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NSA MID SOUTH  
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PRELIMINARY RISK EVALUATION WHERRY HOUSING MILLINGTON SUPPACT TN  
8/6/2001  
ENSAFE

# **Preliminary Risk Evaluation**

## **NSA Mid-South — Millington, Tennessee Wherry Housing**

**Revision: 0**

**Prepared for:**

**NSA Mid-South  
Millington, Tennessee**

**Prepared by:**

***ENSAFE***

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**August 6, 2001**

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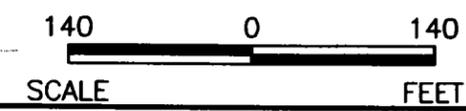
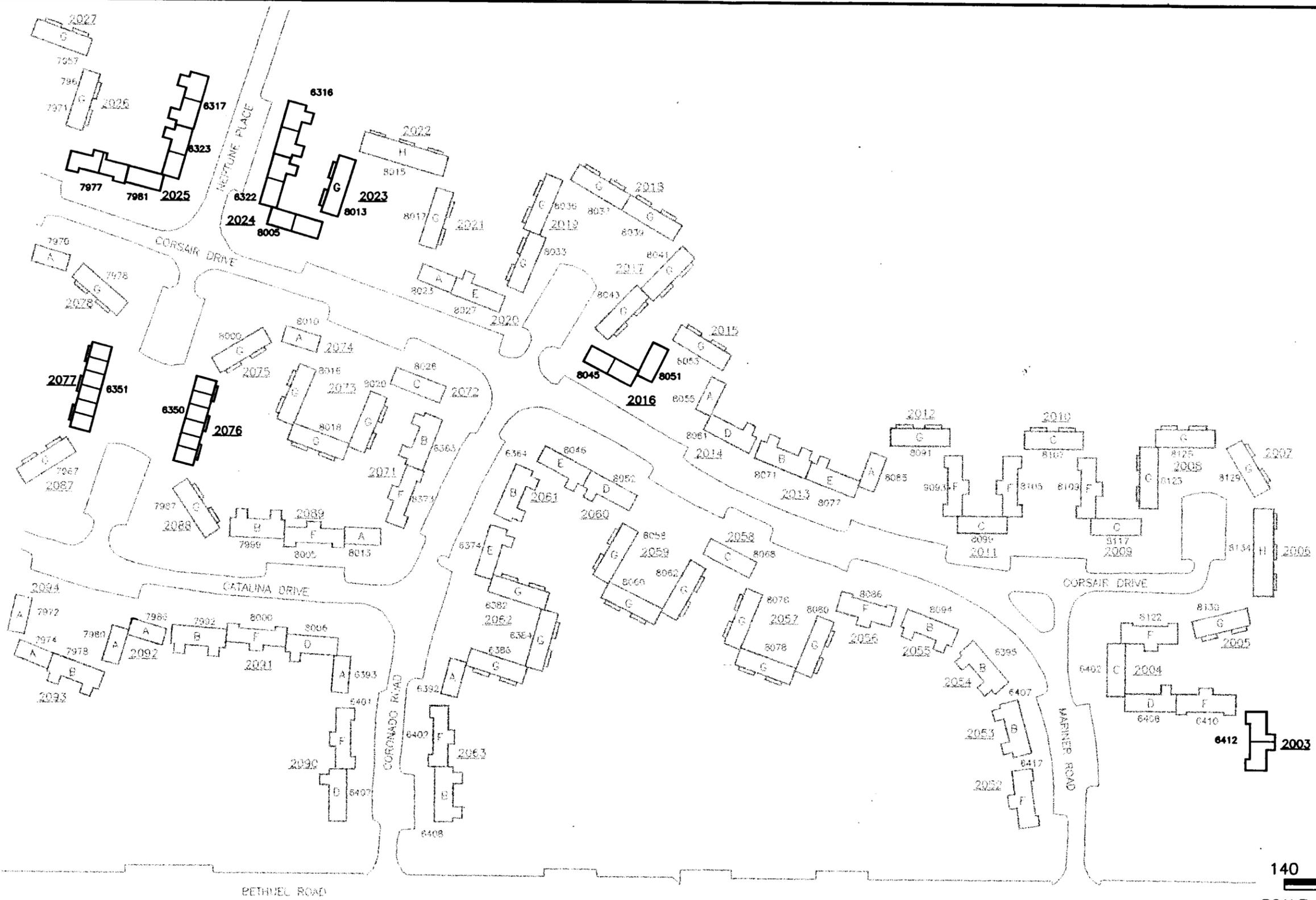
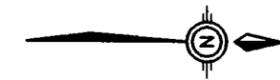
## **1.0 INTRODUCTION**

This preliminary risk evaluation (PRE) has been conducted to determine whether soil beneath and around six buildings slated for demolition in the Wherry Housing complex at NSA Mid-South would pose an unacceptable risk to future construction workers and/or children, who will ultimately use the areas for playgrounds. EnSafe visited the site from July 6 to July 10, 2001, to implement the soil sampling activities outlined in the *Sampling Work Plan — Wherry Housing, Naval Support Activity (NSA) Mid-South, Millington, Tennessee* (EnSafe, 2001). The contaminants of interest are pesticides, specifically chlorinated and organophosphorus pesticides that may have been routinely used for pest control. The Wherry Housing complex, which is on the eastern portion of the NSA Mid-South Northside (Figure 1), consists of multiple-unit one- and two-story wood-framed buildings on concrete slab foundations with brick exterior walls. The six housing units 2003, 2016, 2024, 2025, 2076, and 2077 slated for demolition are shown on Figure 2.

## **2.0 SOIL SAMPLING**

The housing units have been treated for termites through injection of pesticides beneath the building foundation via holes drilled into the exterior walls and/or injection of pesticides directly into the ground around the building foundation. Therefore, the investigation focused on both areas. Soil samples were collected around the building's perimeter from 18 to 24 inches below ground surface (bgs) with a stainless-steel hand auger. Site plans provided by NSA Mid-South indicate this is just below the building footings and the zone likely to have received past pesticide/termiticide applications. Backfill samples were also collected from beneath the buildings by coring a 5-inch diameter hole into the concrete slab, then collecting sample material from directly beneath the concrete. The backfill material generally consisted of tan sand with occasional pea gravel.





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FIGURE 2  
BUILDING LOCATION MAP  
WHERRY HOUSING  
NSA MID-SOUTH  
MILLINGTON, TENNESSEE

DWG DATE: 07/23/01 NAME: 3134001W001

Except for one grab sample, all soil samples were either two-, three-, or four-point composite samples. Sample locations and sample IDs for each building are shown on Figures 3 - 6. Equal amounts of material from each composite sampling location were collected into a clean stainless steel bowl. The material was mixed using a clean stainless-steel spoon and immediately placed into glass sample containers provided by the laboratory. The samples were then placed on ice, logged on the chain of custody, and shipped to the Severn Trent Laboratories in Savannah, Georgia, via an overnight courier. Samples were analyzed for chlorinated pesticides using USEPA Method 8081 and organophosphorus pesticides using USEPA Method 8141. Quality control/quality assurance (QA/QC) samples collected to ensure the validity of the sampling results included three duplicates, one field blank, two matrix spike/matrix spike duplicates, and one equipment rinsate blank sample.

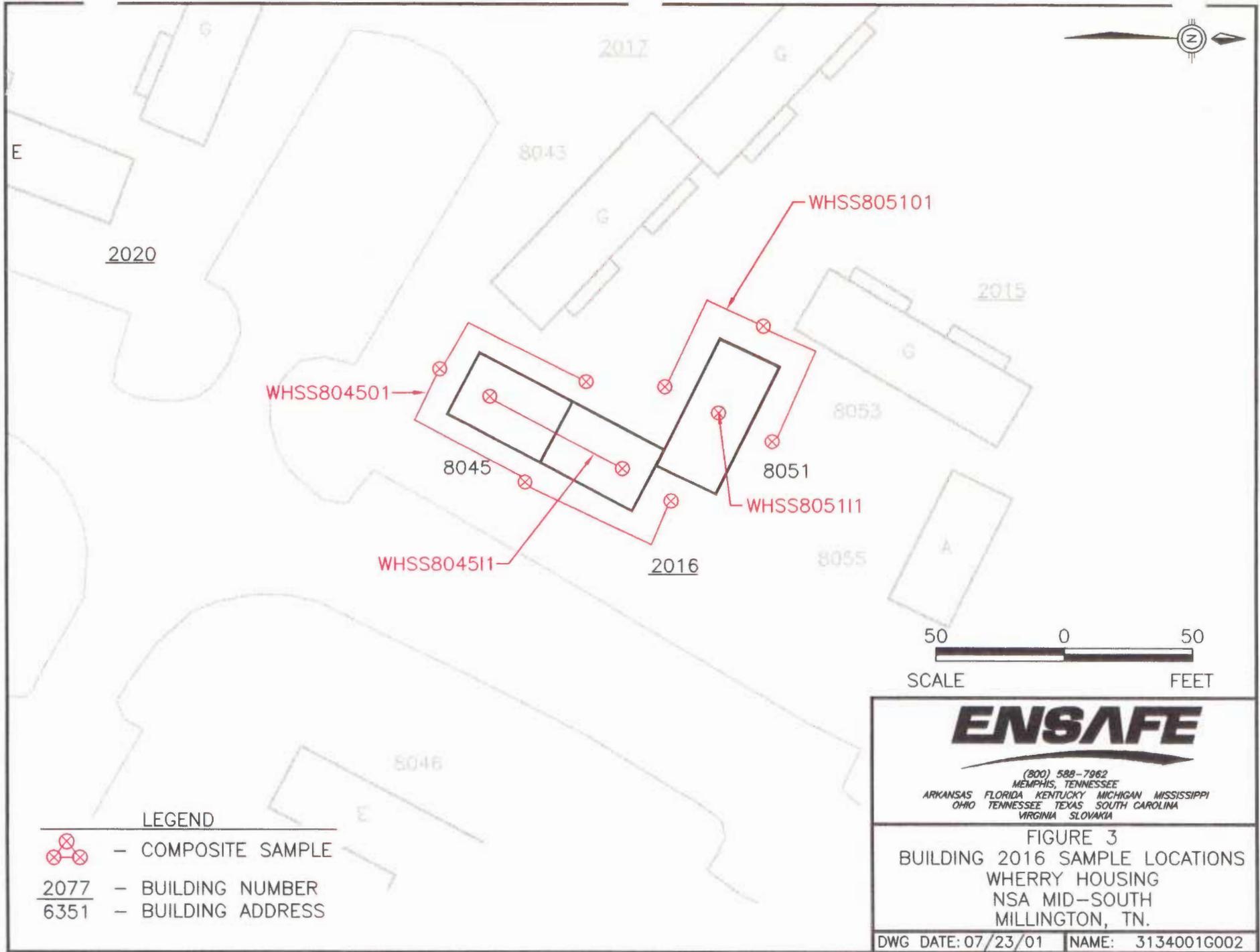
### **3.0 ANALYTICAL RESULTS**

Samples were analyzed and reported as definitive data, and QC forms were submitted for validation. Two types of definitive data packages were submitted for review: summary QC package (formerly USEPA Level III deliverables without raw data) were provided for 90 percent of the samples while a full QC package (formerly USEPA Level IV deliverables with raw data) were provided for 10 percent of the samples. Analytical data and the data validation report are presented in Appendix A.

### **4.0 PRELIMINARY RISK EVALUATION**

#### **4.1 Contaminants of Potential Concern (COPC) Selection**

In accordance with *Supplemental Guidance to RAGS Bulletin 1, Data Collection and Evaluation* (USEPA, November 1995), COPCs were identified by comparing the maximum concentration of each detected chemical with its corresponding residential and industrial soil preliminary remediation goal (PRG) values. The PRGs are based on a target incidental lifetime cancer risk



**LEGEND**

-  - COMPOSITE SAMPLE
- 2077 - BUILDING NUMBER
- 6351 - BUILDING ADDRESS



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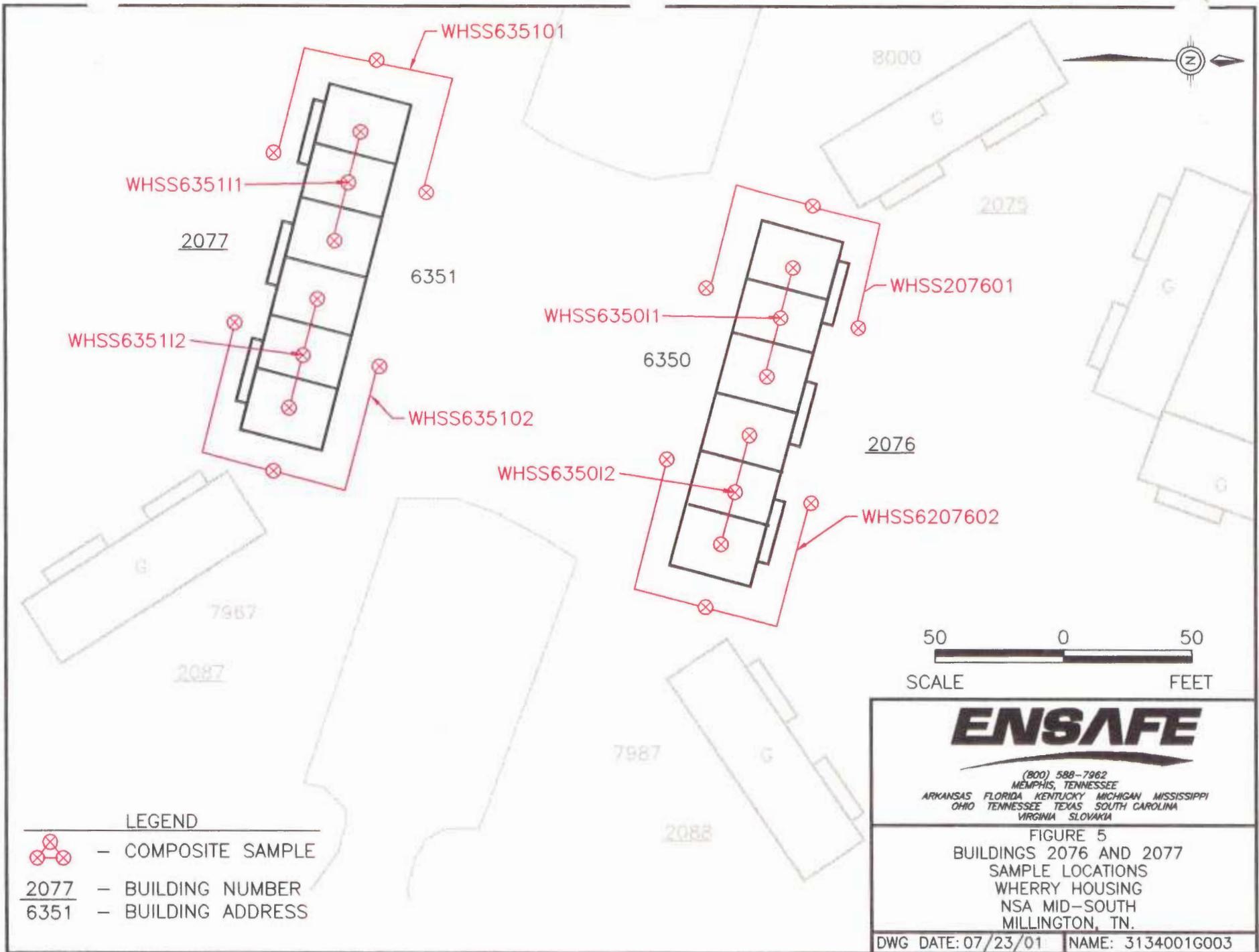
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**FIGURE 3**  
BUILDING 2016 SAMPLE LOCATIONS  
WHERRY HOUSING  
NSA MID-SOUTH  
MILLINGTON, TN.

DWG DATE: 07/23/01      NAME: 3134001G002





WHSS635111

2077

6351

WHSS635112

WHSS635102

WHSS635011

6350

WHSS207601

WHSS635012

2076

WHSS6207602

50 0 50  
SCALE FEET

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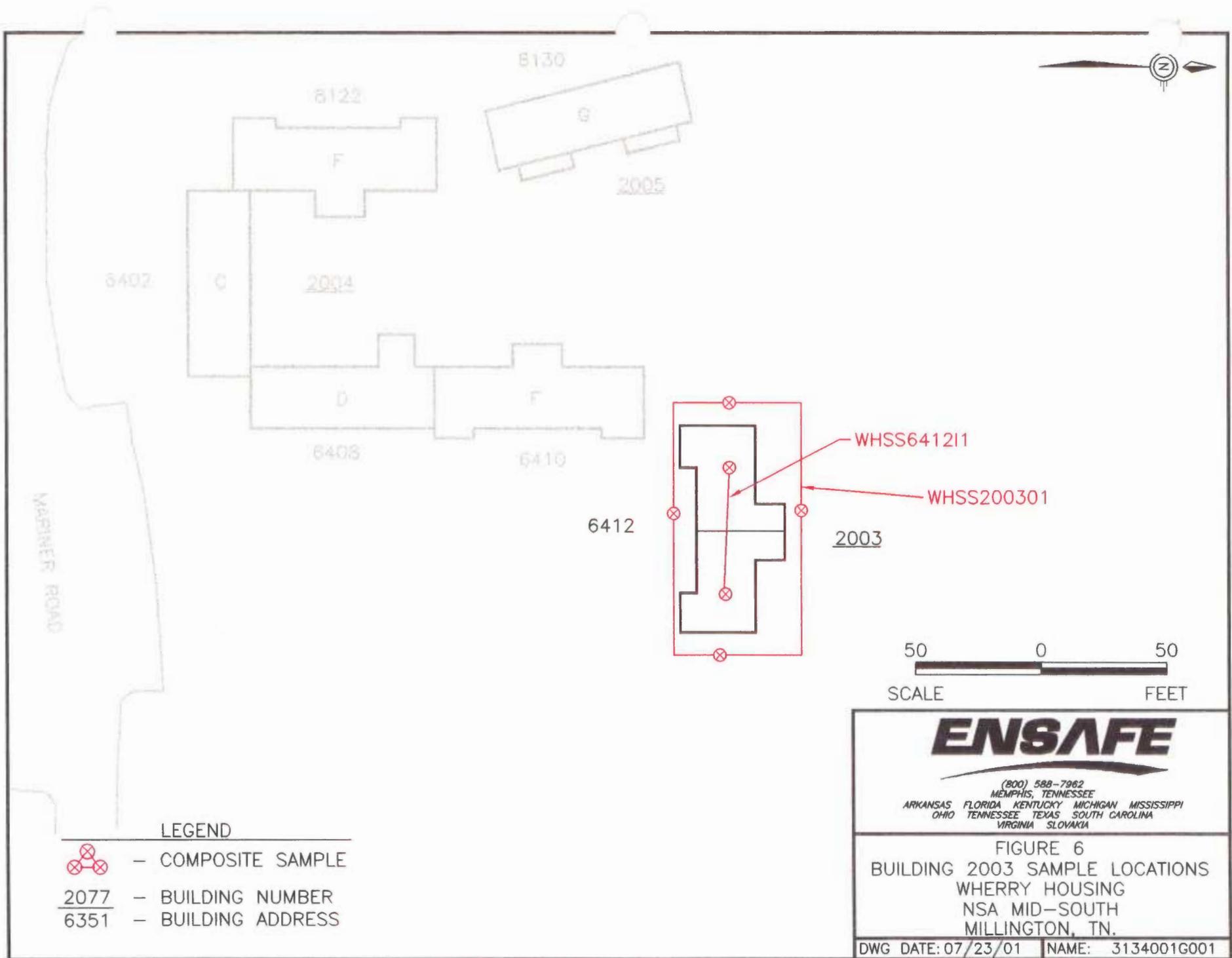
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FIGURE 5  
BUILDINGS 2076 AND 2077  
SAMPLE LOCATIONS  
WHERRY HOUSING  
NSA MID-SOUTH  
MILLINGTON, TN.

DWG DATE: 07/23/01 NAME: 3134001G003

LEGEND

-  - COMPOSITE SAMPLE
- 2077 - BUILDING NUMBER
- 6351 - BUILDING ADDRESS



LEGEND

-  - COMPOSITE SAMPLE
- 2077 - BUILDING NUMBER
- 6351 - BUILDING ADDRESS

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FIGURE 6  
BUILDING 2003 SAMPLE LOCATIONS  
WHERRY HOUSING  
NSA MID-SOUTH  
MILLINGTON, TN.

DWG DATE: 07/23/01 | NAME: 3134001G001

(ILCR) of 1E-06 and a target hazard quotient (HQ) of 1. Noncarcinogenic-based PRGs were adjusted from a target HQ of 1 to 0.1 in accordance with the Supplemental Guidance to RAGS. The cumulative ILCR threshold is 1E-04 and the cumulative hazard threshold is 1, in accordance with *Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease* (USEPA 1994).<sup>1</sup>

Table 1, which summarizes the soil data, presents detection ranges and frequencies, average detected concentrations, and industrial and residential soil Region 9 PRGs for residential and industrial soil (USEPA, 2000). Aldrin, alpha-chlordane, dieldrin, gamma-chlordane, heptachlor, and heptachlor epoxide were identified as COPCs.

Because the industrial receptor identified for this site is a construction worker, the exposure assumptions used to calculate the Region 9 industrial PRGs are not appropriate for this scenario. Region 9 industrial soil PRGs are based on a default scenario for a site worker who is expected to be present on the site 250 days per year for a total duration of 25 years and who is assumed to ingest 50 milligrams of soil per day. Because construction activities are much briefer, exposure parameter assumptions used for other sites at NSA Mid-South were used to calculate site-specific construction worker soil PRGs (SSPRGs) (EnSafe, 1999). The exposure assumptions used for the construction worker are listed below.

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<sup>1</sup>Carcinogens eliminated based on the 1E-06 target risk are not expected to contribute greatly to cumulative ILCR, because this threshold is 1E-04. Noncarcinogens are not be expected to greatly contribute to the hazard index (HI) because the target HQ (0.1) is less than the cumulative threshold of 1. Screening determines which contaminants pose the greatest threat to human receptors identifies hot spots and eliminates chemicals that would not significantly affect the PRE conclusions.

Table 1  
 Frequency and Occurrence of Pesticides in Soil  
 Wherry Housing, Millington, Tennessee

Chemical	Units	Detection Range	Detection Frequency	Average Detected Concentration	Residential Soil PRG	Industrial Soil PRG	Exceeds	
							Residential Soil PRG?	Industrial Soil PRG
Chlorpyrifos	mg/kg	8.00E-03 – 1.30E-02	3 / 30	1.07E-02	1.83E+01	2.64E+02	No	No
Malathion	mg/kg	1.60E-02 – 2.00E-02	6 / 30	1.73E-02	1.22E+02	1.76E+03	No	No
Tetrachlorovinphos (Stirophos)	mg/kg	1.40E-02 – 1.40E-02	1 / 30	1.40E-02	2.03E+01	1.03E+02	No	No
Trichloronate	mg/kg	4.80E-03 – 5.00E-03	4 / 30	4.93E-03	NA	NA	NA	No
4,4'-DDE	mg/kg	7.20E-04 – 3.90E-02	12 / 30	6.48E-03	1.72E+00	1.21E+01	No	No
4,4'-DDT	mg/kg	7.70E-04 – 9.40E-01	8 / 30	1.20E-01	1.72E+00	1.21E+01	No	No
<b>Aldrin</b>	mg/kg	2.30E-01 – 7.30E-01	4 / 30	4.00E-01	2.86E-02	1.45E-01	<b>Yes</b>	<b>Yes</b>
<b>alpha-Chlordane</b>	mg/kg	1.50E-02 – 4.30E+01	21 / 30	2.51E+00	1.62E+00	1.07E+01	<b>Yes</b>	<b>Yes</b>
<b>Dieldrin</b>	mg/kg	1.30E-03 – 5.10E+01	24 / 30	6.74E+00	3.04E-02	1.54E-01	<b>Yes</b>	<b>Yes</b>
Endrin	mg/kg	1.70E-03 – 1.20E+00	7 / 30	5.65E-01	1.83E+00	2.64E+01	No	No
<b>gamma-Chlordane</b>	mg/kg	1.70E-02 – 7.50E+01	23 / 30	4.37E+00	1.62E+00	1.07E+01	<b>Yes</b>	<b>Yes</b>
<b>Heptachlor</b>	mg/kg	3.10E-03 – 8.40E+01	24 / 30	6.92E+00	1.08E-01	5.48E-01	<b>Yes</b>	<b>Yes</b>
<b>Heptachlor Epoxide</b>	mg/kg	9.40E-04 – 5.20E-01	19 / 30	7.41E-02	5.34E-02	2.71E-01	<b>Yes</b>	<b>Yes</b>

Notes:

PRG = preliminary remediation goal (USEPA Region 9, 2000)

mg/kg = milligrams per kilogram

NA = not applicable

- Exposure frequency (EF)                      120 days per year
- Exposure duration (ED)                      1 year
- Soil ingestion rate (IR)                      200 milligrams per day

These exposure assumptions account for the shorter exposure periods and increased soil ingestion rates for construction workers. While these values are not presented in any guidance, they were agreed to by the Tennessee Department of Environment and Conservation and USEPA Region 4 for use during the RCRA Facility Investigations at NSA Mid-South. All other exposure parameters, chemical/physical values, toxicity values, and route-to-route extrapolation assumptions are the same as those used in the Region 9 PRG calculations. SSPRGs were calculated only for chemicals that exceeded the Region 9 industrial soil PRGs. Tables 2 - 6 present the calculations used to develop the SSPRGs for the construction worker scenario. Table 7 indicates that only dieldrin and heptachlor exceed the SSPRGs.

#### 4.2 Pre Methodology

Equations 1 and 2 were used to estimate risk and hazard ratios.

$$\text{Carcinogenic Risk Ratio} = \frac{\text{maximum concentration} \times \text{target risk level}(10^{-6})}{\text{Screening Level}} \quad \text{Equation 1}$$

$$\text{Noncarcinogenic Hazard Ratio} = \frac{\text{maximum concentration} \times \text{target hazard quotient}(1)}{\text{Screening Level}} \quad \text{Equation 2}$$

where: Screening Level = Region 9 PRG for residential soil or the site-specific construction worker soil PRG.

Table 2  
 Calculation of Site-specific Preliminary Remediation Goals: Oral Pathway  
 Construction Worker Scenario  
 Wherry Housing, Millington, Tennessee

**Noncarcinogenic**

Equation	Oral SSPRG <sub>N</sub>	=	[(	THI	×	BW	×	AT	×	RfDo	×	365	)]+(	IR	×	ED	×	EF	×	1E-06	)]
Units	mg/kg			unitless		kg		years		mg/kg-day		days/year		mg/day		years		days/year		kg/mg	
Aldrin	3.19E+01	=	[(	1	×	70	×	1	×	3E-05	×	365	)]+(	200	×	1	×	120	×	1E-06	)]
Dieldrin	5.32E+01	=	[(	1	×	70	×	1	×	5E-05	×	365	)]+(	200	×	1	×	120	×	1E-06	)]
Heptachlor	5.32E+02	=	[(	1	×	70	×	1	×	5E-04	×	365	)]+(	200	×	1	×	120	×	1E-06	)]
Heptachlor Epoxide	1.38E+01	=	[(	1	×	70	×	1	×	1.3E-05	×	365	)]+(	200	×	1	×	120	×	1E-06	)]
alpha-Chlordane	5.32E+02	=	[(	1	×	70	×	1	×	5E-04	×	365	)]+(	200	×	1	×	120	×	1E-06	)]
gamma-Chlordane	5.32E+02	=	[(	1	×	70	×	1	×	5E-04	×	365	)]+(	200	×	1	×	120	×	1E-06	)]

**Carcinogenic**

Equation	Oral SSPRG <sub>C</sub>	=	[(	TR	×	BW	×	AT	×	365	+	SFo	×	IR	×	ED	×	EF	×	1E-06	)]
Units	mg/kg			unitless		kg		years		days/year		(mg/kg-day) <sup>-1</sup>		mg/day		years		days/year		kg/mg	
Aldrin	4.38E+00	=	[(	1E-06	×	70	×	70	×	365	+	1.7E+01	×	200	×	1	×	120	×	1E-06	)]
Dieldrin	4.66E+00	=	[(	1E-06	×	70	×	70	×	365	+	1.6E+01	×	200	×	1	×	120	×	1E-06	)]
Heptachlor	1.66E+01	=	[(	1E-06	×	70	×	70	×	365	+	4.5E+00	×	200	×	1	×	120	×	1E-06	)]
Heptachlor Epoxide	8.19E+00	=	[(	1E-06	×	70	×	70	×	365	+	9.1E+00	×	200	×	1	×	120	×	1E-06	)]
alpha-Chlordane	2.13E+02	=	[(	1E-06	×	70	×	70	×	365	+	3.5E-01	×	200	×	1	×	120	×	1E-06	)]
gamma-Chlordane	2.13E+02	=	[(	1E-06	×	70	×	70	×	365	+	3.5E-01	×	200	×	1	×	120	×	1E-06	)]

Notes:

- SSPRG<sub>N</sub> = noncancer site-specific preliminary remediation goal
- THI = target hazard index
- BW = body weight
- AT = averaging time
- RfDo = reference dose
- IR = ingestion rate
- ED = exposure duration
- EF = exposure frequency
- SSPRG<sub>C</sub> = cancer site-specific preliminary remediation goal
- TR = target risk level
- SFo = oral slope factor
- NA = not applicable

Surrogate toxicity values:

Chlordane toxicity values were used for alpha-chlordane and gamma-chlordane.

Table 3  
 Calculation of Site-specific Preliminary Remediation Goals: Dermal Pathway  
 Construction Worker Scenario  
 Wherry Housing, Millington, Tennessee

**Noncarcinogenic**

Equation	Dermal SSPRG <sub>N</sub>	=	[(	THI	x	BW	x	AT	x	RfDo	x	365	)+(	SA	x	AF	x	ABS	x	EF	x	ED	x	1E-06	)]
Units	mg/kg			unitless		kg		years		mg/kg-day		days/year		cm <sup>2</sup> /event		mg/cm <sup>2</sup>		unitless		events/year		years		kg/mg	
Aldrin	9.68E+01	=	[(	1	x	70	x	1	x	3.00E-05	x	365	)+(	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
Dieldrin	1.61E+02	=	[(	1	x	70	x	1	x	5.00E-05	x	365	)+(	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
Heptachlor	1.61E+03	=	[(	1	x	70	x	1	x	5.00E-04	x	365	)+(	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
Heptachlor Epoxide	4.19E+01	=	[(	1	x	70	x	1	x	1.30E-05	x	365	)+(	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
alpha-Chlordane	4.03E+03	=	[(	1	x	70	x	1	x	5.00E-04	x	365	)+(	3300	x	0.2	x	0.04	x	120	x	1	x	1E-06	)]
gamma-Chlordane	4.03E+03	=	[(	1	x	70	x	1	x	5.00E-04	x	365	)+(	3300	x	0.2	x	0.04	x	120	x	1	x	1E-06	)]

**Carcinogenic**

Equation	Dermal SSPRG <sub>C</sub>	=	[(	TR	x	BW	x	AT	x	365	)+	SFo	x	SA	x	AF	x	ABS	x	EF	x	ED	x	1E-06	)]
Units	mg/kg			unitless		kg		years		days/year		(mg/kg-day) <sup>-1</sup>		cm <sup>2</sup> /event		mg/cm <sup>2</sup>		unitless		events/year		years		kg/mg	
Aldrin	1.33E+01	=	[(	1E-06	x	70	x	70	x	365	)+	1.7E+01	x	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
Dieldrin	1.41E+01	=	[(	1E-06	x	70	x	70	x	365	)+	1.6E+01	x	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
Heptachlor	5.02E+01	=	[(	1E-06	x	70	x	70	x	365	)+	4.5E+00	x	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
Heptachlor Epoxide	2.48E+01	=	[(	1E-06	x	70	x	70	x	365	)+	9.1E+00	x	3300	x	0.2	x	0.1	x	120	x	1	x	1E-06	)]
alpha-Chlordane	1.61E+03	=	[(	1E-06	x	70	x	70	x	365	)+	3.5E-01	x	3300	x	0.2	x	0.04	x	120	x	1	x	1E-06	)]
gamma-Chlordane	1.61E+03	=	[(	1E-06	x	70	x	70	x	365	)+	3.5E-01	x	3300	x	0.2	x	0.04	x	120	x	1	x	1E-06	)]

Notes:

- SSPRG<sub>N</sub> = noncancer site-specific preliminary remediation goal
- THI = target hazard index
- BW = body weight
- AT = averaging time
- RfDo = oral reference dose; USEPA Region 9 uses the oral reference dose for the dermal contact pathway
- SA = surface area
- AF = adherence factor
- ABS = absorption factor
- EF = exposure frequency
- ED = exposure duration
- SSPRG<sub>C</sub> = cancer site-specific preliminary remediation goal
- TR = target risk level
- SFo = oral slope factor; USEPA Region 9 uses the oral slope factor for the dermal contact pathway
- NA = not applicable

Surrogate toxicity values:

Chlordane toxicity values were used for alpha-chlordane and gamma-chlordane.

Table 4  
 Calculation of Site-specific Preliminary Remediation Goals: Inhalation Pathway  
 Construction Worker Scenario  
 Wherry Housing, Millington, Tennessee

**Noncarcinogenic**

Equation	Inhalation SSPRG <sub>N</sub>	=	[(	THI	×	BW	×	AT	×	365	)+(	IR	×	EF	×	ED	)]×	[(	1	+	RfDi	)]×	[(	1	+	PEF	)]
Units	mg/kg			unitless		kg		years		days/year		m <sup>3</sup> /day		days/year		years				mg/kg-day					m <sup>3</sup> /kg		
Aldrin	4.22E+05	=	[(	1	×	70	×	1	×	365	)+(	20	×	120	×	1	)]×	[(	1	+	3.00E-05	)]×	[(	1	+	1.32E+09	)]
Dieldrin	7.03E+05	=	[(	1	×	70	×	1	×	365	)+(	20	×	120	×	1	)]×	[(	1	+	5.00E-05	)]×	[(	1	+	1.32E+09	)]
Heptachlor	7.03E+06	=	[(	1	×	70	×	1	×	365	)+(	20	×	120	×	1	)]×	[(	1	+	5.00E-04	)]×	[(	1	+	1.32E+09	)]
Heptachlor Epoxide	1.83E+05	=	[(	1	×	70	×	1	×	365	)+(	20	×	120	×	1	)]×	[(	1	+	1.30E-05	)]×	[(	1	+	1.32E+09	)]
alpha-Chlordane	2.81E+06	=	[(	1	×	70	×	1	×	365	)+(	20	×	120	×	1	)]×	[(	1	+	2.00E-04	)]×	[(	1	+	1.32E+09	)]
gamma-Chlordane	2.81E+06	=	[(	1	×	70	×	1	×	365	)+(	20	×	120	×	1	)]×	[(	1	+	2.00E-04	)]×	[(	1	+	1.32E+09	)]

**Carcinogenic**

Equation	Inhalation SSPRG <sub>C</sub>	=	[(	TR	×	BW	×	AT	×	365	)+(	IR	×	EF	×	ED	×	SF <sub>i</sub>	)]×	[(	1	+	PEF	)]
Units	mg/kg			unitless		kg		years		days/year		m <sup>3</sup> /day		days/year		years		(mg/kg-day) <sup>-1</sup>					m <sup>3</sup> /kg	
Aldrin	5.79E+04	=	[(	1.00E-06	×	70	×	70	×	365	)+(	20	×	120	×	1	×	1.7E+01	)]×	[(	1	+	1.32E+09	)]
Dieldrin	6.15E+04	=	[(	1.00E-06	×	70	×	70	×	365	)+(	20	×	120	×	1	×	1.6E+01	)]×	[(	1	+	1.32E+09	)]
Heptachlor	2.14E+05	=	[(	1.00E-06	×	70	×	70	×	365	)+(	20	×	120	×	1	×	4.6E+00	)]×	[(	1	+	1.32E+09	)]
Heptachlor Epoxide	1.08E+05	=	[(	1.00E-06	×	70	×	70	×	365	)+(	20	×	120	×	1	×	9.1E+00	)]×	[(	1	+	1.32E+09	)]
alpha-Chlordane	2.81E+06	=	[(	1.00E-06	×	70	×	70	×	365	)+(	20	×	120	×	1	×	3.5E-01	)]×	[(	1	+	1.32E+09	)]
gamma-Chlordane	2.81E+06	=	[(	1.00E-06	×	70	×	70	×	365	)+(	20	×	120	×	1	×	3.5E-01	)]×	[(	1	+	1.32E+09	)]

Notes:

- SSPRG<sub>N</sub> = noncancer site-specific preliminary remediation goal
- THI = target hazard index
- BW = body weight
- AT = averaging time
- IR = inhalation rate
- EF = exposure frequency
- ED = exposure duration
- RfDi = inhalation reference dose
- PEF = particulate emission factor
- SSPRG<sub>C</sub> = cancer site-specific preliminary remediation goal
- TR = target risk level
- SF<sub>i</sub> = inhalation slope factor
- NA = not applicable

Table 5  
 Summary of Site-specific Preliminary Remediation Goals  
 Construction Worker Scenario  
 Wherry Housing, Millington, Tennessee

**Noncarcinogenic**

Equation	SSPRG <sub>N</sub> = 1 ÷ [( 1 ÷ Oral SSPRG <sub>N</sub> )+( 1 ÷ Dermal SSPRG <sub>N</sub> )+( 1 ÷ Inhalation SSPRG <sub>N</sub> )]			
Units	mg/kg	mg/kg	mg/kg	mg/kg
Aldrin	2.40E+01	3.19E+01	9.68E+01	4.22E+05
Dieldrin	4.00E+01	5.32E+01	1.61E+02	7.03E+05
Heptachlor	4.00E+02	5.32E+02	1.61E+03	7.03E+06
Heptachlor Epoxide	1.04E+01	1.38E+01	4.19E+01	1.83E+05
alpha-Chlordane	4.70E+02	5.32E+02	4.03E+03	2.81E+06
gamma-Chlordane	4.70E+02	5.32E+02	4.03E+03	2.81E+06

**Carcinogenic**

Equation	SSPRG <sub>C</sub> = 1 ÷ [( 1 ÷ Oral SSPRG <sub>C</sub> )+( 1 ÷ Dermal SSPRG <sub>C</sub> )+( 1 ÷ Inhalation SSPRG <sub>C</sub> )]			
Units	mg/kg	mg/kg	mg/kg	mg/kg
Aldrin	3.30E+00	4.38E+00	1.33E+01	5.79E+04
Dieldrin	3.50E+00	4.66E+00	1.41E+01	6.15E+04
Heptachlor	1.25E+01	1.66E+01	5.02E+01	2.14E+05
Heptachlor Epoxide	6.16E+00	8.19E+00	2.48E+01	1.08E+05
alpha-Chlordane	1.88E+02	2.13E+02	1.61E+03	2.81E+06
gamma-Chlordane	1.88E+02	2.13E+02	1.61E+03	2.81E+06

Notes:

- SSPRG<sub>N</sub> = noncancer site-specific preliminary remediation goal
- mg/kg = milligrams per kilogram
- SSPRG<sub>C</sub> = cancer site-specific preliminary remediation goal
- NA = not applicable

Table 6  
 Selected Site-specific Preliminary Remediation Goals  
 Construction Worker Scenario  
 Wherry Housing, Millington, Tennessee

Chemical	Site-specific Preliminary Remediation Goal		Value Used For Screening mg/kg
	Noncarcinogenic mg/kg	Carcinogenic mg/kg	
Aldrin	2.40E+01	3.30E+00	3.30E+00
Dieldrin	4.00E+01	3.50E+00	3.50E+00
Heptachlor	4.00E+02	1.25E+01	1.25E+01
Heptachlor Epoxide	1.04E+01	6.16E+00	6.16E+00
alpha-Chlordane	4.70E+02	1.88E+02	1.88E+02
gamma-Chlordane	4.70E+02	1.88E+02	1.88E+02

Notes:

mg/kg = milligrams per kilogram  
 NA = not applicable

Table 7  
 Comparison of Maximum Detected Concentrations to Site-specific Construction Worker PRGs  
 Wherry Housing, Millington, Tennessee

Chemical	Units	Detection Range	Detection Frequency	Average Detected Concentration	Site-specific Construction Worker PRG <sup>a</sup>	Exceeds Site-specific Construction Worker PRG?
Aldrin	mg/kg	2.30E-01 – 7.30E-01	4 / 30	4.00E-01	3.30E+00	No
alpha-Chlordane	mg/kg	1.50E-02 – 4.30E+01	21 / 30	2.51E+00	1.88E+02	No
<b>Dieldrin</b>	mg/kg	1.30E-03 – 5.10E+01	24 / 30	6.74E+00	3.50E+00	<b>Yes</b>
gamma-Chlordane	mg/kg	1.70E-02 – 7.50E+01	23 / 30	4.37E+00	1.88E+02	No
<b>Heptachlor</b>	mg/kg	3.10E-03 – 8.40E+01	24 / 30	6.92E+00	1.25E+01	<b>Yes</b>
Heptachlor Epoxide	mg/kg	9.40E-04 – 5.20E-01	19 / 30	7.41E-02	6.16E+00	No

Notes:

PRG = preliminary remediation goal (USEPA Region 9, 2000)

mg/kg = milligrams per kilogram

NA = not applicable

<sup>a</sup> Site-specific PRGs were calculated for those chemicals that exceeded the Region 9 industrial soil PRGs.

The risk ratios for each chemical were summed separately for the residential and industrial scenarios to determine cumulative site risk. Cumulative risk (for carcinogens) and cumulative HI (for noncarcinogens) are calculated separately, and then compared with the corresponding cumulative USEPA Region 4 thresholds. Cumulative risk ratios were calculated for the residential and industrial land-use scenarios.

An ILCR greater than  $1E-04$  (the USEPA cumulative upper-bound acceptable risk threshold) or an HI greater than 1 (the USEPA cumulative HI threshold) indicates the site may require additional investigation for the corresponding land-use scenario (USEPA, 1994). In accordance with this memorandum, the property is considered suitable for lease for the specified land-use scenario if the threshold is not exceeded.

### **4.3 Results**

Although the PRE (Table 8) did not identify any COCs for the construction worker land-use scenario, dieldrin and heptachlor were identified as COCs for the residential land-use scenario. The risk for both compounds is based on carcinogenic effects. The cumulative risk for the residential land use scenario ( $2.6E-03$ ) exceeds the acceptable threshold of  $1E-04$ ; therefore, the site is not acceptable for use as a residential site pending further investigation or remediation.

Table 9 indicates eight sample locations with cumulative risk ratios greater than  $1E-04$ : WHSS6316I1, WHSS6322I1, WHSS6350I1, WHSS6350I2, WHSS6412II1, WHSS7977I1, WHSS8005I1, and WHSS8051I1. Cumulative risk ratios for all other sample locations are less than  $1E-04$ .

Table 8  
Preliminary Risk Evaluation  
Residential and Construction Worker Land Use Scenarios  
Wherry Housing, Millington, Tennessee

Chemical	Maximum Concentration (mg/kg)	Region 9 Residential Soil PRG (mg/kg)	Region 9 Industrial Soil PRG (mg/kg)	Site-specific Construction Worker		Residential		Construction Worker		Industrial	
				Soil PRG (mg/kg)	Basis	Risk Ratio (unitless)	Hazard Ratio (unitless)	Risk Ratio (unitless)	Hazard Ratio (unitless)	Risk Ratio (unitless)	Hazard Ratio (unitless)
Aldrin	7.30E-01	2.86E-02	1.45E-01	3.30E+00	C	2.6E-05	NA	2.2E-07	NA	5.0E-06	NA
alpha-Chlordane	4.30E+01	1.62E+00	1.07E+01	1.88E+02	C	2.6E-05	NA	2.3E-07	NA	4.0E-06	NA
Dieldrin	5.10E+01	3.04E-02	1.54E-01	3.50E+00	C	1.7E-03	NA	1.5E-05	NA	3.3E-04	NA
gamma-Chlordane	7.50E+01	1.62E+00	1.07E+01	1.88E+02	C	4.6E-05	NA	4.0E-07	NA	7.0E-06	NA
Heptachlor	8.40E+01	1.08E-01	5.48E-01	1.25E+01	C	7.8E-04	NA	6.7E-06	NA	1.5E-04	NA
Heptachlor Epoxide	5.20E-01	5.34E-02	2.71E-01	6.16E+00	C	9.7E-06	NA	8.4E-08	NA	1.9E-06	NA
<b>Total Risk Ratio</b>						<b>3E-03</b>	<b>7E-01</b>	<b>2E-05</b>	<b>5E-03</b>	<b>5E-04</b>	<b>5E-02</b>
<b>Threshold<sup>a</sup></b>						<b>1E-04</b>	<b>1E+00</b>	<b>1E-04</b>	<b>1E+00</b>	<b>1E-04</b>	<b>1E+00</b>
<b>Further Investigation Required?</b>						<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>No</b>

Notes:

C = carcinogenic

NA = not applicable

<sup>a</sup>The threshold for carcinogenic risk is based on guidance provided in *Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease* (USEPA 1994).

Table 9  
Risk Ratios by Sample Location  
Residential and Construction Worker Land Use Scenarios  
Wherry Housing, Millington, Tennessee

Sample Location	Chemical	Result	Residential PRG	Site-specific Construction Worker PRG	Exceeds Residential Soil PRG?	Exceeds Site-specific Construction Worker PRG?	Residential Risk Ratio	Construction Worker Risk Ratio
WHSC635101	Dieldrin	1.80E-01	3.04E-02	3.50E+00	Yes	No	5.9E-06	5.1E-08
WHSC635101	Heptachlor Epoxide	1.40E-01	5.34E-02	6.16E+00	Yes	No	2.6E-06	2.3E-08
Total Risk Ratio by Sample Location*							8.5E-06	7.4E-08
WHSS207601	Dieldrin	7.10E-02	3.04E-02	3.50E+00	Yes	No	2.3E-06	2.0E-08
WHSS207602	Dieldrin	3.80E-02	3.04E-02	3.50E+00	Yes	No	1.3E-06	1.1E-08
WHSS207602	Heptachlor Epoxide	9.50E-02	5.34E-02	6.16E+00	Yes	No	1.8E-06	1.5E-08
Total Risk Ratio by Sample Location							5.4E-06	4.7E-08
WHSS631611	alpha-Chlordane	5.40E+00	1.62E+00	1.88E+02	Yes	No	3.3E-06	2.9E-08
WHSS631611	Dieldrin	1.50E-01	3.04E-02	3.50E+00	Yes	No	4.9E-06	4.3E-08
WHSS631611	gamma-Chlordane	1.20E+01	1.62E+00	1.88E+02	Yes	No	7.4E-06	6.4E-08
WHSS631611	Heptachlor	1.70E+01	1.08E-01	1.25E+01	Yes	Yes	1.6E-04	1.4E-06
WHSS631611	Heptachlor Epoxide	1.80E-01	5.34E-02	6.16E+00	Yes	No	3.4E-06	2.9E-08
Total Risk Ratio by Sample Location							<b>1.8E-04</b>	1.5E-06
WHSS631711	gamma-Chlordane	4.90E+00	1.62E+00	1.88E+02	Yes	No	3.0E-06	2.6E-08
WHSS631711	Heptachlor	3.60E+00	1.08E-01	1.25E+01	Yes	No	3.3E-05	2.9E-07
Total Risk Ratio by Sample Location							3.6E-05	3.2E-07
WHSS632211	Heptachlor	2.20E+01	1.08E-01	1.25E+01	Yes	Yes	2.0E-04	1.8E-06
Total Risk Ratio by Sample Location							<b>2.0E-04</b>	1.8E-06
WHSS632311	Dieldrin	5.60E-02	3.04E-02	3.50E+00	Yes	No	1.8E-06	1.6E-08
WHSS632311	gamma-Chlordane	3.10E+00	1.62E+00	1.88E+02	Yes	No	1.9E-06	1.6E-08
WHSS632311	Heptachlor	1.30E+00	1.08E-01	1.25E+01	Yes	No	1.2E-05	1.0E-07
Total Risk Ratio by Sample Location							1.6E-05	1.4E-07
WHSS635011	Aldrin	3.20E-01	2.86E-02	3.30E+00	Yes	No	1.1E-05	9.7E-08
WHSS635011	Dieldrin	5.10E+01	3.04E-02	3.50E+00	Yes	Yes	1.7E-03	1.5E-05
Total Risk Ratio by Sample Location							<b>1.7E-03</b>	1.5E-05
WHSS635012	Aldrin	3.20E-01	2.86E-02	3.30E+00	Yes	No	1.1E-05	9.7E-08
WHSS635012	Dieldrin	4.20E+01	3.04E-02	3.50E+00	Yes	Yes	1.4E-03	1.2E-05
Total Risk Ratio by Sample Location							<b>1.4E-03</b>	1.2E-05
WHSS635102	Dieldrin	4.40E-02	3.04E-02	3.50E+00	Yes	No	1.4E-06	1.3E-08
WHSS635102	Heptachlor Epoxide	5.90E-02	5.34E-02	6.16E+00	Yes	No	1.1E-06	9.6E-09
Total Risk Ratio by Sample Location							2.6E-06	2.2E-08
WHSS635111	Heptachlor	1.60E-01	1.08E-01	1.25E+01	Yes	No	1.5E-06	1.3E-08
Total Risk Ratio by Sample Location							1.5E-06	1.3E-08
WHSS641211	Aldrin	2.30E-01	2.86E-02	3.30E+00	Yes	No	8.0E-06	7.0E-08
WHSS641211	Dieldrin	3.30E+01	3.04E-02	3.50E+00	Yes	Yes	1.1E-03	9.4E-06
Total Risk Ratio by Sample Location							<b>1.1E-03</b>	9.5E-06
WHSS797711	Aldrin	7.30E-01	2.86E-02	3.30E+00	Yes	No	2.6E-05	2.2E-07
WHSS797711	Dieldrin	3.50E+01	3.04E-02	3.50E+00	Yes	Yes	1.2E-03	1.0E-05
Total Risk Ratio by Sample Location							<b>1.2E-03</b>	1.0E-05
WHSS798101	Heptachlor Epoxide	5.80E-02	5.34E-02	6.16E+00	Yes	No	1.1E-06	9.4E-09
Total Risk Ratio by Sample Location							1.1E-06	9.4E-09
WHSS800511	Heptachlor	1.80E+01	1.08E-01	1.25E+01	Yes	Yes	1.7E-04	1.4E-06
WHSS800511	Heptachlor Epoxide	5.20E-01	5.34E-02	6.16E+00	Yes	No	9.7E-06	8.4E-08
Total Risk Ratio by Sample Location							<b>1.8E-04</b>	1.5E-06

Table 9  
 Risk Ratios by Sample Location  
 Residential and Construction Worker Land Use Scenarios  
 Wherry Housing, Millington, Tennessee

Sample Location	Chemical	Result	Residential PRG	Site-specific Construction Worker PRG	Exceeds Residential Soil PRG?	Exceeds Site-specific Construction Worker PRG?	Residential Risk Ratio	Construction Worker Risk Ratio
WHSS804511	Dieldrin	4.30E-02	3.04E-02	3.50E+00	Yes	No	1.4E-06	1.2E-08
WHSS804511	gamma-Chlordane	3.20E+00	1.62E+00	1.88E+02	Yes	No	2.0E-06	1.7E-08
WHSS804511	Heptachlor	2.80E+00	1.08E-01	1.25E+01	Yes	No	2.6E-05	2.2E-07
Total Risk Ratio by Sample Location							2.9E-05	2.5E-07
WHSS805111	alpha-Chlordane	4.30E+01	1.62E+00	1.88E+02	Yes	No	2.6E-05	2.3E-07
WHSS805111	gamma-Chlordane	7.50E+01	1.62E+00	1.88E+02	Yes	No	4.6E-05	4.0E-07
WHSS805111	Heptachlor	8.40E+01	1.08E-01	1.25E+01	Yes	Yes	7.8E-04	6.7E-06
Total Risk Ratio by Sample Location							<b>8.5E-04</b>	7.4E-06

**Notes:**

All units are milligrams per kilogram (mg/kg).

\*For the PRE, a risk greater than 1E-04 indicates that the site is not appropriate for the intended land use.

#### **4.4 Uncertainty**

The uncertainty section presents information with a direct influence on the level of confidence in this risk assessment. These issues are discussed to put the results of the risk estimates in proper perspective.

Because the PRE for Wherry Housing is based on the maximum detected concentrations, it assumes that the soil concentrations are uniform throughout the site and receptors would be exposed to the maximum concentrations as they traverse the site. This assumption is not likely because the sample results indicate a range of detected concentrations for both dieldrin and heptachlor that spans more than three orders of magnitude. Additionally, the average detected concentrations for dieldrin and heptachlor are an order of magnitude less than the maximum detected concentration. Therefore, risk ratios are overestimated.

The PRE was completed using PRGs that are based on exposure parameter assumptions that may be inappropriate for the specified future land-use. PRGs are calculated using standard default exposure assumptions for the residential land-use scenarios. Because the future use of the site is recreational, the residential exposure frequency (350 days per year) and exposure duration (30 years) are greater than that of a recreational land use scenario because the recreational receptor would not be present on the site 350 days per year for 30 years.

#### **5.0 ECOLOGICAL RISK ASSESSMENT (ERA)**

No complete exposure pathways exist because of the lack of ecological receptors. The Wherry Housing complex is made up of one- and two-story wood-framed buildings surrounded by grass-covered areas, concrete patios, and concrete walkways. No quality ecological habitat is available; thus, no ERA was performed.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

The following is a summary of results for this PRE.

- Six compounds were identified as COPCs using USEPA Region 9 residential and industrial PRGs: Aldrin, alpha-chlordane, dieldrin, gamma-chlordane, heptachlor, and heptachlor epoxide.
- Using an SSPRG, dieldrin and heptachlor were the only two compounds identified as COPCs under a construction worker scenario.
- Dieldrin and heptachlor were identified as COCs for the residential land-use scenario.
- No COCs were identified for the construction worker land use scenario; however, dieldrin and heptachlor were identified as COCs under an industrial land-use scenario.
- Cumulative residential risk ratios exceeded 1E-04 at eight sample locations (WHSS6316I1, WHSS6322I1, WHSS6350I1, WHSS6350I2, WHSS6412I1, WHSS7977I1, WHSS8005I1, and WHSS8051I1).

Based on these results and the extent of sampling performed, EnSafe recommends that the sand and pea gravel backfill beneath the building foundations be removed and properly disposed of before proceeding to develop the areas as playgrounds after building demolition. Although cumulative residential risks ratios were not greater than 1E-04 for all locations, the number of exceedances, combined with the limited sampling at each location makes it prudent to remove the backfill at all six building locations. After this material has been removed, confirmation samples

should be collected from these areas to confirm that pesticide concentrations no longer pose an unacceptable risk for the sites' intended future use.

EnSafe also recommends that the sand and pea gravel backfill be removed by personnel who meet OSHA 29 CFR 1910.120 training requirements. Backfill material should be further characterized for proper handling and disposal.

## 7.0 REFERENCES

- EnSafe. (2001). *Sampling Work Plan — Wherry Housing, Naval Support Activity (NSA) Mid-South, Millington, Tennessee*. June 28, 2001.
- U.S. Environmental Protection Agency. (2000). *Preliminary Remediation Goal Table*. USEPA Region 9.
- U.S. Environmental Protection Agency. (1995). *Supplemental Guidance to RAGS: Region 4 Bulletins 1 through 5 Human Health Risk Assessment — Interim*, USEPA Region 4, Waste Management Division, Office of Health Assessment. November 1995.
- USEPA. (1994). *Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease* (November 22, 1994)

**APPENDIX A**  
**DATA VALIDATION REPORTS AND ANALYTICAL DATA**



**HEARTLAND**  
ENVIRONMENTAL SERVICES, INC.

**Data Validation Report**

SDG#: MEM81  
Date: July 26, 2001  
Client Name: Ensafe  
Project/Site Name: NSA Mid-South Public Works/Wherry Housing  
Date Sampled: July 6, 2001  
Number of Samples: 3 Non-Aqueous Sample(s) with 0 MS/MSD(s)  
Laboratory: STL - Savannah  
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data  
QA/QC Level: DQO Level IV  
Method(s) Utilized: SW846 Third Edition  
Analytical Fractions: Pesticides and Organophosphorous Pesticides

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

  
\_\_\_\_\_  
Paul R. Humburg, President

7-26-01.  
\_\_\_\_\_  
Date

SDG# MEM81

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	PEST		OPP	
WHSS631601	SOIL		X		X
WHSS632201	SOIL		X		X
WHSS800501	SOIL		X		X
Total Billable Samples (Water/Soil)		0	3	0	3

PEST= Pesticides

OPP= Organophosphorous Pesticides

DATA ASSESSMENT NARRATIVES

# DATA ASSESSMENT NARRATIVE

## PESTICIDES

### General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8081A; the National Functional Guidelines for Organic Data Validation, October 1999, as applicable; and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

### SDG # MEM81

A validation was performed on the Pesticide Data from SDG MEM81. The data was evaluated based on the following parameters:

- \* • Data Completeness
- \* • Holding Times
- \* • GC Performance
- Calibration
- \* • Blanks
- \* • Surrogate Recoveries
- \* • Matrix Spike/Matrix Spike Duplicates
- \* • Field Duplicates
- \* • Compound Identification
- Compound Quantitation

\* - All criteria were met for this parameter.

### Method Deviations

It is recommended by the method that the calibration standards for the single component pesticides be prepared as two calibration mixtures to minimize potential resolution and quantitation problems on confirmation columns... (SW-846, Method 8081A, Revision 1, December 1996, page 8081A - 8, section 5.6.1). The initial and continuing calibration standards used by the laboratory contain all single component target compounds. There were no qualifications required because of this method deviation.

## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

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#### Continuing Calibrations

The continuing calibration analyzed on 07/11/01 at 13:35 exhibited two (2) compounds with %Ds greater than 15% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

WHSS631601                      Heptachlor (46.6%)  
WHSS800501

WHSS631601                      Gamma-Chlordane (-20.0)

The continuing calibration analyzed on 07/11/01 at 13:35 exhibited one (1) compound with a %D greater than 50% and required qualifications. For the following samples and non-compliant compound, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

WHSS631601                      Endrin Ketone (50.9%)  
WHSS800501

The continuing calibration analyzed on 07/12/01 at 01:21 exhibited two (2) compounds with %Ds greater than 15% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

WHSS631601                      Heptachlor (50.7%)  
WHSS800501

WHSS631601                      Gamma-Chlordane (-22.0%)

#### Compound Quantitation

Several samples exhibited column quantitation %RPDs greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation RPDs < 40%. The "P" flag is removed from the result.

## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

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#### Compound Quantitation, Continued

2. The positive sample result which exhibited a column quantitation RPD > 40%, but ≤ 100% is qualified as estimated, J.
3. The positive single component pesticide sample result which exhibited a column quantitation RPD > 100% and is < 10X the respective compound CRQL, is qualified as non-detect, U. (All multi-component results are exempt from this rule.)
4. The positive single component pesticide sample result which exhibited a column quantitation RPD > 100% and > 10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ. (All multi-component results are exempt from this rule.)
5. The positive multi-component pesticide sample result which exhibited a column quantitation RPD > 100% and < 10X the respective multi-component CRQL is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %RPDs.

<u>Sample ID</u>	<u>Compound</u>	<u>%RPD</u>	<u>Lab Qual.</u>	<u>HESI Qual.</u>	<u>Ref. #</u>
WHSS631601	4,4'-DDE	68.8%	P	J	2
WHSS800501	Alpha-Chlordane	59.7%	P	J	2
	4,4'-DDE	57.1%	P	J	2
WHSS632201	Alpha-Chlordane	46.2%	P	J	2
	4,4'-DDE	129.4%	P	U	3
	Dieldrin	88.9%	P	J	2

#### System Performance and Overall Assessment

The data required qualifications.

## GLOSSARY OF DATA QUALIFIERS

### QUALIFICATION CODES

**U** = Not detected

**J** = Estimated value

**UJ** = Reported quantitation limit is qualified as estimated

**NJ** = Result is considered presumptively present at an estimated concentration

**UR** = Result is rejected and unusable

**D** = Result value is based on dilution analysis

### BLANK QUALIFICATION CODES

**CRQL** = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

**U** = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

**No Action** = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
WHSS631601 WHSS800501	Heptachlor	+	J
WHSS631601	Gamma-Chlordane	+	J
WHSS631601 WHSS800501	Endrin Ketone	+/-	J/UJ
WHSS631601 WHSS800501	Heptachlor	+	J
WHSS631601	Gamma-Chlordane	+	J
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	single component pests All P > 100% And < 10X CRQL	+	U
ALL	single component pests All P > 100% And > 10X CRQL	+	NJ
ALL	multi-component pests All P > 100% And < 10X CRQL	+	NJ

- \* DL denotes the Form I qualifier supplied by the laboratory  
 QL denotes the qualifier used by the data validation firm  
 + in the DL column denotes a positive result  
 - in the DL column denotes a non-detect result

# DATA ASSESSMENT NARRATIVE

## ORGANOPHOSPHORUS PESTICIDES

### General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8141; the National Functional Guidelines for Organic Data Validation, October 1999, as applicable; and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

### SDG # MEM81

A validation was performed on the Organophosphorus Pesticide Data from SDG MEM81. The data was evaluated based on the following parameters:

- \* • Data Completeness
- \* • Holding Times
- \* • GC Performance
- \* • Calibration
- \* • Blanks
- Surrogate Recoveries
- \* • Matrix Spike/Matrix Spike Duplicates
- \* • Field Duplicates
- \* • Compound Identification
- \* • Compound Quantitation

\* - All criteria were met for this parameter.

**DATA ASSESSMENT NARRATIVE**  
**ORGANOPHOSPHORUS PESTICIDE ANALYSIS**

**PAGE - 2**

**Surrogate Recoveries**

The sample listed below exhibited a low Triphenyl phosphate recovery. The positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

<u>Sample ID</u>	<u>Surrogate</u>	<u>% Recovery</u>
WHSS800501	Triphenyl phosphate	25%

**System Performance and Overall Assessment**

The data required qualifications.

## **GLOSSARY OF DATA QUALIFIERS**

### **QUALIFICATION CODES**

**U** = Not detected

**J** = Estimated value

**UJ** = Reported quantitation limit is qualified as estimated

**NJ** = Result is considered presumptively present at an estimated concentration

**UR** = Result is rejected and unusable

**D** = Result value is based on dilution analysis

### **BLANK QUALIFICATION CODES**

**CRQL** = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

**U** = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

**No Action** = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
WHSS800501	ALL	+/-	J/UJ

- \* DL denotes the Form I qualifier supplied by the laboratory  
QL denotes the qualifier used by the data validation firm  
+ in the DL column denotes a positive result  
- in the DL column denotes a non-detect result

WHERRY HOUSING COMPLEX  
PRELIMINARY RISK EVALUATION  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM81 OP PEST		SAMPLE ID ----->	WHS-S-6316-01	WHS-S-6322-01	WHS-S-8005-01			
		ORIGINAL ID ----->	WHSS631601	WHSS632201	WHSS800501			
		LAB SAMPLE ID ---->	S114299*1	S114299*3	S114299*2			
		SAMPLE DATE ----->	07/06/01	07/06/01	07/06/01			
		DATE EXTRACTED -->	07/09/01	07/09/01	07/09/01			
		DATE ANALYZED ---->	07/10/01	07/10/01	07/10/01			
		MATRIX ----->	Soil	Soil	Soil			
		UNITS ----->	UG/KG	UG/KG	UG/KG			
CAS #	Parameter							
86-50-0	Azinphos-methyl	78.	U	78.	U	80.	UJ	
35400-43-2	Bolstar (Sulprofos)	39.	U	39.	U	40.	UJ	
2921-88-2	Chlorpyrifos	39.	U	39.	U	40.	UJ	
56-72-4	Coumaphos	390.	U	390.	U	400.	UJ	
298-03-3	Demeton-O	98.	U	98.	U	100.	UJ	
126-75-0	Demeton-S	98.	U	98.	U	100.	UJ	
333-41-5	Diazinon	39.	U	39.	U	40.	UJ	
62-73-7	Dichlorvos	78.	U	78.	U	80.	UJ	
60-51-5	Dimethoate	78.	U	78.	U	80.	UJ	
298-04-4	Disulfoton	78.	U	78.	U	80.	UJ	
13194-48-4	Ethoprop	20.	U	20.	U	20.	UJ	
115-90-2	Fensulfothion	390.	U	390.	U	400.	UJ	
55-38-9	Fenthion	39.	U	39.	U	40.	UJ	
121-75-5	Malathion	39.	U	39.	U	40.	UJ	
150-50-5	Merphos	39.	U	39.	U	40.	UJ	
7786-34-7	Mevinphos	78.	U	78.	U	80.	UJ	
6923-22-4	Azodrin	390.	U	390.	U	400.	UJ	
300-76-5	Naled	390.	U	390.	U	400.	UJ	
56-38-2	Ethyl Parathion	39.	U	39.	U	40.	UJ	
298-00-0	Methyl parathion	20.	U	20.	U	20.	UJ	
298-02-2	Phorate	39.	U	39.	U	40.	UJ	
299-84-3	Ronnel	39.	U	39.	U	40.	UJ	
22248-79-9	Tetrachlorovinphos (Stirophos)	39.	U	39.	U	40.	UJ	
3689-24-5	Sulfotepp	20.	U	20.	U	20.	UJ	
34643-46-4	Tokuthion	39.	U	39.	U	40.	UJ	
327-98-0	Trichloronate	390.	U	390.	U	400.	UJ	
2104-64-5	EPN	39.	U	39.	U	40.	UJ	

**WHERRY HOUSING COMPLEX**  
**PRELIMINARY RISK EVALUATION**  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

CAS #	Parameter	WHS-S-6316-01 WHSS631601 S114299*1 07/06/01 07/09/01 07/11/01 Soil UG/KG	A	WHS-S-6322-01 WHSS632201 S114299*3 07/06/01 07/09/01 07/12/01 Soil UG/KG	A	WHS-S-8005-01 WHSS800501 S114299*2 07/06/01 07/09/01 07/11/01 Soil UG/KG	A
MEM81 PEST	SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> SAMPLE DATE -----> DATE EXTRACTED --> DATE ANALYZED ----> MATRIX -----> UNITS ----->						
319-84-6	Alpha-BHC	10.	U	20.	U	10.	U
319-85-7	Beta-BHC	10.	U	20.	U	10.	U
319-86-8	Delta-BHC	10.	U	20.	U	10.	U
58-89-9	gamma-BHC (Lindane)	10.	U	20.	U	10.	U
76-44-8	Heptachlor	7.8	J	26.	J	32.	J
309-00-2	Aldrin	10.	U	20.	U	10.	U
1024-57-3	Heptachlor Epoxide	26.	J	52.	J	22.	J
959-98-8	Endosulfan I	10.	U	20.	U	10.	U
60-57-1	Dieldrin	11.	J	10.	J	13.	J
72-55-9	4,4'-DDE	2.	J	3.	U	2.	J
72-20-8	Endrin	19.	U	39.	U	20.	U
33213-65-9	Endosulfan II	19.	U	39.	U	20.	U
72-54-8	4,4'-DDD	19.	U	39.	U	20.	U
1031-07-8	Endosulfan Sulfate	19.	U	39.	U	20.	U
50-29-3	4,4'-DDT	19.	U	39.	U	8.	J
72-43-5	Methoxychlor	100.	U	200.	U	100.	U
53494-70-5	Endrin ketone	19.	UJ	39.	U	20.	UJ
7421-93-4	Endrin aldehyde	19.	U	39.	U	20.	U
5103-71-9	alpha-Chlordane	88.	J	150.	J	54.	J
5103-74-2	gamma-Chlordane	78.	J	210.	J	100.	J
8001-35-2	Toxaphene	1000.	U	2000.	U	1000.	U



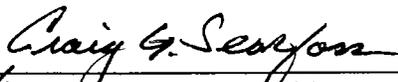
**HEARTLAND**  
ENVIRONMENTAL SERVICES, INC.

**Data Validation Report**

SDG#: MEM82  
Date: July 26, 2001  
Client Name: Ensafe  
Project/Site Name: NSA Mid-South Public Works/Wherry Housing  
Date Sampled: July 5-6, 2001  
Number of Samples: 12 Non-Aqueous Sample(s) with 0 MS/MSD(s)  
Laboratory: STL - Savannah  
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data  
QA/QC Level: DQO Level III  
Method(s) Utilized: SW846 Third Edition  
Analytical Fractions: Pesticides and Organophosphorous Pesticides

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

  
\_\_\_\_\_  
Paul B. Humburg, President

7-26-01.  
\_\_\_\_\_  
Date

SDG# MEM82

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	PEST		OPP	
WHSS200301	SOIL		X		X
WHSS207601	SOIL		X		X
WHSS207602	SOIL		X		X
WHSS631701	SOIL		X		X
WHSS632301	SOIL		X		X
WHSS635101	SOIL		X		X
WHSC635101	SOIL		X		X
WHSS635102	SOIL		X		X
WHSS797701	SOIL		X		X
WHSS798101	SOIL		X		X
WHSS804501	SOIL		X		X
WHSS805101	SOIL		X		X
Total Billable Samples (Water/Soil)		0	12	0	12

PEST= Pesticides

OPP= Organophosphorous Pesticides

DATA ASSESSMENT NARRATIVES

# DATA ASSESSMENT NARRATIVE

## PESTICIDES

### General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8081A; the National Functional Guidelines for Organic Data Validation, October 1999, as applicable; and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

### SDG # MEM82

A validation was performed on the Pesticide Data from SDG MEM82. The data was evaluated based on the following parameters:

- \* • Data Completeness
- \* • Holding Times
- \* • GC Performance
- Calibration
- \* • Blanks
- \* • Surrogate Recoveries
- \* • Matrix Spike/Matrix Spike Duplicates
- \* • Field Duplicates
- \* • Compound Identification
- Compound Quantitation

\* - All criteria were met for this parameter.

### Method Deviations

It is recommended by the method that the calibration standards for the single component pesticides be prepared as two calibration mixtures to minimize potential resolution and quantitation problems on confirmation columns... (SW-846, Method 8081A, Revision 1, December 1996, page 8081A - 8, section 5.6.1). The initial and continuing calibration standards used by the laboratory contain all single component target compounds. There were no qualifications required because of this method deviation.

## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

PAGE - 2

#### Continuing Calibrations

The continuing calibration analyzed on 07/11/01 at 13:35 exhibited three (3) compounds with %Ds greater than 15% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

WHSS805101	Heptachlor (46.6%)
WHSS631701	
WHSS632301	
WHSS635101	
WHSC635101	
WHSS200301	

WHSS804501	Gamma-Chlordane (-20.0)
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WHSS631701	4,4'-DDT (17.0%)
WHSS804501	

The continuing calibration analyzed on 07/11/01 at 13:35 exhibited two (2) compounds with %Ds greater than 50% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

WHSS631701	Heptachlor Epoxide (75.0%)
WHSS632301	
WHSS797701	
WHSS804501	
WHSS635101	
WHSC635101	
WHSS207601	

All Samples	Endrin Ketone (50.9%)
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## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

PAGE - 3

#### Continuing Calibrations, Continued

The bracketing continuing calibration analyzed on 07/12/01 at 01:21 exhibited three (3) compounds with %Ds greater than 15% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

WHSS805101                      Heptachlor (50.7%)

WHSS631701

WHSS632301

WHSS635101

WHSC635101

WHSS200301

WHSS632301                      Heptachlor Epoxide (84.1%)

WHSS797701

WHSS804501

WHSS635101

WHSC635101

WHSS207601

WHSS804501                      Gamma-Chlordane (-22.0%)

#### Compound Quantitation

Several samples exhibited column quantitation %RPDs greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation RPDs < 40%. The "P" flag is removed from the result.
2. The positive sample result which exhibited a column quantitation RPD > 40%, but ≤ 100% is qualified as estimated, J.
3. The positive single component pesticide sample result which exhibited a column quantitation RPD > 100% and is < 10X the respective compound CRQL, is qualified as non-detect, U. (All multi-component results are exempt from this rule.)

**DATA ASSESSMENT NARRATIVE**

**PESTICIDE ANALYSIS**

**PAGE - 4**

**Compound Quantitation, Continued**

4. The positive single component pesticide sample result which exhibited a column quantitation RPD > 100% and > 10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ. (All multi-component results are exempt from this rule.)
5. The positive multi-component pesticide sample result which exhibited a column quantitation RPD > 100% and < 10X the respective multi-component CRQL is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %RPDs.

<u>Sample ID</u>	<u>Compound</u>	<u>%RPD</u>	<u>Lab Qual.</u>	<u>HESI Qual.</u>	<u>Ref. #</u>
WHSS805101	Alpha-Chlordane	45.7%	P	J	2
	4,4'-DDT	72.7%	P	J	2
WHSS631701	Alpha-Chlordane	48.4%	P	J	2
	4,4'-DDT	61.5%	P	J	2
WHSS632301	Alpha-Chlordane	63.8%	P	J	2
WHSS797701	Alpha-Chlordane	68.0%	P	J	2
	4,4'-DDE	43.5%	P	J	2
WHSS798101	Alpha-Chlordane	65.2%	P	J	2
WHSS804501	Heptachlor	109.4%	P	U	3
	Alpha-Chlordane	53.6%	P	J	2
	4,4'-DDT	99.7%	P	J	2
WHSS635101	Alpha-Chlordane	63.8%	P	J	2
	4,4'-DDE	43.5%	P	J	2
WHSC635101	Alpha-Chlordane	61.3%	P	J	2
	4,4'-DDE	85.7%	P	J	2

## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

PAGE - 5

#### Compound Quantitation, Continued

The following samples and compounds have been qualified for high column quantitation %RPDs.

<u>Sample ID</u>	<u>Compound</u>	<u>%RPD</u>	<u>Lab Qual.</u>	<u>HESI Qual.</u>	<u>Ref. #</u>
WHSS635102	Heptachlor	104.3%	P	U	3
	Alpha-Chlordane	67.6%	P	J	2
	4,4'-DDE	88.3%	P	J	2
WHSS207601	Alpha-Chlordane	60.5%	P	J	2
	4,4'-DDE	50.0%	P	J	2
WHSS200301	Alpha-Chlordane	63.5%	P	J	2
	4,4'-DDE	47.0%	P	J	2
WHSS207602	Alpha-Chlordane	63.8%	P	J	2
	4,4'-DDE	87.8%	P	J	2

#### System Performance and Overall Assessment

The data required qualifications.

## **GLOSSARY OF DATA QUALIFIERS**

### **QUALIFICATION CODES**

**U** = Not detected

**J** = Estimated value

**UJ** = Reported quantitation limit is qualified as estimated

**NJ** = Result is considered presumptively present at an estimated concentration

**UR** = Result is rejected and unusable

**D** = Result value is based on dilution analysis

### **BLANK QUALIFICATION CODES**

**CRQL** = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

**U** = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

**No Action** = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
WHSS805101 WHSS631701 WHSS632301 WHSS635101 WHSC635101 WHSS200301	Heptachlor	+	J
WHSS804501	Gamma-Chlordane	+	J
WHSS631701 WHSS804501	4,4'-DDT	+	J
WHSS631701 WHSS632301 WHSS797701 WHSS804501 WHSS635101 WHSC635101 WHSS207601	Heptachlor Epoxide	+/-	J/UJ
All Samples	Endrin Ketone	+/-	J/UJ
WHSS805101 WHSS631701 WHSS632301 WHSS635101 WHSC635101 WHSS200301	Heptachlor	+	J
WHSS632301 WHSS797701 WHSS804501 WHSS635101 WHSC635101 WHSS207601	Heptachlor Epoxide	+	J
WHSS804501	Gamma-Chlordane	+	J
ALL	All P < 40%	+	

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
ALL	All P > 40% But ≤ 100%	+	J
ALL	single component pests All P > 100% And < 10X CRQL	+	U
ALL	single component pests All P > 100% And > 10X CRQL	+	NJ
ALL	multi-component pests All P > 100% And < 10X CRQL	+	NJ

- \* DL denotes the Form I qualifier supplied by the laboratory  
 QL denotes the qualifier used by the data validation firm  
 + in the DL column denotes a positive result  
 - in the DL column denotes a non-detect result

# DATA ASSESSMENT NARRATIVE

## ORGANOPHOSPHORUS PESTICIDES

### General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8141; the National Functional Guidelines for Organic Data Validation, October 1999, as applicable; and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

### SDG # MEM82

A validation was performed on the Organophosphorus Pesticide Data from SDG MEM82. The data was evaluated based on the following parameters:

- \* • Data Completeness
- \* • Holding Times
- \* • GC Performance
- \* • Calibration
- \* • Blanks
- \* • Surrogate Recoveries
- \* • Matrix Spike/Matrix Spike Duplicates
- \* • Field Duplicates
- \* • Compound Identification
- \* • Compound Quantitation

\* - All criteria were met for this parameter.

### System Performance and Overall Assessment

The data did not require qualifications.

## GLOSSARY OF DATA QUALIFIERS

### QUALIFICATION CODES

**U** = Not detected

**J** = Estimated value

**UJ** = Reported quantitation limit is qualified as estimated

**NJ** = Result is considered presumptively present at an estimated concentration

**UR** = Result is rejected and unusable

**D** = Result value is based on dilution analysis

### BLANK QUALIFICATION CODES

**CRQL** = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

**U** = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

**No Action** = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
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NO QUALIFICATIONS WERE REQUIRED.

- \* DL denotes the Form I qualifier supplied by the laboratory
- QL denotes the qualifier used by the data validation firm
- + in the DL column denotes a positive result
- in the DL column denotes a non-detect result

**WHERRY HOUSING COMPLEX**  
**PRELIMINARY RISK EVALUATION**  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM82 OP PEST	SAMPLE ID ----->	WHS-S-2003-01	WHS-S-2076-01	WHS-S-2076-02	WHS-S-6317-01	WHS-S-6323-01	WHS-S-6351-01
	ORIGINAL ID ----->	WHSS200301	WHSS207601	WHSS207602	WHSS631701	WHSS632301	WHSS635101
	LAB SAMPLE ID ---->	S114299A*11	S114299A*10	S114299A*12	S114299A*2	S114299A*3	S114299A*7
	SAMPLE DATE ----->	07/06/01	07/06/01	07/06/01	07/05/01	07/05/01	07/06/01
	DATE EXTRACTED -->	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01
	DATE ANALYZED --->	07/11/01	07/11/01	07/11/01	07/10/01	07/10/01	07/10/01
	MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
		A	A	A	A	A	A
CAS #	Parameter						
86-50-0	Azinphos-methyl	80. U	82. U	81. U	77. U	76. U	75. U
35400-43-2	Bolstar (Sulprofos)	40. U	41. U	41. U	38. U	38. U	38. U
2921-88-2	Chlorpyrifos	40. U	41. U	41. U	38. U	38. U	38. U
56-72-4	Coumaphos	400. U	410. U	410. U	380. U	380. U	380. U
298-03-3	Demeton-O	100. U	100. U	100. U	96. U	95. U	94. U
126-75-0	Demeton-S	100. U	100. U	100. U	96. U	95. U	94. U
333-41-5	Diazinon	40. U	41. U	41. U	38. U	38. U	38. U
62-73-7	Dichlorvos	80. U	82. U	81. U	77. U	76. U	75. U
60-51-5	Dimethoate	80. U	82. U	81. U	77. U	76. U	75. U
298-04-4	Disulfoton	80. U	82. U	81. U	77. U	76. U	75. U
13194-48-4	Ethoprop	20. U	21. U	21. U	20. U	20. U	19. U
115-90-2	Fensulfothion	400. U	410. U	410. U	380. U	380. U	380. U
55-38-9	Fenthion	40. U	41. U	41. U	38. U	38. U	38. U
121-75-5	Malathion	40. U	41. U	41. U	38. U	38. U	38. U
150-50-5	Merphos	40. U	41. U	41. U	38. U	38. U	38. U
7786-34-7	Mevinphos	80. U	82. U	81. U	77. U	76. U	75. U
6923-22-4	Azodrin	400. U	410. U	410. U	380. U	380. U	380. U
300-76-5	Naled	400. U	410. U	410. U	380. U	380. U	380. U
56-38-2	Ethyl Parathion	40. U	41. U	41. U	38. U	38. U	38. U
298-00-0	Methyl parathion	20. U	21. U	21. U	20. U	20. U	19. U
298-02-2	Phorate	40. U	41. U	41. U	38. U	38. U	38. U
299-84-3	Ronnel	40. U	41. U	41. U	38. U	38. U	38. U
22248-79-9	Tetrachlorovinphos (Stirophos)	40. U	41. U	41. U	38. U	38. U	38. U
3689-24-5	Sulfotepp	20. U	21. U	21. U	20. U	20. U	19. U
34643-46-4	Tokuthion	40. U	41. U	41. U	38. U	38. U	38. U
327-98-0	Trichloronate	400. U	410. U	410. U	380. U	380. U	380. U
2104-64-5	EPN	40. U	41. U	41. U	38. U	38. U	38. U

**WHERRY HOUSING COMPLEX**  
**PRELIMINARY RISK EVALUATION**  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM82 OP PEST	SAMPLE ID ----->	WHS-C-6351-01	WHS-S-6351-02	WHS-S-7977-01	WHS-S-7981-01	WHS-S-8045-01	WHS-S-8051-01	
	ORIGINAL ID ----->	WHSC635101	WHSS635102	WHSS797701	WHSS798101	WHSS804501	WHSS805101	
	LAB SAMPLE ID ---->	S114299A*8	S114299A*9	S114299A*4	S114299A*5	S114299A*6	S114299A*1	
	SAMPLE DATE ----->	07/06/01	07/06/01	07/05/01	07/05/01	07/05/01	07/05/01	
	DATE EXTRACTED -->	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01	
	DATE ANALYZED ---->	07/11/01	07/11/01	07/10/01	07/10/01	07/10/01	07/10/01	
	MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil	
	UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	
	CAS #	Parameter						
	86-50-0	Azinphos-methyl	78. U	80. U	80. U	80. U	76. U	78. U
	35400-43-2	Bolstar (Sulprofos)	39. U	40. U	40. U	40. U	38. U	39. U
	2921-88-2	Chlorpyrifos	39. U	40. U	40. U	40. U	38. U	39. U
	56-72-4	Coumaphos	390. U	400. U	400. U	400. U	380. U	390. U
	298-03-3	Demeton-O	99. U	100. U	100. U	100. U	95. U	99. U
	126-75-0	Demeton-S	99. U	100. U	100. U	100. U	95. U	99. U
	333-41-5	Diazinon	39. U	40. U	40. U	40. U	38. U	39. U
	62-73-7	Dichlorvos	78. U	80. U	80. U	80. U	76. U	78. U
	60-51-5	Dimethoate	78. U	80. U	80. U	80. U	76. U	78. U
	298-04-4	Disulfoton	78. U	80. U	80. U	80. U	76. U	78. U
	13194-48-4	Ethoprop	20. U	21. U	20. U	21. U	20. U	20. U
	115-90-2	Fensulfothion	390. U	400. U	400. U	400. U	380. U	390. U
	55-38-9	Fenthion	39. U	40. U	40. U	40. U	38. U	39. U
	121-75-5	Malathion	39. U	40. U	40. U	40. U	38. U	39. U
	150-50-5	Merphos	39. U	40. U	40. U	40. U	38. U	39. U
	7786-34-7	Mevinphos	78. U	80. U	80. U	80. U	76. U	78. U
	6923-22-4	Azodrin	390. U	400. U	400. U	400. U	380. U	390. U
	300-76-5	Naled	390. U	400. U	400. U	400. U	380. U	390. U
	56-38-2	Ethyl Parathion	39. U	40. U	40. U	40. U	38. U	39. U
	298-00-0	Methyl parathion	20. U	21. U	20. U	21. U	20. U	20. U
	298-02-2	Phorate	39. U	40. U	40. U	40. U	38. U	39. U
	299-84-3	Ronnel	39. U	40. U	40. U	40. U	38. U	39. U
	22248-79-9	Tetrachlorovinphos (Stirophos)	39. U	40. U	40. U	40. U	38. U	39. U
	3689-24-5	Sulfotepp	20. U	21. U	20. U	21. U	20. U	20. U
	34643-46-4	Tokuthion	39. U	40. U	40. U	40. U	38. U	39. U
	327-98-0	Trichloronate	390. U	400. U	400. U	400. U	380. U	390. U
	2104-64-5	EPN	39. U	40. U	40. U	40. U	38. U	39. U

WHERRY HOUSING COMPLEX  
PRELIMINARY RISK EVALUATION  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM82 PEST	SAMPLE ID ----->	WHS-S-2003-01	WHS-S-2076-01	WHS-S-2076-02	WHS-S-6317-01	WHS-S-6323-01	WHS-S-6351-01
	ORIGINAL ID ----->	WHSS200301	WHSS207601	WHSS207602	WHSS631701	WHSS632301	WHSS635101
	LAB SAMPLE ID ---->	S114299A*11	S114299A*10	S114299A*12	S114299A*2	S114299A*3	S114299A*7
	SAMPLE DATE ----->	07/06/01	07/06/01	07/06/01	07/05/01	07/05/01	07/06/01
	DATE EXTRACTED --->	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01
	DATE ANALYZED ---->	07/11/01	07/11/01	07/11/01	07/11/01	07/11/01	07/11/01
	MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
	UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG

CAS #	Parameter						
319-84-6	Alpha-BHC	4.1	U	4.2	U	21.	U
319-85-7	Beta-BHC	4.1	U	4.2	U	21.	U
319-86-8	Delta-BHC	4.1	U	4.2	U	21.	U
58-89-9	gamma-BHC (Lindane)	4.1	U	4.2	U	21.	U
76-44-8	Heptachlor	5.9	J	4.3	U	29.	J
309-00-2	Aldrin	4.1	U	4.2	U	21.	U
1024-57-3	Heptachlor Epoxide	35.	U	10.	J	95.	UJ
959-98-8	Endosulfan I	4.1	U	4.2	U	21.	U
60-57-1	Dieldrin	21.	U	71.	J	38.	J
72-55-9	4,4'-DDE	1.3	J	0.72	J	3.9	J
72-20-8	Endrin	8.	U	1.7	J	41.	U
33213-65-9	Endosulfan II	8.	U	8.2	U	41.	U
72-54-8	4,4'-DDD	8.	U	8.2	U	41.	U
1031-07-8	Endosulfan Sulfate	8.	U	8.2	U	41.	U
50-29-3	4,4'-DDT	8.	U	2.5	J	41.	U
72-43-5	Methoxychlor	41.	U	42.	U	210.	U
53494-70-5	Endrin ketone	8.	UJ	8.2	UJ	41.	UJ
7421-93-4	Endrin aldehyde	8.	U	8.2	U	41.	U
5103-71-9	alpha-Chlordane	43.	J	15.	J	160.	J
5103-74-2	gamma-Chlordane	76.	U	25.	J	280.	J
8001-35-2	Toxaphene	410.	U	420.	U	2100.	U

WHERRY HOUSING COMPLEX  
PRELIMINARY RISK EVALUATION  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM82 PEST		SAMPLE ID ----->	WHS-C-6351-01	WHS-S-6351-02	WHS-S-7977-01	WHS-S-7981-01	WHS-S-8045-01	WHS-S-8051-01					
		ORIGINAL ID ----->	WHSC635101	WHSS635102	WHSS797701	WHSS798101	WHSS804501	WHSS805101					
		LAB SAMPLE ID ---->	S114299A*8	S114299A*9	S114299A*4	S114299A*5	S114299A*6	S114299A*1					
		SAMPLE DATE ----->	07/06/01	07/06/01	07/05/01	07/05/01	07/05/01	07/05/01					
		DATE EXTRACTED -->	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01					
		DATE ANALYZED ---->	07/11/01	07/11/01	07/11/01	07/11/01	07/11/01	07/11/01					
		MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil					
		UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG					
CAS #	Parameter		A	A	A	A	A	A					
319-84-6	Alpha-BHC	40.	U	10.	U	4.1	U	10.	U	2.	U	4.	U
319-85-7	Beta-BHC	40.	U	10.	U	4.1	U	10.	U	2.	U	4.	U
319-86-8	Delta-BHC	40.	U	10.	U	4.1	U	10.	U	2.	U	4.	U
58-89-9	gamma-BHC (Lindane)	40.	U	10.	U	4.1	U	10.	U	2.	U	4.	U
76-44-8	Heptachlor	27.	J	11.	U	33.	U	51.	U	1.2	U	16.	J
309-00-2	Aldrin	40.	U	10.	U	4.1	U	10.	U	2.	U	4.	U
1024-57-3	Heptachlor Epoxide	140.	J	59.	U	26.	J	58.	U	27.	J	17.	U
959-98-8	Endosulfan I	40.	U	10.	U	4.1	U	10.	U	2.	U	4.	U
60-57-1	Dieldrin	180.	U	44.	U	19.	U	5.2	J	6.6	U	6.7	J
72-55-9	4,4'-DDE	7.2	J	3.1	J	2.7	J	20.	U	1.4	J	7.8	U
72-20-8	Endrin	12.	J	20.	U	8.	U	20.	U	3.8	U	7.8	U
33213-65-9	Endosulfan II	78.	U	20.	U	8.	U	20.	U	3.8	U	7.8	U
72-54-8	4,4'-DDD	78.	U	20.	U	8.	U	20.	U	3.8	U	7.8	U
1031-07-8	Endosulfan Sulfate	78.	U	20.	U	8.	U	20.	U	3.8	U	7.8	U
50-29-3	4,4'-DDT	78.	U	20.	U	3.7	J	20.	U	0.77	J	2.8	J
72-43-5	Methoxychlor	400.	U	100.	U	41.	U	100.	U	20.	U	40.	U
53494-70-5	Endrin ketone	78.	UJ	20.	UJ	8.	UJ	20.	UJ	3.8	UJ	7.8	UJ
7421-93-4	Endrin aldehyde	78.	U	20.	U	8.	U	20.	U	3.8	U	7.8	U
5103-71-9	alpha-Chlordane	260.	J	89.	J	33.	J	61.	J	15.	J	54.	J
5103-74-2	gamma-Chlordane	540.	U	150.	U	67.	U	130.	U	17.	J	72.	U
8001-35-2	Toxaphene	4000.	U	1000.	U	410.	U	1000.	U	200.	U	400.	U



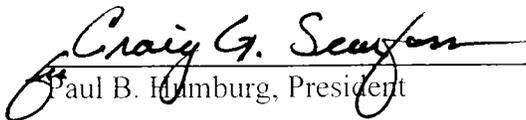
**HEARTLAND**  
ENVIRONMENTAL SERVICES, INC.

**Data Validation Report**

SDG#: MEM83  
Date: July 30, 2001  
Client Name: Ensafe  
Project/Site Name: NSA Mid-South Public Works/Wherry Housing  
Date Sampled: July 9 - 10, 2001  
Number of Samples: 15 Non-Aqueous Sample(s) with 0 MS/MSD(s)  
2 Aqueous Sample(s) with 0 MS/MSD(s)  
Laboratory: STL - Savannah  
Validation Guidance: National Functional Guidelines for Organic and Inorganic Data  
QA/QC Level: DQO Level III  
Method(s) Utilized: SW846 Third Edition  
Analytical Fractions: Pesticides and Organophosphorous Pesticides

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

  
Paul B. Humburg, President

7-30-01.  
Date

SDG# MEM83

Samples and Fractions Reviewed

Sample Identifications

Analytical Fractions

ENSAFE ID	MATRIX	PEST		OPP	
WHSE070901	WATER	X		X	
WHSF070901	WATER	X		X	
WHSS631611	SOIL		X		X
WHSS631711	SOIL		X		X
WHSS632211	SOIL		X		X
WHSC632211	SOIL		X		X
WHSS632311	SOIL		X		X
WHSS635011	SOIL		X		X
WHSS635012	SOIL		X		X
WHSS635111	SOIL		X		X
WHSS635112	SOIL		X		X
WHSC635112	SOIL		X		X
WHSS641211	SOIL		X		X
WHSS797711	SOIL		X		X
WHSS800511	SOIL		X		X
WHSS804511	SOIL		X		X
WHSS805111	SOIL		X		X
Total Billable Samples (Water/Soil)		2	15	2	15

PEST= Pesticides

OPP= Organophosphorous Pesticides

**DATA ASSESSMENT NARRATIVES**

# DATA ASSESSMENT NARRATIVE

## PESTICIDES

### General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8081A; the National Functional Guidelines for Organic Data Validation, October 1999, as applicable; and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

### SDG # MEM83

A validation was performed on the Pesticide Data from SDG MEM83. The data was evaluated based on the following parameters:

- \* • Data Completeness
- \* • Holding Times
- \* • GC Performance
- Calibration
- Blanks
- Surrogate Recoveries
- \* • Matrix Spike/Matrix Spike Duplicates
- Field Duplicates
- \* • Compound Identification
- Compound Quantitation

\* - All criteria were met for this parameter.

### Method Deviations

It is recommended by the method that the calibration standards for the single component pesticides be prepared as two calibration mixtures to minimize potential resolution and quantitation problems on confirmation columns... (SW-846, Method 8081A, Revision 1, December 1996, page 8081A - 8, section 5.6.1). The initial and continuing calibration standards used by the laboratory contain all single component target compounds. There were no qualifications required because of this method deviation.

**DATA ASSESSMENT NARRATIVE**

**PESTICIDE ANALYSIS**

**PAGE - 2**

**Continuing Calibrations**

The continuing calibration analyzed on 07/18/01 at 22:03 exhibited two (2) compounds with %Ds greater than 15% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

WHSS6316I1	Heptachlor (28.4%)
WHSS6317I1	
WHSS6322I1	
WHSC6322I1	
WHSS6323I1	
WHSS6351I2	
WHSS8005I1	
WHSS8045I1	

WHSS6350I2	Endrin (19.9%)
WHSS7977I1	

The bracketing continuing calibration analyzed on 07/19/01 at 09:03 exhibited one (1) compound with a %D greater than 15% and required qualifications. For the following samples and non-compliant compound, the positive results are qualified as estimated, J.

WHSS6316I1	Heptachlor (17.6%)
WHSS6317I1	
WHSS6322I1	
WHSC6322I1	
WHSS6323I1	
WHSS6351I2	
WHSS8005I1	
WHSS8045I1	

The continuing calibration analyzed on 07/21/01 at 16:32 exhibited two (2) compounds with %Ds greater than 15% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

WHSS6351I1	Heptachlor (33.5%)
WHSC6351I2	
WHSS8051I1	

WHSS6351I1	Dieldrin (16.3%)
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## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

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#### Continuing Calibrations, Continued

The bracketing continuing calibration analyzed on 07/22/01 at 06:54 exhibited two (2) compounds with %Ds greater than 15% and required qualifications. For the following samples and non-compliant compounds, the positive results are qualified as estimated, J.

WHSS805111	4,4'-DDT (20.2%)
WHSS635111	Heptachlor (26.0%)
WHSC635112	
WHSS805111	

#### Blanks

One (1) associated method blank and the associated field blank exhibited contamination for target compounds and required qualifications. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moistures as associated samples. These factors must be taken into consideration when applying the 5X criteria to field samples. The blank results were compared to the associated samples.

<u>Blank ID</u>	<u>Compound</u>	<u>Concentration</u>	<u>Action Level</u>
07170-JMB	Heptachlor	0.71 J µg/Kg	3.55 µg/Kg
	Gamma Chlordane	0.39 J µg/Kg	1.95 µg/Kg
WHSF070901	Heptachlor	0.017 J µg/L	2.89 µg/Kg
	Alpha Chlordane	0.054 P µg/L	9.18 µg/Kg
	Gamma Chlordane	0.095 µg/L	16.15 µg/Kg

The following samples have been qualified for blank contamination. The qualifications are for all the blanks.

<u>Sample</u>	<u>Compound</u>	<u>Qualification</u>
WHSS635012	Heptachlor	RL
WHSS797711		
WHSS641211	Heptachlor	U

## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

PAGE - 4

#### Blanks, Continued

The following samples have been qualified for blank contamination. The qualifications are for all the blanks.

<u>Sample</u>	<u>Compound</u>	<u>Qualification</u>
WHSS6350I2 WHSS6412I1 WHSS7977I1	Gamma Chlordane	RL
WHSS6322I1 WHSC6322I1 WHSS8005I1	Gamma Chlordane	U
WHSS6317I1 WHSS6322I1 WHSC6322I1 WHSS6351I1 WHSS8005I1	Alpha Chlordane	U

#### Surrogate Recoveries

The samples listed below exhibited high DCB recoveries. The positive results are qualified as estimated, J.

<u>Sample ID</u>	<u>Surrogate</u>	<u>% Recovery</u>
WHSS6351I2	DCB-2	288%
WHSC6351I2	DCB-2	235%

## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

PAGE - 5

#### Field Duplicates

The field duplicate pair of samples WHSS635112 and WHSC635112 exhibited a high RPD for one (1) compound and required qualifications. For the following samples and non-compliant compound, the positive results are qualified as estimated, J.

WHSS635112	Heptachlor Epoxide (117%)
WHSC635112	

#### Compound Quantitation

Several samples exhibited column quantitation %RPDs greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation RPDs < 40%. The "P" flag is removed from the result.
2. The positive sample result which exhibited a column quantitation RPD > 40%, but ≤ 100% is qualified as estimated, J.
3. The positive single component pesticide sample result which exhibited a column quantitation RPD > 100% and is < 10X the respective compound CRQL, is qualified as non-detect, U. (All multi-component results are exempt from this rule.)
4. The positive single component pesticide sample result which exhibited a column quantitation RPD > 100% and > 10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ. (All multi-component results are exempt from this rule.)
5. The positive multi-component pesticide sample result which exhibited a column quantitation RPD > 100% and < 10X the respective multi-component CRQL is qualified as presumptively present at an estimated concentration, NJ.

## DATA ASSESSMENT NARRATIVE

### PESTICIDE ANALYSIS

PAGE - 6

#### Compound Quantitation, Continued

The following samples and compounds have been qualified for high column quantitation %RPDs.

<u>Sample ID</u>	<u>Compound</u>	<u>%RPD</u>	<u>Lab Qual.</u>	<u>HESI Qual.</u>	<u>Ref. #</u>
WHSS6317I1	Heptachlor Epoxide	131.8%	P	U	3
WHSS6323I1	Heptachlor Epoxide	149.0%	P	U	3
	Dieldrin	56.4%	P	J	2
WHSS6316I1	Heptachlor Epoxide	66.7%	P	J	2
	Dieldrin	50.0%	P	J	2
WHSS6351I1	Heptachlor Epoxide	63.6%	P	J	2
WHSS6351I2	Dieldrin	63.2%	P	J	2
WHSC6351I2	Heptachlor Epoxide	80.2%	P	J	2
	Dieldrin	139.4%	P	U	3
WHSS6412I1	Heptachlor Epoxide	106.7%	P	U	3
	Aldrin	60.6%	P	J	2
WHSS8045I1	Dieldrin	64.6%	P	J	2
WHSS8051I1	4,4'-DDT	93.8%	P	J	2
WHSS6350I1	Endrin	41.9%	P	J	2

One (1) sample was diluted to accurately quantitate target compounds. For the following sample, the results for the E-flagged compounds are replaced with the corresponding results from the dilution analysis. All other results from the dilution analysis are not used.

WHSS7977I1

**DATA ASSESSMENT NARRATIVE**

**PESTICIDE ANALYSIS**

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**System Performance and Overall Assessment**

The data required qualifications.

## **GLOSSARY OF DATA QUALIFIERS**

### **QUALIFICATION CODES**

**U** = Not detected

**J** = Estimated value

**UJ** = Reported quantitation limit is qualified as estimated

**NJ** = Result is considered presumptively present at an estimated concentration

**UR** = Result is rejected and unusable

**D** = Result value is based on dilution analysis

### **BLANK QUALIFICATION CODES**

**CRQL** = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

**U** = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

**No Action** = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
WHSS6316I1 WHSS6317I1 WHSS6322I1 WHSC6322I1 WHSS6323I1 WHSS6351I2 WHSS8005I1 WHSS8045I1	Heptachlor	+	J
WHSS6350I2 WHSS7977I1	Endrin	+	J
WHSS6316I1 WHSS6317I1 WHSS6322I1 WHSC6322I1 WHSS6323I1 WHSS6351I2 WHSS8005I1 WHSS8045I1	Heptachlor	+	J
WHSS6351I1 WHSC6351I2 WHSS8051I1	Heptachlor	+	J
WHSS6351I1	Dieldrin	+	J
WHSS8051I1	4,4'-DDT	+	J
WHSS6351I1 WHSC6351I2 WHSS8051I1	Heptachlor	+	J
WHSS6350I2 WHSS7977I1	Heptachlor	+	RL
WHSS6412I1	Heptachlor	+	U

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
WHSS635012 WHSS641211 WHSS797711	Gamma Chlordane	+	RL
WHSS632211 WHSC632211 WHSS800511	Gamma Chlordane	+	U
WHSS631711 WHSS632211 WHSC632211 WHSS635111 WHSS800511	Alpha Chlordane	+	U
WHSS635112 WHSC635112	ALL	+	J
WHSS635112 WHSC635112	Heptachlor Epoxide	+	J
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	single component pests All P > 100% And < 10X CRQL	+	U
ALL	single component pests All P > 100% And > 10X CRQL	+	NJ
ALL	multi-component pests All P > 100% And < 10X CRQL	+	NJ
WHSS797711	All E-Flagged	+E	D

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
WHSS7977I1DL	All except corresponding D-Flagged results	+/-	not used

- \* DL denotes the Form I qualifier supplied by the laboratory  
QL denotes the qualifier used by the data validation firm  
+ in the DL column denotes a positive result  
- in the DL column denotes a non-detect result

# DATA ASSESSMENT NARRATIVE

## ORGANOPHOSPHORUS PESTICIDES

### General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8141; the National Functional Guidelines for Organic Data Validation, October 1999, as applicable; and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

### SDG # MEM83

A validation was performed on the Organophosphorus Pesticide Data from SDG MEM83. The data was evaluated based on the following parameters:

- \* • Data Completeness
- \* • Holding Times
- \* • GC Performance
- \* • Calibration
- \* • Blanks
- \* • Surrogate Recoveries
- \* • Matrix Spike/Matrix Spike Duplicates
- \* • Field Duplicates
- \* • Compound Identification
- Compound Quantitation

\* - All criteria were met for this parameter.

**DATA ASSESSMENT NARRATIVE**  
**ORGANOPHOSPHORUS PESTICIDE ANALYSIS**

**PAGE - 2**

**Compound Quantitation**

Several samples exhibited column quantitation %RPDs greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation %RPDs < 40%. The "P" flag is removed from the result.
2. The positive sample result which exhibited a column quantitation %RPD > 40%, but ≤ 100% is qualified as estimated, J.
3. The positive sample result which exhibited a column quantitation %RPD > 100% and is < 10X the respective compound CRQL, is qualified as non-detect, U.
4. The positive sample result which exhibited a column quantitation %RPD > 100% and > 10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %RPDs.

<u>Sample ID</u>	<u>Compound</u>	<u>%RPD</u>	<u>Lab Qual.</u>	<u>HESI Qual.</u>	<u>Ref. #</u>
WHSS631611	Trichloronate	84.0 %	P	J	2
WHSS632211	Trichloronate	78.5 %	P	J	2
WHSC632211	Trichloronate	82.4 %	P	J	2
WHSS800511	Trichloronate	82.4 %	P	J	2
WHSS805111	Malathion	92.1 %	P	J	2
	Trichloronate	113.2 %	P	U	3

**System Performance and Overall Assessment**

The data required qualifications.

## **GLOSSARY OF DATA QUALIFIERS**

### **QUALIFICATION CODES**

**U** = Not detected

**J** = Estimated value

**UJ** = Reported quantitation limit is qualified as estimated

**NJ** = Result is considered presumptively present at an estimated concentration

**UR** = Result is rejected and unusable

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### **BLANK QUALIFICATION CODES**

**CRQL** = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

**U** = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

**No Action** = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

## SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>COMPOUND ID</u>	<u>DL</u>	<u>QL</u>
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	single component pests All P > 100% And < 10X CRQL	+	U
ALL	single component pests All P > 100% And > 10X CRQL	+	NJ
ALL	multi-component pests All P > 100% And < 10X CRQL	+	NJ

- \* DL denotes the Form I qualifier supplied by the laboratory  
 QL denotes the qualifier used by the data validation firm  
 + in the DL column denotes a positive result  
 - in the DL column denotes a non-detect result

WHERRY HOUSING COMPLEX  
PRELIMINARY RISK EVALUATION  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM83 OP PEST	SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> SAMPLE DATE -----> DATE EXTRACTED ---> DATE ANALYZED ---> MATRIX -----> UNITS ----->	WHS-S-6316-11 WHSS631611 S114348*4 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-S-6317-11 WHSS631711 S114348*1 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-S-6322-11 WHSS632211 S114348*5 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-C-6322-11 WHSC632211 S114348*6 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-S-6323-11 WHSS632311 S114348*2 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-S-6350-11 WHSS635011 S114348*15 07/10/01 07/11/01 07/13/01 Soil UG/KG	A
CAS #	Parameter												
86-50-0	Azinphos-methyl	69.	U	69.	U	70.	U	69.	U	68.	U	73.	U
35400-43-2	Bolstar (Sulprofos)	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
2921-88-2	Chlorpyrifos	35.	U	11.	J	35.	U	34.	U	8.	J	37.	U
56-72-4	Coumaphos	350.	U	340.	U	350.	U	340.	U	340.	U	370.	U
298-03-3	Demeton-O	87.	U	86.	U	88.	U	86.	U	86.	U	92.	U
126-75-0	Demeton-S	87.	U	86.	U	88.	U	86.	U	86.	U	92.	U
333-41-5	Diazinon	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
62-73-7	Dichlorvos	69.	U	69.	U	70.	U	69.	U	68.	U	73.	U
60-51-5	Dimethoate	69.	U	69.	U	70.	U	69.	U	68.	U	73.	U
298-04-4	Disulfoton	69.	U	69.	U	70.	U	69.	U	68.	U	73.	U
13194-48-4	Ethoprop	18.	U	19.	U								
115-90-2	Fensulfothion	350.	U	340.	U	350.	U	340.	U	340.	U	370.	U
55-38-9	Fenthion	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
121-75-5	Malathion	18.	J	16.	J	16.	J	20.	J	34.	U	37.	U
150-50-5	Merphos	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
7786-34-7	Mevinphos	69.	U	69.	U	70.	U	69.	U	68.	U	73.	U
6923-22-4	Azodrin	350.	U	340.	U	350.	U	340.	U	340.	U	370.	U
300-76-5	Naled	350.	U	340.	U	350.	U	340.	U	340.	U	370.	U
56-38-2	Ethyl Parathion	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
298-00-0	Methyl parathion	18.	U	19.	U								
298-02-2	Phorate	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
299-84-3	Ronnel	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
22248-79-9	Tetrachlorovinphos (Stirophos)	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
3689-24-5	Sulfotepp	18.	U	19.	U								
34643-46-4	Tokuthion	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U
327-98-0	Trichloronate	4.9	J	340.	U	4.8	J	5.	J	340.	U	370.	U
2104-64-5	EPN	35.	U	34.	U	35.	U	34.	U	34.	U	37.	U

**WHERRY HOUSING COMPLEX**  
**PRELIMINARY RISK EVALUATION**  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM83 OP PEST		SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> SAMPLE DATE -----> DATE EXTRACTED --> DATE ANALYZED ----> MATRIX -----> UNITS ----->	WHS-S-6350-12 WHSS635012 S114348*14 07/10/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-S-6351-11 WHSS635111 S114348*8 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-S-6351-12 WHSS635112 S114348*9 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-C-6351-12 WHSC635112 S114348*10 07/09/01 07/11/01 07/12/01 Soil UG/KG	A	WHS-S-6412-11 WHSS641211 S114348*11 07/10/01 07/11/01 07/13/01 Soil UG/KG	A	WHS-S-7977-11 WHSS797711 S114348*3 07/09/01 07/11/01 07/12/01 Soil UG/KG	A
CAS #	Parameter													
86-50-0	Azinphos-methyl	68.	U	67.	U	67.	U	78.	U	69.	U	68.	U	
35400-43-2	Bolstar (Sulprofos)	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
2921-88-2	Chlorpyrifos	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
56-72-4	Coumaphos	340.	U	330.	U	340.	U	390.	U	350.	U	340.	U	
298-03-3	Demeton-O	85.	U	84.	U	85.	U	99.	U	87.	U	86.	U	
126-75-0	Demeton-S	85.	U	84.	U	85.	U	99.	U	87.	U	86.	U	
333-41-5	Diazinon	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
62-73-7	Dichlorvos	68.	U	67.	U	67.	U	78.	U	69.	U	68.	U	
60-51-5	Dimethoate	68.	U	67.	U	67.	U	78.	U	69.	U	68.	U	
298-04-4	Disulfoton	68.	U	67.	U	67.	U	78.	U	69.	U	68.	U	
13194-48-4	Ethoprop	18.	U	17.	U	17.	U	20.	U	18.	U	18.	U	
115-90-2	Fensulfothion	340.	U	330.	U	340.	U	390.	U	350.	U	340.	U	
55-38-9	Fenthion	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
121-75-5	Malathion	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
150-50-5	Merphos	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
7786-34-7	Mevinphos	68.	U	67.	U	67.	U	78.	U	69.	U	68.	U	
6923-22-4	Azodrin	340.	U	330.	U	340.	U	390.	U	350.	U	340.	U	
300-76-5	Naled	340.	U	330.	U	340.	U	390.	U	350.	U	340.	U	
56-38-2	Ethyl Parathion	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
298-00-0	Methyl parathion	18.	U	17.	U	17.	U	20.	U	18.	U	18.	U	
298-02-2	Phorate	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
299-84-3	Ronnel	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
22248-79-9	Tetrachlorovinphos (Stirophos)	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
3689-24-5	Sulfotepp	18.	U	17.	U	17.	U	20.	U	18.	U	18.	U	
34643-46-4	Tokuthion	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	
327-98-0	Trichloronate	340.	U	330.	U	340.	U	390.	U	350.	U	340.	U	
2104-64-5	EPN	34.	U	33.	U	34.	U	39.	U	35.	U	34.	U	

WHERRY HOUSING COMPLEX  
PRELIMINARY RISK EVALUATION  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

CAS #	Parameter	WHS-S-8005-11	WHS-S-8045-11	WHS-S-8051-11			
MEM83 OP PEST	SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> SAMPLE DATE -----> DATE EXTRACTED ---> DATE ANALYZED ----> MATRIX -----> UNITS ----->	WHS-S-8005-11 WHSS800511 S114348*7 07/09/01 07/11/01 07/12/01 Soil UG/KG	WHS-S-8045-11 WHSS804511 S114348*12 07/10/01 07/11/01 07/12/01 Soil UG/KG	WHS-S-8051-11 WHSS805111 S114348*13 07/10/01 07/11/01 07/12/01 Soil UG/KG			
86-50-0	Azinphos-methyl	70. U	70. U	68. U			
35400-43-2	Bolstar (Sulprofos)	35. U	35. U	34. U			
2921-88-2	Chlorpyrifos	35. U	35. U	13. J			
56-72-4	Coumaphos	350. U	350. U	340. U			
298-03-3	Demeton-O	88. U	88. U	86. U			
126-75-0	Demeton-S	88. U	88. U	86. U			
333-41-5	Diazinon	35. U	35. U	34. U			
62-73-7	Dichlorvos	70. U	70. U	68. U			
60-51-5	Dimethoate	70. U	70. U	68. U			
298-04-4	Disulfoton	70. U	70. U	68. U			
13194-48-4	Ethoprop	18. U	18. U	18. U			
115-90-2	Fensulfothion	350. U	350. U	340. U			
55-38-9	Fenthion	35. U	35. U	34. U			
121-75-5	Malathion	17. J	35. U	17. J			
150-50-5	Merphos	35. U	35. U	34. U			
7786-34-7	Mevinphos	70. U	70. U	68. U			
6923-22-4	Azodrin	350. U	350. U	340. U			
300-76-5	Naled	350. U	350. U	340. U			
56-38-2	Ethyl Parathion	35. U	35. U	34. U			
298-00-0	Methyl parathion	18. U	18. U	18. U			
298-02-2	Phorate	35. U	35. U	34. U			
299-84-3	Ronnel	35. U	35. U	34. U			
22248-79-9	Tetrachlorovinphos (Stirophos)	35. U	35. U	14. J			
3689-24-5	Sulfotepp	18. U	18. U	18. U			
34643-46-4	Tokuthion	35. U	35. U	34. U			
327-98-0	Trichloronate	5. J	350. U	6.1 U			
2104-64-5	EPN	35. U	35. U	34. U			

WHERRY HOUSING COMPLEX  
PRELIMINARY RISK EVALUATION  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM83 PEST	SAMPLE ID ----->	WHS-S-6316-11	WHS-S-6317-11	WHS-S-6322-11	WHS-C-6322-11	WHS-S-6323-11	WHS-S-6350-11
	ORIGINAL ID ----->	WHSS631611	WHSS631711	WHSS6322I1	WHSC6322I1	WHSS6323I1	WHSS6350I1
	LAB SAMPLE ID ---->	S114348*4	S114348*1	S114348*5	S114348*6	S114348*2	S114348*15
	SAMPLE DATE ----->	07/09/01	07/09/01	07/09/01	07/09/01	07/09/01	07/10/01
	DATE EXTRACTED --->	07/17/01	07/17/01	07/17/01	07/17/01	07/17/01	07/17/01
	DATE ANALYZED ---->	07/19/01	07/18/01	07/19/01	07/19/01	07/19/01	07/19/01
	MATRIX ----->	Soil	Soil	Soil	Soil	Soil	Soil
UNITS ----->	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	

CAS #	Parameter						
319-84-6	Alpha-BHC	890.	U	440.	U	1800.	U
319-85-7	Beta-BHC	890.	U	440.	U	1800.	U
319-86-8	Delta-BHC	890.	U	440.	U	1800.	U
58-89-9	gamma-BHC (Lindane)	890.	U	440.	U	1800.	U
76-44-8	Heptachlor	17000.	J	3600.	J	22000.	J
309-00-2	Aldrin	890.	U	440.	U	1800.	U
1024-57-3	Heptachlor Epoxide	180.	J	37.	U	1800.	U
959-98-8	Endosulfan I	890.	U	440.	U	1800.	U
60-57-1	Dieldrin	150.	J	860.	U	3500.	U
72-55-9	4,4'-DDE	1700.	U	860.	U	3500.	U
72-20-8	Endrin	1700.	U	860.	U	3500.	U
33213-65-9	Endosulfan II	1700.	U	860.	U	3500.	U
72-54-8	4,4'-DDD	1700.	U	860.	U	3500.	U
1031-07-8	Endosulfan Sulfate	1700.	U	860.	U	3500.	U
50-29-3	4,4'-DDT	1700.	U	860.	U	3500.	U
72-43-5	Methoxychlor	8900.	U	4400.	U	18000.	U
53494-70-5	Endrin ketone	1700.	U	860.	U	3500.	U
7421-93-4	Endrin aldehyde	1700.	U	860.	U	3500.	U
5103-71-9	alpha-Chlordane	5400.	U	2200.	U	4200.	U
5103-74-2	gamma-Chlordane	12000.	U	4900.	U	9400.	U
8001-35-2	Toxaphene	89000.	U	44000.	U	180000.	U

**WHERRY HOUSING COMPLEX**  
**PRELIMINARY RISK EVALUATION**  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

<b>MEM83</b> <b>PEST</b>	<b>SAMPLE ID -----&gt;</b> <b>ORIGINAL ID -----&gt;</b> <b>LAB SAMPLE ID ----&gt;</b> <b>SAMPLE DATE -----&gt;</b> <b>DATE EXTRACTED --&gt;</b> <b>DATE ANALYZED ----&gt;</b> <b>MATRIX -----&gt;</b> <b>UNITS -----&gt;</b>	WHS-S-6350-12 WHSS635012 S114348*14 07/10/01 07/17/01 07/19/01 Soil UG/KG	WHS-S-6351-11 WHSS635111 S114348*8 07/09/01 07/17/01 07/22/01 Soil UG/KG	WHS-S-6351-12 WHSS635112 S114348*9 07/09/01 07/17/01 07/19/01 Soil UG/KG	WHS-C-6351-12 WHSC635112 S114348*10 07/09/01 07/17/01 07/22/01 Soil UG/KG	WHS-S-6412-11 WHSS641211 S114348*11 07/10/01 07/17/01 07/19/01 Soil UG/KG	WHS-S-7977-11 WHSS797711 S114348*3 07/09/01 07/17/01 07/19/01 Soil UG/KG
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CAS #	Parameter												
319-84-6	Alpha-BHC	1800.	U	8.6	U	3.5	U	2.	U	1800.	U	880.	U
319-85-7	Beta-BHC	1800.	U	8.6	U	3.5	U	2.	U	1800.	U	880.	U
319-86-8	Delta-BHC	1800.	U	8.6	U	3.5	U	2.	U	1800.	U	880.	U
58-89-9	gamma-BHC (Lindane)	1800.	U	8.6	U	3.5	U	2.	U	1800.	U	880.	U
76-44-8	Heptachlor	1800.	U	160.	J	31.	J	22.	J	2800.	U	880.	U
309-00-2	Aldrin	320.	J	8.6	U	3.5	U	2.	U	230.	J	730.	J
1024-57-3	Heptachlor Epoxide	1800.	U	3.	J	3.6	J	0.94	J	1800.	U	880.	U
959-98-8	Endosulfan I	1800.	U	8.6	U	3.5	U	2.	U	1800.	U	880.	U
60-57-1	Dieldrin	42000.		4.3	J	1.3	J	1.5	U	33000.		35000.	D
72-55-9	4,4'-DDE	3400.	U	17.	U	6.7	U	3.9	U	3500.	U	1700.	U
72-20-8	Endrin	1200.	J	17.	U	6.7	U	3.9	U	930.	J	820.	J
33213-65-9	Endosulfan II	3400.	U	17.	U	6.7	U	3.9	U	3500.	U	1700.	U
72-54-8	4,4'-DDD	3400.	U	17.	U	6.7	U	3.9	U	3500.	U	1700.	U
1031-07-8	Endosulfan Sulfate	3400.	U	17.	U	6.7	U	3.9	U	3500.	U	1700.	U
50-29-3	4,4'-DDT	3400.	U	17.	U	6.7	U	3.9	U	3500.	U	1700.	U
72-43-5	Methoxychlor	18000.	U	86.	U	35.	U	20.	U	18000.	U	8800.	U
53494-70-5	Endrin ketone	3400.	U	17.	U	6.7	U	3.9	U	3500.	U	1700.	U
7421-93-4	Endrin aldehyde	3400.	U	17.	U	6.7	U	3.9	U	3500.	U	1700.	U
5103-71-9	alpha-Chlordane	1800.	U	34.	U	20.	J	16.	J	1800.	U	880.	U
5103-74-2	gamma-Chlordane	1800.	U	84.	U	34.	J	26.	J	1800.	U	880.	U
8001-35-2	Toxaphene	180000.	U	860.	U	350.	U	200.	U	180000.	U	88000.	U

WHERRY HOUSING COMPLEX  
PRELIMINARY RISK EVALUATION  
DATA FOR JULY 2001 SOIL SAMPLING EVENT

MEM83 PEST	SAMPLE ID ----->	WHS-S-8005-11	WHS-S-8045-11	WHS-S-8051-11			
	ORIGINAL ID ----->	WHSS800511	WHSS804511	WHSS805111			
	LAB SAMPLE ID ---->	S114348*7	S114348*12	S114348*13			
	SAMPLE DATE ----->	07/09/01	07/10/01	07/10/01			
	DATE EXTRACTED -->	07/17/01	07/17/01	07/17/01			
	DATE ANALYZED ---->	07/19/01	07/19/01	07/22/01			
	MATRIX ----->	Soil	Soil	Soil			
	UNITS ----->	UG/KG	UG/KG	UG/KG			

CAS #	Parameter						
319-84-6	Alpha-BHC	1800.	U	180.	U	4400.	U
319-85-7	Beta-BHC	1800.	U	180.	U	4400.	U
319-86-8	Delta-BHC	1800.	U	180.	U	4400.	U
58-89-9	gamma-BHC (Lindane)	1800.	U	180.	U	4400.	U
76-44-8	Heptachlor	18000.	J	2800.	J	84000.	J
309-00-2	Aldrin	1800.	U	180.	U	4400.	U
1024-57-3	Heptachlor Epoxide	520.	J	180.	U	4400.	U
959-98-8	Endosulfan I	1800.	U	180.	U	4400.	U
60-57-1	Dieldrin	3500.	U	43.	J	8500.	U
72-55-9	4,4'-DDE	3500.	U	350.	U	8500.	U
72-20-8	Endrin	3500.	U	350.	U	8500.	U
33213-65-9	Endosulfan II	3500.	U	350.	U	8500.	U
72-54-8	4,4'-DDD	3500.	U	350.	U	8500.	U
1031-07-8	Endosulfan Sulfate	3500.	U	350.	U	8500.	U
50-29-3	4,4'-DDT	3500.	U	350.	U	940.	J
72-43-5	Methoxychlor	18000.	U	1800.	U	44000.	U
53494-70-5	Endrin ketone	3500.	U	350.	U	8500.	U
7421-93-4	Endrin aldehyde	3500.	U	350.	U	8500.	U
5103-71-9	alpha-Chlordane	5500.	U	1400.		43000.	
5103-74-2	gamma-Chlordane	12000.	U	3200.		75000.	
8001-35-2	Toxaphene	180000.	U	18000.	U	440000.	U