AUS-0A07-100-SS-0X			AUS-0A07-102-SS-0X			AUS-0A07-103-SS-0X			AUS-0A07-103-SS-02		
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001					
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,1,1-Trichloroethane	ND	0 / 17																<	4	U			
1,1,2,2-Tetrachloroethane	ND	0 / 17																<	4	U			
1,1,2-Trichloroethane	ND	0 / 17																<	4	U			
1,1-Dichloroethane	ND	0 / 17																<	4	U			
1,1-Dichloroethene	ND	0 / 17																<	4	U			
1,2-Dichloroethane	ND	0 / 17																<	4	U			
1,2-Dichloropropane	660	5 / 17																<	4	U			
2-Butanone	ND	0 / 17																<	4	U			
2-Hexanone	ND	0 / 17																<	4	U			
4-Methyl-2-Pentanone	ND	0 / 17																<	4	U			
Acetone	24	8 / 17																<	4	U			
Benzene	8	3 / 17																<	4	U			
Bromodichloromethane	ND	0 / 17																<	4	U			
Bromoform	ND	0 / 17																<	4	U			
Bromomethane	ND	0 / 17																<	4	U			
Carbon Disulfide	ND	0 / 17																<	4	U			
Carbon Tetrachloride	ND	0 / 17																<	4	U			
Chlorobenzene	48	3 / 17																<	4	U			
Chloroethane	ND	0 / 17																<	4	U			
Chloroform	ND	0 / 17																<	4	U			
Chloromethane	ND	0 / 17																<	4	U			
cis-1,2-Dichloroethene	ND	0 / 17																<	4	U			
cis-1,3-Dichloropropene	ND	0 / 17																<	4	U			
Dibromochloromethane	ND	0 / 17																<	4	U			
Ethylbenzene	41	2 / 17																<	4	U			
Methylene Chloride	ND	0 / 17																<	4	U			
n-Hexane	ND	0 / 17																<	4	U			
Styrene	28	2 / 17																<	4	U			
Tetrachloroethene	48	2 / 17																<	4	U			
Toluene	11	3 / 17																<	4	U			
trans-1,2-Dichloroethene	ND	0 / 17																<	4	U			
trans-1,3-Dichloropropene	ND	0 / 17																<	4	U			
Trichloroethene	ND	0 / 17																<	4	U			
Vinyl Chloride	ND	0 / 17																<	4	U			
Xylene (total)	4500	3 / 17																<	4	U			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-093-SS-0X			AUS-0A07-097-SS-0X			AUS-0A07-099-SS-0X			AUS-0A07-100-SS-0X			AUS-0A07-102-SS-0X			AUS-0A07-103-SS-0X			AUS-0A07-103-SS-02		
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001					
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																							
1,2,4-Trichlorobenzene	ND	0 / 14																<	1100	U			
1,2-Dichlorobenzene	ND	0 / 14																<	1100	U			
1,3-Dichlorobenzene	ND	0 / 14																<	1100	U			
1,4-Dichlorobenzene	ND	0 / 14																<	1100	U			
2,2-Oxybis(1-chloro)propane	ND	0 / 14																<	1100	U			
2,4,5-Trichlorophenol	ND	0 / 14																<	5900	U			
2,4,6-Trichlorophenol	ND	0 / 14																<	1100	U			
2,4-Dichlorophenol	ND	0 / 14																<	1100	U			
2,4-Dimethylphenol	ND	0 / 14																<	1100	U			
2,4-Dinitrophenol	ND	0 / 14																<	5900	U			
2,4-Dinitrotoluene	ND	0 / 14																<	1100	U			
2,6-Dinitrotoluene	ND	0 / 14																<	1100	U			
2-Chloronaphthalene	ND	0 / 14																<	1100	U			
2-Chlorophenol	ND	0 / 14																<	1100	U			
2-Methylnaphthalene	ND	0 / 14																<	1100	U			
2-Methylphenol (o-cresol)	ND	0 / 14																<	1100	U			
2-Nitroaniline	ND	0 / 14																<	5900	U			
2-Nitrophenol	ND	0 / 14																<	1100	U			
3,3-Dichlorobenzidine	ND	0 / 14																<	2300	U			
3-Nitroaniline	ND	0 / 14																<	5900	U			
4,6-Dinitro-2-methylphenol	ND	0 / 14																<	5900	U			
4-Bromophenyl-phenylether	ND	0 / 14																<	1100	U			
4-Chloro-3-methylphenol	ND	0 / 14																<	1100	U			
4-Chloroaniline	ND	0 / 14																<	1100	U			
4-Chlorophenyl-phenylether	ND	0 / 14																<	1100	U			
4-Methylphenol (p-cresol)	ND	0 / 14																<	1100	U			
4-Nitroaniline	ND	0 / 14																<	5900	U			
4-Nitrophenol	ND	0 / 14																<	5900	U			
Acenaphthene	ND	0 / 14																<	1100	U			
Acenaphthylene	ND	0 / 14																<	1100	U			
Anthracene	ND	0 / 14																<	1100	U			
Benzo(a)anthracene	ND	0 / 14																<	1100	U			
Benzo(a)pyrene	ND	0 / 14																<	1100	U			
Benzo(b)fluoranthene	ND	0 / 14																<	1100	U			
Benzo(g,h,i)perylene	ND	0 / 14																<	1100	U			

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-093-SS-0X			AUS-0A07-097-SS-0X			AUS-0A07-099-SS-0X			AUS-0A07-100-SS-0X			AUS-0A07-102-SS-0X			AUS-0A07-103-SS-0X			AUS-0A07-103-SS-02		
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001					
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
Benzo(k)fluoranthene	ND	0 / 14																<	1100	U			
bis(2-Chloroethoxy)methane	ND	0 / 14																<	1100	U			
bis(2-Chloroethyl)ether	ND	0 / 14																<	1100	U			
bis(2-Ethylhexyl)phthalate	2500	1 / 14																<	1100	U			
Butylbenzylphthalate	ND	0 / 14																<	1100	U			
Carbazole	ND	0 / 14																<	1100	U			
Chrysene	ND	0 / 14																<	1100	U			
Di-n-butylphthalate	ND	0 / 14																<	1100	U			
Di-n-octylphthalate	ND	0 / 14																<	1100	U			
Dibenz(a,h)anthracene	ND	0 / 14																<	1100	U			
Dibenzofuran	ND	0 / 14																<	1100	U			
Diethylphthalate	ND	0 / 14																<	1100	U			
Dimethylphthalate	ND	0 / 14																<	1100	U			
Fluoranthene	ND	0 / 14																<	1100	U			
Fluorene	ND	0 / 14																<	1100	U			
Hexachlorobenzene	ND	0 / 14																<	1100	U			
Hexachlorobutadiene	ND	0 / 14																<	1100	U			
Hexachlorocyclopentadiene	ND	0 / 14																<	1100	U			
Hexachloroethane	ND	0 / 14																<	1100	U			
Indeno(1,2,3-cd)pyrene	ND	0 / 14																<	1100	U			
Isophorone	ND	0 / 14																<	1100	U			
N-Nitroso-di-n-propylamine	ND	0 / 14																<	1100	U			
N-Nitrosodiphenylamine	ND	0 / 14																<	1100	U			
Naphthalene	ND	0 / 14																<	1100	U			
Nitrobenzene	ND	0 / 14																<	1100	U			
Pentachlorophenol	ND	0 / 14																<	5900	U			
Phenanthrene	ND	0 / 14																<	1100	U			
Phenol	ND	0 / 14																<	1100	U			
Pyrene	ND	0 / 14																<	1100	U			
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)																							
(µg/kg)																							
Acenaphthene	320	2 / 4																					
Acenaphthylene	420	3 / 4																					
Anthracene	87	3 / 4																					
Benzo(a)anthracene	100	4 / 4																					
Benzo(a)pyrene	17	2 / 4																					
Benzo(b)fluoranthene	21	4 / 4																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-093-SS-0X			AUS-0A07-097-SS-0X			AUS-0A07-099-SS-0X			AUS-0A07-100-SS-0X			AUS-0A07-102-SS-0X			AUS-0A07-103-SS-0X			AUS-0A07-103-SS-02					
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001								
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
Benzo(g,h,i)perylene	15 J	1 / 4																								
Benzo(k)fluoranthene	11	4 / 4																								
Chrysene	81	4 / 4																								
Dibenz(a,h)anthracene	ND	0 / 4																								
Fluoranthene	620	4 / 4																								
Fluorene	210	2 / 4																								
Indeno(1,2,3-cd)pyrene	14 J	2 / 4																								
Naphthalene	330	2 / 4																								
Phenanthrene	360	4 / 4																								
Pyrene	330	4 / 4																								
PESTICIDES (ORGANOCHLORINE) (µg/kg)																										
Aldrin	1300000	75 / 103	30	3	J	88000	3000		25	31	J	57	31	UJ	<	30	U	27	2.9	J						
Alpha-BHC	ND	0 / 105	<	3	U	<	300	U	<	31	U			R	<	30	U	<	2.9	U						
Alpha-Chlordane	490	4 / 104	<	3	U	490	300		<	31	U			R	<	30	U	<	2.9	U						
beta-BHC	ND	0 / 104	<	3	U	<	300	U	<	31	U			R	<	30	U	<	2.9	U						
delta-BHC	ND	0 / 104	<	3	U	<	300	U	<	31	U			R	<	30	U	<	2.9	U						
Dieldrin	190000 J	92 / 104	1000	120		140000	6200		510	63		510	63	UJ	28	60	J	41	6	J						
Endosulfan I	ND	0 / 104	<	3	U	<	300	U	<	31	U			R	<	30	U	<	2.9	U						
Endosulfan II	5.3 J	1 / 104	<	6.1	U	<	620	U	<	63	U			R	<	60	U	<	6	U						
Endosulfan sulfate	ND	0 / 104	<	6.1	U	<	620	U	<	63	U			R	<	60	U	<	6	U						
Endrin	12000	30 / 105	24	6.1	J	1200	620		<	63	U	44	63	UJ	<	60	U	<	6	U						
Endrin aldehyde	9000	16 / 104	<	6.1	U	2100	620		<	63	U			R	<	60	U	<	6	U						
Endrin ketone	20000	29 / 102	<	6.1	U	4900	620		<	63	U			R	<	60	U	<	6	U						
gamma-BHC (Lindane)	ND	0 / 105	<	3	U	<	300	U	<	31	U			R	<	30	U	<	2.9	U						
gamma-Chlordane	1600	11 / 104	3.1	3		1600	300		<	31	U			R	<	30	U	<	2.9	U						
Heptachlor	ND	0 / 104	<	3	U	<	300	U	<	31	U			R	<	30	U	<	2.9	U						
Heptachlor epoxide	ND	0 / 105	<	3	U	<	300	U	<	31	U			R	<	30	U	<	2.9	U						
Hexachlorobenzene	2700	11 / 105	<	3	U	2300	300		<	31	U			R	<	30	U	<	2.9	U						
Isodrin	49000 J	29 / 103	<	6.1	U	920	620		<	63	U			R	<	60	U	<	6	U						
Methoxychlor	ND	0 / 105	<	30	U	<	3000	U	<	310	U			R	<	300	U	<	29	U						
4,4-DDD	12000	30 / 104	24	6.1		12000	620		31	63	J	250	63	UJ	<	60	U	<	6	U						
4,4-DDE	4800	14 / 104	<	6.1	U	1800	620		100	63				R	<	60	U	<	6	U						
4,4-DDT	190000	38 / 103	13	6.1	J	12000	620		110	63				R	<	60	U	2.1	6	J						
Technical Chlordane	ND	0 / 104	<	12	U	<	1200	U	<	120	U			R	<	120	U	<	12	U						
Toxaphene	ND	0 / 104	<	60	U	<	6100	U	<	620	U			R	<	590	U	<	59	U						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID DATE COLLECTED			AUS-0A07-093-SS-0X			AUS-0A07-097-SS-0X			AUS-0A07-099-SS-0X			AUS-0A07-100-SS-0X			AUS-0A07-102-SS-0X			AUS-0A07-103-SS-0X			AUS-0A07-103-SS-02		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) (µg/kg)																							
Aroclor 1016	ND	0 / 3																					
Aroclor 1221	ND	0 / 3																					
Aroclor 1232	ND	0 / 3																					
Aroclor 1242	ND	0 / 3																					
Aroclor 1248	ND	0 / 3																					
Aroclor 1254	ND	0 / 3																					
Aroclor 1260	ND	0 / 3																					
DIOXINS/FURANS (ng/kg)																							
1,2,3,4,6,7,8-HpCDD	55.5	3 / 3																					
1,2,3,4,6,7,8-HpCDF	7.31	3 / 3																					
1,2,3,4,7,8,9-HpCDF	1.42	2 / 3																					
1,2,3,4,7,8-HxCDD	0.59	3 / 3																					
1,2,3,4,7,8-HxCDF	2.29	3 / 3																					
1,2,3,6,7,8-HxCDD	1.3	3 / 3																					
1,2,3,6,7,8-HxCDF	0.98	3 / 3																					
1,2,3,7,8,9-HxCDD	0.997	3 / 3																					
1,2,3,7,8,9-HxCDF	1.14	1 / 3																					
1,2,3,7,8-PeCDD	0.373	3 / 3																					
1,2,3,7,8-PeCDF	3.5	3 / 3																					
2,3,4,6,7,8-HxCDF	0.765	2 / 3																					
2,3,4,7,8-PeCDF	3.35	3 / 3																					
2,3,7,8-TCDD	0.289	1 / 3																					
2,3,7,8-TCDF	4.16	2 / 3																					
OCDD	1250	3 / 3																					
OCDF	33.4	3 / 3																					
Total HpCDDs	166	3 / 3																					
Total HpCDFs	21.4	3 / 3																					
Total HxCDDs	14.9	3 / 3																					
Total HxCDFs	9.98	3 / 3																					
Total PeCDDs	3.55	3 / 3																					
Total PeCDFs	15.6	3 / 3																					
Total TCDDs	0.351	1 / 3																					
Total TCDFs	15.2	2 / 3																					

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-093-SS-0X		AUS-0A07-097-SS-0X			AUS-0A07-099-SS-0X			AUS-0A07-100-SS-0X			AUS-0A07-102-SS-0X			AUS-0A07-103-SS-0X			AUS-0A07-103-SS-02		
			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																				
Aluminum	17900	18 / 18													10700	19.4				
Antimony	0.63	7 / 18													0.42	0.28				
Arsenic	9.6	18 / 18													5.9	0.97				
Barium	153	18 / 18													129	0.97				
Beryllium	1.2	17 / 18													0.86	0.39				
Boron	6.2	10 / 18													4	4.8				
Cadmium	0.39	5 / 18													<	0.19	U			
Calcium	217000	18 / 18													2240	9.7				
Chromium	25.6	18 / 18													17.4	0.97				
Cobalt	15.1	18 / 18													8.9	0.48				
Copper	23.5	18 / 18													12.6	0.97				
Iron	34000	18 / 18													17900	4.8				
Lead	58.1	18 / 18													9.3	0.48				
Magnesium	19700	18 / 18													2190	9.7				
Manganese	1370	18 / 18													694	0.97				
Mercury	0.053	3 / 18													<	0.04	U			
Nickel	22.9	18 / 18													19.8	0.97				
Potassium	930	18 / 18													735	48.4				
Selenium	0.78	1 / 18													<	0.49	U			
Silver	ND	0 / 18													<	0.48	U			
Sodium	1360	18 / 18													1290	96.8				
Thallium	ND	0 / 18													<	0.97	U			
Vanadium	38.1	18 / 18													32.6	0.48				
Zinc	95.4	18 / 18													36.9	0.97				

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-105-SS-0X			AUS-0A07-106-SS-0X		
			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)								
1,1,1-Trichloroethane	ND	0 / 17						
1,1,2,2-Tetrachloroethane	ND	0 / 17						
1,1,2-Trichloroethane	ND	0 / 17						
1,1-Dichloroethane	ND	0 / 17						
1,1-Dichloroethene	ND	0 / 17						
1,2-Dichloroethane	ND	0 / 17						
1,2-Dichloropropane	660	5 / 17						
2-Butanone	ND	0 / 17						
2-Hexanone	ND	0 / 17						
4-Methyl-2-Pentanone	ND	0 / 17						
Acetone	24	8 / 17						
Benzene	8	3 / 17						
Bromodichloromethane	ND	0 / 17						
Bromoform	ND	0 / 17						
Bromomethane	ND	0 / 17						
Carbon Disulfide	ND	0 / 17						
Carbon Tetrachloride	ND	0 / 17						
Chlorobenzene	48	3 / 17						
Chloroethane	ND	0 / 17						
Chloroform	ND	0 / 17						
Chloromethane	ND	0 / 17						
cis-1,2-Dichloroethene	ND	0 / 17						
cis-1,3-Dichloropropene	ND	0 / 17						
Dibromochloromethane	ND	0 / 17						
Ethylbenzene	41	2 / 17						
Methylene Chloride	ND	0 / 17						
n-Hexane	ND	0 / 17						
Styrene	28	2 / 17						
Tetrachloroethene	48	2 / 17						
Toluene	11	3 / 17						
trans-1,2-Dichloroethene	ND	0 / 17						
trans-1,3-Dichloropropene	ND	0 / 17						
Trichloroethene	ND	0 / 17						
Vinyl Chloride	ND	0 / 17						
Xylene (total)	4500	3 / 17						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-105-SS-0X			AUS-0A07-106-SS-0X			
	DATE COLLECTED	Maximum	Frequency	March 22, 2001			March 22, 2001		
				Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)									
1,2,4-Trichlorobenzene		ND	0 / 14						
1,2-Dichlorobenzene		ND	0 / 14						
1,3-Dichlorobenzene		ND	0 / 14						
1,4-Dichlorobenzene		ND	0 / 14						
2,2-Oxybis(1-chloro)propane		ND	0 / 14						
2,4,5-Trichlorophenol		ND	0 / 14						
2,4,6-Trichlorophenol		ND	0 / 14						
2,4-Dichlorophenol		ND	0 / 14						
2,4-Dimethylphenol		ND	0 / 14						
2,4-Dinitrophenol		ND	0 / 14						
2,4-Dinitrotoluene		ND	0 / 14						
2,6-Dinitrotoluene		ND	0 / 14						
2-Chloronaphthalene		ND	0 / 14						
2-Chlorophenol		ND	0 / 14						
2-Methylnaphthalene		ND	0 / 14						
2-Methylphenol (o-cresol)		ND	0 / 14						
2-Nitroaniline		ND	0 / 14						
2-Nitrophenol		ND	0 / 14						
3,3-Dichlorobenzidine		ND	0 / 14						
3-Nitroaniline		ND	0 / 14						
4,6-Dinitro-2-methylphenol		ND	0 / 14						
4-Bromophenyl-phenylether		ND	0 / 14						
4-Chloro-3-methylphenol		ND	0 / 14						
4-Chloroaniline		ND	0 / 14						
4-Chlorophenyl-phenylether		ND	0 / 14						
4-Methylphenol (p-cresol)		ND	0 / 14						
4-Nitroaniline		ND	0 / 14						
4-Nitrophenol		ND	0 / 14						
Acenaphthene		ND	0 / 14						
Acenaphthylene		ND	0 / 14						
Anthracene		ND	0 / 14						
Benzo(a)anthracene		ND	0 / 14						
Benzo(a)pyrene		ND	0 / 14						
Benzo(b)fluoranthene		ND	0 / 14						
Benzo(g,h,i)perylene		ND	0 / 14						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-105-SS-0X			AUS-0A07-106-SS-0X		
			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
Benzo(k)fluoranthene	ND	0 / 14						
bis(2-Chloroethoxy)methane	ND	0 / 14						
bis(2-Chloroethyl)ether	ND	0 / 14						
bis(2-Ethylhexyl)phthalate	2500	1 / 14						
Butylbenzylphthalate	ND	0 / 14						
Carbazole	ND	0 / 14						
Chrysene	ND	0 / 14						
Di-n-butylphthalate	ND	0 / 14						
Di-n-octylphthalate	ND	0 / 14						
Dibenz(a,h)anthracene	ND	0 / 14						
Dibenzofuran	ND	0 / 14						
Diethylphthalate	ND	0 / 14						
Dimethylphthalate	ND	0 / 14						
Fluoranthene	ND	0 / 14						
Fluorene	ND	0 / 14						
Hexachlorobenzene	ND	0 / 14						
Hexachlorobutadiene	ND	0 / 14						
Hexachlorocyclopentadiene	ND	0 / 14						
Hexachloroethane	ND	0 / 14						
Indeno(1,2,3-cd)pyrene	ND	0 / 14						
Isophorone	ND	0 / 14						
N-Nitroso-di-n-propylamine	ND	0 / 14						
N-Nitrosodiphenylamine	ND	0 / 14						
Naphthalene	ND	0 / 14						
Nitrobenzene	ND	0 / 14						
Pentachlorophenol	ND	0 / 14						
Phenanthrene	ND	0 / 14						
Phenol	ND	0 / 14						
Pyrene	ND	0 / 14						
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)								
(µg/kg)								
Acenaphthene	320	2 / 4						
Acenaphthylene	420	3 / 4						
Anthracene	87	3 / 4						
Benzo(a)anthracene	100	4 / 4						
Benzo(a)pyrene	17	2 / 4						
Benzo(b)fluoranthene	21	4 / 4						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-105-SS-0X			AUS-0A07-106-SS-0X		
			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	15 J	1 / 4						
Benzo(k)fluoranthene	11	4 / 4						
Chrysene	81	4 / 4						
Dibenz(a,h)anthracene	ND	0 / 4						
Fluoranthene	620	4 / 4						
Fluorene	210	2 / 4						
Indeno(1,2,3-cd)pyrene	14 J	2 / 4						
Naphthalene	330	2 / 4						
Phenanthrene	360	4 / 4						
Pyrene	330	4 / 4						
PESTICIDES (ORGANOCHLORINE) (µg/kg)								
Aldrin	1300000	75 / 103	<	31	U	34	3.1	
Alpha-BHC	ND	0 / 105	<	31	U	<	3.1	U
Alpha-Chlordane	490	4 / 104	<	31	U	<	3.1	U
beta-BHC	ND	0 / 104	<	31	U	<	3.1	U
delta-BHC	ND	0 / 104	<	31	U	<	3.1	U
Dieldrin	190000 J	92 / 104	410	64		490	64	
Endosulfan I	ND	0 / 104	<	31	U	<	3.1	U
Endosulfan II	5.3 J	1 / 104	<	64	U	<	6.4	U
Endosulfan sulfate	ND	0 / 104	<	64	U	<	6.4	U
Endrin	12000	30 / 105	<	64	U	5.4	6.4	J
Endrin aldehyde	9000	16 / 104	<	64	U	2.6	6.4	J
Endrin ketone	20000	29 / 102	<	64	U	10	6.4	
gamma-BHC (Lindane)	ND	0 / 105	<	31	U	<	3.1	U
gamma-Chlordane	1600	11 / 104	<	31	U	<	3.1	U
Heptachlor	ND	0 / 104	<	31	U	<	3.1	U
Heptachlor epoxide	ND	0 / 105	<	31	U	<	3.1	U
Hexachlorobenzene	2700	11 / 105	<	31	U	<	3.1	U
Isodrin	49000 J	29 / 103	<	64	U	<	6.4	U
Methoxychlor	ND	0 / 105	<	310	U	<	31	U
4,4-DDD	12000	30 / 104	<	64	U	<	6.4	U
4,4-DDE	4800	14 / 104	<	64	U	<	6.4	U
4,4-DDT	100000	38 / 103	44	64	J	4.8	6.4	J
Technical Chlordane	ND	0 / 104	<	120	U	<	12	U
Toxaphene	ND	0 / 104	<	630	U	<	63	U

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-105-SS-0X			AUS-0A07-106-SS-0X		
			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
POLYCHLORINATED BIPHENYLS (PCB) ($\mu\text{g}/\text{kg}$)								
Aroclor 1016	ND	0 / 3						
Aroclor 1221	ND	0 / 3						
Aroclor 1232	ND	0 / 3						
Aroclor 1242	ND	0 / 3						
Aroclor 1248	ND	0 / 3						
Aroclor 1254	ND	0 / 3						
Aroclor 1260	ND	0 / 3						
DIOXINS/FURANS (ng/kg)								
1,2,3,4,6,7,8-HpCDD	55.5	3 / 3						
1,2,3,4,6,7,8-HpCDF	7.31	3 / 3						
1,2,3,4,7,8,9-HpCDF	1.42	2 / 3						
1,2,3,4,7,8-HxCDD	0.59	3 / 3						
1,2,3,4,7,8-HxCDF	2.29	3 / 3						
1,2,3,6,7,8-HxCDD	1.3	3 / 3						
1,2,3,6,7,8-HxCDF	0.98	3 / 3						
1,2,3,7,8,9-HxCDD	0.997	3 / 3						
1,2,3,7,8,9-HxCDF	1.14	1 / 3						
1,2,3,7,8-PeCDD	0.373	3 / 3						
1,2,3,7,8-PeCDF	3.5	3 / 3						
2,3,4,6,7,8-HxCDF	0.765	2 / 3						
2,3,4,7,8-PeCDF	3.35	3 / 3						
2,3,7,8-TCDD	0.289	1 / 3						
2,3,7,8-TCDF	4.16	2 / 3						
OCDD	1250	3 / 3						
OCDF	33.4	3 / 3						
Total HpCDDs	166	3 / 3						
Total HpCDFs	21.4	3 / 3						
Total HxCDDs	14.9	3 / 3						
Total HxCDFs	9.98	3 / 3						
Total PeCDDs	3.55	3 / 3						
Total PeCDFs	15.6	3 / 3						
Total TCDDs	0.351	1 / 3						
Total TCDFs	15.2	2 / 3						

**TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS FOR SOIL SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-105-SS-0X			AUS-0A07-106-SS-0X		
			March 22, 2001			March 22, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)								
Aluminum	17900	18 / 18						
Antimony	0.63	7 / 18						
Arsenic	9.6	18 / 18						
Barium	153	18 / 18						
Beryllium	1.2	17 / 18						
Boron	6.2	10 / 18						
Cadmium	0.39	5 / 18						
Calcium	217000	18 / 18						
Chromium	25.6	18 / 18						
Cobalt	15.1	18 / 18						
Copper	23.5	18 / 18						
Iron	34000	18 / 18						
Lead	58.1	18 / 18						
Magnesium	19700	18 / 18						
Manganese	1370	18 / 18						
Mercury	0.053	3 / 18						
Nickel	22.9	18 / 18						
Potassium	930	18 / 18						
Selenium	0.78	1 / 18						
Silver	ND	0 / 18						
Sodium	1360	18 / 18						
Thallium	ND	0 / 18						
Vanadium	38.1	18 / 18						
Zinc	95.4	18 / 18						

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

ng/kg = nanograms per kilogram

R = Rejected

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-025-SD-02			AUS-0A07-025-SD-04			AUS-0A07-025-SD-0X			AUS-0A07-063-SD-0X			AUS-0A07-064-SD-0X			AUS-0A07-065-SD-02			
			March 20, 2001			March 20, 2001			March 20, 2001			March 19, 2001			March 20, 2001			March 20, 2001			
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
VOLATILE ORGANIC COMPOUNDS (µg/kg)																					
	ND	0/4				<	6	U										<	5	U	
1,1,1-Trichloroethane	ND	0/4				<	6	U										<	5	U	
1,1,2,2-Tetrachloroethane	ND	0/4				<	6	U										<	5	U	
1,1,2-Trichloroethane	ND	0/4				<	6	U										<	5	U	
1,1-Dichloroethane	ND	0/4				<	6	U										<	5	U	
1,1-Dichloroethene	ND	0/4				<	6	U										<	5	U	
1,2-Dichloroethane	ND	0/4				<	6	U										<	5	U	
1,2-Dichloropropane	10	2/4				<	6	U										8	5		
2-Butanone	ND	0/4				<	6	U										<	5	U	
2-Hexanone	ND	0/4				<	6	U										<	5	U	
4-Methyl-2-Pentanone	ND	0/4				<	6	U										<	5	U	
Acetone	ND	0/4				<	12	U										<	23	U	
Benzene	ND	0/4				<	6	U										<	5	U	
Bromodichloromethane	ND	0/4				<	6	U										<	5	U	
Bromoform	ND	0/4				<	6	U										<	5	U	
Bromomethane	ND	0/4				<	6	U										<	5	U	
Carbon Disulfide	ND	0/4				<	6	U										<	5	U	
Carbon Tetrachloride	ND	0/4				<	6	U										<	5	U	
Chlorobenzene	ND	0/4				<	6	U										<	5	U	
Chloroethane	ND	0/4				<	6	U										<	5	U	
Chloroform	ND	0/4				<	6	U										<	5	U	
Chloromethane	ND	0/4				<	6	U										<	5	U	
cis-1,2-Dichloroethene	ND	0/4				<	6	U										<	5	U	
cis-1,3-Dichloropropene	ND	0/4				<	6	U										<	5	U	
Dibromochloromethane	ND	0/4				<	6	U										<	5	U	
Ethylbenzene	ND	0/4				<	6	U										<	5	U	
Methylene Chloride	ND	0/4				<	6	U										<	5	U	
n-Hexane	ND	0/4				<	6	U										<	5	U	
Styrene	ND	0/4				<	6	U										<	5	U	
Tetrachloroethene	ND	0/4				<	6	U										<	5	U	
Toluene	ND	0/4				<	6	U										<	5	U	
trans-1,2-Dichloroethene	ND	0/4				<	6	U										<	5	U	
trans-1,3-Dichloropropene	ND	0/4				<	6	U										<	5	U	
Trichloroethene	ND	0/4				<	6	U										<	5	U	
Vinyl Chloride	ND	0/4				<	6	U										<	5	U	
Xylene (total)	ND	0/4				<	6	U										<	5	U	

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-025-SD-02		AUS-0A07-025-SD-04			AUS-0A07-025-SD-0X			AUS-0A07-063-SD-0X			AUS-0A07-064-SD-0X			AUS-0A07-065-SD-02					
			March 20, 2001			March 20, 2001			March 20, 2001			March 19, 2001			March 20, 2001			March 20, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																				
1,2,4-Trichlorobenzene	ND	0 / 1							<	1300	U									
1,2-Dichlorobenzene	ND	0 / 1							<	1300	U									
1,3-Dichlorobenzene	ND	0 / 1							<	1300	U									
1,4-Dichlorobenzene	ND	0 / 1							<	1300	U									
2,2-Oxybis(1-chloro)propane	ND	0 / 1							<	1300	U									
2,4,5-Trichlorophenol	ND	0 / 1							<	6500	U									
2,4,6-Trichlorophenol	ND	0 / 1							<	1300	U									
2,4-Dichlorophenol	ND	0 / 1							<	1300	U									
2,4-Dimethylphenol	ND	0 / 1							<	1300	U									
2,4-Dinitrophenol	ND	0 / 1							<	6500	U									
2,4-Dinitrotoluene	ND	0 / 1							<	1300	U									
2,6-Dinitrotoluene	ND	0 / 1							<	1300	U									
2-Chloronaphthalene	ND	0 / 1							<	1300	U									
2-Chlorophenol	ND	0 / 1							<	1300	U									
2-Methylnaphthalene	ND	0 / 1							<	1300	U									
2-Methylphenol (o-cresol)	ND	0 / 1							<	1300	U									
2-Nitroaniline	ND	0 / 1							<	6500	U									
2-Nitrophenol	ND	0 / 1							<	1300	U									
3,3-Dichlorobenzidine	ND	0 / 1							<	2600	U									
3-Nitroaniline	ND	0 / 1							<	6500	U									
4,6-Dinitro-2-methylphenol	ND	0 / 1							<	6500	U									
4-Bromophenyl-phenylether	ND	0 / 1							<	1300	U									
4-Chloro-3-methylphenol	ND	0 / 1							<	1300	U									
4-Chloroaniline	ND	0 / 1							<	1300	U									
4-Chlorophenyl-phenylether	ND	0 / 1							<	1300	U									
4-Methylphenol (p-cresol)	ND	0 / 1							<	1300	U									
4-Nitroaniline	ND	0 / 1							<	6500	U									
4-Nitrophenol	ND	0 / 1							<	6500	U									
Acenaphthene	ND	0 / 1							<	1300	U									
Acenaphthylene	ND	0 / 1							<	1300	U									
Anthracene	ND	0 / 1							<	1300	U									
Benzo(a)anthracene	ND	0 / 1							<	1300	U									
Benzo(a)pyrene	ND	0 / 1							<	1300	U									
Benzo(b)fluoranthene	ND	0 / 1							<	1300	U									

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES ON
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-025-SD-02			AUS-0A07-025-SD-04			AUS-0A07-025-SD-0X			AUS-0A07-063-SD-0X			AUS-0A07-064-SD-0X			AUS-0A07-065-SD-02		
			March 20, 2001			March 20, 2001			March 20, 2001			March 19, 2001			March 20, 2001			March 20, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	ND	0/1							<	1300	U									
Benzo(k)fluoranthene	ND	0/1							<	1300	U									
bis(2-Chloroethoxy)methane	ND	0/1							<	1300	U									
bis(2-Chloroethyl)ether	ND	0/1							<	1300	U									
bis(2-Ethylhexyl)phthalate	ND	0/1							<	1300	U									
Butylbenzylphthalate	ND	0/1							<	1300	U									
Carbazole	ND	0/1							<	1300	U									
Chrysene	ND	0/1							<	1300	U									
Di-n-butylphthalate	ND	0/1							<	1300	U									
Di-n-octylphthalate	ND	0/1							<	1300	U									
Dibenz(a,h)anthracene	ND	0/1							<	1300	U									
Dibenzofuran	ND	0/1							<	1300	U									
Diethylphthalate	ND	0/1							<	1300	U									
Dimethylphthalate	ND	0/1							<	1300	U									
Fluoranthene	ND	0/1							<	1300	U									
Fluorene	ND	0/1							<	1300	U									
Hexachlorobenzene	ND	0/1							<	1300	U									
Hexachlorobutadiene	ND	0/1							<	1300	U									
Hexachlorocyclopentadiene	ND	0/1							<	1300	U									
Hexachloroethane	ND	0/1							<	1300	U									
Indeno(1,2,3-cd)pyrene	ND	0/1							<	1300	U									
Isophorone	ND	0/1							<	1300	U									
N-Nitroso-di-n-propylamine	ND	0/1							<	1300	U									
N-Nitrosodiphenylamine	ND	0/1							<	1300	U									
Naphthalene	ND	0/1							<	1300	U									
Nitrobenzene	ND	0/1							<	1300	U									
Pentachlorophenol	ND	0/1							<	6500	U									
Phenanthrene	ND	0/1							<	1300	U									
Phenol	ND	0/1							<	1300	U									
Pyrene	ND	0/1							<	1300	U									
PESTICIDES (ORGANOCHLORINE) (µg/kg)																				
Aldrin	64	4/19	35	31					14	16	J	<	36	U	<	3.1	U	<	3.1	U
Alpha-BHC	ND	0/19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
Alpha-Chlordane	ND	0/19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
beta-BHC	ND	0/19	<	31	U				<		U	<	36	U	<	3.1	U	<	3.1	U
delta-BHC	ND	0/19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-025-SD-02			AUS-0A07-025-SD-04			AUS-0A07-025-SD-0X			AUS-0A07-063-SD-0X			AUS-0A07-064-SD-0X			AUS-0A07-065-SD-02		
			March 20, 2001			March 20, 2001			March 20, 2001			March 19, 2001			March 20, 2001			March 20, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
Dieldrin	16	1 / 19	<	64	U				<	33	U	<	74	U	<	6.4	U	<	6.3	U
Endosulfan I	ND	0 / 19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
Endosulfan II	ND	0 / 19	<	64	U				<	33	U	<	74	U	<	6.4	U	<	6.3	U
Endosulfan sulfate	ND	0 / 19	<	64	U				<	33	U	<	74	U	<	6.4	U	<	6.3	U
Endrin	ND	0 / 19	<	64	U				<	33	U	<	74	U	<	6.4	U	<	6.3	U
Endrin aldehyde	ND	0 / 19	<	64	U				<	33	U	<	74	U	<	6.4	U	<	6.3	U
Endrin ketone	ND	0 / 19	<	64	U				<	33	U	<	74	U	<	6.4	U	<	6.3	U
gamma-BHC (Lindane)	ND	0 / 19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
gamma-Chlordane	ND	0 / 19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
Heptachlor	ND	0 / 19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
Heptachlor epoxide	ND	0 / 19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
Hexachlorobenzene	ND	0 / 19	<	31	U				<	16	U	<	36	U	<	3.1	U	<	3.1	U
Isodrin	ND	0 / 19	<	64	U				<	33	U	<	74	U	<	6.4	U	<	6.3	U
Methoxychlor	14 J	1 / 19	<	310	U				<	160	U	<	360	U	<	31	U	<	31	U
4,4-DDD	1400	6 / 19	1400	64					19	33	J	39	74	J	<	6.4	U	<	6.3	U
4,4-DDE	400	2 / 19	400	64					<	33	U	<	74	U	<	6.4	U	<	6.3	U
4,4-DDT	48 J	3 / 19	22	64	J				<	33	U	48	74	J	<	6.4	U	<	6.3	U
Technical Chlordane	ND	0 / 19	<	120	U				<	65	U	<	140	U	<	12	U	<	12	U
Toxaphene	ND	0 / 19	<	630	U				<	330	U	<	730	U	<	63	U	<	62	U
INORGANICS (mg/kg)																				
Aluminum	8760	1 / 1							8760	18.1										
Antimony	0.33	1 / 1							0.33	0.33										
Arsenic	25.2	1 / 1							25.2	0.91										
Barium	85.8	1 / 1							85.8	0.91										
Beryllium	1.3	1 / 1							1.3	0.36										
Boron	3.5	1 / 1							3.5	4.5										
Cadmium	ND	0 / 1							<	0.33	U									
Calcium	3790	1 / 1							3790	9.1										
Chromium	28.1	1 / 1							28.1	0.91										
Cobalt	16.4	1 / 1							16.4	0.45										
Copper	14.8	1 / 1							14.8	0.91										
Iron	38600	1 / 1							38600	4.5										
Lead	33.7	1 / 1							33.7	0.45										
Magnesium	2530	1 / 1							2530	9.1										
Manganese	1180	1 / 1							1180	4.5										
Mercury	0.036	1 / 1							0.036	0.044										

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-025-SD-02			AUS-0A07-025-SD-04			AUS-0A07-025-SD-0X			AUS-0A07-063-SD-0X			AUS-0A07-064-SD-0X			AUS-0A07-065-SD-02		
			March 20, 2001			March 20, 2001			March 20, 2001			March 19, 2001			March 20, 2001			March 20, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
Nickel	13	1 / 1							13	0.91										
Potassium	497	1 / 1							497	45.4										
Selenium	1.8	1 / 1							1.8	0.45										
Silver	ND	0 / 1							<	0.45	U									
Sodium	1090	1 / 1							1090	90.7										
Thallium	ND	0 / 1							<	1.1	U									
Vanadium	65.1	1 / 1							65.1	0.45										
Zinc	144	1 / 1							144	0.91										

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	AUS-0A07-065-SD-0X		AUS-0A07-066-SD-0X			AUS-0A07-067-SD-02			AUS-0A07-067-SD-0X			AUS-0A07-068-SD-02			AUS-0A07-068-SD-0X		
DATE COLLECTED			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)																	
1,1,1-Trichloroethane	ND	0/4				<	5	U									
1,1,2,2-Tetrachloroethane	ND	0/4				<	5	U									
1,1,2-Trichloroethane	ND	0/4				<	5	U									
1,1-Dichloroethane	ND	0/4				<	5	U									
1,1-Dichloroethene	ND	0/4				<	5	U									
1,2-Dichloroethane	ND	0/4				<	5	U									
1,2-Dichloropropane	10	2/4				<	5	U									
2-Butanone	ND	0/4				<	5	U									
2-Hexanone	ND	0/4				<	5	U									
4-Methyl-2-Pentanone	ND	0/4				<	5	U									
Acetone	ND	0/4				<	5	U									
Benzene	ND	0/4				<	5	U									
Bromodichloromethane	ND	0/4				<	5	U									
Bromoform	ND	0/4				<	5	U									
Bromomethane	ND	0/4				<	5	U									
Carbon Disulfide	ND	0/4				<	5	U									
Carbon Tetrachloride	ND	0/4				<	5	U									
Chlorobenzene	ND	0/4				<	5	U									
Chloroethane	ND	0/4				<	5	U									
Chloroform	ND	0/4				<	5	U									
Chloromethane	ND	0/4				<	5	U									
cis-1,2-Dichloroethene	ND	0/4				<	5	U									
cis-1,3-Dichloropropene	ND	0/4				<	5	U									
Dibromochloromethane	ND	0/4				<	5	U									
Ethylbenzene	ND	0/4				<	5	U									
Methylene Chloride	ND	0/4				<	5	U									
n-Hexane	ND	0/4				<	5	U									
Styrene	ND	0/4				<	5	U									
Tetrachloroethene	ND	0/4				<	5	U									
Toluene	ND	0/4				<	5	U									
trans-1,2-Dichloroethene	ND	0/4				<	5	U									
trans-1,3-Dichloropropene	ND	0/4				<	5	U									
Trichloroethene	ND	0/4				<	5	U									
Vinyl Chloride	ND	0/4				<	5	U									
Xylene (total)	ND	0/4				<	5	U									

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	AUS-0A07-065-SD-0X		AUS-0A07-066-SD-0X			AUS-0A07-067-SD-02			AUS-0A07-067-SD-0X			AUS-0A07-068-SD-02			AUS-0A07-068-SD-0X		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
DATE COLLECTED	Maximum Frequency		March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001		
SEMIVOLATILE ORGANIC COMPOUNDS ($\mu\text{g}/\text{kg}$)																	
1,2,4-Trichlorobenzene	ND	0/1															
1,2-Dichlorobenzene	ND	0/1															
1,3-Dichlorobenzene	ND	0/1															
1,4-Dichlorobenzene	ND	0/1															
2,2-Oxybis(1-chloro)propane	ND	0/1															
2,4,5-Trichlorophenol	ND	0/1															
2,4,6-Trichlorophenol	ND	0/1															
2,4-Dichlorophenol	ND	0/1															
2,4-Dimethylphenol	ND	0/1															
2,4-Dinitrophenol	ND	0/1															
2,4-Dinitrotoluene	ND	0/1															
2,6-Dinitrotoluene	ND	0/1															
2-Chloronaphthalene	ND	0/1															
2-Chlorophenol	ND	0/1															
2-Methylnaphthalene	ND	0/1															
2-Methylphenol (o-cresol)	ND	0/1															
2-Nitroaniline	ND	0/1															
2-Nitrophenol	ND	0/1															
3,3-Dichlorobenzidine	ND	0/1															
3-Nitroaniline	ND	0/1															
4,6-Dinitro-2-methylphenol	ND	0/1															
4-Bromophenyl-phenylether	ND	0/1															
4-Chloro-3-methylphenol	ND	0/1															
4-Chloroaniline	ND	0/1															
4-Chlorophenyl-phenylether	ND	0/1															
4-Methylphenol (p-cresol)	ND	0/1															
4-Nitroaniline	ND	0/1															
4-Nitrophenol	ND	0/1															
Acenaphthene	ND	0/1															
Acenaphthylene	ND	0/1															
Anthracene	ND	0/1															
Benzo(a)anthracene	ND	0/1															
Benzo(a)pyrene	ND	0/1															
Benzo(b)fluoranthene	ND	0/1															

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-065-SD-0X			AUS-0A07-066-SD-0X			AUS-0A07-067-SD-02			AUS-0A07-067-SD-0X			AUS-0A07-068-SD-02			AUS-0A07-068-SD-0X		
	DATE COLLECTED		March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	ND	0 / 1																		
Benzo(k)fluoranthene	ND	0 / 1																		
bis(2-Chloroethoxy)methane	ND	0 / 1																		
bis(2-Chloroethyl)ether	ND	0 / 1																		
bis(2-Ethylhexyl)phthalate	ND	0 / 1																		
Butylbenzylphthalate	ND	0 / 1																		
Carbazole	ND	0 / 1																		
Chrysene	ND	0 / 1																		
Di-n-butylphthalate	ND	0 / 1																		
Di-n-octylphthalate	ND	0 / 1																		
Dibenz(a,h)anthracene	ND	0 / 1																		
Dibenzofuran	ND	0 / 1																		
Diethylphthalate	ND	0 / 1																		
Dimethylphthalate	ND	0 / 1																		
Fluoranthene	ND	0 / 1																		
Fluorene	ND	0 / 1																		
Hexachlorobenzene	ND	0 / 1																		
Hexachlorobutadiene	ND	0 / 1																		
Hexachlorocyclopentadiene	ND	0 / 1																		
Hexachloroethane	ND	0 / 1																		
Indeno(1,2,3-cd)pyrene	ND	0 / 1																		
Isophorone	ND	0 / 1																		
N-Nitroso-di-n-propylamine	ND	0 / 1																		
N-Nitrosodiphenylamine	ND	0 / 1																		
Naphthalene	ND	0 / 1																		
Nitrobenzene	ND	0 / 1																		
Pentachlorophenol	ND	0 / 1																		
Phenanthrene	ND	0 / 1																		
Phenol	ND	0 / 1																		
Pyrene	ND	0 / 1																		
PESTICIDES (ORGANOCHLORINE) (µg/kg)																				
Aldrin	64	4 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U
Alpha-BHC	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U
Alpha-Chlordane	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U
beta-BHC	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U
delta-BHC	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-065-SD-0X			AUS-0A07-066-SD-0X			AUS-0A07-067-SD-02			AUS-0A07-067-SD-0X			AUS-0A07-068-SD-02			AUS-0A07-068-SD-0X			
			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
Dieldrin	16	1 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
Endosulfan I	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U	
Endosulfan II	ND	0 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
Endosulfan sulfate	ND	0 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
Endrin	ND	0 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
Endrin aldehyde	ND	0 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
Endrin ketone	ND	0 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
gamma-BHC (Lindane)	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U	
gamma-Chlordane	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U	
Heptachlor	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U	
Heptachlor epoxide	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U	
Hexachlorobenzene	ND	0 / 19	<	31	U	<	3	U	<	3	U	<	3.1	U	<	16	U	<	17	U	
Isodrin	ND	0 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
Methoxychlor	14 J	1 / 19	<	310	U	<	30	U	<	30	U	14	31	J	<	160	U	<	170	U	
4,4-DDD	1400	6 / 19	<	63	U	<	6.1	U	<	6.1	U	2.9	6.4	J	<	33	U	<	35	U	
4,4-DDE	400	2 / 19	<	63	U	<	6.1	U	<	6.1	U	<	6.4	U	<	33	U	<	35	U	
4,4-DDT	48 J	3 / 19	<	63	U	<	6.1	U	<	6.1	U	4.7	6.4	J	<	33	U	<	35	U	
Technical Chlordane	ND	0 / 19	<	120	U	<	12	U	<	12	U	<	12	U	<	64	U	<	68	U	
Toxaphene	ND	0 / 19	<	620	U	<	59	U	<	60	U	<	62	U	<	330	U	<	340	U	
INORGANICS (mg/kg)																					
Aluminum	8760	1 / 1																			
Antimony	0.33	1 / 1																			
Arsenic	25.2	1 / 1																			
Barium	85.8	1 / 1																			
Beryllium	1.3	1 / 1																			
Boron	3.5	1 / 1																			
Cadmium	ND	0 / 1																			
Calcium	3790	1 / 1																			
Chromium	28.1	1 / 1																			
Cobalt	16.4	1 / 1																			
Copper	14.8	1 / 1																			
Iron	38600	1 / 1																			
Lead	33.7	1 / 1																			
Magnesium	2530	1 / 1																			
Manganese	1180	1 / 1																			
Mercury	0.036	1 / 1																			

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID	DATE COLLECTED		AUS-0A07-065-SD-0X			AUS-0A07-066-SD-0X			AUS-0A07-067-SD-02			AUS-0A07-067-SD-0X			AUS-0A07-068-SD-02			AUS-0A07-068-SD-0X		
			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001			March 20, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Nickel	13	1 / 1																		
Potassium	497	1 / 1																		
Selenium	1.8	1 / 1																		
Silver	ND	0 / 1																		
Sodium	1090	1 / 1																		
Thallium	ND	0 / 1																		
Vanadium	65.1	1 / 1																		
Zinc	144	1 / 1																		

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-069-SD-0X			AUS-0A07-079-SD-0X			AUS-0A07-080-SD-0X			AUS-0A07-081-SD-02			AUS-0A07-081-SD-0X			AUS-0A07-R25-SD-04			
	DATE COLLECTED		March 20, 2001			March 19, 2001			March 19, 2001			March 19, 2001			March 19, 2001			May 22, 2001			
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
VOLATILE ORGANIC COMPOUNDS (µg/kg)																					
1,1,1-Trichloroethane	ND	0/4																			
1,1,2,2-Tetrachloroethane	ND	0/4																			
1,1,2-Trichloroethane	ND	0/4																			
1,1-Dichloroethane	ND	0/4																			
1,1-Dichloroethene	ND	0/4																			
1,2-Dichloroethane	ND	0/4																			
1,2-Dichloropropane	10	2/4																			
2-Butanone	ND	0/4																			
2-Hexanone	ND	0/4																			
4-Methyl-2-Pentanone	ND	0/4																			
Acetone	ND	0/4																			
Benzene	ND	0/4																			
Bromodichloromethane	ND	0/4																			
Bromoform	ND	0/4																			
Bromomethane	ND	0/4																			
Carbon Disulfide	ND	0/4																			
Carbon Tetrachloride	ND	0/4																			
Chlorobenzene	ND	0/4																			
Chloroethane	ND	0/4																			
Chloroform	ND	0/4																			
Chloromethane	ND	0/4																			
cis-1,2-Dichloroethene	ND	0/4																			
cis-1,3-Dichloropropene	ND	0/4																			
Dibromochloromethane	ND	0/4																			
Ethylbenzene	ND	0/4																			
Methylene Chloride	ND	0/4																			
n-Hexane	ND	0/4																			
Styrene	ND	0/4																			
Tetrachloroethene	ND	0/4																			
Toluene	ND	0/4																			
trans-1,2-Dichloroethene	ND	0/4																			
trans-1,3-Dichloropropene	ND	0/4																			
Trichloroethene	ND	0/4																			
Vinyl Chloride	ND	0/4																			
Xylene (total)	ND	0/4																			

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-069-SD-0X			AUS-0A07-079-SD-0X			AUS-0A07-080-SD-0X			AUS-0A07-081-SD-02			AUS-0A07-081-SD-0X			AUS-0A07-R25-SD-04		
	DATE COLLECTED		March 20, 2001			March 19, 2001			March 19, 2001			March 19, 2001			March 19, 2001			May 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)																				
1,2,4-Trichlorobenzene	ND	0/1																		
1,2-Dichlorobenzene	ND	0/1																		
1,3-Dichlorobenzene	ND	0/1																		
1,4-Dichlorobenzene	ND	0/1																		
2,2-Oxybis(1-chloro)propane	ND	0/1																		
2,4,5-Trichlorophenol	ND	0/1																		
2,4,6-Trichlorophenol	ND	0/1																		
2,4-Dichlorophenol	ND	0/1																		
2,4-Dimethylphenol	ND	0/1																		
2,4-Dinitrophenol	ND	0/1																		
2,4-Dinitrotoluene	ND	0/1																		
2,6-Dinitrotoluene	ND	0/1																		
2-Chloronaphthalene	ND	0/1																		
2-Chlorophenol	ND	0/1																		
2-Methylnaphthalene	ND	0/1																		
2-Methylphenol (o-cresol)	ND	0/1																		
2-Nitroaniline	ND	0/1																		
2-Nitrophenol	ND	0/1																		
3,3-Dichlorobenzidine	ND	0/1																		
3-Nitroaniline	ND	0/1																		
4,6-Dinitro-2-methylphenol	ND	0/1																		
4-Bromophenyl-phenylether	ND	0/1																		
4-Chloro-3-methylphenol	ND	0/1																		
4-Chloroaniline	ND	0/1																		
4-Chlorophenyl-phenylether	ND	0/1																		
4-Methylphenol (p-cresol)	ND	0/1																		
4-Nitroaniline	ND	0/1																		
4-Nitrophenol	ND	0/1																		
Acenaphthene	ND	0/1																		
Acenaphthylene	ND	0/1																		
Anthracene	ND	0/1																		
Benzo(a)anthracene	ND	0/1																		
Benzo(a)pyrene	ND	0/1																		
Benzo(b)fluoranthene	ND	0/1																		

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-069-SD-0X			AUS-0A07-079-SD-0X			AUS-0A07-080-SD-0X			AUS-0A07-081-SD-02			AUS-0A07-081-SD-0X			AUS-0A07-R25-SD-04		
			March 20, 2001			March 19, 2001			March 19, 2001			March 19, 2001			March 19, 2001			May 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	ND	0/1																		
Benzo(k)fluoranthene	ND	0/1																		
bis(2-Chloroethoxy)methane	ND	0/1																		
bis(2-Chloroethyl)ether	ND	0/1																		
bis(2-Ethylhexyl)phthalate	ND	0/1																		
Butylbenzylphthalate	ND	0/1																		
Carbazole	ND	0/1																		
Chrysene	ND	0/1																		
Di-n-butylphthalate	ND	0/1																		
Di-n-octylphthalate	ND	0/1																		
Dibenz(a,h)anthracene	ND	0/1																		
Dibenzofuran	ND	0/1																		
Diethylphthalate	ND	0/1																		
Dimethylphthalate	ND	0/1																		
Fluoranthene	ND	0/1																		
Fluorene	ND	0/1																		
Hexachlorobenzene	ND	0/1																		
Hexachlorobutadiene	ND	0/1																		
Hexachlorocyclopentadiene	ND	0/1																		
Hexachloroethane	ND	0/1																		
Indeno(1,2,3-cd)pyrene	ND	0/1																		
Isophorone	ND	0/1																		
N-Nitroso-di-n-propylamine	ND	0/1																		
N-Nitrosodiphenylamine	ND	0/1																		
Naphthalene	ND	0/1																		
Nitrobenzene	ND	0/1																		
Pentachlorophenol	ND	0/1																		
Phenanthrene	ND	0/1																		
Phenol	ND	0/1																		
Pyrene	ND	0/1																		
PESTICIDES (ORGANOCHLORINE) (µg/kg)																				
Aldrin	64	4/19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	8.8	3	J
Alpha-BHC	ND	0/19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	U
Alpha-Chlordane	ND	0/19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	UJ
beta-BHC	ND	0/19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	U
delta-BHC	ND	0/19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	U

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	DATE COLLECTED		AUS-0A07-069-SD-0X			AUS-0A07-079-SD-0X			AUS-0A07-080-SD-0X			AUS-0A07-081-SD-02			AUS-0A07-081-SD-0X			AUS-0A07-R25-SD-04		
			March 20, 2001			March 19, 2001			March 19, 2001			March 19, 2001			March 19, 2001			May 22, 2001		
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result
Dieldrin	16	1 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	16	6.1	
Endosulfan I	ND	0 / 19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	UJ
Endosulfan II	ND	0 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	<	6.1	U
Endosulfan sulfate	ND	0 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	<	6.1	U
Endrin	ND	0 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	<	6.1	UJ
Endrin aldehyde	ND	0 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	<	6.1	U
Endrin ketone	ND	0 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	<	6.1	U
gamma-BHC (Lindane)	ND	0 / 19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	U
gamma-Chlordane	ND	0 / 19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	UJ
Heptachlor	ND	0 / 19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	UJ
Heptachlor epoxide	ND	0 / 19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	UJ
Hexachlorobenzene	ND	0 / 19	<	3	U	<	3.3	U	<	3.3	U	<	37	U	<	37	U	<	3	U
Isodrin	ND	0 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	<	6.1	U
Methoxychlor	14 J	1 / 19	<	30	U	<	33	U	<	33	U	<	370	U	<	370	U	<	30	U
4,4-DDD	1400	6 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	62	6.1	
4,4-DDE	400	2 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	8.3	6.1	
4,4-DDT	48 J	3 / 19	<	6.2	U	<	6.8	U	<	6.8	U	<	75	U	<	75	U	<	6.1	U
Technical Chlordane	ND	0 / 19	<	12	U	<	13	U	<	13	U	<	150	U	<	150	U	<	12	U
Toxaphene	ND	0 / 19	<	61	U	<	67	U	<	66	U	<	740	U	<	730	U	<	60	U
INORGANICS (mg/kg)																				
Aluminum	8760	1 / 1																		
Antimony	0.33	1 / 1																		
Arsenic	25.2	1 / 1																		
Barium	85.8	1 / 1																		
Beryllium	1.3	1 / 1																		
Boron	3.5	1 / 1																		
Cadmium	ND	0 / 1																		
Calcium	3790	1 / 1																		
Chromium	28.1	1 / 1																		
Cobalt	16.4	1 / 1																		
Copper	14.8	1 / 1																		
Iron	38600	1 / 1																		
Lead	33.7	1 / 1																		
Magnesium	2530	1 / 1																		
Manganese	1180	1 / 1																		
Mercury	0.036	1 / 1																		

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-069-SD-0X			AUS-0A07-079-SD-0X			AUS-0A07-080-SD-0X			AUS-0A07-081-SD-02			AUS-0A07-081-SD-0X			AUS-0A07-R25-SD-04		
	DATE COLLECTED		March 20, 2001			March 19, 2001			March 19, 2001			March 19, 2001			March 19, 2001			May 22, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Nickel	13	1 / 1																		
Potassium	497	1 / 1																		
Selenium	1.8	1 / 1																		
Silver	ND	0 / 1																		
Sodium	1090	1 / 1																		
Thallium	ND	0 / 1																		
Vanadium	65.1	1 / 1																		
Zinc	144	1 / 1																		

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-115-SD-02			AUS-0A07-139-SD-0X		
			March 20, 2001			March 19, 2001		
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANIC COMPOUNDS (µg/kg)								
	1,1,1-Trichloroethane	ND	0/4	<	6	U		
	1,1,2,2-Tetrachloroethane	ND	0/4	<	6	U		
	1,1,2-Trichloroethane	ND	0/4	<	6	U		
	1,1-Dichloroethane	ND	0/4	<	6	U		
	1,1-Dichloroethene	ND	0/4	<	6	U		
	1,2-Dichloroethane	ND	0/4	<	6	U		
	1,2-Dichloropropane	10	2/4	10	6			
	2-Butanone	ND	0/4	<	6	U		
	2-Hexanone	ND	0/4	<	6	U		
	4-Methyl-2-Pentanone	ND	0/4	<	6	U		
	Acetone	ND	0/4	<	22	U		
	Benzene	ND	0/4	<	6	U		
	Bromodichloromethane	ND	0/4	<	6	U		
	Bromoform	ND	0/4	<	6	U		
	Bromomethane	ND	0/4	<	6	U		
	Carbon Disulfide	ND	0/4	<	6	U		
	Carbon Tetrachloride	ND	0/4	<	6	U		
	Chlorobenzene	ND	0/4	<	6	U		
	Chloroethane	ND	0/4	<	6	U		
	Chloroform	ND	0/4	<	6	U		
	Chloromethane	ND	0/4	<	6	U		
	cis-1,2-Dichloroethene	ND	0/4	<	6	U		
	cis-1,3-Dichloropropene	ND	0/4	<	6	U		
	Dibromochloromethane	ND	0/4	<	6	U		
	Ethylbenzene	ND	0/4	<	6	U		
	Methylene Chloride	ND	0/4	<	6	U		
	n-Hexane	ND	0/4	<	6	U		
	Styrene	ND	0/4	<	6	U		
	Tetrachloroethene	ND	0/4	<	6	U		
	Toluene	ND	0/4	<	6	U		
	trans-1,2-Dichloroethene	ND	0/4	<	6	U		
	trans-1,3-Dichloropropene	ND	0/4	<	6	U		
	Trichloroethene	ND	0/4	<	6	U		
	Vinyl Chloride	ND	0/4	<	6	U		
	Xylene (total)	ND	0/4	<	6	U		

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-115-SD-02			AUS-0A07-139-SD-0X		
	DATE COLLECTED		March 20, 2001			March 19, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)								
1,2,4-Trichlorobenzene	ND	0 / 1						
1,2-Dichlorobenzene	ND	0 / 1						
1,3-Dichlorobenzene	ND	0 / 1						
1,4-Dichlorobenzene	ND	0 / 1						
2,2-Oxybis(1-chloro)propane	ND	0 / 1						
2,4,5-Trichlorophenol	ND	0 / 1						
2,4,6-Trichlorophenol	ND	0 / 1						
2,4-Dichlorophenol	ND	0 / 1						
2,4-Dimethylphenol	ND	0 / 1						
2,4-Dinitrophenol	ND	0 / 1						
2,4-Dinitrotoluene	ND	0 / 1						
2,6-Dinitrotoluene	ND	0 / 1						
2-Chloronaphthalene	ND	0 / 1						
2-Chlorophenol	ND	0 / 1						
2-Methylnaphthalene	ND	0 / 1						
2-Methylphenol (o-cresol)	ND	0 / 1						
2-Nitroaniline	ND	0 / 1						
2-Nitrophenol	ND	0 / 1						
3,3-Dichlorobenzidine	ND	0 / 1						
3-Nitroaniline	ND	0 / 1						
4,6-Dinitro-2-methylphenol	ND	0 / 1						
4-Bromophenyl-phenylether	ND	0 / 1						
4-Chloro-3-methylphenol	ND	0 / 1						
4-Chloroaniline	ND	0 / 1						
4-Chlorophenyl-phenylether	ND	0 / 1						
4-Methylphenol (p-cresol)	ND	0 / 1						
4-Nitroaniline	ND	0 / 1						
4-Nitrophenol	ND	0 / 1						
Acenaphthene	ND	0 / 1						
Acenaphthylene	ND	0 / 1						
Anthracene	ND	0 / 1						
Benzo(a)anthracene	ND	0 / 1						
Benzo(a)pyrene	ND	0 / 1						
Benzo(b)fluoranthene	ND	0 / 1						

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-115-SD-02			AUS-0A07-139-SD-0X		
	DATE COLLECTED		March 20, 2001			March 19, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
Benzo(g,h,i)perylene	ND	0/1						
Benzo(k)fluoranthene	ND	0/1						
bis(2-Chloroethoxy)methane	ND	0/1						
bis(2-Chloroethyl)ether	ND	0/1						
bis(2-Ethylhexyl)phthalate	ND	0/1						
Butylbenzylphthalate	ND	0/1						
Carbazole	ND	0/1						
Chrysene	ND	0/1						
Di-n-butylphthalate	ND	0/1						
Di-n-octylphthalate	ND	0/1						
Dibenz(a,h)anthracene	ND	0/1						
Dibenzofuran	ND	0/1						
Diethylphthalate	ND	0/1						
Dimethylphthalate	ND	0/1						
Fluoranthene	ND	0/1						
Fluorene	ND	0/1						
Hexachlorobenzene	ND	0/1						
Hexachlorobutadiene	ND	0/1						
Hexachlorocyclopentadiene	ND	0/1						
Hexachloroethane	ND	0/1						
Indeno(1,2,3-cd)pyrene	ND	0/1						
Isophorone	ND	0/1						
N-Nitroso-di-n-propylamine	ND	0/1						
N-Nitrosodiphenylamine	ND	0/1						
Naphthalene	ND	0/1						
Nitrobenzene	ND	0/1						
Pentachlorophenol	ND	0/1						
Phenanthrene	ND	0/1						
Phenol	ND	0/1						
Pyrene	ND	0/1						
PESTICIDES (ORGANOCHLORINE) (µg/kg)								
Aldrin	64	4/19				<	3.3	U
Alpha-BHC	ND	0/19				<	3.3	U
Alpha-Chlordane	ND	0/19				<	3.3	U
beta-BHC	ND	0/19				<	3.3	U
delta-BHC	ND	0/19				<	3.3	U

TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-115-SD-02			AUS-0A07-139-SD-0X		
			March 20, 2001			March 19, 2001		
			Maximum	Frequency	Result	RL	Qual	Result
Dieldrin	16	1 / 19				<	6.7	U
Endosulfan I	ND	0 / 19				<	3.3	U
Endosulfan II	ND	0 / 19				<	6.7	U
Endosulfan sulfate	ND	0 / 19				<	6.7	U
Endrin	ND	0 / 19				<	6.7	U
Endrin aldehyde	ND	0 / 19				<	6.7	U
Endrin ketone	ND	0 / 19				<	6.7	U
gamma-BHC (Lindane)	ND	0 / 19				<	3.3	U
gamma-Chlordane	ND	0 / 19				<	3.3	U
Heptachlor	ND	0 / 19				<	3.3	U
Heptachlor epoxide	ND	0 / 19				<	3.3	U
Hexachlorobenzene	ND	0 / 19				<	3.3	U
Isodrin	ND	0 / 19				<	6.7	U
Methoxychlor	14 J	1 / 19				<	33	U
4,4-DDD	1400	6 / 19				<	6.7	U
4,4-DDE	400	2 / 19				<	6.7	U
4,4-DDT	48 J	3 / 19				<	6.7	U
Technical Chlordane	ND	0 / 19				<	13	U
Toxaphene	ND	0 / 19				<	66	U
INORGANICS (mg/kg)								
Aluminum	8760	1 / 1						
Antimony	0.33	1 / 1						
Arsenic	25.2	1 / 1						
Barium	85.8	1 / 1						
Beryllium	1.3	1 / 1						
Boron	3.5	1 / 1						
Cadmium	ND	0 / 1						
Calcium	3790	1 / 1						
Chromium	28.1	1 / 1						
Cobalt	16.4	1 / 1						
Copper	14.8	1 / 1						
Iron	38600	1 / 1						
Lead	33.7	1 / 1						
Magnesium	2530	1 / 1						
Manganese	1180	1 / 1						
Mercury	0.036	1 / 1						

**TABLE 4-10
SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID DATE COLLECTED			AUS-0A07-115-SD-02 March 20, 2001			AUS-0A07-139-SD-0X March 19, 2001		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual
Nickel	13	1 / 1						
Potassium	497	1 / 1						
Selenium	1.8	1 / 1						
Silver	ND	0 / 1						
Sodium	1090	1 / 1						
Thallium	ND	0 / 1						
Vanadium	65.1	1 / 1						
Zinc	144	1 / 1						

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 4-11
SUMMARY OF ANALYTICAL RESULTS FOR THE SURFACE WATER SAMPLE

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID			AUS-0A07-025-SW-00		
DATE COLLECTED			March 20, 2001		
	Maximum	Frequency	Result	RL	Qual
PESTICIDES (ORGANOCHLORINE) (µg/L)					
Aldrin	ND	0 / 1	<	0.027	U
Alpha-BHC	ND	0 / 1	<	0.027	U
Alpha-Chlordane	ND	0 / 1	<	0.027	U
beta-BHC	ND	0 / 1	<	0.027	U
delta-BHC	ND	0 / 1	<	0.027	U
Dieldrin	ND	0 / 1	<	0.054	U
Endosulfan I	ND	0 / 1	<	0.027	U
Endosulfan II	ND	0 / 1	<	0.054	U
Endosulfan sulfate	ND	0 / 1	<	0.054	U
Endrin	ND	0 / 1	<	0.054	U
Endrin aldehyde	ND	0 / 1	<	0.054	U
Endrin ketone	ND	0 / 1	<	0.054	U
gamma-BHC (Lindane)	ND	0 / 1	<	0.027	U
gamma-Chlordane	ND	0 / 1	<	0.027	U
Heptachlor	ND	0 / 1	<	0.027	U
Heptachlor epoxide	ND	0 / 1	<	0.027	U
Hexachlorobenzene	0.027	1 / 1	0.027	0.027	
Isodrin	ND	0 / 1	<	0.054	U
Methoxychlor	ND	0 / 1	<	0.27	U
4,4-DDD	ND	0 / 1	<	0.054	U
4,4-DDE	ND	0 / 1	<	0.054	U
4,4-DDT	ND	0 / 1	<	0.054	U
Technical Chlordane	ND	0 / 1	<	0.11	U
Toxaphene	ND	0 / 1	<	0.54	U
INORGANICS (µg/L)					
Aluminum	625	1 / 1	625	200	
Antimony	ND	0 / 1	<	3	U
Arsenic	ND	0 / 1	<	10	U
Barium	80.9	1 / 1	80.9	10	
Beryllium	ND	0 / 1	<	4	U
Boron	20.9	1 / 1	20.9	50	
Cadmium	ND	0 / 1	<	2	U
Calcium	77100	1 / 1	77100	100	
Chromium	ND	0 / 1	<	10	U
Cobalt	ND	0 / 1	<	5	U
Copper	ND	0 / 1	<	10	U
Iron	493	1 / 1	493	50	
Lead	ND	0 / 1	<	2	U
Magnesium	33500	1 / 1	33500	100	
Manganese	180	1 / 1	180	10	
Mercury	ND	0 / 1	<	0.2	U
Nickel	ND	0 / 1	<	10	U
Potassium	1110	1 / 1	1110	500	
Selenium	ND	0 / 1	<	5	U
Silver	ND	0 / 1	<	5	U
Sodium	34200	1 / 1	34200	1000	
Thallium	ND	0 / 1	<	10	U
Vanadium	2.1	1 / 1	2.1	5	
Zinc	19.3	1 / 1	19.3	10	

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

(µg/L) = micrograms per liter

J = Estimated, U = Nondetect, UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-12
SUMMARY OF ANALYTICAL RESULTS FOR DUST SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID DATE COLLECTED	Maximum Frequency		AUS-0A07-096-DUST			AUS-0A07-097-DUST			AUS-0A07-098-DUST			AUS-0A07-099-DUST		
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001		
			Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
PESTICIDES (ORGANOCHLORINE) (µg/kg)														
Aldrin	5300000	4 / 4	21000	1300		5300000	260000		14000	4900		4000	1300	
Alpha-BHC	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
Alpha-Chlordane	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
beta-BHC	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
delta-BHC	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
Dieldrin	460000	4 / 4	54000	2700		460000	110000		160000	10000		7500	2600	
Endosulfan I	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
Endosulfan II	ND	0 / 4	<	2700	U	<	110000	U	<	10000	U	<	2600	U
Endosulfan sulfate	ND	0 / 4	<	2700	U	<	110000	U	<	10000	U	<	2600	U
Endrin	45000	3 / 4	5100	2700		<	110000	U	45000	10000		1200	2600	J
Endrin aldehyde	ND	0 / 4	<	2700	U	<	110000	U	<	10000	U	<	2600	U
Endrin ketone	150000	4 / 4	18000	2700		150000	110000		38000	10000		3700	2600	
gamma-BHC (Lindane)	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
gamma-Chlordane	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
Heptachlor	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
Heptachlor epoxide	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
Hexachlorobenzene	ND	0 / 4	<	1300	U	<	52000	U	<	4900	U	<	1300	U
Isodrin	2100 J	2 / 4	2100	2700	J	<	110000	U	<	10000	U	910	2600	J
Methoxychlor	ND	0 / 4	<	13000	U	<	520000	U	<	49000	U	<	13000	U
4,4-DDD	ND	0 / 4	<	2700	U	<	110000	U	<	10000	U	<	2600	U
4,4-DDE	ND	0 / 4	<	2700	U	<	110000	U	<	10000	U	<	2600	U
4,4-DDT	39000 J	3 / 4	3200	2700		39000	110000	J	12000	10000		<	2600	U
Technical Chlordane	ND	0 / 4	<	5200	U	<	210000	U	<	20000	U	<	5000	U
Toxaphene	ND	0 / 4	<	26000	U	<	1100000	U	<	99000	U	<	25000	U

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

µg/kg = micrograms per kilogram

J = Estimated, U = Nondetect, UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-13
SUMMARY OF ANALYTICAL RESULTS FOR WIPE SAMPLES**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

FIELD ID			AUS-0A07-082-WIPE			AUS-0A07-083-WIPE			AUS-0A07-084-WIPE			AUS-0A07-085-WIPE			AUS-0A07-086-WIPE			AUS-0A07-087-WIPE			AUS-0A07-088-WIPE			
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			
			Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL
PESTICIDES (ORGANOCHLORINE) (µg/wipe)																								
Aldrin	720	11 / 14	<	5	U	75	12		18	2.5		240	25		590	25		3.1	1.2		0.63	0.25		
Alpha-BHC	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
Alpha-Chlordane	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
beta-BHC	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
delta-BHC	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
Dieldrin	590	14 / 14	110	10		190	25		140	25		590	50		590	50		65	10		1.8	0.5		
Endosulfan I	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
Endosulfan II	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	10	U	<	5	U	<	2.5	U	<	0.5	U	
Endosulfan sulfate	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	10	U	<	5	U	<	2.5	U	<	0.5	U	
Endrin	99	13 / 14	18	10		11	5		23	5		46	10		97	50		5.1	2.5		<	0.5	U	
Endrin aldehyde	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	10	U	<	5	U	<	2.5	U	<	0.5	U	
Endrin ketone	200	12 / 14	19	10		<	5	U	20	5		180	10		200	50		15	2.5		1	0.5		
gamma-BHC (Lindane)	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
gamma-Chlordane	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
Heptachlor	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
Heptachlor epoxide	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
Hexachlorobenzene	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	5	U	<	2.5	U	<	1.2	U	<	0.25	U	
Isodrin	110	7 / 14	2.9	10	J	6.6	5		<	5	U	16	10		110	50		<	2.5	U	<	0.5	U	
Methoxychlor	ND	0 / 14	<	50	U	<	25	U	<	25	U	<	50	U	<	25	U	<	12	U	<	2.5	U	
4,4-DDD	39	4 / 14	<	10	U	11	5		<	5	U	19	10		<	5	U	<	2.5	U	<	0.5	U	
4,4-DDE	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	10	U	<	5	U	<	2.5	U	<	0.5	U	
4,4-DDT	59	8 / 14	3.3	10	J	<	5	U	<	5	U	17	10		14	5		4.3	2.5		<	0.5	U	
Technical Chlordane	ND	0 / 14	<	20	U	<	10	U	<	10	U	<	20	U	<	10	U	<	5	U	<	1	U	
Toxaphene	ND	0 / 14	<	100	U	<	50	U	<	50	U	<	100	U	<	50	U	<	25	U	<	5	U	

Notes:
 ND = Not Detected
 RL = Reporting Limit
 Qual = Qualifier
 ug = micrograms
 J = Estimated
 U = Nondetect
 UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

TABLE 4-13
SUMMARY OF ANALYTICAL RESULTS FOR WIPE SAMPLES

AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE

FIELD ID	AUS-0A07-089-WIPE		AUS-0A07-090-WIPE			AUS-0A07-091-WIPE			AUS-0A07-092-WIPE			AUS-0A07-093-WIPE			AUS-0A07-094-WIPE			AUS-0A07-095-WIPE						
			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001			March 21, 2001						
DATE COLLECTED	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	
PESTICIDES (ORGANOCHLORINE) (µg/wipe)																								
Aldrin	720	11 / 14	<	5	U	2.4	2.5	J	570	25		12	12	J	720	25		<	2.5	U	0.82	0.25		
Alpha-BHC	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
Alpha-Chlordane	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
beta-BHC	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
delta-BHC	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
Dieldrin	590	14 / 14	200	25		56	5		380	50		310	25		290	50		32	5		13	2.5		
Endosulfan I	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
Endosulfan II	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	25	U	<	10	U	<	5	U	<	0.5	U	
Endosulfan sulfate	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	25	U	<	10	U	<	5	U	<	0.5	U	
Endrin	99	13 / 14	77	10		26	5		8.9	5		99	25		14	10		16	5		1.5	0.5		
Endrin aldehyde	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	25	U	<	10	U	<	5	U	<	0.5	U	
Endrin ketone	200	12 / 14	17	10		30	5		72	5		23	25	J	89	10		<	5	U	4.1	0.5		
gamma-BHC (Lindane)	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
gamma-Chlordane	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
Heptachlor	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
Heptachlor epoxide	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
Hexachlorobenzene	ND	0 / 14	<	5	U	<	2.5	U	<	2.5	U	<	12	U	<	5	U	<	2.5	U	<	0.25	U	
Isodrin	110	7 / 14	<	10	U	<	5	U	69	50		<	25	U	110	50		<	5	U	0.34	0.5	J	
Methoxychlor	ND	0 / 14	<	50	U	<	25	U	<	25	U	<	120	U	<	50	U	<	25	U	<	2.5	U	
4,4-DDD	39	4 / 14	39	10		<	5	U	<	5	U	<	25	U	30	10		<	5	U	<	0.5	U	
4,4-DDE	ND	0 / 14	<	10	U	<	5	U	<	5	U	<	25	U	<	10	U	<	5	U	<	0.5	U	
4,4-DDT	59	8 / 14	47	10		59	5		12	5		13	25	J	<	10	U	<	5	U	<	0.5	U	
Technical Chlordane	ND	0 / 14	<	20	U	<	10	U	<	10	U	<	50	U	<	20	U	<	10	U	<	1	U	
Toxaphene	ND	0 / 14	<	100	U	<	50	U	<	50	U	<	250	U	<	100	U	<	50	U	<	5	U	

Notes:

ND = Not Detected

RL = Reporting Limit

Qual = Qualifier

ug = micrograms

J = Estimated

U = Nondetect

UJ = Estimated Nondetect

The calculation of detection frequency does not include results from reanalyzed samples.

**TABLE 4-14
CHEMICALS DETECTED ABOVE SCREENING CRITERIA AND ABOVE REFUGE BACKGROUND
(WHERE APPLICABLE)**

**AREA 7 (AUS-0A07)
ADDITIONAL AND UNCHARACTERIZED SITES OU
CRAB ORCHARD NATIONAL WILDLIFE REFUGE**

Chemical	Soil	Sediment	Surface Water
VOCs			
1,2-Dichloropropane	H	H	NA
Benzene	H		NA
Tetrachloroethylene (PCE)	H		NA
Trichloroethylene (TCE)		H	NA
Total Xylenes	E		NA
SVOCs			
Acenaphthene	E		NA
Anthracene	E		NA
Benzo(a)anthracene	H,E		NA
Benzo(a)pyrene	E		NA
Benzo(b)fluoranthene	E		NA
Benzo(g,h,i)perylene	E		NA
Benzo(k)fluoranthene	E		NA
bis(2-Ethylhexyl)phthalate	E		NA
Chrysene	E		NA
Fluoranthene	E		NA
Fluorene	E		NA
Indeno(1,2,3-c,d)pyrene	E		NA
Phenanthrene	E		NA
Pyrene	E		NA
Metals			
Aluminum			E
Arsenic		H,E	
Beryllium	H		
Boron	E		
Chromium	H,E	H	
Iron	E		
Manganese		E	
Nickel	H		
Selenium		H,E	
Zinc		E	

Chemical	Soil	Sediment	Surface Water
Pesticides (Organochlorine)			
4,4'-DDD	H,E	H,E	
4,4'-DDE	H,E	E	
4,4'-DDT	H,E	E	
Aldrin	H,E	E	
alpha-Chlordane	E		
beta-BHC	H,E		
Dieldrin	H,E	H,E	
Endosulfan sulfate	E		
Endrin	H,E		
Endrin aldehyde	H,E		
Endrin ketone	H		
gamma-BHC (Lindane)	H,E		
gamma-Chlordane	H,E		
Heptachlor	E		
Heptachlor epoxide	E		
Hexachlorobenzene	H,E		E
Isodrin	E		
Methoxychlor	E	E	
Dioxins/Furans			
2,3,7,8-TCDD	E	NA	NA

Key:

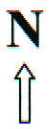
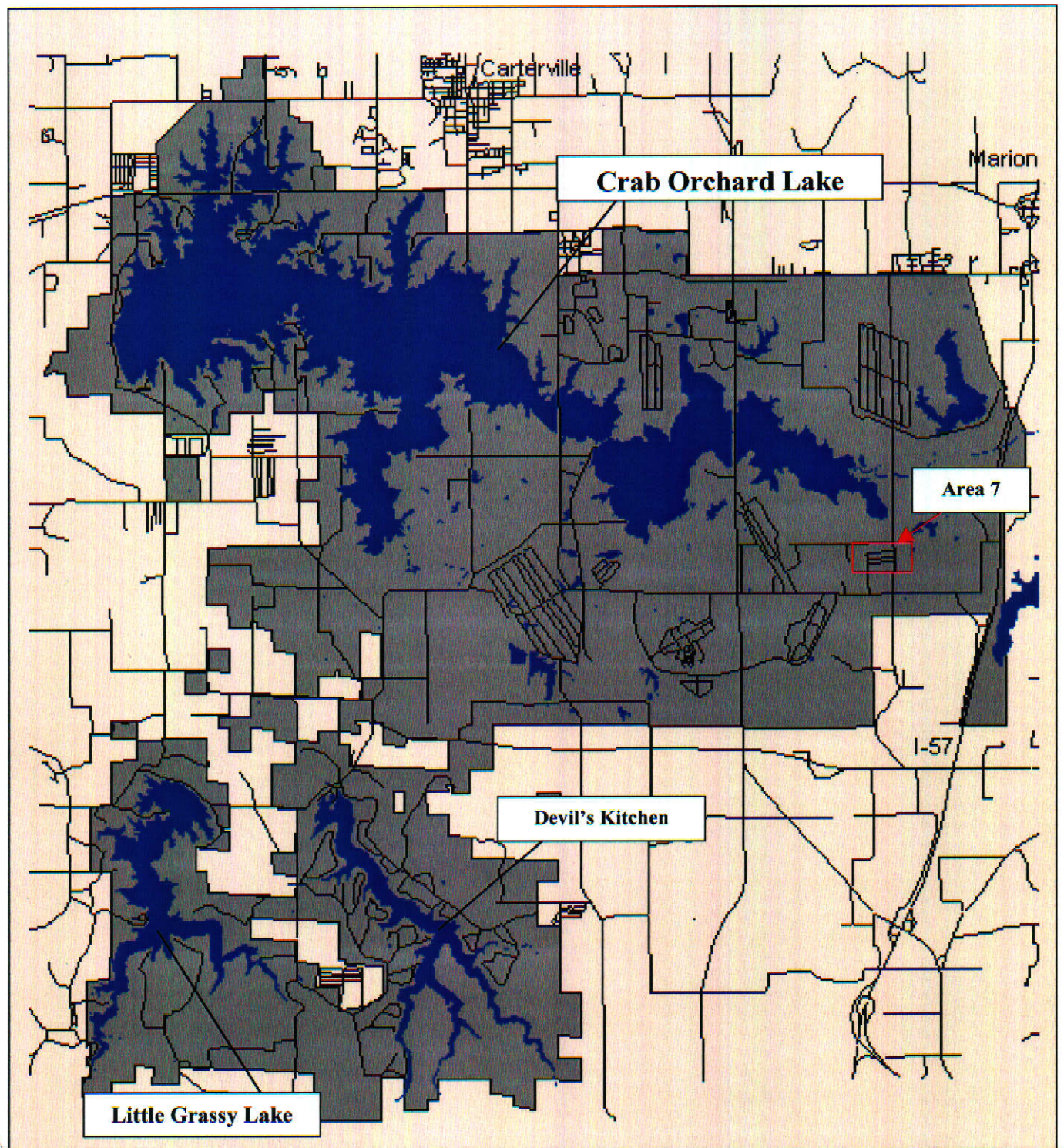
NA = not analyzed

H = human health screening criteria exceeded

E = ecological screening criteria exceeded

Table Created By: MAM

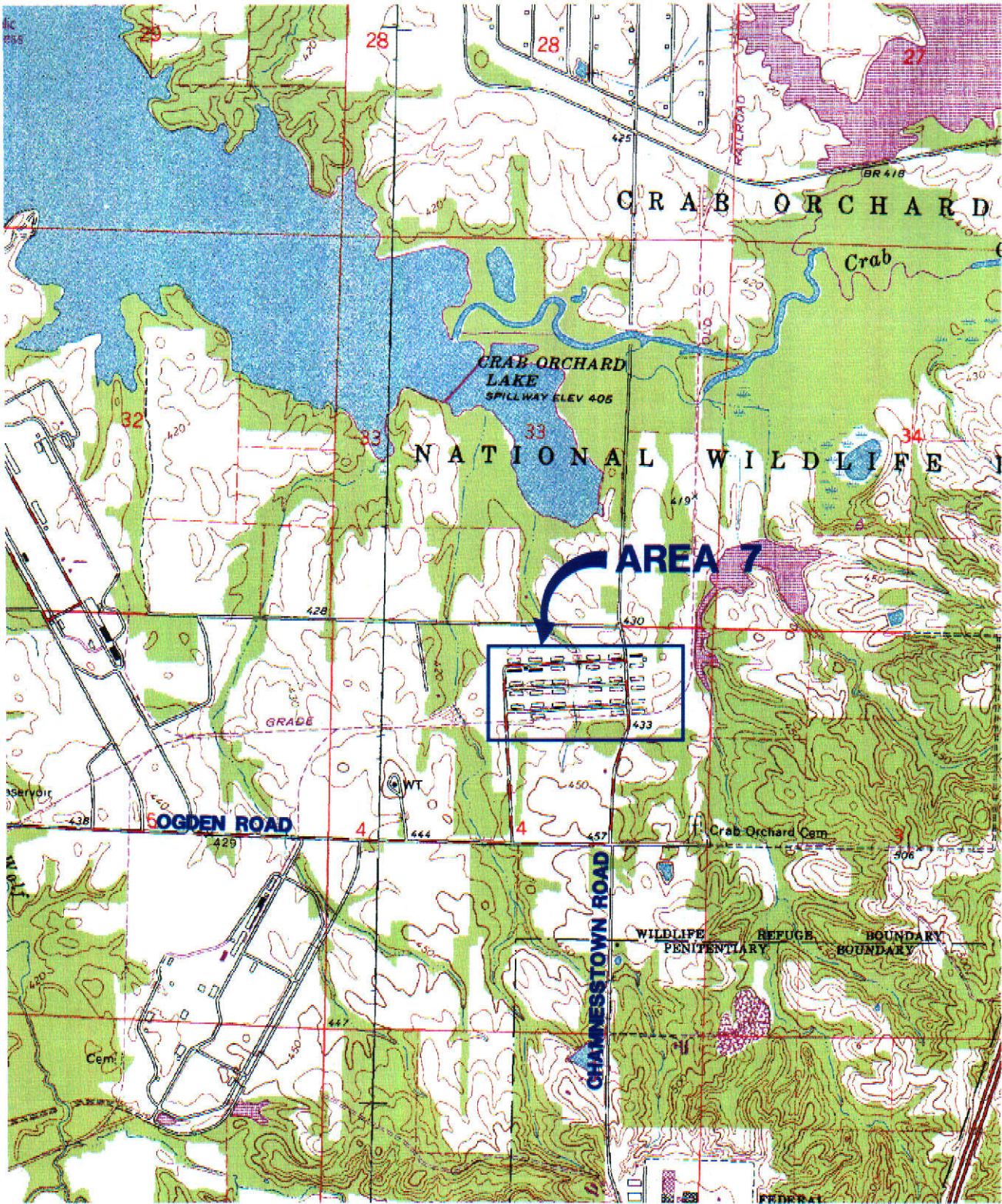
Table Checked By: CMW



Source: U.S. Fish & Wildlife Service Web Site, *Crab Orchard National Wildlife Refuge Area Map*, http://www.fws.gov/r3paol/cr_orch/map.htm

AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS		PROJECT NO. 2320000026.00
URS		
DRN. BY: CMW DSGN. BY: CMW CHD. BY: MAM	CRAB ORCHARD NATIONAL WILDLIFE REFUGE	FIG NO. 1-1

File: F:\2320000026.001\FIG_1-2.DWG Last edited: JUL 22 02 @ 1:16 p.m. URS Corp



SOURCE: USGS DIGITAL RASTER GRAPHIC



AREA 7 SUPPLEMENTAL SAMPLING REPORT
CRAB ORCHARD NWR
MARION, ILLINOIS

PROJECT NO.
2320000026.001

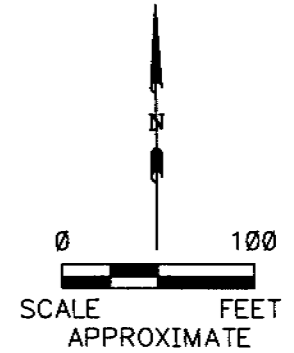
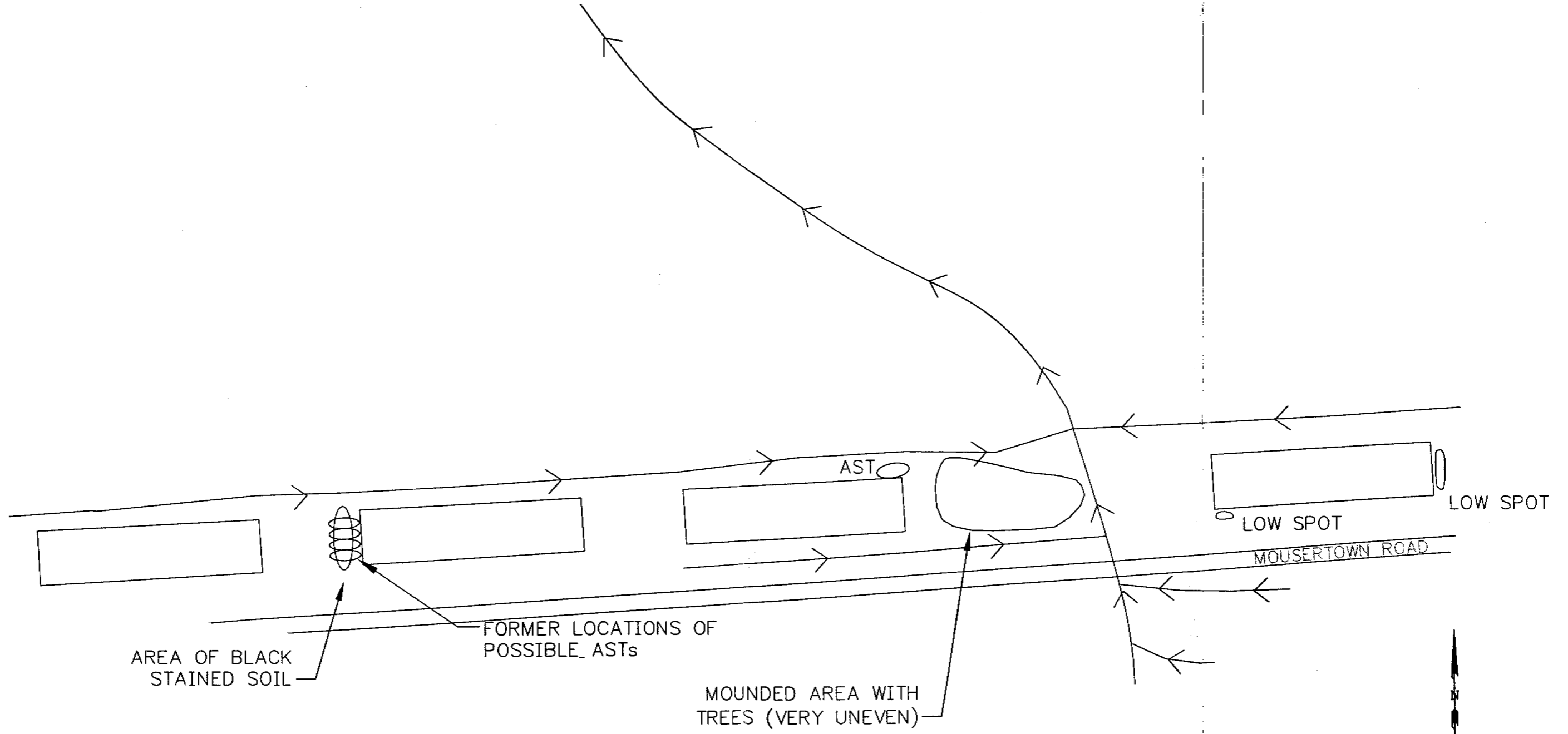
URS

DRN. BY:djd 12/18/01
DSGN. BY:mch
CHKD. BY:cmw

Area 7 Site Location Map

FIG. NO.
1-2

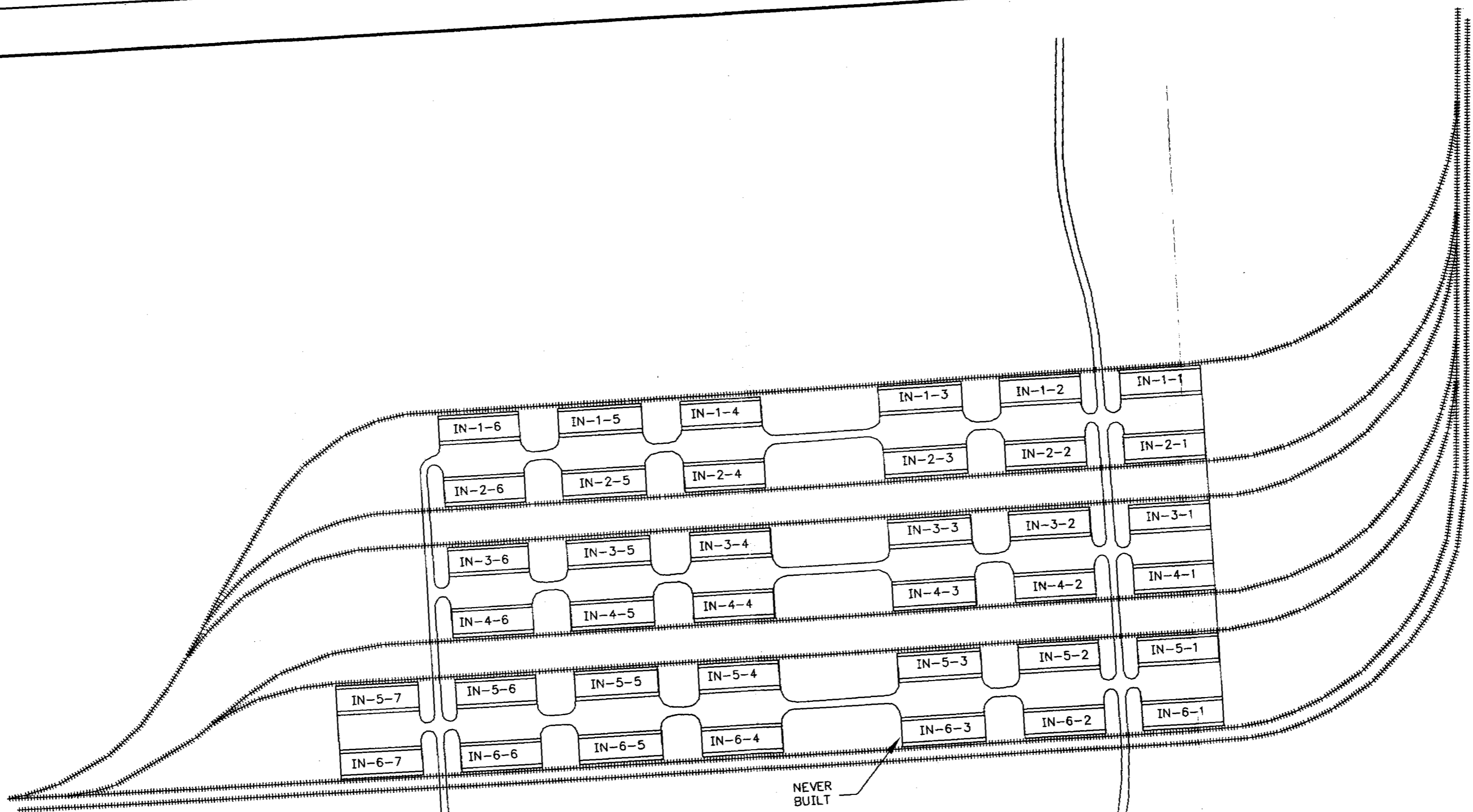
File: E:\2320000026.001\FIG_1-3.DWG Last edited: 06/26/02 @ 09:39 a.m. @ WCC-ST.LOUIS



AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS		PROJECT NO. 2320000026.001
URS		
DRN. BY:djd 12/18/01 DSGN. BY:mam CHKD. BY:cmw	Area 7 Buildings IN-1-3 through IN-1-6	FIG. NO. 1-3

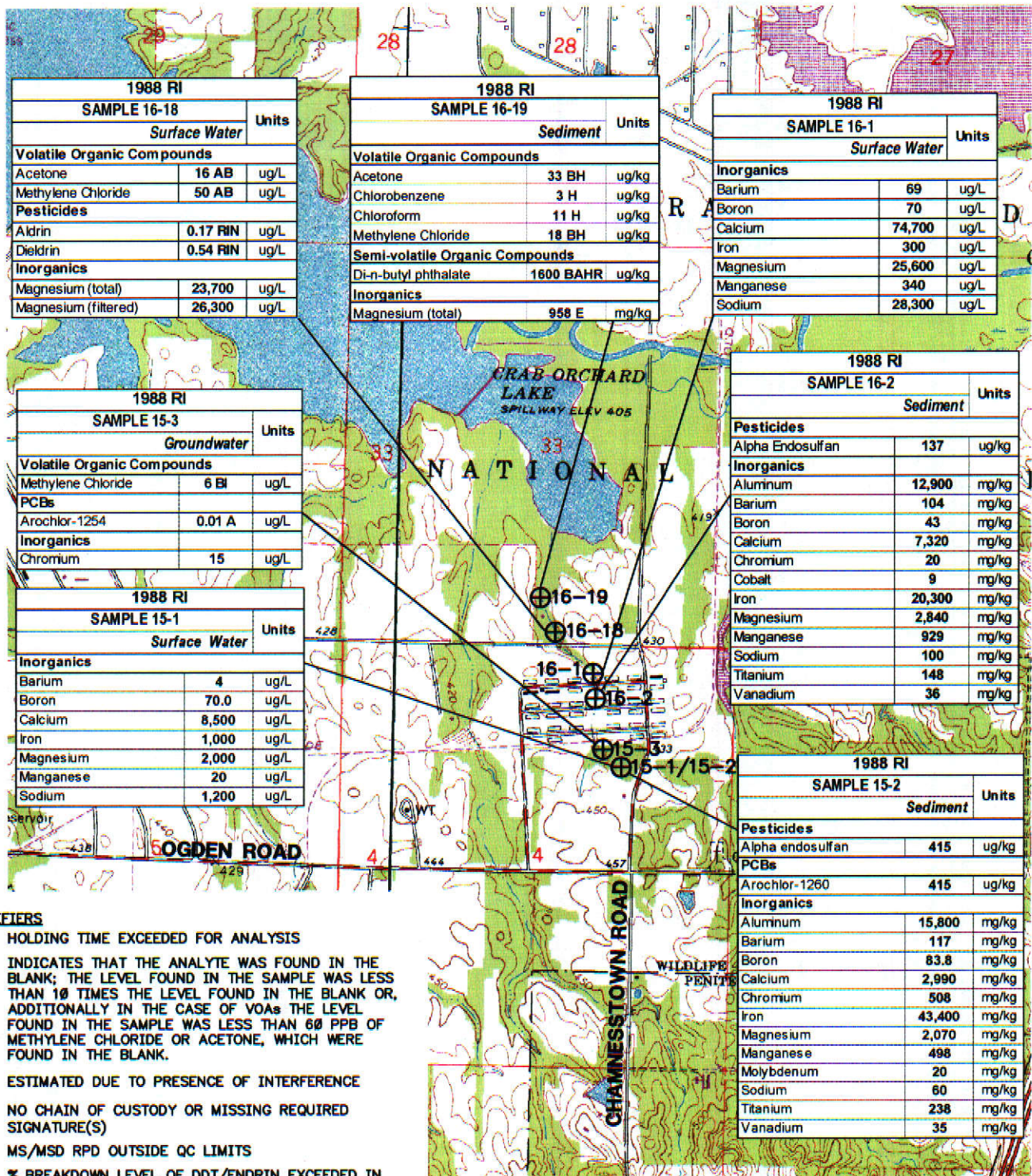
File: E:\2320000026.001\FIG 2-1.DWG Last edited: 06/26/02 @ 09:40 a.m. © WCC-ST.LOUIS

SOURCE: U.S. ACE. 1944, WAR DEPARTMENT
FACILITIES INVENTORY OF THE ILLINOIS
ORDNANCE PLANT
PART I SECT. 5, PAGE 5
(PLAN NO. 6544-101.11)



AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS		PROJECT NO. 232000026.001
URS		
DRN. BY: djd 9/7/99 DSGN. BY: mam CHKD. BY: cmw	Area 7 Original IOP Configuration	FIG. NO. 2-1

File: F:\2320000026.001\FIG_2-2.DWG Last edited: JUL 22 02 @ 1:25 p.m. URS Corp



1988 RI		
SAMPLE 16-18		Units
Surface Water		
Volatile Organic Compounds		
Acetone	16 AB	ug/L
Methylene Chloride	50 AB	ug/L
Pesticides		
Aldrin	0.17 RIN	ug/L
Dieldrin	0.54 RIN	ug/L
Inorganics		
Magnesium (total)	23,700	ug/L
Magnesium (filtered)	26,300	ug/L

1988 RI		
SAMPLE 16-19		Units
Sediment		
Volatile Organic Compounds		
Acetone	33 BH	ug/kg
Chlorobenzene	3 H	ug/kg
Chloroform	11 H	ug/kg
Methylene Chloride	18 BH	ug/kg
Semi-volatile Organic Compounds		
Di-n-butyl phthalate	1600 BAH	ug/kg
Inorganics		
Magnesium (total)	958 E	mg/kg

1988 RI		
SAMPLE 16-1		Units
Surface Water		
Inorganics		
Barium	69	ug/L
Boron	70	ug/L
Calcium	74,700	ug/L
Iron	300	ug/L
Magnesium	25,600	ug/L
Manganese	340	ug/L
Sodium	28,300	ug/L

1988 RI		
SAMPLE 15-3		Units
Groundwater		
Volatile Organic Compounds		
Methylene Chloride	6 BI	ug/L
PCBs		
Arochlor-1254	0.01 A	ug/L
Inorganics		
Chromium	15	ug/L

1988 RI		
SAMPLE 15-1		Units
Surface Water		
Inorganics		
Barium	4	ug/L
Boron	70.0	ug/L
Calcium	8,500	ug/L
Iron	1,000	ug/L
Magnesium	2,000	ug/L
Manganese	20	ug/L
Sodium	1,200	ug/L

1988 RI		
SAMPLE 16-2		Units
Sediment		
Pesticides		
Alpha Endosulfan	137	ug/kg
Inorganics		
Aluminum	12,900	mg/kg
Barium	104	mg/kg
Boron	43	mg/kg
Calcium	7,320	mg/kg
Chromium	20	mg/kg
Cobalt	9	mg/kg
Iron	20,300	mg/kg
Magnesium	2,840	mg/kg
Manganese	929	mg/kg
Sodium	100	mg/kg
Titanium	148	mg/kg
Vanadium	36	mg/kg

1988 RI		
SAMPLE 15-2		Units
Sediment		
Pesticides		
Alpha endosulfan	415	ug/kg
PCBs		
Arochlor-1260	415	ug/kg
Inorganics		
Aluminum	15,800	mg/kg
Barium	117	mg/kg
Boron	83.8	mg/kg
Calcium	2,990	mg/kg
Chromium	508	mg/kg
Iron	43,400	mg/kg
Magnesium	2,070	mg/kg
Manganese	498	mg/kg
Molybdenum	20	mg/kg
Sodium	60	mg/kg
Titanium	238	mg/kg
Vanadium	35	mg/kg

QUALIFIERS

- A HOLDING TIME EXCEEDED FOR ANALYSIS
- B INDICATES THAT THE ANALYTE WAS FOUND IN THE BLANK; THE LEVEL FOUND IN THE SAMPLE WAS LESS THAN 10 TIMES THE LEVEL FOUND IN THE BLANK OR, ADDITIONALLY IN THE CASE OF VOAs THE LEVEL FOUND IN THE SAMPLE WAS LESS THAN 60 PPB OF METHYLENE CHLORIDE OR ACETONE, WHICH WERE FOUND IN THE BLANK.
- E ESTIMATED DUE TO PRESENCE OF INTERFERENCE
- H NO CHAIN OF CUSTODY OR MISSING REQUIRED SIGNATURE(S)
- I MS/MSD RPD OUTSIDE QC LIMITS
- N % BREAKDOWN LEVEL OF DDT/ENDRIN EXCEEDED IN PREVIOUS EVAL MIX B-PEST/PCB
- R MS/MSD % RECOVERY OUTSIDE OF QC LIMITS

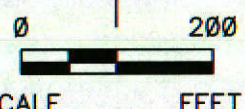
SOURCES:

- 1.) USGS DIGITAL RASTERGRAPHIC
- 2.) O'BRIEN & GERE. 1988. REMEDIAL INVESTIGATION REPORT-CRAB ORCHARD NATIONAL WILDLIFE REFUGE, VOLUME I, FINAL REPORT, FIGURES 22-1, 23-1, AND APPENDIX I.

<p>AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS</p>	<p>PROJECT NO. 2320000026.001</p>	
<p>DRN. BY: djd 4/25/02 DSGN. BY: cmw CHKD. BY:</p>	<p>Previous Sample Results Sites 15 & 16 Phases I&II of the 1988 R.I.</p>	<p>FIG. NO. 2-2</p>



File: E:\232000026.001\FIG 2-3.DWG Last edited: 07/22/02 @ 1:29 p.m. @ WCC-ST.LOUIS



AUS-0A07-002	Units	Result:	Reference	Result:	Reference
		0 - 6 in	Code	2 ft	Code
Pesticides (Organochlorine)					
4,4'-DDD	UG/KG	ND		7	e5
4,4'-DDE	UG/KG	280	e5	ND	
Aldrin	UG/KG	520000	e1,e5,h1,h2,h7,h8,h9	1300	e1,e5,h1,h7,h8
alpha-Chlordane	UG/KG	ND		0.66	e5
beta-BHC	UG/KG	8.4	e1,e5,h5	ND	
Dieldrin	UG/KG	240000	e1,e5,h1,h2,h5,h7,h8,h9	810	e1,e5,h1,h5,h7,h8
Endrin	UG/KG	ND		11	e1,e5
Endrin aldehyde	UG/KG	ND		1.7	e5
Endrin Ketone	UG/KG	ND		100	h5
gamma-Chlordane	UG/KG	150	e5	ND	
Heptachlor	UG/KG	86	e1,e5	ND	
Heptachlor epoxide	UG/KG	11	e5	ND	
Hexachlorobenzene	UG/KG	150	e5,h5	ND	
Isodrin	UG/KG	60000	e1	130	e1

AUS-0A07-003	Units	Result:	Reference	Result:	Reference
		0 - 6 in	Code	2 ft	Code
Pesticides (Organochlorine)					
4,4'-DDD	UG/KG	1	e5	ND	
Aldrin	UG/KG	ND		8.7	e1,e5
Dieldrin	UG/KG	180	e1,e5,h1,h5,h8	24	e1,e5,h5,h8
Endrin Ketone	UG/KG	9.9		1.9	
Isodrin	UG/KG	ND		0.9	

AUS-0A07-004	Units	Result:	Reference	Result:	Reference
		0 - 6 in	Code	2 ft	Code
Pesticides (Organochlorine)					
4,4'-DDD	UG/KG	66	e5	ND	
4,4'-DDE	UG/KG	5.4	e5	5.8	e5
4,4'-DDT	UG/KG	37	e1,e5	13	e6
Aldrin	UG/KG	350000	e1,e5,h1,h2,h7,h8,h9	2300	e1,e5,h1,h7,h8
alpha-Chlordane	UG/KG	ND		41	e5
alpha-Endosulfan	UG/KG	12		6.7	
beta-BHC	UG/KG	1.3	e5,h5	ND	
Dieldrin	UG/KG	290000	e1,e5,h1,h2,h5,h7,h8,h9	120000	e1,e5,h1,h2,h5,h7,h8,h9
Endrin	UG/KG	1100	e1,e5,h5,h8	840	e1,e5,h5
Endrin aldehyde	UG/KG	ND		26	e1,e5
Endrin Ketone	UG/KG	410	h5	440	h5
gamma-BHC (Lindane)	UG/KG	1.1	e5,h5	59	e5,h5
gamma-Chlordane	UG/KG	310	e1,e5	32	e5
Heptachlor	UG/KG	63	e1,e5	52	e1,e5
Heptachlor epoxide	UG/KG	2.2	e5	4.7	e6
Hexachlorobenzene	UG/KG	72	e5	25	e6
Isodrin	UG/KG	310	e1	5.7	e1
Methoxychlor	UG/KG	ND		28	e1,e5

AUS-0A07-005	Units	Result:	Reference	Result:	Reference
		0 - 6 in	Code	2 ft	Code
Pesticides (Organochlorine)					
4,4'-DDD	UG/KG	1400	e1,e5,h5	130	e5
4,4'-DDE	UG/KG	290	e5	14	e5
4,4'-DDT	UG/KG	630	e1,e5	15	e5
Aldrin	UG/KG	350	e1,e5,h1,h7	110	e1,e5
alpha-Chlordane	UG/KG	17	e5	ND	
alpha-Endosulfan	UG/KG	ND		2.2	
Dieldrin	UG/KG	2600	e1,e5,h1,h5,h7,h8	410	e1,e5,h1,h5,h7,h8
Endosulfan sulfate	UG/KG	ND		7.7	e5
Endrin	UG/KG	290	e1,e5,h5	19	e1,e5
Endrin aldehyde (duplicate)	UG/KG	15	e1,e5		
Endrin Ketone	UG/KG	240	h5	12	
gamma-BHC (Lindane)	UG/KG	5.6	e1,e5,h5	0.71	e5,h5
gamma-Chlordane	UG/KG	130	e5	13	e5
Heptachlor	UG/KG	4	e5	ND	
Heptachlor epoxide	UG/KG	3.7	e5	0.72	e5
Hexachlorobenzene	UG/KG	4.4	e5	ND	
Isodrin	UG/KG	9	e1	ND	

AUS-0A07-001	Units	Result:	Reference	Result:	Reference
		0 - 6 in	Code	2 ft	Code
Pesticides (Organochlorine)					
4,4'-DDD	UG/KG	320	e5	1.7	e5
4,4'-DDE	UG/KG	31	e5	ND	
4,4'-DDT	UG/KG	41	e1,e5	ND	
Aldrin	UG/KG	49000	e1,e5,h1,h2,h7,h8,h9	1600	e1,e5,h1,h7,h8
alpha-Chlordane	UG/KG	78	e5	0.81	e5
alpha-Endosulfan	UG/KG	ND		0.62	
beta-Endosulfan	UG/KG	18	ND		
Dieldrin	UG/KG	55000	e1,e5,h1,h2,h5,h7,h8,h9	480	e1,e5,h1,h5,h7,h8
Endrin	UG/KG	1000	e1,e5,h5	7.1	e5
Endrin Ketone	UG/KG	840	h5	20	
gamma-BHC (Lindane)	UG/KG	1.3	e5,h5	ND	
gamma-Chlordane	UG/KG	56	e5	0.73	e5
Heptachlor	UG/KG	6.1	e1,e5	ND	
Heptachlor epoxide	UG/KG	4.9	e5	ND	
Hexachlorobenzene	UG/KG	35	e5	ND	
Isodrin	UG/KG	2800	e1	48	e1

AUS-0A07-006	Units	Result:	Reference	Result:	Reference
		0 - 6 in	Code	2 ft	Code
Volatile Organic Compounds					
All VOCs	UG/KG	NA		ND	
Semivolatile Organic Compounds					
All SVOCs	UG/KG			NA	
Benz(a,h)perylene	UG/KG	130	e5		

AUS-0A07-025	Units	Result:	Reference	Result:	Reference
		0 - 6 in	Code	2 ft	Code
Volatile Organic Compounds					
All VOCs	UG/KG	NA			
Trichloroethylene (TCE)	UG/KG			21	h5
Polychlorinated Biphenyls (PCB)					
All PCBs	UG/KG	ND		NA	

AUS-0A07-006	Units	Result:	Reference
		0 - 6 in	Code
Metals			
Aluminum	MG/KG	16100	
Antimony	MG/KG	0.34	h5
Arsenic	MG/KG	7.1	h1,h5,h7
Barium	MG/KG	135	h5
Beryllium	MG/KG	0.67	
Boron	MG/KG	0.85	e1
Calcium	MG/KG	3850	b1
Chromium	MG/KG	20.7	e1,h5
Cobalt	MG/KG	9.9	
Copper	MG/KG	14.5	b1
Iron	MG/KG	22100	b1,e1
Lead	MG/KG	64.8	b1
Magnesium	MG/KG	3780	b1
Manganese	MG/KG	569	e1
Mercury	MG/KG	0.011	e5
Nickel	MG/KG	16.4	h5
Potassium	MG/KG	897	b1
Sodium	MG/KG	62.4	
Vanadium	MG/KG	38.4	
Zinc	MG/KG	58.2	b1

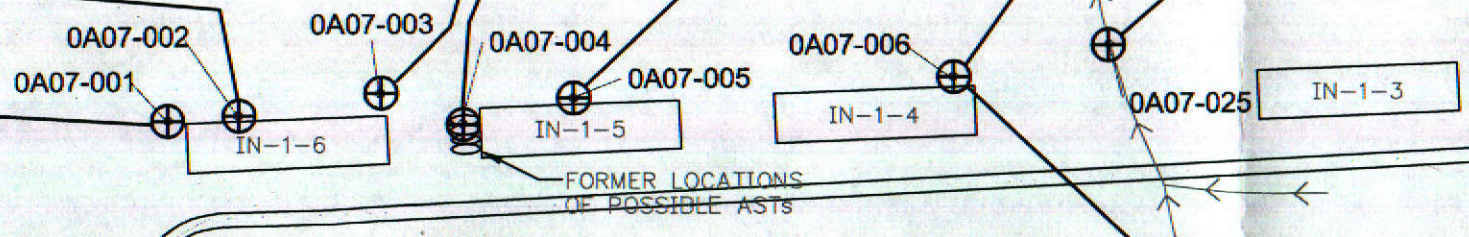
LEGEND
⊕ HAND AUGER LOCATION

Screening Reference	Reference Code
AUS Background Soil UTL	h1
Little Grassly Background Sediment UTL	h2
Little Grassly Background Surface Water UTL	h3
Ecological Direct Exposure Pathway TRV - Soil	e1
Ecological Direct Exposure Pathway TRV - Sediment	e2
Ecological Direct Exposure Pathway TRV - Surface Water	e3
IEPA General Use Surface Water Quality Aquatic Life Toxicity	e4
Superfund Chemical Data Matrix Kow values (potential bioaccumulation)	e5
USEPA Region IX Industrial Soil PRG - cancerous	h1
USEPA Region IX Industrial Soil PRG - noncancerous	h2
USEPA Region IX Tap Water PRG - cancerous	h3
USEPA Region IX Tap Water PRG - noncancerous	h4
USEPA Region IX Migration to Groundwater PRG (DAF=1)	h5
USEPA MCL Drinking Water Standards	h6
IEPA TACO Industrial/Commercial Soil Ingestion	h7
IEPA TACO Construction Worker Soil Ingestion	h8
IEPA TACO Class I Soil Component of Groundwater	h9
IEPA General Use Surface Water Quality Human Health	h10

NOTES:

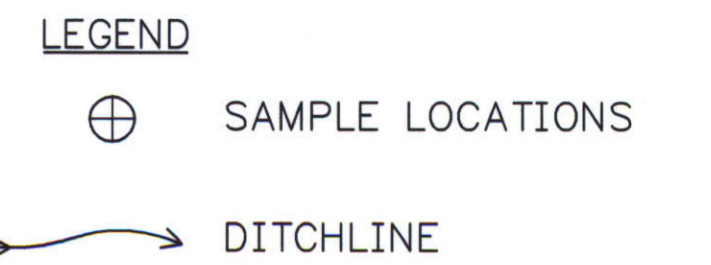
- 1.) SAMPLE LOCATIONS FOR AREA 7 AT CRAB ORCHARD NATIONAL WILDLIFE REFUGE. BUILDING AND ROAD LOCATIONS ARE BASED ON 1993 USGS DOQ'S. FOR FURTHER INFORMATION CONTACT CHUCK BEASLEY OR THE CRAB ORCHARD CERCLA STAFF.

CRAB ORCHARD NATIONAL WILDLIFE REFUGE
8588 ROUTE 148
MARION, ILLINOIS 62959
(618) 997-3344
- 2.) DATA QUALIFIERS FOR ANALYTICAL RESULTS ARE NOT INDICATED. REFER TO THE QCSR FOR DATA QUALIFIERS. THE QCSR IS A COMPANION DOCUMENT TO THE PA/SI REPORT (SEPTEMBER 2001)
- 3.) A SHADING CONVENTION IS USED THAT INDICATES EXCEEDANCES OF PARTICULAR SCREENING CRITERIA. THESE CRITERIA ARE INDICATED BY THE CODE IN THE ANALYTICAL RESULTS LABELS ON THESE FIGURES. DUPLICATE RESULTS ARE SHOWN ONLY IF THE DUPLICATE RESULT FOR AN ANALYTE EXCEEDED THE SCREENING CRITERIA AND THE RESULT FROM THE ORIGINAL SAMPLE DID NOT; OR, IF THE ANALYTE WAS DETECTED IN THE DUPLICATE AND NOT IN THE ORIGINAL SAMPLE.



AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS		PROJECT NO. 23-20000026.00
URS		
DRN. BY: djd DSGN. BY: mch CHKD. BY: cmw	Previous Sample Results (Soil) AUS-0A07 Sample Locations and Detections in Soil PA/SI Report, Sept. 2001	FIG. NO. 2-3

AUS-0A07-IOP INERT STORAGE AREA

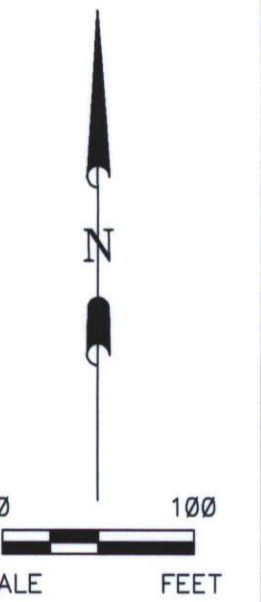


Screening Reference	Reference Code
AUS Background Soil L/T/L	B1
Little Grassy Background Sediment L/T/L	B2
Little Grassy Background Surface Water L/T/L	B3
Ecological Direct Exposure Pathway TRV - Soil	E1
Ecological Direct Exposure Pathway TRV - Sediment	E2
Ecological Direct Exposure Pathway TRV - Surface Water	E3
IEPA General Use Surface Water Quality Aquatic Life Toxicity	E4
Superfund Chemical Data Matrix Kow values (potential bioaccumulators)	E5
USEPA Region IX Industrial Soil PRG - carcinous	B1
USEPA Region IX Industrial Soil PRG - noncarcinous	B2
USEPA Region IX Tap Water PRG - carcinous	B3
USEPA Region IX Tap Water PRG - noncarcinous	B4
USEPA Region IX Migration to Groundwater PRG (DAG-1)	B5
USEPA MCL Drinking Water Standards	B6
IEPA TACO Industrial/Commercial Soil Ingestion	B7
IEPA TACO Construction Worker Soil Ingestion	B8
IEPA TACO Class I Soil Component of Groundwater	B9
IEPA General Use Surface Water Quality Human Health	B10

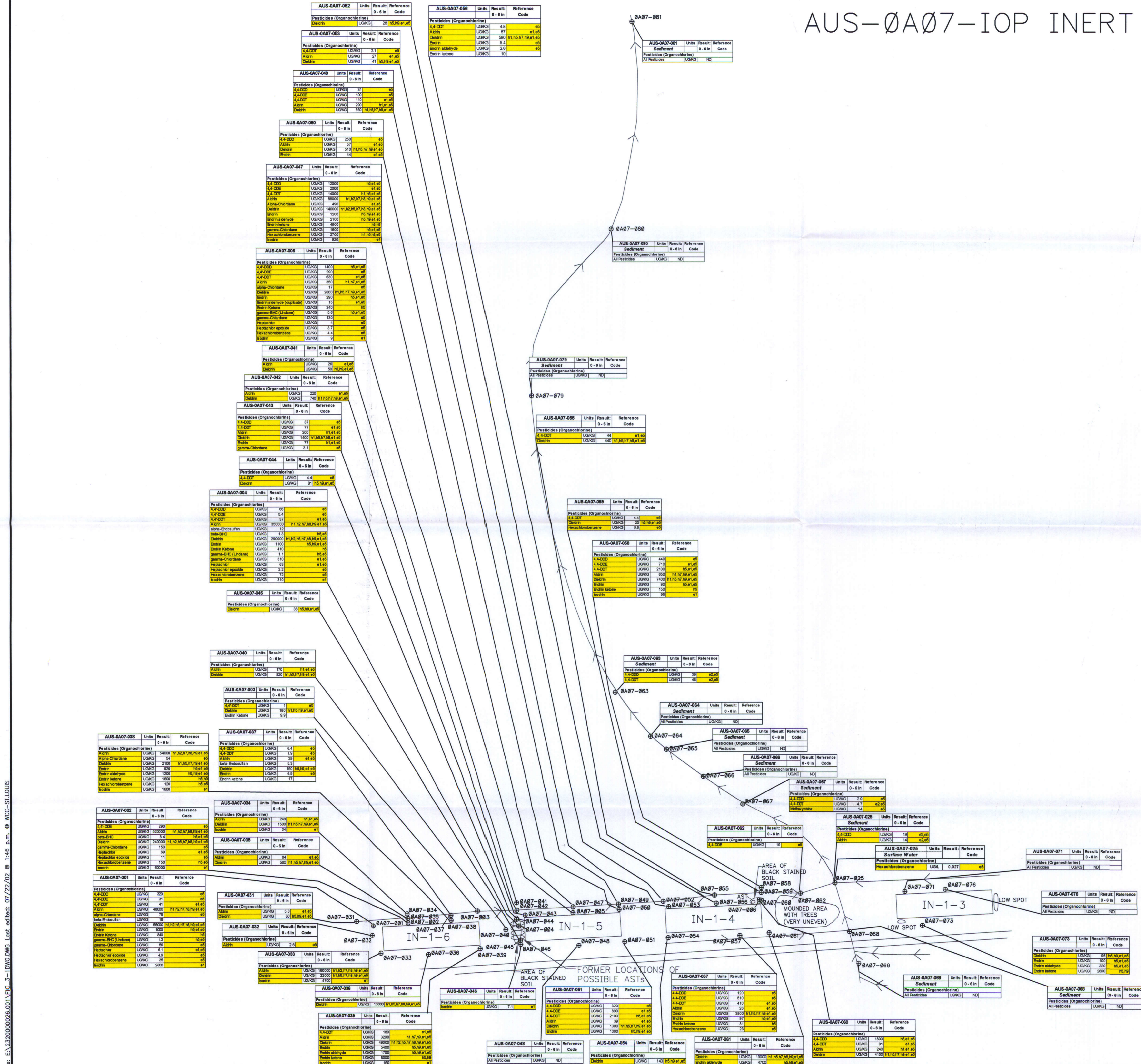
1. SAMPLE LOCATIONS FOR AREA 7 AT CRAB ORCHARD NATIONAL WILDLIFE REFUGE. BUILDING AND ROAD LOCATIONS ARE BASED ON 1993 USGS DOQ'S. FOR FURTHER INFORMATION CONTACT CHUCK BEASLEY OR THE CRAB ORCHARD CERCLA STAFF.

CRAB ORCHARD NATIONAL WILDLIFE REFUGE
8588 ROUTE 148
MARION, ILLINOIS 62959
(618) 997-3344

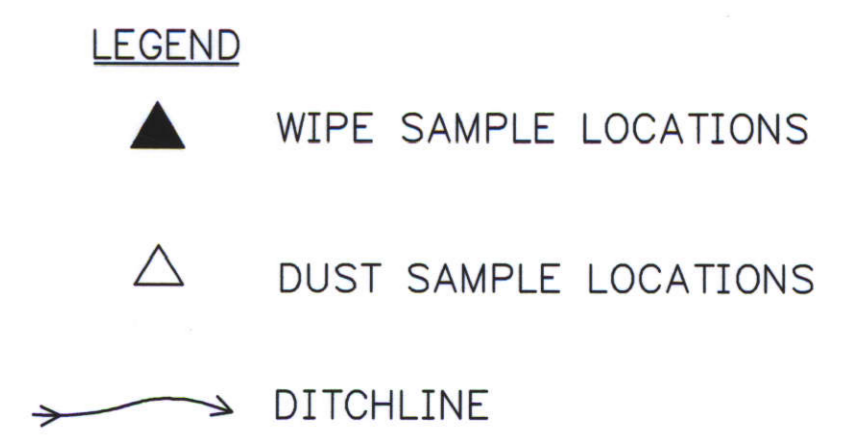
2. DATA QUALIFIERS FOR ANALYTICAL RESULTS ARE NOT INDICATED. REFER TO TABLES 4-9 THROUGH 4-13.



Revision No.	Description	Date	By	App.	
REVISIONS					
AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS					
Pesticides Results for 0-6 inch Soil and Sediment Samples and for Surface Water					
Date:	12/18/01	Project Number:	2320000026.001	Figure Number:	3-1
Drawn by:	djd	Design by:	mam	Checked by:	cmw
URS					

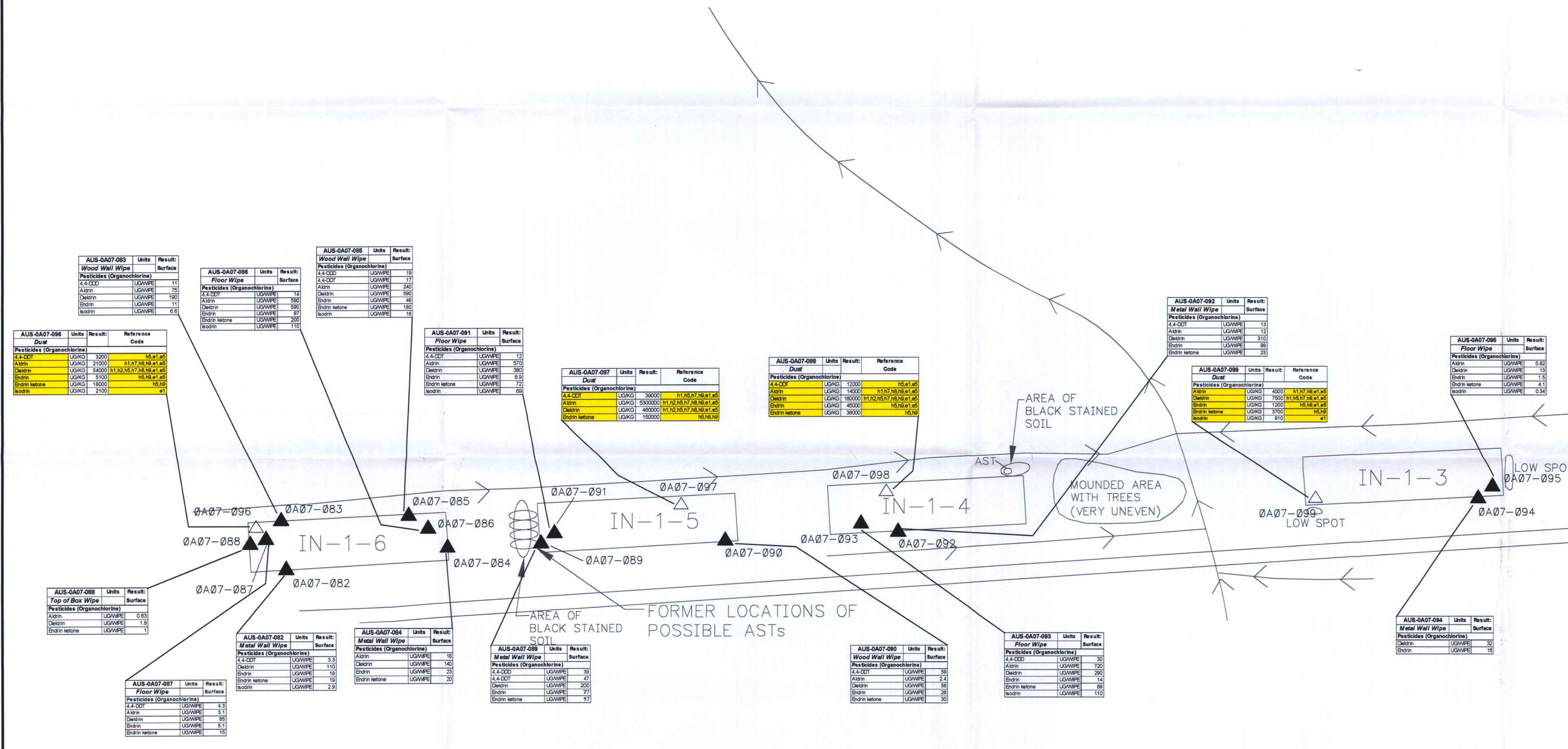


File: E:\2320000026.001\FIG_3-1.DWG Date: 07/22/02 1:46 pm WCC-STLOUIS



Screening Reference	Reference Code
AUS Background Soil UTL	b1
Little Grass Background Sediment UTL	b2
Little Grass Background Surface Water UTL	b3
Ecological Direct Exposure Pathway TRV - Soil	e1
Ecological Direct Exposure Pathway TRV - Sediment	e2
Ecological Direct Exposure Pathway TRV - Surface Water	e3
IRPA General Use Surface Water Quality Aquatic Life Toxicity	a4
Superfund Chemical Data Matrix Key values (potential bioaccumulation)	a5
USEPA Region IX Industrial Soil PRG - noncarcinogenic	b1
USEPA Region IX Industrial Soil PRG - carcinogenic	b2
USEPA Region IX Tap Water PRG - noncarcinogenic	b3
USEPA Region IX Tap Water PRG - carcinogenic	b4
USEPA Region IX Migration to Groundwater PRG (DAF=1)	b5
USEPA MCL Drinking Water Standards	b6
IRPA TACO Industrial Worker Soil Ingestion	b7
IRPA TACO Construction Worker Soil Ingestion	b8
IRPA TACO Class I Soil Component of Groundwater	b9
IRPA General Use Surface Water Quality Human Health	b10

NOTES:
 1.) SAMPLE LOCATIONS INSIDE BUILDINGS ARE APPROXIMATE BECAUSE THEY WERE NOT SURVEYED.



AUS-0A07-083	Units	Result	Reference Code
Wood Wall Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	11	
Aldrin	UGWPE	75	
Chlorin	UGWPE	160	
Endrin	UGWPE	11	
Endrin lactone	UGWPE	6.6	

AUS-0A07-085	Units	Result	Reference Code
Wood Wall Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	19	
Aldrin	UGWPE	17	
Chlorin	UGWPE	240	
Endrin	UGWPE	590	
Endrin lactone	UGWPE	180	
Isodrin	UGWPE	19	

AUS-0A07-086	Units	Result	Reference Code
Floor Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	14	
Aldrin	UGWPE	590	
Chlorin	UGWPE	590	
Endrin	UGWPE	37	
Endrin lactone	UGWPE	200	
Isodrin	UGWPE	110	

AUS-0A07-087	Units	Result	Reference Code
Floor Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	17	
Aldrin	UGWPE	170	
Chlorin	UGWPE	390	
Endrin	UGWPE	8.9	
Endrin lactone	UGWPE	7.2	
Isodrin	UGWPE	89	

AUS-0A07-088	Units	Result	Reference Code
Dust			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	12000	h5 a1 a5
Aldrin	UGWPE	14000	h1 h7 h8 a1 a5
Chlorin	UGWPE	180000	h1 h2 h5 h7 h8 h9 a1 a5
Endrin	UGWPE	45000	h5 h9 a1 a5
Endrin lactone	UGWPE	38000	h5 h9

AUS-0A07-089	Units	Result	Reference Code
Metal Wall Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	13	
Aldrin	UGWPE	12	
Chlorin	UGWPE	310	
Endrin	UGWPE	99	
Endrin lactone	UGWPE	23	

AUS-0A07-090	Units	Result	Reference Code
Dust			
Pesticides (Organochlorine)			
Aldrin	UGWPE	4000	h1 h7 h8 a1 a5
Chlorin	UGWPE	7800	h1 h2 h5 h7 h8 h9 a1 a5
Endrin	UGWPE	1300	h5 h9 a1 a5
Endrin lactone	UGWPE	3700	h5 h9
Isodrin	UGWPE	910	a1

AUS-0A07-091	Units	Result	Reference Code
Floor Wipe			
Pesticides (Organochlorine)			
Aldrin	UGWPE	0.83	
Chlorin	UGWPE	1.9	
Endrin lactone	UGWPE	4.3	
Isodrin	UGWPE	0.34	

AUS-0A07-088	Units	Result	Reference Code
Top of Box Wipe			
Pesticides (Organochlorine)			
Aldrin	UGWPE	0.93	
Chlorin	UGWPE	1.8	
Endrin lactone	UGWPE	1	

AUS-0A07-082	Units	Result	Reference Code
Metal Wall Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	3.3	
Aldrin	UGWPE	110	
Chlorin	UGWPE	19	
Endrin lactone	UGWPE	2.9	
Isodrin	UGWPE	2.9	

AUS-0A07-084	Units	Result	Reference Code
Metal Wall Wipe			
Pesticides (Organochlorine)			
Aldrin	UGWPE	18	
Chlorin	UGWPE	140	
Endrin	UGWPE	29	
Endrin lactone	UGWPE	20	

AUS-0A07-089	Units	Result	Reference Code
Metal Wall Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	30	
Aldrin	UGWPE	2.4	
Chlorin	UGWPE	59	
Endrin	UGWPE	29	
Endrin lactone	UGWPE	30	

AUS-0A07-090	Units	Result	Reference Code
Wood Wall Wipe			
Pesticides (Organochlorine)			
4,4-DDT	UGWPE	30	
Aldrin	UGWPE	720	
Chlorin	UGWPE	260	
Endrin	UGWPE	14	
Endrin lactone	UGWPE	89	
Isodrin	UGWPE	110	

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- SAMPLE LOCATIONS FOR AREA 7 AT CRAB ORCHARD NATIONAL WILDLIFE REFUGE. BUILDING AND ROAD LOCATIONS ARE BASED ON 1993 USGS DOQ'S. FOR FURTHER INFORMATION CONTACT CHUCK BEASLEY OR THE CRAB ORCHARD CERCLA STAFF.

CRAB ORCHARD NATIONAL WILDLIFE REFUGE
8588 ROUTE 148
MARION, ILLINOIS 62959
(618) 997-3344
- DATA QUALIFIERS FOR ANALYTICAL RESULTS ARE NOT INDICATED. REFER TO TABLES 4-9 THROUGH 4-13.

AUS-0A07-IOP INERT STORAGE AREA

Revision No.	Description	Date	By	App.	
REVISIONS					
AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS					
Pesticides Results for Wipe and Dust Samples Collected from Interiors of Buildings					
Date:	12/18/01	Project Number:	232000026.001	Figure Number:	3-3
Drawn by:	djd	Design by:	mam	Checked by:	cmw
URS					

AUS-ØAØ-IOP INERT STORAGE AREA

LEGEND



Screening Reference	Reference Code
AUS Background Soil LTI	b1
Little Grass Background Sediment LTI	b2
Little Grass Background Surface Water LTI	b3
Ecological Direct Exposure Pathway TRV - Soil	e1
Ecological Direct Exposure Pathway TRV - Sediment	e2
Ecological Direct Exposure Pathway TRV - Surface Water	e3
SEPA General Use Surface Water Quality Aquatic Life Toxicity	e4
Superfund Chemical Data Matrix Ken Values (potential Noncumulator)	e5
USEPA Region IX Industrial Soil PRG - cancerous	h1
USEPA Region IX Industrial Soil PRG - noncancerous	h2
USEPA Region IX Tap Water PRG - cancerous	h3
USEPA Region IX Tap Water PRG - noncancerous	h4
USEPA Region IX Migration to Groundwater PRG (DAP-1)	h5
USEPA MCL Drinking Water Standards	h6
IEPA TACO Industrial/Commercial Soil Ingestion	h7
IEPA TACO Construction Worker Soil Ingestion	h8
IEPA TACO Class I Soil Component of Groundwater	h9
IEPA General Use Surface Water Quality Human Health	h10

Units	Result	Reference	Units	Result	Reference
		4 ft			4 ft
1,2-Dichlorobenzene	LGKG	20	ND		
Acenaphthylene	LGKG	95	e5		
Acenaphthylene	LGKG	87	e5		
Acenaphthylene	LGKG	100	e5		
Acenaphthylene	LGKG	4.9	e5		
Acenaphthylene	LGKG	4.5	e5		
Chrysene	LGKG	11	e5		
Chrysene	LGKG	11	e5		
Chrysene	LGKG	210	e5		
Fluorene	LGKG	500	e5		
Fluorene	LGKG	210	e5		
Fluorene	LGKG	330	e5		
Fluorene	LGKG	330	e5		
Fluorene	LGKG	330	e5		
Fluorene	LGKG	330	e5		

Units	Result	Reference	Units	Result	Reference
		3 ft			3 ft
1,2-Dichlorobenzene	LGKG	660	16.8	ND	
Acetone	LGKG	14	14	ND	
Benzene	LGKG	7	8	18	71
Chlorobenzene	LGKG	48	38	13	
Ethylbenzene	LGKG	41	27	ND	
Styrene	LGKG	28	21	ND	
Tetrachlorobenzene	LGKG	49	15	16	ND
Toluene	LGKG	11	10	41	
Xylenes (total)	LGKG	4500	e1	2500	e1

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	190	190	ND	
Acetone	LGKG	14	14	ND	
Benzene	LGKG	7	8	18	71
Chlorobenzene	LGKG	48	38	13	
Ethylbenzene	LGKG	41	27	ND	
Styrene	LGKG	28	21	ND	
Tetrachlorobenzene	LGKG	49	15	16	ND
Toluene	LGKG	11	10	41	
Xylenes (total)	LGKG	4500	e1	2500	e1

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	10			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

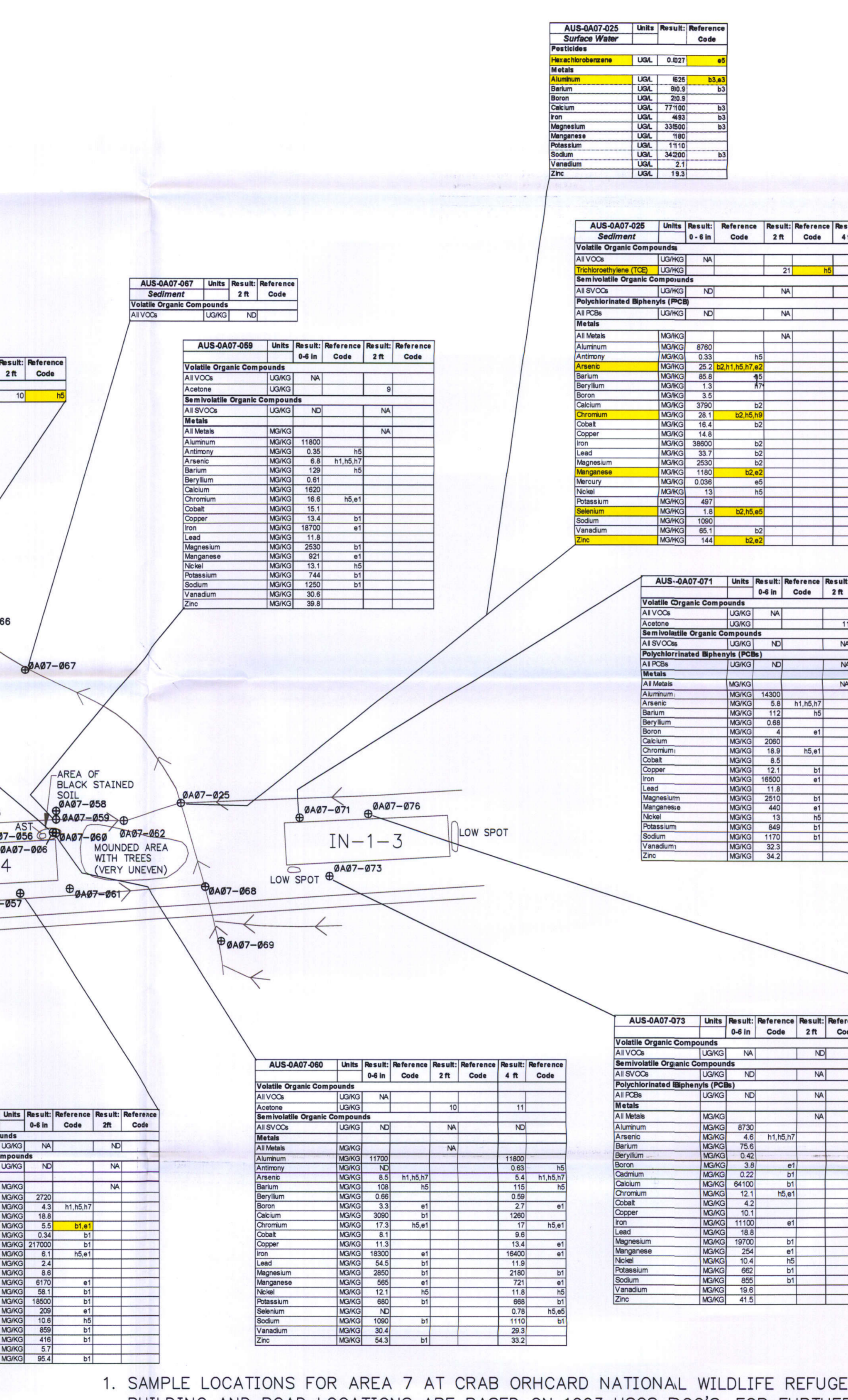
Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	NA			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

Units	Result	Reference	Units	Result	Reference
		0-6 in			2 ft
1,2-Dichlorobenzene	LGKG	10			
Acetone	LGKG	10			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			
Acetone	LGKG	15			

E:\2320000026\001\FIG_3-4.DWG Last edited: 07/22/02 © 1:43 p.m. © MCC-STLOUIS



1. SAMPLE LOCATIONS FOR AREA 7 AT CRAB ORCHARD NATIONAL WILDLIFE REFUGE, BUILDING AND ROAD LOCATIONS ARE BASED ON 1993 USGS DOQ'S. FOR FURTHER INFORMATION CONTACT CHUCK BEASLEY OR THE CRAB ORCHARD CERCLA STAFF.

CRAB ORCHARD NATIONAL WILDLIFE REFUGE
 8588 ROUTE 148
 MARION, ILLINOIS 62959
 (618) 997-3344

2. DATA QUALIFIERS FOR ANALYTICAL RESULTS ARE NOT INDICATED. REFER TO TABLES 4-9 THROUGH 4-13.

Revision No.	Description	Date	By	App.	
REVISIONS					
AREA 7 SUPPLEMENTAL SAMPLING REPORT CRAB ORCHARD NWR MARION, ILLINOIS					
Organic and Inorganic Results for all Soil Sediment and Surface Water Samples, Excluding Pesticides					
Date:	12/18/01	Project Number:	232000026.001	Figure Number:	3-4
Drawn by:	djd	Design by:	mam	Checked by:	cmw

APPENDIX A
DATA VALIDATION REPORTS

Crab Orchard Area 7 Data Review

Laboratory SDG: 202474

Reviewer: Craig Johnson

Date Reviewed: 6/27/2001

Sample Identification #	Sample Identification #
AUS-0A07-081-SD-0X	AUS-0A07-066-SD-0X
AUS-0A07-081-SD-02	AUS-0A07-067-SD-0X
AUS-0A07-080-SD-0X	AUS-0A07-067-SD-02
AUS-0A07-079-SD-0X	AUS-0A07-115-SD-02
AUS-0A07-139-SD-0X	AUS-0A07-068-SD-0X
AUS-0A07-063-SD-0X	AUS-0A07-068-SD-02
AUS-0A07-002-TB-00	AUS-0A07-069-SD-0X
AUS-0A07-064-SD-0X	AUS-0A07-025-SD-0X
AUS-0A07-065-SD-0X	AUS-0A07-025-SD-02
AUS-0A07-065-SD-02	AUS-0A07-025-SD-04

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative indicated MS/MSD RPDs surrogate outside evaluation criteria. These issues are addressed in the appropriate section below. Also, the narrative indicated CCV for pesticides and internal standard recoveries for VOCs were outside evaluation criteria. While the CCVs and IS are not part of the data review, the CCV and IS for the impacted samples were reviewed and no data required rejection. ICB/CCB and serial dilutions were outside criteria for metals. These parameters are not included in the data review; however, they were reviewed for the impacted samples. No data required "R" qualification. No problems were noted on the cooler receipt form which impact data quality.

Additionally, due to sampling errors, sample integrity was compromised and pesticide analyses were qualified rejected (R) for sample AUS-0A07-025-SD-04.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202474

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes.

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes.

Blank ID	Analyte	Concentration	Units
Metals blank	Arsenic	-0.43	mg/kg
Metals blank	Cadmium	-0.40	mg/kg
Metals blank	Calcium	7.53	mg/kg
Metals blank	Chromium	0.14	mg/kg
Metals blank	Cobalt	-0.13	mg/kg
Metals blank	Lead	0.34	mg/kg
Metals blank	Nickel	-0.310	mg/kg
Metals blank	Potassium	12.39	mg/kg
Metals blank	Selenium	0.28	mg/kg
Metals blank	Thallium	-0.640	mg/kg
AUS-0A07-002-TB-00	Acetone	3.0	ug/L
AUS-0A07-002-TB-00	Methylene chloride	0.5	ug/L

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-025-SD-0X	Cadmium	0.33	U	Method blank
AUS-0A07-025-SD-0X	Thallium	1.1	U	Method blank

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No

Crab Orchard Area 7 Data Review

Laboratory SDG: 202474

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	Criteria (%)
VBLK14042	Bromomethane	44	64-139
SBLK14824	2,2'-oxybis(1-chloropropane)	108	43-106
SBLK14824	n-Nitrosodipehnylamine	116/114/2	65-111/20

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
NA		

Associated data were reported as nondetect, therefore, no qualification of data was required.

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

No, some surrogate compound recoveries for QC samples (i.e. LCS and method blanks) were slightly above evaluation criteria. Since the surrogate recoveries for investigative samples were within criteria and the exceedences were slight, no qualification of data was required.

Field ID	Analysis	Surrogate	Recovery	Criteria
NA				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes,

Were MS/MSD recoveries within evaluation criteria?

Crab Orchard Area 7 Data Review

Laboratory SDG: 202474

No, various MS, MSD, and MS/MSD RPDs for VOCs were outside evaluation criteria. In addition, some MS, MSD and RPDs for pesticides were outside evaluation criteria. Organic data should not be qualified using MS/MSD data alone. Since the recoveries were greater than the upper limit (with the exception of bromomethane for LCS, which was previously qualified) and associated data were reported as nondetect, no qualification of data was required.

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
NA				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes

Crab Orchard Area 7 Data Review

Laboratory SDG: 202474

Field ID	Field Duplicate ID
AUS-0A07-065-SD-02	AUS-0A07-115-SD-02
AUS-0A07-079-SD-0X	AUS-0A07-139-SD-0X

Were field duplicates within evaluation criteria?

Yes

Field ID	Field Duplicate ID	Analyte	Qualification
NA			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No.

11.0 Additional Qualifications

Were additional qualifications applied?

Yes.

Field ID	Analyte	New RL	Qual	Comments
AUS-0A07-065-SD-02	Acetone	23	U	Common lab cont., in TB sample
AUS-0A07-115-SD-02	Acetone	22	U	Common lab cont., in TB sample
AUS-0A07-025-SD-04	Acetone	12	U	Common lab cont., in TB sample

Crab Orchard Area 7 Data Review

Laboratory SDG: 202477

Reviewer: Jeff Aust

Date Reviewed: 4/20/2001

Sample Identification #	Sample Identification #
AUS-0A07-01-RN-00	AUS-0A07-002-RN-00
AUS-0A07-025-SW-00	AUS-0A07-01-TB-00
AUS-0A07-075-SW-00	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

No problems were noted in the case narrative.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes

Field ID	Analyte	Qualification
N/A		

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes

Blank ID	Analyte	Concentration	Units
MBLK	Antimony	-3.7	ug/L
MBLK	Arsenic	-7.3	ug/L
MBLK	Cadmium	-0.6	ug/L
MBLK	Calcium	74.9	ug/L

Crab Orchard Area 7 Data Review

Laboratory SDG: 202477

Blank ID	Analyte	Concentration	Units
MBLK	Chromium	4.7	ug/L
MBLK	Copper	3	ug/L
MBLK	Iron	45.1	ug/L
MBLK	Manganese	1	ug/L
MBLK	Potassium	181	ug/L
MBLK	Sodium	-294.5	ug/L
AUS-0A07-01-TB-00	Acetone	4	ug/L
AUS-0A07-01-TB-00	Methylene chloride	0.6	ug/L

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification. No analytical samples in this SDG had VOC requests; therefore no qualifications of data due to trip blank contamination were required.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-025-SW-00	Copper	-	U	MBLK
AUS-0A07-075-SW-00	Copper	-	U	MBLK

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No.

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
VBLK13895	Bromomethane	51	-	-
SBLK13884	4-Nitrophenol	113/119	5	52-117/40
SBLK13884	Butylbenzylphthalate	100/88	13	65-115/12
SBLK13884	Bis(2-Ethylhexyl)phthalate	104/82	24	57-128/18

LCS ID	LCS Compound	LCS Recovery, primary (%)	LCS Recovery, secondary (%)	LCS Criteria (%)
NA				

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification. No analytical samples in this SDG had VOC requests; therefore no qualifications of data due to trip blank contamination were required.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202477

Field ID	Analyte	Qualification
N/A		

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes

Were MS/MSD recoveries within evaluation criteria?

Yes

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
NA		

Crab Orchard Area 7 Data Review

Laboratory SDG: 202477

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

No.

Field ID	Field Duplicate ID
N/A	

Were field duplicates within evaluation criteria?

N/A

Field ID	Field Duplicate ID	Analyte	Qualification
N/A			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No samples were diluted.

The following table identifies the analyses which only diluted results were provided and one or more analytes were reported as nondetect.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202477

Analysis	Quantity	Dilution Factor Range
N/A		

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Professional judgement was used to qualify acetone and methylene chloride data reported less than two times (2X) the RL since both compounds are common laboratory contaminants. Additionally, if the RPD for an initial analysis concentration and a reanalysis (or dilution analysis) concentration was greater than 50%, then the data was qualified nondetect (U) based on professional judgement.

12.0 QA/QC Summary

QA/QC ID	Analysis	# of Analytes	# of Analytes Outside Criteria
Surrogates	VOC	4	0
	SVOC	6	0
	Pesticides	8	0
Laboratory Control Samples (LCS and LCSD)	VOC	37	1
	SVOC	128	1
	Pesticides	22	0
	Metals	24	0
Matrix Spikes (MS and MS/MSD)	VOC	-	-
	SVOC	-	-
	Pesticides	44	0
	Metals	48	0
Precision (Lab Dup, MSD RPD and LCS RPD)	VOC	-	-
	SVOC	64	2
	Pesticides	22	0
	Metals	24	0
Field Duplicates	N/A	-	-

Crab Orchard Area 7 Data Review

Laboratory SDG: 202497

Reviewer: Jeff Aust

Date Reviewed: 4/20/2001

Sample Identification #	Sample Identification #
AUS-0A07-082-WIPE	AUS-0A07-091-WIPE
AUS-0A07-083-WIPE	AUS-0A07-090-WIPE
AUS-0A07-084-WIPE	Wipe Blank
AUS-0A07-085-WIPE	AUS-0A07-094-WIPE
AUS-0A07-086-WIPE	AUS-0A07-095-WIPE
AUS-0A07-087-WIPE	AUS-0A07-092-WIPE
AUS-0A07-088-WIPE	AUS-0A07-093-WIPE
AUS-0A07-089-WIPE	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative/cooler receipt form indicated the following:

- Units on Form I reports should be ng/wipe

These issues are addressed in the appropriate sections below. The case narrative also indicated the following:

- Some 4,4'-DDT breakdown on the confirmation column exceeded the required control limit. This information is not part of the review procedure, therefore no qualification of data was required.

No additional problems were noted in the case narrative.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202497

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes

Field ID	Analyte	Qualification
N/A		

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

The case narrative stated that the method blank results were below the reporting limit for all target analytes.

Blank ID	Analyte	Concentration	Units
N/A			

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

Yes

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

LCS ID	LCS Compound	LCS Recovery, primary (%)	LCS Recovery, secondary (%)	LCS Criteria (%)
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202497

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes, however most were diluted out and no results were obtained

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

No.

Were MS/MSD recoveries within evaluation criteria?

N/A

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample

Crab Orchard Area 7 Data Review

Laboratory SDG: 202497

concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
NA		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

No. They were supposed to have been collected, but were not.

Field ID	Field Duplicate ID
N/A	

Were field duplicates within evaluation criteria?

NA

Field ID	Field Duplicate ID	Analyte	Qualification
N/A			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

Crab Orchard Area 7 Data Review

Laboratory SDG: 202497

No.

The following table identifies the analyses which only diluted results were provided and one or more analytes were reported as nondetect.

Analysis	Quantity	Dilution Factor Range
8081	All	10-1000

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Professional judgement was used to qualify acetone and methylene chloride data reported less than two times (2X) the RL since both compounds are common laboratory contaminants. Additionally, if the RPD for an initial analysis concentration and a reanalysis (or dilution analysis) concentration was greater than 50%, then the data was qualified nondetect (U) based on professional judgement.

12.0 QA/QC Summary

QA/QC ID	Analysis	# of Analytes	# of Analytes Outside Criteria
Surrogates	Pesticides	3	0
Laboratory Control Samples (LCS and LCSD)	Pesticides	44	0
Matrix Spikes (MS and MS/MSD)	N/A	-	-
Precision (Lab Dup, MSD RPD and LCS RPD)	Pesticides	22	0
Field Duplicates	N/A	-	-

Crab Orchard Area 7 Data Review

Laboratory SDG: 202498

Reviewer: Jeff Aust / Peter Guy

Date Reviewed: July 9, 2001

Sample Identification #	Sample Identification #
AUS-0A07-096-DUST	AUS-0A07-003-RN-00
AUS-0A07-097-DUST	AUS-0A07-001-SS-04 (R)
AUS-0A07-098-DUST	AUS-0A07-051-SS-04
AUS-0A07-099-DUST	AUS-0A07-002-SS-03 (R)
AUS-0A07-031-SS-0X	AUS-0A07-002-SS-04 (R)
AUS-0A07-032-SS-0X	AUS-0A07-002-SS-05 (R)
AUS-0A07-032-SS-02	AUS-0A07-003-SS-04 (R)
AUS-0A07-033-SS-0X	AUS-0A07-005-SS-04 (R)
AUS-0A07-033-SS-02 (R)	

(R) = Rejected data

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes, sample IDs marked with (R) had the pesticides results rejected due to improper decontamination techniques while sampling.

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative/cooler receipt form indicated the following:

- Surrogates were diluted out of several samples during sulfur clean-up.
- Select MS/MSD recoveries were biased high during pesticide analysis.
- Select LCS recoveries were biased high during SVOC analysis.

These issues are addressed below in the appropriate sections. No additional problems were noted in the case narrative.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202498

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes.

Field ID	Analyte	Qualification
N/A		

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes

Blank ID	Analyte	Concentration	Units
Method blank	Aluminum	70.6	ug/L
Method blank	Cadmium	-0.4	ug/L
Method blank	Copper	-4.6	ug/L
Method blank	Manganese	-1.1	ug/L
Method blank	Nickel	-6.0	ug/L
Method blank	Sodium	-602.0	ug/L
Method blank	Thallium	-8.9	ug/L

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-003-RN-00	aluminum	-	U	MB
AUS-0A07-003-RN-00	manganese	-	U	MB

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No.

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
SBLK13894	2-methylnaphthalene	106/108	2	52-107 / 21

Crab Orchard Area 7 Data Review

Laboratory SDG: 202498

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
SBLK13894	4-nitrophenol	120/112	7	52-117 / 40
SBLK13894	bis(2-ethylhexyl)phthalate	108/86	23	57-128 / 18
SBLK13894	benzo9b0fluoranthene	106/91	15	64-115 / 12

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes; however, surrogates were diluted out of several pesticide analyses due to sulfur clean-up and dilutions. No qualifications to the data were required.

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes.

Were MS/MSD recoveries within evaluation criteria?

No.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202498

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
AUS-0A07-001-SS-04	aldrin	429/852	66	68-129 / 37
AUS-0A07-001-SS-04	isodrin	138/298	73	50-150 / 40
AUS-0A07-001-SS-04	Dieldrin	771/592	26	67-111 / 27
AUS-0A07-001-SS-04	Endrin	173/117	39	71-129 / 35
AUS-0A07-001-SS-04	4,4'-DDT	141/125	12	66-127
AUS-0A07-001-SS-04	endrin ketone	411/175	80	59-140 / 20

Sample AUS-0A07-001-SS-04 was previously qualified as rejected due to field sampling errors (see Section 1.0 of this SDG). No additional qualifications to the data were required.

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes

Field ID	Field Duplicate ID
AUS-0A07-001-SS-04	AUS-0A07-051-SS-04

Were field duplicates within evaluation criteria?

Yes

Crab Orchard Area 7 Data Review

Laboratory SDG: 202498

Field ID	Field Duplicate ID	Analyte	Qualification
N/A			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No.

The following table identifies the analyses which only diluted results were provided and one or more analytes were reported as nondetect.

Analysis	Quantity	Dilution Factor Range
Pesticides	12	10-100000

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202519

Reviewer: Craig Johnson

Date Reviewed: 6/27/2001

Sample Identification #	Sample Identification #
AUS-0A07-053-SS-02	AUS-0A07-103-SS-02
AUS-0A07-057-SS-02	AUS-0A07-076-SS-02
AUS-0A07-060-SS-04	AUS-0A07-047-SS-04
AUS-0A07-060-SS-02	AUS-0A07-047-SS-05
AUS-0A07-042-SS-04	AUS-0A07-047-SS-03
AUS-0A07-059-SS-02	AUS-0A07-073-SS-02
AUS-0A07-038-SS-02	AUS-0A07-071-SS-02
AUS-0A07-043-SS-02	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative indicated LCS and surrogate recoveries outside evaluation criteria. These issues are addressed in the appropriate section below. Also, the narrative indicated internal standard recoveries outside evaluation criteria. While the internal standards are not part of the data review, the IS were reviewed and no data required rejection. No problems were noted on the cooler receipt form which impact data quality.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes.

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

No.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202519

Blank ID	Analyte	Concentration	Units
NA			

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	Criteria (%)
VBLK13906	Methylene chloride	61	62-131
VBLK13906	Hexane	0	25-169
VBLK14042	Bromomethane	44	64-139

In addition, some RPDs were outside evaluation criteria. No qualification was necessary if the LCS and LCSD was within criteria.

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
AUS-0A07-047-SS-04	Methylene chloride	UJ
AUS-0A07-047-SS-05	Methylene chloride	UJ
AUS-0A07-047-SS-03	Methylene chloride	UJ
AUS-0A07-047-SS-04	Hexane	R
AUS-0A07-047-SS-05	Hexane	R
AUS-0A07-047-SS-03	Hexane	R
AUS-0A07-060-SS-04	Bromomethane	J/UJ
AUS-0A07-038-SS-02	Bromomethane	J/UJ
AUS-0A07-071-SS-02	Bromomethane	J/UJ

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Crab Orchard Area 7 Data Review

Laboratory SDG: 202519

Yes.

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

No.

Were MS/MSD recoveries within evaluation criteria?

Yes.

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
NA				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202519

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

No

Field ID	Field Duplicate ID
NA	

Were field duplicates within evaluation criteria?

No

Field ID	Field Duplicate ID	Analyte	Qualification
NA			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No.

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202534

Reviewer: Craig Johnson

Date Reviewed: 7/12/2001

Sample Identification #	Sample Identification #
AUS-0A07-039-SS-02	AUS-0A07-036-SS-02
AUS-0A07-039-SS-0X	AUS-0A07-037-SS-0X
AUS-0A07-041-SS-0X	AUS-0A07-037-SS-02
AUS-0A07-042-SS-0X	AUS-0A07-038-SS-0X
AUS-0A07-042-SS-02	AUS-0A07-088-SS-0X
AUS-0A07-042-SS-04	AUS-0A07-038-SS-02
AUS-0A07-043-SS-0X	AUS-0A07-088-SS-02
AUS-0A07-093-SS-0X	AUS-0A07-049-SS-0X
AUS-0A07-043-SS-02	AUS-0A07-099-SS-0X
AUS-0A07043-SS-04-	AUS-0A07-049-SS-02
AUS-0A07-092-SS-0X	AUS-0A07-052-SS-0X
AUS-0A07-036-SS-0X	AUS-0A07-102-SS-0X

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes.

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative/cooler receipt form indicated surrogate and MS/MSD recoveries outside evaluation criteria.

These issues are addressed below in the appropriate sections. Additional items of interest not normally included in the data review process were:

- ICB/CCB were outside evaluation criteria for sodium. Since the sodium values were much greater than the ICB/CCB concentrations, no qualification of data was required.
- Due to sampling errors, sample integrity was compromised and pesticide analyses were qualified rejected (**R**) for samples AUS-0A07-037-SS-02, AUS-0A07-039-SS-02, AUS-0A07-042-SS-02, AUS-0A07-042-SS-04, AUS-0A07-043-SS-02, and AUS-0A07-043-SS-04.

No additional problems were noted in the laboratory case narrative.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202534

3.0 Sample Preservation and Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes,

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes.

Blank ID	Analyte	Concentration	Units
Method	Aluminum	9.730	ug/L
Method	Arsenic	-0.41	ug/L
Method	Boron	2.95	ug/L
Method	Cadmium	-0.808	ug/L
Method	Calcium	5.3	ug/L
Method	Cobalt	-0.18	ug/L
Method	Copper	-0.600	ug/L
Method	Nickel	-0.15	ug/L
Method	Potassium	13.75	ug/L
Method	Selenium	-0.270	ug/L
Method	Sodium	-68.02	ug/L

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-042-SS-04	Boron	NA	U	See above
AUS-0A07-043-SS-0X	Boron	NA	U	See above
AUS-0A07-038-SS-0X	Boron	NA	U	See above
AUS-0A07-088-SS-0X	Boron	NA	U	See above

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202534

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	Criteria (%/RPD)
SBLK14822	2-Methylphenol	110	59-101
SBLK14822	2,2'-oxybis(1-chloropropane)	119	43-106
SBLK14822	n-nitroso-di-n-propylamine	116	52-108
SBLK14822	4-Methylphenol	119	58-107
SBLK14822	2-Nitroaniline	114	67-110
SBLK14822	2,6-Dinitroaniline	122	65-113
SBLK14822	2,4-Dinitrophenol	137	42-127
SBLK14822	4,6-Dinitro-2-methylphenol	125	60-123

Associated data were reported as nondetect, therefore, no qualification of data was required.

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes; however, surrogates were diluted out of several pesticide analyses due to sulfur clean-up and dilutions. No qualifications to the data were required.

Field ID	Analysis	Surrogate	Recovery	Criteria
NA				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes.

Were MS/MSD recoveries within evaluation criteria?

No.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202534

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
AUS-0A07-043-SS-0X	Antimony	4.9	NA	75-125
AUS-0A07-043-SS-0X	Arsenic	69.4	NA	75-125
AUS-0A07-043-SS-0X	Lead	127	NA	75-125

MS/MSD recoveries for an SVOC MS/MSD sample were diluted out. No qualification of data was required. In addition, MS/MSD recoveries for SVOC and pesticides were outside evaluation criteria. National Functional Guidelines for Organic Data Review (USEPA 1999) does not require data qualifications based on MS/MSD analysis alone. Since the above data was previously qualified due to the LCS recoveries, no further qualifications to the organic data were made.

Field ID	Analyte	Qualification
AUS-0A07-043-SS-0X	Antimony	R
AUS-0A07-043-SS-0X	Arsenic	J
AUS-0A07-043-SS-0X	Lead	J

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

Yes.

Were laboratory duplicate sample RPDs within criteria?

No

Field ID	Analyte	%RPD	Criteria
AUS-0A07-043-SS-0X	Calcium	68.8	75-125
AUS-0A07-043-SS-0X	Cobalt	26.6	75-125
AUS-0A07-043-SS-0X	Magnesium	37.6	75-125

Field ID	Analyte	Qualification
AUS-0A07-043-SS-0X	Calcium	J
AUS-0A07-043-SS-0X	Cobalt	J
AUS-0A07-043-SS-0X	Magnesium	J

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Crab Orchard Area 7 Data Review

Laboratory SDG: 202534

Yes.

Field ID	Field Duplicate ID
AUS-0A07-042-SS-0X	AUS-0A07-092-SS-0X
AUS-0A07-043-SS-0X	AUS-0A07-093-SS-0X
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02
AUS-0A07-038-SS-0X	AUS-0A07-088-SS-0X
AUS-0A07-049-SS-0X	AUS-0A07-099-SS-0X
AUS-0A07-052-SS-0X	AUS-0A07-102-SS-0X

Were field duplicates within evaluation criteria?

No.

Field ID	Field Duplicate ID	Analyte	Qualification
AUS-0A07-042-SS-0X	AUS-0A07-092-SS-0X	Aldrin	J
AUS-0A07-043-SS-0X	AUS-0A07-093-SS-0X	Aldrin	J
AUS-0A07-043-SS-0X	AUS-0A07-093-SS-0X	Endrin	J
AUS-0A07-043-SS-0X	AUS-0A07-093-SS-0X	4,4'-DDT	J
AUS-0A07-038-SS-0X	AUS-0A07-088-SS-0X	Aldrin	J
AUS-0A07-038-SS-0X	AUS-0A07-088-SS-0X	4,4'-DDT	J
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02	Aldrin	J
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02	Dieldrin	J
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02	4,4'-DDT	J
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02	Endrin aldehyde	J
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02	Endrin ketone	J
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02	Isodrin	J
AUS-0A07-038-SS-02	AUS-0A07-088-SS-02	Hexachlorobenzene	J
AUS-0A07-049-SS-0X	AUS-0A07-099-SS-0X	Aldrin	J

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No.

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RI	Qualification	Comments
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202535

Reviewer: Craig Johnson

Date Reviewed: 7/16/2001

Sample Identification #	Sample Identification #
AUS-0A07-052-SS-02	AUS-0A07-076-SS-0X
AUS-0A07-053-SS-0X	AUS-0A07-076-SS-02
AUS-0A07-103-SS-0X	AUS-0A07-047-SS-0X
AUS-0A07-053-SS-02	AUS-0A07-097-SS-0X
AUS-0A07-054-SS-0X	AUS-0A07-047-SS-02
AUS-0A07-054-SS-02	AUS-0A07-047-SS-03
AUS-0A07-105-SS-0X	AUS-0A07-047-SS-04
AUS-0A07-055-SS-02	AUS-0A07-047-SS-05
AUS-0A07-071-SS-0X	AUS-0A07-034-SS-0X
AUS-0A07-071-SS-02	AUS-0A07-035-SS-0X
AUS-0A07-073-SS-0X	AUS-0A07-035-SS-02
AUS-0A07-073-SS-02	AUS-0A07-055-SS-0X

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes; however, the pesticide results for the following sample results were qualified as rejected "R" due to sampling errors. AUS-0A07-054-SS-02, AUS-0A07-055-SS-02, AUS-0A07-047-SS-02, AUS-0A07-047-SS-03, AUS-0A07-047-SS-04, AUS-0A07-047-SS-05, and AUS-0A07-035-SS-02

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative/cooler receipt form indicated LCS, surrogate and MS/MSD recoveries outside evaluation criteria. These issues are addressed in the appropriate sections below. In addition, the narrative indicated CCVs and ICB/CCBs outside evaluation criteria. These QC measurements are not included in the data review, but were briefly reviewed to determine if the data required rejection. No, data required rejection.

No additional problems were noted in the laboratory case narrative.

3.0 Sample Preservation and Holding Times

Were samples extracted/analyzed within QAPP limits?

Crab Orchard Area 7 Data Review

Laboratory SDG: 202535

Yes,

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes.

Blank ID	Analyte	Concentration	Units
Method	Arsenic	-0.43	Mg/kg
Method	Boron	0.62	Mg/kg
Method	Cadmium	-0.04	Mg/kg
Method	Calcium	7.53	Mg/kg
Method	Chromium	0.140	Mg/kg
Method	Cobalt	-0.130	Mg/kg
Method	Lead	0.340	Mg/kg
Method	Nickel	-0.310	Mg/kg
Method	Potassium	12.39	Mg/kg
Method	Selenium	0.28	Mg/kg
Method	Thallium	-0.640	Mg/kg

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-053-SS-0X	Cadmium	NA	U	See above
AUS-0A07-053-SS-0X	Selenium	0.65	U	See above
AUS-0A07-053-SS-0X	Thallium	0.94	U	See above
AUS-0A07-103-SS-0X	Cadmium	NA	U	See above
AUS-0A07-103-SS-0X	Selenium	0.49	U	See above
AUS-0A07-103-SS-0X	Thallium	NA	U	See above
AUS-0A07-071-SS-0X	Selenium	0.9	U	See above
AUS-0A07-073-SS-0X	Selenium	NA	U	See above
AUS-0A07-076-SS-0X	Boron	NA	U	See above
AUS-0A07-076-SS-0X	Selenium	0.65	U	See above
AUS-0A07-047-SS-03	Boron	NA	U	See above
AUS-0A07-047-SS-03	Cadmium	NA	U	See above
AUS-0A07-047-SS-03	Selenium	0.92	U	See above
AUS-0A07-047-SS-04	Potassium	0.97	U	See above
AUS-0A07-047-SS-04	Thallium	NA	U	See above
AUS-0A07-047-SS-05	Selenium	0.72	U	See above

Crab Orchard Area 7 Data Review

Laboratory SDG: 202535

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

HERE.

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	Criteria (%/RPD)
SBLK14822	2-Methylphenol	110	59-101
SBLK14822	2,2'-oxybis(1-chloropropane)	119	43-106
SBLK14822	n-nitroso-di-n-propylamine	116	52-108
SBLK14822	4-Methylphenol	119	58-107
SBLK14822	2-Nitroaniline	114	67-110
SBLK14822	2,6-Dinitroaniline	122	65-113
SBLK14822	2,4-Dinitrophenol	137	42-127
SBLK14822	4,6-Dinitro-2-methylphenol	125	60-123

Associated data were reported as nondetect, therefore, no qualification of data was required.

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes; however, surrogates were diluted out of several pesticide analyses due to sulfur clean-up and dilutions. No qualifications to the data were required.

Field ID	Analysis	Surrogate	Recovery	Criteria
NA				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Crab Orchard Area 7 Data Review

Laboratory SDG: 202535

Yes.

Were MS/MSD recoveries within evaluation criteria?

Yes; however, MS/MSD recoveries for pesticides were diluted out due to high levels of target compounds.

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
NA				

Field ID	Analyte	Qualification
NA		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

NA

Field ID	Analyte	%RPD	Criteria
NA			

Field ID	Analyte	Qualification
NA		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes.

Field ID	Field Duplicate ID
AUS-0A07-053-SS-0X	AUS-0A07-103-SS-0X
AUS-0A07-047-SS-0X	AUS-0A07-097-SS-0X
AUS-0A07-055-SS-0X	AUS-0A07-105-SS-0X

Were field duplicates within evaluation criteria?

Crab Orchard Area 7 Data Review

Laboratory SDG: 202535

No.

Field ID	Field Duplicate ID	Analyte	Qualification
AUS-0A07-053-SS-0X	AUS-0A07-103-SS-0X	Aldrin	J
AUS-0A07-053-SS-0X	AUS-0A07-103-SS-0X	Dieldrin	J

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No.

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202536

Reviewer: Peter Guy

Date Reviewed: 7/13/2001

Sample Identification #	Sample Identification #
AUS-0A07-045-SS-04	AUS-0A07-045-SS-05
AUS-0A07-040-SS-02	AUS-0A07-045-SS-02
AUS-0A07-057-SS-0X	AUS-0A07-057-SS-02
AUS-0A07-058-SS-0X	AUS-0A07-040-SS-0X
AUS-0A07-042-SS-02	AUS-0A07-059-SS-0X
AUS-0A07-059-SS-02	AUS-0A07-060-SS-0X
AUS-0A07-061-SS-0X	AUS-0A07-061-SS-02
AUS-0A07-044-SS-04	AUS-0A07-056-SS-02
AUS-0A07-045-SS-0X	AUS-0A07-044-SS-0X

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes.

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative/cooler receipt form indicated the following:

- Lead contamination existed in the metals calibration blanks.
- Surrogates were diluted out of select pesticide samples during sulfur cleanup.
- The pesticide LCS was biased high for select compounds.

These issues are addressed below in the appropriate sections. Additional items of interest not normally included in the data review process were:

- One calibration verification was biased low for antimony. The one CV in question did not bracket any URS samples and did not affect data quality.
- Due to sampling errors, sample integrity was compromised and pesticide analyses were qualified rejected (**R**) for samples AUS-0A07-045-SS-04, AUS-0A07-045-SS-05, AUS-0A07-040-SS-02, AUS-0A07-045-SS-02, AUS-0A07-059-SS-02, AUS-0A07-061-SS-02, AUS-0A07-044-SS-04 and AUS-0A07-056-SS-02.

No additional problems were noted in the laboratory case narrative.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202536

3.0 Sample Preservation and Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes.

Field ID	Analyte	Qualification
N/A		

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes.

Blank ID	Analyte	Concentration	Units
Trip Blank	Acetone	3.0	µg/L
Trip Blank	Methylene Chloride	0.7	µg/L
Prep. Blank	Arsenic	0.43	µg/L
Prep. Blank	Boron	0.62	µg/L
Prep. Blank	Cadmium	0.04	µg/L
Prep. Blank	Calcium	7.53	µg/L
Prep. Blank	Chromium	0.14	µg/L
Prep. Blank	Cobalt	0.13	µg/L
Prep. Blank	Lead	0.34	µg/L
Prep. Blank	Nickel	0.31	µg/L
Prep. Blank	Potassium	12.39	µg/L
Prep. Blank	Selenium	0.28	µg/L
Prep. Blank	Thallium	0.64	µg/L

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-045-SS-04	Boron	-	U	Prep. blank
AUS-0A07-045-SS-04	Cadmium	-	U	Prep. blank
AUS-0A07-045-SS-04	Selenium	-	U	Prep. blank
AUS-0A07-045-SS-04	Acetone	7.0	U	Trip blank
AUS-0A07-045-SS-02	Acetone	14.0	U	Trip blank

Crab Orchard Area 7 Data Review

Laboratory SDG: 202536

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-057-SS-0X	Thallium	-	U	Prep. blank
AUS-0A07-059-SS-0X	Boron	-	U	Prep. blank
AUS-0A07-059-SS-0X	Selenium	-	U	Prep. blank
AUS-0A07-059-SS-0X	Thallium	-	U	Prep. blank
AUS-0A07-060-SS-0X	Cadmium	-	U	Prep. blank
AUS-0A07-060-SS-0X	Selenium	0.92	U	Prep. blank
AUS-0A07-045-SS-0X	Selenium	-	U	Prep. blank
AUS-0A07-045-SS-0X	Thallium	-	U	Prep. blank

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No.

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
VBLK14042	Bromomethane	44	-	64-139
SBLK14824	2,2'-oxybis(1-chloropropane)	108/115	6	43-106 / 20
SBLK14824	n-Nitrosodiphenylamine	116/114	2	65-111 / 20
14829BS	delta-BHC	48/83	53	40-156 / 19

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification. Data that was previously rejected (see above) was not qualified again for LCS recoveries.

Field ID	Analyte	Qualification
AUS-0A07-045-SS-04	Bromomethane	UJ
AUS-0A07-045-SS-02	Bromomethane	UJ

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes; however, surrogates were diluted out of several pesticide analyses due to sulfur clean-up and dilutions. No qualifications to the data were required.

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202536

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

No.

Were MS/MSD recoveries within evaluation criteria?

N/A

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

National Functional Guidelines for Organic Data Review (USEPA 1999) does not require data qualifications based on MS/MSD analysis alone.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A

Field ID	Analyte	%RPD	Criteria
N/A			

Crab Orchard Area 7 Data Review

Laboratory SDG: 202536

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

No.

Field ID	Field Duplicate ID
N/A	

Were field duplicates within evaluation criteria?

N/A

Field ID	Field Duplicate ID	Analyte	Qualification
N/A			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No.

The following table identifies the analyses which only diluted results were provided and one or more analytes were reported as nondetect.

Analysis	Quantity	Dilution Factor Range
Pesticides	11	10-1000
Metals	1	5

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202537

Reviewer: Peter Guy

Date Reviewed: 7/03/2001

Sample Identification #	Sample Identification #
AUS-0A07-051-SS-0X	AUS-0A07-045-SS-03
AUS-0A07-046-SS-02	AUS-0A07-046-SS-01
AUS-0A07-051-SS-02	AUS-0A07-056-SS-0X
AUS-0A07-060-SS-02	AUS-0A07-060-SS-04
AUS-0A07-062-SS-0X	AUS-0A07-062-SS-02
AUS-0A07-050-SS-0X	AUS-0A07-100-SS-0X
AUS-0A07-048-SS-0X	AUS-0A07-048-SS-02
AUS-0A07-090-SS-02	AUS-0A07-106-SS-0X
AUS-0A07-050-SS-02	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes.

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative/cooler receipt form indicated the following:

- Lead contamination existed in the metals calibration blanks.
- Surrogates were diluted out of select pesticide samples during sulfur cleanup.
- The pesticide LCS was biased low; therefore, several samples were re-extracted and re-analyzed. Samples were re-extracted beyond holding times and both sets of results were reported.
- The pesticide MS/MSD had several recoveries and RPDs outside QC limits.

These issues are addressed below in the appropriate sections. Additional items of interest not normally included in the data review process were:

- Several pesticide calibration verifications were biased low for select compounds. Although calibration verifications are not normally included in data reviews, the calibration data was evaluated and determined not to require rejection.
- Due to sample collection errors, sample integrity was compromised and pesticide analyses were qualified rejected (R) for samples AUS-0A07-060-SS-02, AUS-0A07-

Crab Orchard Area 7 Data Review

Laboratory SDG: 202537

060-SS-04, AUS-0A07-062-SS-02, AUS-0A07-090-SS-02, and AUS-0A07-050-SS-02.

No additional problems were noted in the laboratory case narrative.

3.0 Sample Preservation and Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes, original samples were extracted within holding time. All re-extracted pesticide samples were extracted 20 days past holding time and were qualified rejected.

Field ID	Analyte	Qualification
AUS-0A07-060-SS-02RE	All pesticides	R
AUS-0A07-060-SS-04RE	All pesticides	R
AUS-0A07-062-SS-0XRE	All pesticides	R
AUS-0A07-062-SS-02RE	All pesticides	R
AUS-0A07-050-SS-0XRE	All pesticides	R
AUS-0A07-100-SS-0XRE	All pesticides	R
AUS-0A07-048-SS-0XRE	All pesticides	R
AUS-0A07-048-SS-02RE	All pesticides	R
AUS-0A07-090-SS-02RE	All pesticides	R

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes.

Blank ID	Analyte	Concentration	Units
Trip Blank	Acetone	3.0	µg/L
Trip Blank	Methylene Chloride	0.7	µg/L
Prep. Blank	Arsenic	0.43	µg/L
Prep. Blank	Boron	0.62	µg/L
Prep. Blank	Cadmium	0.04	µg/L
Prep. Blank	Calcium	7.53	µg/L
Prep. Blank	Chromium	0.14	µg/L
Prep. Blank	Cobalt	0.13	µg/L
Prep. Blank	Lead	0.34	µg/L
Prep. Blank	Nickel	0.31	µg/L
Prep. Blank	Potassium	12.39	µg/L
Prep. Blank	Selenium	0.28	µg/L
Prep. Blank	Thallium	0.64	µg/L

Crab Orchard Area 7 Data Review

Laboratory SDG: 202537

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No.

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
VBLK14178	Methylene Chloride	58	-	59-130
VBLK14178	m,p-Xylene	48	-	82-127
VBLK14178	Xylene (total)	68	-	82-130
SBLK14824	2,2'-oxybis(1-chloropropane)	108/115	6	43-106 / 20
SBLK14824	n-Nitrosodiphenylamine	116/114	2	65-111 / 20
14828-BS	Endosulfan I	92/118	25	66-121 / 20
15049-BS	Hexachlorbenzene	36	-	50-150
15049-BS	alpha-BHC	31	-	58-131
15049-BS	gamma-BHC	34	-	59-103
15049-BS	Heptachlor	34	-	69-118
15049-BS	Aldrin	32	-	68-129
15049-BS	Isodrin	36	-	50-150
15049-BS	Heptachlor Epoxide	40	-	69-125
15049-BS	gamma-Chlordane	43	-	72-111
15049-BS	Endosulfan I	42	-	66-121
15049-BS	alpha-Chlordane	47	-	68-148
15049-BS	4,4'-DDE	50	-	66-132
15049-BS	Dieldrin	53	-	67-111
15049-BS	Endrin	48	-	71-129
15049-BS	Endosulfan II	56	-	63-114
15049-BS	4,4'-DDT	63	-	66-127

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification. Data that was previously rejected (see above) was not qualified again for LCS recoveries.

Crab Orchard Area 7 Data Review

Laboratory SDG: 202537

Field ID	Analyte	Qualification
AUS-0A07-062-SS-0X	All pesticides	J/UJ
AUS-0A07-050-SS-0X	All pesticides	J/UJ
AUS-0A07-100-SS-0X	All pesticides	J/UJ
AUS-0A07-048-SS-0X	All pesticides	J/UJ
AUS-0A07-048-SS-02	All pesticides	J/UJ

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes; however, surrogates were diluted out of several pesticide analyses due to sulfur clean-up and dilutions. No qualifications to the data were required.

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes.

Were MS/MSD recoveries within evaluation criteria?

No.

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
AUS-0A07-050-SS-0X	Aldrin	95/134	34	68-129 / 37
AUS-0A07-050-SS-0X	Heptachlor Epoxide	126/179	35	69-125 / 20
AUS-0A07-050-SS-0X	4,4'-DDE	93/120	25	66-132 / 24
AUS-0A07-050-SS-0X	Dieldrin	-105/268	458	67-111 / 27

Crab Orchard Area 7 Data Review

Laboratory SDG: 202537

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
AUS-0A07-050-SS-0X	Endrin	123/158	25	71-129 / 35
AUS-0A07-050-SS-0X	4,4'-DDD	38/116	101	59-126 / 19
AUS-0A07-050-SS-0X	4,4'-DDT	114/168	38	66-127 / 37
AUS-0A07-050-SS-0X	Endrin Ketone	135/154	13	59-140 / 17
AUS-0A07-050-SS-0XRE	Aldrin	-122/-110	-10	68-129 / 37
AUS-0A07-050-SS-0XRE	Dieldrin	-533/-343	-43	67-111 / 27
AUS-0A07-050-SS-0XRE	Endrin	45/64	35	71-129 / 35
AUS-0A07-050-SS-0XRE	4,4'-DDD	38/9	-123	59-126 / 19
AUS-0A07-050-SS-0XRE	4,4'-DDT	35/29	19	66-127 / 37
AUS-0A07-050-SS-0XRE	Endrin Ketone	150/160	6	59-140 / 20

National Functional Guidelines for Organic Data Review (USEPA 1999) does not require data qualifications based on MS/MSD analysis alone. Since the above data was previously qualified due to the LCS recoveries, no further qualifications to the data were made.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

Crab Orchard Area 7 Data Review

Laboratory SDG: 202537

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes.

Field ID	Field Duplicate ID
AUS-0A07-040-SS-02	AUS-0A07-090-SS-02 (rejected)
AUS-0A07-050-SS-0X	AUS-0A07-100-SS-0X
AUS-0A07-056-SS-0X	AUS-0A07-106-SS-0X

Were field duplicates within evaluation criteria?

No; however, the parent samples and field duplicates were previously qualified under LCS and no additional qualifications were required.

Field ID	Field Duplicate ID	Analyte	Qualification
N/A			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No.

The following table identifies the analyses which only diluted results were provided and one or more analytes were reported as nondetect.

Analysis	Quantity	Dilution Factor Range
Pesticides	11	10-50

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202538

Reviewer: Jeff Aust

Date Reviewed: 4/21/2001

Sample Identification #	Sample Identification #
AUS-0A07-004-RN-00	AUS-0A07-010-RN-00
AUS-0A07-005-RN-00	AUS-0A07-011-RN-00
AUS-0A07-006-RN-00	AUS-0A07-012-RN-00
AUS-0A07-007-RN-00	AUS-0A07-013-RN-00
AUS-0A07-008-RN-00	AUS-0A07-014-RN-00
AUS-0A07-009-RN-00	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

No problems were noted in the case narrative.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes

Field ID	Analyte	Qualification
N/A		

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

No.

Blank ID	Analyte	Concentration	Units
N/A			

Crab Orchard Area 7 Data Review

Laboratory SDG: 202538

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

Yes

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

LCS ID	LCS Compound	LCS Recovery, primary (%)	LCS Recovery, secondary (%)	LCS Criteria (%)
N/A				

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with

Crab Orchard Area 7 Data Review

Laboratory SDG: 202538

surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

No.

Were MS/MSD recoveries within evaluation criteria?

NA

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Crab Orchard Area 7 Data Review

Laboratory SDG: 202538

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

No.

Field ID	Field Duplicate ID
N/A	

Were field duplicates within evaluation criteria?

N/A

Field ID	Field Duplicate ID	Analyte	Qualification
N/A			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No samples were diluted

The following table identifies the analyses which only diluted results were provided and one or more analytes were reported as nondetect.

Analysis	Quantity	Dilution Factor Range
N/A		

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Crab Orchard Area 7 Data Review

Laboratory SDG: 202538

Professional judgement was used to qualify acetone and methylene chloride data reported less than two times (2X) the RL since both compounds are common laboratory contaminants. Additionally, if the RPD for an initial analysis concentration and a reanalysis (or dilution analysis) concentration was greater than 50%, then the data was qualified nondetect (U) based on professional judgement.

12.0 QA/QC Summary

QA/QC ID	Analysis	# of Analytes	# of Analytes Outside Criteria
Surrogates	Pesticides	22	0
Laboratory Control Samples (LCS and LCSD)	Pesticides	44	0
Matrix Spikes (MS and MS/MSD)	Pesticides	-	-
Precision (Lab Dup, MSD RPD and LCS RPD)	Pesticides	22	0
Field Duplicates	NA		

Crab Orchard Area 7 Data Review

Laboratory SDG: 203557

Reviewer: Craig Johnson

Date Reviewed: 6/22/2001

Sample Identification #	Sample Identification #
AUS-0A07-RSS-SS-02	AUS-0A07-R03-SS-04
AUS-0A07-R01-SS-04	AUS-0A07-R42-SS-02
AUS-0A07-R02-SS-03	AUS-0A07-R42-SS-04
AUS-0A07-R02-SS-04	AUS-0A07-R45-SS-02
AUS-0A07-R02-SS-05	AUS-0A07-R45-SS-04
AUS-0A07-515-SS-05	AUS-0A07-R45-SS-05
AUS-0A07-R35-SS-02	AUS-0A07-R40-SS-02
AUS-0A07-R39-SS-02	AUS-0A07-R44-SS-04
AUS-0A07-R37-SS-02	AUS-0A07-R43-SS-02
AUS-0A07-516-SS-02	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative indicated holding time exceedences, and surrogate, blank spike and matrix spike recoveries outside evaluation criteria. These issues are addressed in the appropriate sections below. No additional problems were noted in the case narrative or cooler receipt form.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

No, the reanalysis for sample AUS-0A07-R39-SS-02 and the Matrix spike/matrix spike duplicate for sample AUS-0A07-R39-SS-02 were extracted 2 days beyond the 14 day extraction time period.

Field ID	Analyte	Qualification
AUS-0A07-R39-SS-02 (Re-analysis)	All pesticides	J/UJ

Crab Orchard Area 7 Data Review

Laboratory SDG: 203557

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

No.

Blank ID	Analyte	Concentration	Units
NA			

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	Criteria (%)
21185-BS	Heptachlor	60/76/20	69-125/20
21185-BS	Aldrin	59/77/26	68-129/37
21185-BS	Heptachlor epoxide	62/76/20	69-125/20
21185-BS	Gamma chlordane	64/79/21	72-111/20
21185-BS	Endosulfan I	62/76/20	66-121/20
21185-BS	Endrin	70/85/19	71-129/35

In addition, some RPDs were outside evaluation criteria. No qualification was necessary if the LCS and LCSD was within criteria.

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Crab Orchard Area 7 Data Review

Laboratory SDG: 203557

Field ID	Analyte	Qualification
AUS-0A07-R44-SS-04	Heptachlor	J/UJ
AUS-0A07-R44-SS-04	Aldrin	J/UJ
AUS-0A07-R44-SS-04	Heptachlor epoxide	J/UJ
AUS-0A07-R44-SS-04	Gamma chlordane	J/UJ
AUS-0A07-R44-SS-04	Endosulfan I	J/UJ
AUS-0A07-R44-SS-04	Endrin	J/UJ
AUS-0A07-R43-SS-02	Heptachlor	J/UJ
AUS-0A07-R43-SS-02	Aldrin	J/UJ
AUS-0A07-R43-SS-02	Heptachlor epoxide	J/UJ
AUS-0A07-R43-SS-02	Gamma chlordane	J/UJ
AUS-0A07-R43-SS-02	Endosulfan I	J/UJ
AUS-0A07-R43-SS-02	Endrin	J/UJ
AUS-0A07-R43-SS-02DL	Heptachlor	J/UJ
AUS-0A07-R43-SS-02DL	Aldrin	J/UJ
AUS-0A07-R43-SS-02DL	Heptachlor epoxide	J/UJ
AUS-0A07-R43-SS-02DL	Gamma chlordane	J/UJ
AUS-0A07-R43-SS-02DL	Endosulfan I	J/UJ
AUS-0A07-R43-SS-02DL	Endrin	J/UJ

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

No, the surrogate recovery for the method blank sample were outside evaluation criteria. Since the surrogate recoveries for the associated samples were within criteria, no qualification of data was required. In addition, surrogate recoveries were "diluted out" for several samples. Since the surrogate recoveries for the original samples were within evaluation criteria, no qualification of data was required.

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

Crab Orchard Area 7 Data Review

Laboratory SDG: 203557

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes, AUS-0A07-R39-SS-02.

Were MS/MSD recoveries within evaluation criteria?

No, several MS/MSD and RPDs were outside evaluation criteria. The sample was analyzed at a dilution and also re-extracted and re-analyzed. Due to the considerable number of outlying recoveries for the sample, all pesticide results were qualified as J/UJ for sample AUS-0A07-R39-SS-02 and its reanalysis.

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

Crab Orchard Area 7 Data Review

Laboratory SDG: 203557

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes

Field ID	Field Duplicate ID
AUS-0A07-R02-SS-05	AUS-0A07-515-SS-05
AUS-0A07-R37-SS-02	AUS-0A07-51-SS-02

Were field duplicates within evaluation criteria?

No

Field ID	Field Duplicate ID	Analyte	Qualification
AUS-0A07-R37-SS-02	AUS-0A07-51-SS-02	Aldrin	J
AUS-0A07-R37-SS-02	AUS-0A07-51-SS-02	Dieldrin	J
AUS-0A07-R37-SS-02	AUS-0A07-51-SS-02	Endrin ketone	J/UJ
AUS-0A07-R37-SS-02	AUS-0A07-51-SS-02	Isodrin	J/UJ

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No; however, samples were diluted due to the presence of high concentrations of target analytes.

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Professional judgement was used to qualify acetone and methylene chloride data reported less than two times (2X) the RL since both compounds are common laboratory contaminants. Additionally, if the RPD for an initial analysis concentration and a reanalysis (or dilution analysis) concentration was greater than 50%, then the data was qualified nondetect (U) based on professional judgement.

Crab Orchard Area 7 Data Review

Laboratory SDG: 203559

Reviewer: Craig Johnson

Date Reviewed: 6/25/2001

Sample Identification #	Sample Identification #
AUS-0A07-R76-SS-0X	AUS-0A07-RN1
AUS-0A07-R73-SS-0X	AUS-0A07-RN2
AUS-0A07-R25-SD-04	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative indicated blank spike recoveries outside evaluation criteria. This issue is addressed in the appropriate section below. No additional problems were noted in the case narrative or cooler receipt form.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes.

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

No.

Blank ID	Analyte	Concentration	Units
NA			

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the

Crab Orchard Area 7 Data Review

Laboratory SDG: 203559

associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	Criteria (%)
21185-BS	Heptachlor	61	69-125/20
21185-BS	Aldrin	60	68-129/37
21185-BS	Heptachlor epoxide	61	69-125/20
21185-BS	Gamma chlordane	64	72-111/20
21185-BS	Endosulfan I	62	66-121/20
21185-BS	Alpha-chlordane	67	68-148
21185-BS	Endrin	70	71-129/35

In addition, some RPDs were outside evaluation criteria. No qualification was necessary if the LCS and LCSD was within criteria.

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
AUS-0A07-R25-SD-04	Heptachlor	J/UJ
AUS-0A07-R25-SD-04	Aldrin	J/UJ
AUS-0A07-R25-SD-04	Heptachlor epoxide	J/UJ
AUS-0A07-R25-SD-04	Gamma chlordane	J/UJ
AUS-0A07-R25-SD-04	Endosulfan I	J/UJ
AUS-0A07-R25-SD-04	Endrin	J/UJ
AUS-0A07-R25-SD-04	Alpha-chlordane	J/UJ

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes

Crab Orchard Area 7 Data Review

Laboratory SDG: 203559

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes, AUS-0A07-R76-SS-0X.

Were MS/MSD recoveries within evaluation criteria?

Yes.

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
NA				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Crab Orchard Area 7 Data Review

Laboratory SDG: 203559

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

No.

Field ID	Field Duplicate ID
NA	

Were field duplicates within evaluation criteria?

No

Field ID	Field Duplicate ID	Analyte	Qualification
NA			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No; however, samples were diluted due to the presence of high concentrations of target analytes.

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Professional judgement was used to qualify acetone and methylene chloride data reported less than two times (2X) the RL since both compounds are common laboratory contaminants. Additionally, if the RPD for an initial analysis concentration and a reanalysis (or dilution analysis) concentration was greater than 50%, then the data was qualified nondetect (U) based on professional judgement.

Crab Orchard Area 7 Data Review

Laboratory SDG: 203560

Reviewer: Craig Johnson

Date Reviewed: 6/25/2001

Sample Identification #	Sample Identification #
AUS-0A07517-SS-02	AUS-0A07R-R56-SS-02
AUS-0A07R43-SS-04	AUS-0A07R60-SS-02
AUS-0A07R47-SS-02	AUS-0A07R60-SS-04
AUS-0A07R47-SS-03	AUS-0A07R-R59-SS-02
AUS-0A07R47-SS-04	AUS-0A07R61-SS-02
AUS-0A07R47-SS-05	AUS-0A07-518-SS-02
AUS-0A07R05-SS-04	AUS-0A07R62-SS-02
AUS-0A07-R50-SS-02	AUS-0A07R71-SS-0X
AUS-0A07R54-SS-02	AUS-0A07-519-SS-0X
AUS-0A07R55-SS-02	

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative indicated surrogate and blank spike recoveries outside evaluation criteria. These issues are addressed in the appropriate sections below. No additional problems were noted in the case narrative or cooler receipt form.

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes.

Crab Orchard Area 7 Data Review

Laboratory SDG: 203560

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

No.

Blank ID	Analyte	Concentration	Units
NA			

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
N/A				

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

No

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	Criteria (%)
21185-BS	Heptachlor	61	69-125/20
21185-BS	Aldrin	60	68-129/37
21185-BS	Heptachlor epoxide	61	69-125/20
21185-BS	Gamma chlordane	64	72-111/20
21185-BS	Endosulfan I	62	66-121/20
21185-BS	Alpha-chlordane	67	68-148
21185-BS	Endrin	70	71-129/35

In addition, some RPDs were outside evaluation criteria. No qualification was necessary if the LCS and LCSD was within criteria.

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Crab Orchard Area 7 Data Review

Laboratory SDG: 203560

Field ID	Analyte	Qualification
AUS-0A07517-SS-02	Heptachlor	J/UJ
AUS-0A07517-SS-02	Aldrin	J/UJ
AUS-0A07517-SS-02	Heptachlor epoxide	J/UJ
AUS-0A07517-SS-02	Gamma chlordane	J/UJ
AUS-0A07517-SS-02	Endosulfan I	J/UJ
AUS-0A07517-SS-02	Endrin	J/UJ
AUS-0A07517-SS-02	Alpha-chlordane	J/UJ
AUS-0A07R43-SS-04	Heptachlor	J/UJ
AUS-0A07R43-SS-04	Aldrin	J/UJ
AUS-0A07R43-SS-04	Heptachlor epoxide	J/UJ
AUS-0A07R43-SS-04	Gamma chlordane	J/UJ
AUS-0A07R43-SS-04	Endosulfan I	J/UJ
AUS-0A07R43-SS-04	Endrin	J/UJ
AUS-0A07R43-SS-04	Alpha-chlordane	J/UJ
AUS-0A07R47-SS-02	Heptachlor	J/UJ
AUS-0A07R47-SS-02	Aldrin	J/UJ
AUS-0A07R47-SS-02	Heptachlor epoxide	J/UJ
AUS-0A07R47-SS-02	Gamma chlordane	J/UJ
AUS-0A07R47-SS-02	Endosulfan I	J/UJ
AUS-0A07R47-SS-02	Alpha-chlordane	J/UJ
AUS-0A07R47-SS-02	Endrin	J/UJ
AUS-0A07R47-SS-03	Heptachlor	J/UJ
AUS-0A07R47-SS-03	Aldrin	J/UJ
AUS-0A07R47-SS-03	Heptachlor epoxide	J/UJ
AUS-0A07R47-SS-03	Gamma chlordane	J/UJ
AUS-0A07R47-SS-03	Endosulfan I	J/UJ
AUS-0A07R47-SS-03	Endrin	J/UJ
AUS-0A07R47-SS-03	Alpha-chlordane	J/UJ
AUS-0A07R47-SS-04	Heptachlor	J/UJ
AUS-0A07R47-SS-04	Aldrin	J/UJ
AUS-0A07R47-SS-04	Heptachlor epoxide	J/UJ
AUS-0A07R47-SS-04	Gamma chlordane	J/UJ
AUS-0A07R47-SS-04	Endosulfan I	J/UJ
AUS-0A07R47-SS-04	Endrin	J/UJ
AUS-0A07R47-SS-04	Alpha-chlordane	J/UJ
AUS-0A07R47-SS-05	Heptachlor	J/UJ
AUS-0A07R47-SS-05	Aldrin	J/UJ
AUS-0A07R47-SS-05	Heptachlor epoxide	J/UJ
AUS-0A07R47-SS-05	Gamma chlordane	J/UJ
AUS-0A07R47-SS-05	Endosulfan I	J/UJ
AUS-0A07R47-SS-05	Endrin	J/UJ
AUS-0A07R47-SS-05	Alpha-chlordane	J/UJ
AUS-0A07R47-SS-02DL	Heptachlor	J/UJ
AUS-0A07R47-SS-02DL	Aldrin	J/UJ

Crab Orchard Area 7 Data Review

Laboratory SDG: 203560

Field ID	Analyte	Qualification
AUS-0A07R47-SS-02DL	Heptachlor epoxide	J/UJ
AUS-0A07R47-SS-02DL	Gamma chlordane	J/UJ
AUS-0A07R47-SS-02DL	Endosulfan I	J/UJ
AUS-0A07R47-SS-02DL	Endrin	J/UJ
AUS-0A07R47-SS-02DL	Alpha-chlordane	J/UJ
AUS-0A07R47-SS-03DL	Heptachlor	J/UJ
AUS-0A07R47-SS-03DL	Aldrin	J/UJ
AUS-0A07R47-SS-03DL	Heptachlor epoxide	J/UJ
AUS-0A07R47-SS-03DL	Gamma chlordane	J/UJ
AUS-0A07R47-SS-03DL	Endosulfan I	J/UJ
AUS-0A07R47-SS-03DL	Endrin	J/UJ
AUS-0A07R47-SS-03DL	Alpha-chlordane	J/UJ
AUS-0A07R47-SS-04DL	Heptachlor	J/UJ
AUS-0A07R47-SS-04DL	Aldrin	J/UJ
AUS-0A07R47-SS-04DL	Heptachlor epoxide	J/UJ
AUS-0A07R47-SS-04DL	Gamma chlordane	J/UJ
AUS-0A07R47-SS-04DL	Endosulfan I	J/UJ
AUS-0A07R47-SS-04DL	Endrin	J/UJ

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes.

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

Yes, AUS-0A07-R55-SS-02.

Crab Orchard Area 7 Data Review

Laboratory SDG: 203560

Were MS/MSD recoveries within evaluation criteria?

Yes.

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
NA				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
N/A		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

Yes

Field ID	Field Duplicate ID
AUS-0A07-R43-SS-02	AUS-0A07-517-SS-02
AUS-0A07-R61-SS-02	AUS-0A07-518-SS-02
AUS-0A07-R71-SS-0X	AUS-0A07-519-SS-0X

Crab Orchard Area 7 Data Review

Laboratory SDG: 203560

Were field duplicates within evaluation criteria?

No

Field ID	Field Duplicate ID	Analyte	Qualification
AUS-0A07-R43-SS-02	AUS-0A07-517-SS-02	Aldrin	J/UJ
AUS-0A07-R43-SS-02	AUS-0A07-517-SS-02	Dieldrin	J/UJ
AUS-0A07-R43-SS-02	AUS-0A07-517-SS-02	Endrin keton	J/UJ

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No; however, samples were diluted due to the presence of high concentrations of target analytes.

11.0 Additional Qualifications

Were additional qualifications applied?

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Professional judgement was used to qualify acetone and methylene chloride data reported less than two times (2X) the RL since both compounds are common laboratory contaminants. Additionally, if the RPD for an initial analysis concentration and a reanalysis (or dilution analysis) concentration was greater than 50%, then the data was qualified nondetect (U) based on professional judgement.

Crab Orchard Area 7 Data Review

Laboratory SDG: G296-79 (Paradigm Analytical)

Reviewer: Jeff Aust

Date Reviewed: 4/21/2001

Sample Identification #	Sample Identification #
AUS-0A07-045-SS-0X	AUS-0A07-076-SS-0X

1.0 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes

2.0 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form which are not discussed in subsequent sections?

The laboratory case narrative/cooler receipt form indicated the following:

- A case narrative/cooler receipt form was not provided

3.0 Holding Times

Were samples extracted/analyzed within QAPP limits?

Yes

Field ID	Analyte	Qualification
N/A		

4.0 Blank Contamination

Were any analytes detected in the Method Blanks, Field Blanks or Trip Blanks?

Yes

Blank ID	Analyte	Concentration	Units
LMB	1,2,3,4,6,7,8-HpCDD	0.446	pg/g
LMB	OCDD	1.26	pg/g
LMB	1,2,3,4,6,7,8-HpCDF	0.0960	pg/g
LMB	2,3,4,7,8-PeCDF	0.0700	pg/g

Crab Orchard Area 7 Data Review

Laboratory SDG: G296-79 (Paradigm Analytical)

Blank ID	Analyte	Concentration	Units
LMB	Total HpCDDs	0.446	pg/g
LMB	Total PeCDFs	0.0700	pg/g
LMB	Total HpCDFs	0.0960	pg/g
LMB	ITEF TEQ (ND=0)	0.0417	pg/g
LMB	ITEF TEQ (ND=1/2)	0.144	pg/g

Qualifications due to blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration (10X for common laboratory contaminants) did not require qualification.

Field ID	Analyte	New RL	Qualification	Assoc. Blank ID
AUS-0A07-076-SS-0X	2,3,4,7,8-PeCDF	0.0823	U	LMB

5.0 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

Yes

LCS ID	LCS Compound	LCS/LCSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

LCS ID	LCS Compound	LCS Recovery, primary (%)	LCS Recovery, secondary (%)	LCS Criteria (%)
N/A				

Analytical data that required qualification based on LCS data are included in the table below. Analytical data which were reported as nondetect and associated with LCS recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

6.0 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes

Crab Orchard Area 7 Data Review

Laboratory SDG: G296-79 (Paradigm Analytical)

Field ID	Analysis	Surrogate	Recovery	Criteria
N/A				

Analytical data that required qualification based on surrogate data are included in the table below. Analytical data which were reported as nondetect and associated with surrogate recoveries above evaluation criteria, indicating a possible high bias, did not require qualification.

Field ID	Analyte	Qualification
N/A		

7.0 Matrix Spike and Matrix Spike Duplicate Recoveries

Were MS/MSD samples reported as part of this SDG?

No.

Were MS/MSD recoveries within evaluation criteria?

NA

MS/MSD ID	Analyte	MS/MSD Recovery (%)	RPD	Criteria (%/RPD)
N/A				

Analytical data that required qualification based on MS/MSD data are included in the table below. The MS/MSD recoveries for inorganic compounds with sample concentrations greater than four times (4X) the matrix spike concentration did not require evaluation or qualification.

Field ID	Analyte	Qualification
NA		

8.0 Lab Duplicate Results

Were lab duplicate samples collected as part of this SDG?

No.

Were laboratory duplicate sample RPDs within criteria?

Crab Orchard Area 7 Data Review

Laboratory SDG: G296-79 (Paradigm Analytical)

N/A.

Field ID	Analyte	%RPD	Criteria
N/A			

Field ID	Analyte	Qualification
N/A		

9.0 Field Duplicate Results

Were field duplicate samples collected as part of this SDG?

No.

Field ID	Field Duplicate ID
N/A	

Were field duplicates within evaluation criteria?

NA

Field ID	Field Duplicate ID	Analyte	Qualification
N/A			

10.0 Sample Dilutions

For samples which were diluted, were undiluted results also reported?

No samples were diluted

The following table identifies the analyses which only diluted results were provided and one or more analytes were reported as nondetect.

Analysis	Quantity	Dilution Factor Range
N/A		

11.0 Additional Qualifications

Were additional qualifications applied?

Crab Orchard Area 7 Data Review

Laboratory SDG: G296-79 (Paradigm Analytical)

No.

Field ID	Analyte	New RL	Qualification	Comments
N/A				

Professional judgement was used to qualify acetone and methylene chloride data reported less than two times (2X) the RL since both compounds are common laboratory contaminants. Additionally, if the RPD for an initial analysis concentration and a reanalysis (or dilution analysis) concentration was greater than 50%, then the data was qualified nondetect (U) based on professional judgement.

12.0 QA/QC Summary

QA/QC ID	Analysis	# of Analytes	# of Analytes Outside Criteria
Surrogates	Dioxins	18	0
Laboratory Control Samples (LCS and LCSD)	Dioxins	17	0
Matrix Spikes (MS and MS/MSD)	N/A	-	-
Precision (Lab Dup, MSD RPD and LCS RPD)	N/A	-	-
Field Duplicates	N/A	-	-

APPENDIX B

LETTER FROM IEPA

RECEIVED

JUN 11 2001



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

(217) 785-7728

THOMAS V. SKINNER, DIRECTOR

June 7, 2001

U.S. Fish and Wildlife Service
 Attn: Mr. Dennis Pinigis, Superfund Mgr.
 Crab Orchard National Wildlife Refuge
 8588 Route 148
 Marion, IL 62959

Re: Area 7 Pesticides

1998620014 -- Williamson
 Crab Orchard/AUS OU
 Superfund/Technical File

Dear Mr. Pinigis:

On May 15, 2001 the Illinois Environmental Protection Agency ("Illinois EPA") received electronic mail from the U.S. Fish and Wildlife Service ("USFWS") containing information related to pesticide sampling in four buildings in Area 7 of the Crab Orchard National Wildlife Refuge ("Refuge"). Area 7 is one of the areas investigated as part of the Additional and Uncharacterized Sites ("AUS") Operable Unit ("OU") Preliminary Assessment/Site Investigation ("PA/SI"). Great Lakes Terminal and Transport (GLT&T), also known as Great Lakes Solvents, leased the buildings in Area 7 for storage of pesticides for Shell Chemical Company. These four warehouse buildings were numbered: IN-1-3, IN-1-4, IN-1-5 and IN-1-6. These buildings have had several tenants since WWII and all four are currently occupied.

Maytag, MDM Distributors (the Party Shop), USFWS and the Illinois Department of Natural Resources continue to use the warehouses now. Employees of these entities enter the buildings varying amounts. USFWS collected dust, air and wipe samples from the interiors of the buildings because of pesticide residues found outside the buildings, the past pesticide storage within the buildings and because the buildings are in use. In order to assist USFWS understand the risk implications of worker contact with pesticides detected inside the buildings, Illinois EPA calculated conservative screening levels for most of the analyzed pesticides (described below).

It appears that two of the pesticides, aldrin and dieldrin, are present above their screening levels. This suggests that the buildings may be unacceptable for routine worker exposure. Note Illinois EPA has not evaluated the results of the air samples, since URS has already recommended minimizing worker exposure due to the measured air values in their report.

Screening Levels – The screening levels have been calculated using a procedure developed by Jeffrey M. Paul (*A Proposed Risk-Based Model for the Evaluation of*

788
 GEORGE H. RYAN, GOVERNOR

1998620014
 Crab Orchard
 Superfund

Mr. Dennis Pinigis, USFWS
 Area 7 Pesticides
 June 7, 2001
 Page 2 of 4

1998620014 -- Williamson
 Crab Orchard/AUS OU
 Superfund/Technical File

Surface Contamination, and the Assessment of Potential Dermal Exposure. Thesis submitted to: The School of Hygiene and Public Health of the Johns Hopkins University. (1997). This is one of two approaches for addressing surface exposures that have been recommended to the Illinois EPA by USEPA. The basic equation for calculating the Risk-Based Screening Level (RBSL, in units of ug/cm²) is:

$$\text{RBSL} = \frac{D_{\max} \times \text{BW} \times \text{AT}}{\text{CR} \times f_{ss} \times [((1 - f_{do}) \times (f_{der})) + (f_{do} \times f_{gi})] \times \text{EF} \times \text{ED}}, \text{ where:}$$

- D_{\max} = Risk-Specific and Benchmark Dose (Risk-Specific Dose (RSD) for carcinogens and Reference Dose (RfD) for noncarcinogens, chemical-specific);
 BW = Body Weight (70 kg assumed)
 AT = Averaging Time (70 years for carcinogens and 1 year for noncarcinogens assumed)
 CR = Surface Area Contact Rate (420 cm²/hr for 8 hours assumed)
 f_{ss} = Transfer Efficiency from Surface to Skin (10% = 0.10 assumed)
 f_{do} = Transfer Efficiency from Dermal to Oral Route (5% = 0.05 assumed)
 f_{der} = Dermal Absorption Fraction (chemical-specific or 10% = 0.10 assumed for organic chemicals and 1% = 0.01 assumed for inorganic chemicals)
 f_{gi} = Oral Absorption Fraction (chemical-specific)
 EF = Exposure Frequency (250 d/yr assumed for workers)
 ED = Exposure Duration (1 year assumed)

The chemical-specific variables (where available) for the analyzed chemicals are summarized in the following table. Note that the Risk-Specific Dose assumes an excess cancer risk of 1E-06.

Chemical	RSD (ug/kg/d)	RfD (ug/kg/d)	f_{der}	f_{gi}
Aldrin	5.9E-05 ^a	0.03 ^a	0.078 ^b	0.80 ^c
Dieldrin	6.25E-05 ^a	0.05 ^a	0.077 ^b	0.80 ^c
Endrin + Ketone (total)	NA	0.30 ^d	0.10 ^c	0.80 ^c
DDT	2.9E-03 ^a	0.50 ^a	0.03 ^f	0.80 ^f
Isodrin	ND	ND	ND	ND

Notes:

NA = Not applicable.

ND = No data available.

(a) = Value from USEPA's Integrated Risk Information System (IRIS; online).

(b) = Value from ATSDR's Toxicological Profile for Aldrin/Dieldrin (Update). US Dept. of Health & Human Services. September 2000.

(c) = Value from ATSDR's Toxicological Profile for Chlordane (Update). US Dept. of Health & Human Services. May 1994. (Based on structural similarity.)

(d) = Value from USEPA Region 3's Risk-Based Concentration Table, 10/5/00.

(e) = Default value, no chemical-specific value available.

(f) = Value from ATSDR's Toxicological Profile for DDT/DDD/DDE (Update). US

Mr. Dennis Pinigis, USFWS
 Area 7 Pesticides
 June 7, 2001
 Page 3 of 4

1998620014 -- Williamson
 Crab Orchard/AUS OU
 Superfund/Technical File

Dept. of Health & Human Services. September 2000.

Using the default and chemical-specific values listed above, screening levels were calculated for carcinogenic and/or noncarcinogenic effects for all chemicals except isodrin (for which insufficient data were available to complete calculations). Since the analytical data are reported as ug/wipe, and the wipe samples were collected from 1 square foot surfaces (= 929 square centimeters), all data were converted to units of ug/cm² to facilitate comparison with the screening values. The analytical data and screening values are summarized in the following table.

Chemical	Amount (maximum) (ug/cm ²)	RBSL (cancer) (ug/cm ²)	RBSL (noncancer) (ug/cm ²)
Aldrin	0.78	0.01	0.08
Dieldrin	0.64	0.01	0.13
Endrin + Ketone (total)	0.32	NA	0.68
DDT	0.06	0.22	9.1
Isodrin	0.12	ND	ND

Notes:

NA = Not applicable

ND = No data available.

Discussion – Comparing the RBSLs to the maximum amount analyzed on a building surface, it can be seen that workers are potentially exposed to unacceptable levels of pesticides in all three buildings for aldrin and dieldrin. These results suggest that worker exposure be minimized to protect against both cancer and noncancer risks, since the maximum amounts of both chemicals exceed both the cancer and noncancer RBSLs. Furthermore, aldrin and dieldrin are similar in structure and toxic endpoints, so their effects are considered additive.

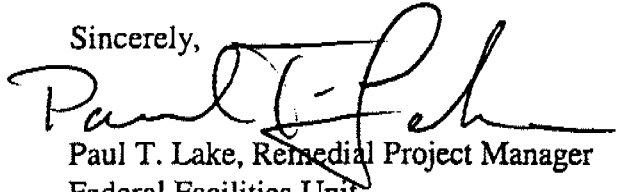
It should be noted that the calculation of the RBSLs has been done using conservative assumptions, such as assuming full-time worker exposure (8 hr/d for 250 d/yr) and a surface contact rate of 420 cm²/hr. If the workers' exposures are less than these assumed values, then their risks would be correspondingly less. However, as mentioned above, the inhalation risks have already been found to be a concern, so the workers' total exposure to pesticides is likely to be unacceptable under all but the briefest of exposures.

Mr. Dennis Pinigis, USFWS
Area 7 Pesticides
June 7, 2001
Page 4 of 4

1998620014 -- Williamson
Crab Orchard/AUS OU
Superfund/Technical File

Should you have any questions regarding this letter, please do not hesitate to contact me at 217/785-7728.

Sincerely,



Paul T. Lake, Remedial Project Manager
Federal Facilities Unit
Federal Sites Remediation Section
Bureau of Land

HL
PTL:bac:sdn:H:\CONWR\adduncou\area7pestcuos

cc: Nan Gowda, USEPA (SRF-5J)
Mary Fulgham, USEPA
Janet Goodwin, DOI
Gary Chisholm, USACE-Louisville