

## APPENDIX B. TABLES

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**Table 1. Population Distribution by Race and Sex<sup>1</sup>.  
Pab Oil Site, Vermilion Parish, Louisiana**

	White		Black/African American		Other Race/ Ethnicity		Total	Median Family Income	Median Household Income
	Female	Male	Female	Male	Female	Male			
Abbeville	3,549	3,058	2,231	1,915	189	245	11,187	\$14,769	\$12,653
Vermilion Parish	21,686	20,551	3,721	3,122	394	581	50,055	\$21,815	\$18,202
Census Tract 9506	1,411	1,306	67	60	29	38	2,911	\$21,733	\$19,622

<sup>1</sup> 1990 U.S. Census data.

**Table 2. Population Distribution by Age Group<sup>1</sup>.  
Pab Oil, Vermilion Parish, Louisiana.**

	Age								
	<5	5-14	15-24	25-34	35-44	45-54	55-64	65-74	>75
Abbeville	996	2,026	1,548	1,658	1,306	912	976	969	796
Vermilion Parish	3,998	9,062	6,866	8,003	6,504	4,725	4,316	3,664	2,917
Census Tract 9506	224	471	411	471	377	269	297	232	159

<sup>1</sup> 1990 U. S. Census data.

**Table 3. Predominant Contaminants Detected in the Waste Pits.  
Pab Oil, Vermilion Parish, Louisiana.**

Contaminant	Maximum Concentration (ppm <sup>1</sup> )		
	Northwest Pit	Northeast Pit	South Pit
benzene	6.6	42	7.5
toluene	27	145	11.5
ethyl benzene	15	80	6.5
total xylenes	75	325	40
naphthalene	200	200	7.4
2-methyl-naphthalene	540	455	50
fluorene	55	61	6
phenanthrene	95	180	7.8
pyrene	4.3	20	2.3
dioxin (OCDD)	0.004	0.234	0.008
dioxin (2,3,7,8-TCDD)	0.000038	undetected	undetected
arsenic	25.1	13.5	7.5
barium	46,500	48,400	7,450
cadmium	11.8	7	undetected
calcium	32,000	24,100	16,600
chromium	933	857	136
copper	685	111	15.4
lead	2,780	585	32.4
mercury	2.6	3.4	0.4
zinc	3,610	2,560	1,510

<sup>1</sup> ppm - parts per million

**Table 4. Predominant Contaminants Detected in the Storage Tanks.  
Pab Oil, Vermilion Parish, Louisiana.**

Contaminant	Maximum Concentration (ppm <sup>1</sup> )
benzene	530
ethyl benzene	6
total xylene	2,700
acetone	1,100
2-methylnaphthalene	900
phenol	1,200
phenanthrene	170
arsenic	18.9
barium	9,824
chromium	40.5
lead	54.3
mercury	5.9

<sup>1</sup>ppm - parts per million

**Table 5. Range of Contaminant Concentrations in On-site Shallow Soil Samples.  
Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant		Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
				ppm	Source
<b>Organics:</b>					
PAHs	phenanthrene	0.049-0.076	1	none	none
	chrysene	0.097-0.17	1	none	none
	benzo(b)fluoranthene	0.18-0.21	1	none	none
	benzo(a)pyrene	0.042-0.092	1	0.1	CREG <sup>2</sup>
	indeno(1,2,3-cd)pyrene	0.032-0.071	1	none	none
	benzo(ghi)perylene	0.029-0.089	1	none	none
	benzo(k) fluoranthene	0.16-0.18	1	none	none
TPH <sup>3</sup>	29-18,110	1	none	none	
<b>Inorganics:</b>					
	antimony	4.7-10.8	1	0.8	RMEG <sup>4</sup>
	arsenic	2.3-30.7	1	0.5	CREG
	barium	108-23,500	1	100	RMEG
	chromium	10.1-69.8	1	6	RMEG
	iron	8,480-55,200	1	none	none
	manganese	138-3,580	1	300	RMEG
	vanadium	0.85-69.1	1	6	EMEG <sup>5</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>CREG - Cancer Risk Evaluation Guide

<sup>3</sup>TPH - Total Petroleum Hydrocarbon

<sup>4</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>5</sup>EMEG - Environmental Media Evaluation Guide

**Table 6. Range of Contaminant Concentrations in On-site Subsurface Soil Samples.  
Pab Oil, Vermilion Parish, Louisiana. January 1993, September 1988**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Organics:</b>				
PAHs <sup>2</sup>	0.068-0.16	1 2	none	none
TPH <sup>3</sup>	32-1,067	1 2	none	none
<b>Inorganics:</b>				
antimony	7.3-96	1 2	0.8	RMEG <sup>4</sup>
arsenic	1.6-13.6	1 2	0.5	CREG <sup>5</sup>
chromium	7.6-118	1 2	6	RMEG
iron	4210-53,900	1 2	none	none
manganese	103-14,800	1 2	300	RMEG
nickel	2.1-94.9	1 2	40	RMEG
vanadium	14.6-63.9	1 2	6	EMEG <sup>6</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>PAHs - Polycyclic aromatic hydrocarbons

<sup>3</sup>TPH - Total petroleum hydrocarbons

<sup>4</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>5</sup>CREG - Cancer Risk Evaluation Guide

<sup>6</sup>EMEG - Environmental Media Evaluation Guide

**Table 7. Range of Contaminant Concentrations in On-site Sediment Samples.  
Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Organics:</b>				
PAHs <sup>2</sup>	0.043-5.7	1	none	none
TPH <sup>3</sup>	35-4167	1	none	none
<b>Inorganics:</b>				
antimony	5.5-9.1	1	0.8	RMEG <sup>4</sup>
arsenic	2.8-27.6	1	0.5	CREG <sup>5</sup>
chromium	13.7-115	1	6	RMEG
iron	8020-34,700	1	none	none
manganese	64.5-2,810	1	300	RMEG
vanadium	16.7-48.6	1	6	EMEG <sup>6</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>PAHs - Polycyclic aromatic hydrocarbons

<sup>3</sup>TPH - Total petroleum hydrocarbons

<sup>4</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>5</sup>CREG - Cancer Risk Evaluation Guide

<sup>6</sup>EMEG - Environmental Media Evaluation Guide

**Table 8. Range of Contaminant Concentrations in On-site Surface Water Samples.  
Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Inorganics:</b>				
arsenic	0.002-0.006	1	0.00002	CREG <sup>2</sup>
barium	0.094-2.89	1	0.7	RMEG <sup>3</sup>
lead	0.001-0.021	1	0	MCLG <sup>4</sup>
nickel	4.4-8.6	1	0.2	RMEG
manganese	0.006-2.32	1	0.05	RMEG

<sup>1</sup>ppm - parts per million

<sup>2</sup>CREG - Cancer Risk Evaluation Guide

<sup>3</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>4</sup>MCLG - Maximum Contaminant Level Goal



**Table 9. Range of Contaminant Concentrations in On-site Groundwater Samples.  
Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Volatile Organics:</b>				
benzene	0.002-0.003	1	0.001	CREG <sup>2</sup>
<b>Inorganics:</b>				
antimony	0.013-0.015	1	0.004	RMEG <sup>3</sup>
arsenic	0.003-0.011	1	0.00002	CREG
chromium	0.004-1.33	1	0.03	RMEG
iron	0.019-112	1	none	none
lead	0.001-0.138	1	0	MCLG <sup>4</sup>
manganese	0.11-2.3	1	0.05	RMEG
nickel	0.008-0.66	1	0.2	RMEG
vanadium	0.003-0.194	1	0.03	EMEG <sup>5</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>CREG - Cancer Risk Evaluation Guide

<sup>3</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>4</sup>MCLG - Maximum Contaminant Level Goal

<sup>5</sup>EMEG - Environmental Media Evaluation Guide

**Table 10. Range of Contaminant Concentrations in Off-site Shallow Soil Samples.  
Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Organics:</b>				
TPH <sup>2</sup>	55.3	1	none	none
<b>Inorganics:</b>				
antimony	7.8-14	1	0.8	RMEG <sup>3</sup>
arsenic	1.7-7.3	1	0.5	CREG <sup>4</sup>
chromium	6.8-17.9	1	6	RMEG
manganese	254-641	1	300	RMEG
vanadium	13-32.4	1	6	EMEG <sup>5</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>TPH - Total petroleum hydrocarbons

<sup>3</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>4</sup>CREG - Cancer Risk Evaluation Guide

<sup>5</sup>EMEG - Environmental Media Evaluation Guide

**Table 11. Range of Contaminant Concentrations in Off-site Subsurface Soil Samples.**

**Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Organics:</b>				
TPH <sup>2</sup>	32.9-71.7	1	none	none
<b>Inorganics:</b>				
arsenic	1.2-14.1	1	0.5	CREG <sup>3</sup>
chromium	7.9-31.8	1	6	RMEG <sup>4</sup>
manganese	27.3-772	1	300	RMEG
vanadium	11.8-58.1	1	6	EMEG <sup>5</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>TPH - Total petroleum hydrocarbons

<sup>3</sup>CREG - Cancer Risk Evaluation Guide

<sup>4</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>5</sup>EMEG - Environmental Media Evaluation Guide

**Table 12. Range of Contaminant Concentrations in Off-site Sediment Samples.**

**Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Organics:</b>				
TPH <sup>2</sup>	45	1	none	none
<b>Inorganics:</b>				
arsenic	2.8-31	1	0.5	CREG <sup>3</sup>
chromium	14.5-26.1	1	6	RMEG <sup>4</sup>
manganese	122-2,020	1	300	RMEG
vanadium	20.7-57.8	1	6	EMEG <sup>5</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>TPH - Total petroleum hydrocarbons

<sup>3</sup>CREG - Cancer Risk Evaluation Guide

<sup>4</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>5</sup>EMEG - Environmental Media Evaluation Guide

**Table 13. Range of Contaminant Concentrations in Off-site Surface Water Samples.  
Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Inorganics:</b>				
arsenic	0.003-0.015	1	0.00002	CREG <sup>2</sup>
manganese	0.034-1.95	1	0.05	RMEG <sup>3</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>CREG - Cancer Risk Evaluation Guide

<sup>3</sup>RMEG - Reference Dose Media Evaluation Guide

**Table 14. Range of Contaminant Concentrations in Off-site Groundwater  
(Monitoring Well) Samples. Pab Oil, Vermilion Parish, Louisiana. January 1993**

Contaminant	Concentration Range (ppm <sup>1</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Inorganics:</b>				
arsenic	0.006	1	0.00002	CREG <sup>2</sup>
barium	0.24-1.2	1	0.7	RMEG <sup>3</sup>
chromium	0.029-0.083	1	0.03	RMEG
iron	0.014-48	1	none	none
lead	0.022-0.14	1	0	MCLG <sup>4</sup>
manganese	0.44-1.97	1	0.05	RMEG
vanadium	0.004-0.1	1	0.03	EMEG <sup>5</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>CREG - Cancer Risk Evaluation Guide

<sup>3</sup>RMEG - Reference Dose Media Evaluation Guide

<sup>4</sup>MCLG - Maximum Contaminant Level Goal

<sup>5</sup>EMEG - Environmental Media Evaluation Guide

**Table 15. Range of Contaminant Concentrations in Off-site Groundwater (Residential Well) Samples Collected by EPA<sup>1</sup>. Pab Oil, Vermilion Parish, Louisiana. January 1993.**

Contaminant	Concentration Range (ppm <sup>2</sup> )	Comparison Value	
		ppm	Source
<b>Inorganics:</b>			
arsenic	0.002-0.031	0.00002	CREG <sup>3</sup>
manganese	0.27-0.77	0.05	RMEG <sup>4</sup>

<sup>1</sup>U.S. Environmental Protection Agency.

<sup>2</sup>ppm - parts per million

<sup>3</sup>CREG - Cancer Risk Evaluation Guide

<sup>4</sup>RMEG - Reference Dose Media Evaluation Guide

**Table 16. Range of Contaminant Concentrations in Off-site Groundwater (Residential Well) Samples Collected by Louisiana Office of Public Health. Pab Oil, Vermilion Parish, Louisiana. March 1993.**

Contaminant	Concentration Range (ppm <sup>2</sup> )	Reference	Comparison Value	
			ppm	Source
<b>Inorganics:</b>				
arsenic	0.005-0.031	3	0.00002	CREG <sup>2</sup>
iron	0.01-12	3	none	none
manganese	0.03-0.64	3	0.05	RMEG <sup>3</sup>

<sup>1</sup>ppm - parts per million

<sup>2</sup>CREG - Cancer Risk Evaluation Guide

<sup>3</sup>RMEG - Reference Dose Media Evaluation Guide

**Table 17. Completed and Potential Exposure Pathways. Pab Oil, Vermilion Parish, Louisiana.**

PATHWAY NAME	EXPOSURE PATHWAY ELEMENTS					TIME PERIOD
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
<b>Completed Exposure Pathways:</b>						
surface soil	Pab Oil	shallow soil	site	ingestion	workers, trespassers	past
sediments	Pab Oil	sediments	ponds, ditches, canals	dermal contact	children, teenagers	past
surface water	Pab Oil	surface water	ponds, ditches, canals	dermal contact	children, teenagers	past
groundwater (residential wells)	unknown	groundwater	residences (taps)	ingestion	residents	past present future
<b>Potential Exposure Pathways:</b>						
groundwater (residential wells)	Pab Oil	groundwater	residences (taps)	ingestion	residents	future

<sup>2</sup>CREG - Cancer Risk Evaluation Guide



**Table 18. Standardized Incidence Ratios (SIR) for Pab Oil (Census Tract 9506),  
1988-1996. Comparison of Observed and Expected Cancer Incidence Using Louisiana Region IV  
Rates (1988-1992). All Races.**

Cancer Type	Sex	Cases		SIR <sup>1</sup>	p-value <sup>3</sup>
		Observed	Expected		
All Cancers	Male	56	71.56	0.78	0.0659
Breast	Female	17	15.49	1.10	0.7008
Bladder	Male	4	4.04	0.99	0.9825
Colorectal	Male	5	7.25	0.69	0.4041
Lung/Bronchus	Male	12	17.78	0.67	0.1701
	Female	4	7.96	0.50	0.1606
Ovarian	Female	4	1.48	<b>2.71<sup>2</sup></b>	0.0376
Pancreas	Male	6	2.47	<b>2.43<sup>2</sup></b>	0.0246
Prostate	Male	16	16.51	0.97	0.9004



**Table 19. Standardized Incidence Ratios (SIRs) for Pab Oil (Census Tract 9506),  
1988-1996. Comparison of Observed and Expected Cancer Incidence,  
Using Louisiana Region IV Rates (1988-1992). Whites Only.**

Cancer Type	Sex	Cases		SIR <sup>1</sup>	p-value <sup>3</sup>
		Observed	Expected		
All Cancers	Male	54	69.49	0.78	0.0631
Breast	Female	17	15.38	1.11	0.6789
Bladder	Male	4	4.40	0.91	0.8492
Colorectal	Male	5	7.37	0.68	0.3824
Lung/Bronchus	Male	12	16.47	0.73	0.2706
Ovarian	Female	4	1.51	<b>2.65<sup>2</sup></b>	0.0425
Pancreas	Male	5	2.21	2.26	0.0607
Prostate	Male	15	16.43	0.91	0.7237

<sup>1</sup> SIR- Standardized Incidence Ratio. The SIR is calculated by dividing the observed number of cases by the expected number of cases.

<sup>2</sup> Statistically elevated at the p<0.05 level.

<sup>3</sup> p-value- The probability (ranging from zero to one) that the results observed in a study (or results more extreme) could have occurred by chance.