

ATTACHMENT D
SEDIMENT ANALYTICAL RESULTS

Attachment D
Sediment Analytical Results
Red River Fish Kill
Oscar, Jefferson County, Oklahoma

Analyte	Units	Location Sample ID Date Sample Type	RR01 RR01-110822-51 08/22/2011 Background	RR02 RR02-110822-51 08/22/2011 Field Sample	RR07 RR07-110823-51 08/23/2011 Field Sample	RR07 RR07-110823-52 08/23/2011 Field Duplicate
Herbicides						
2,4,5-T	mg/Kg	--	0.00062 U	0.00053 U	0.00053 U	0.00055 U
2,4-D	mg/Kg	--	0.00048 U	0.00041 U	0.00041 U	0.00043 U
2,4-DB	mg/Kg	--	0.00093 U	0.00079 U	0.0008 U	0.00083 U
Dalapon	mg/Kg	--	0.022 U	0.019 U	0.019 U	0.02 U
Dicamba	mg/Kg	--	0.00065 U	0.00055 U	0.00056 U	0.00058 U
Dichlorprop	mg/Kg	--	0.00063 U	0.00054 U	0.00054 U	0.00057 U
Dinoseb	mg/Kg	--	0.00045 U	0.00038 U	0.00039 U	0.0004 U
MCPA	mg/Kg	--	0.091 U	0.078 U	0.079 U	0.082 U
Mecoprop	mg/Kg	--	0.064 U	0.055 U	0.055 U	0.058 U
Silvex (2,4,5-TP)	mg/Kg	--	0.0006 U	0.00051 U	0.00052 U	0.00054 U
Metals						
Aluminum	mg/Kg	--	17000 JK	850 JK	290 JK	490 JK
Antimony	mg/Kg	--	0.32 UR	0.32 JQL	0.27 JQ	0.37 JQ
Arsenic	mg/Kg	--	4.3	0.69 JQ	0.63 JQ	0.79 JQ
Barium	mg/Kg	--	460 JK	62 JK	22	23
Beryllium	mg/Kg	--	1.2	0.017 UJL	0.04 JQL	0.043 JQL
Cadmium	mg/Kg	--	0.39	0.03 U	0.034 JQH	0.035 JQH
Calcium	mg/Kg	--	14000 JK	12000 JK	5700	8700
Chromium	mg/Kg	--	23 JK	1.9 JK	0.95	1.2
Cobalt	mg/Kg	--	9.5 JK	0.68 JK	0.35 JQ	0.41 JQ
Copper	mg/Kg	--	18	1.1 JK	0.39 JQH	0.6 JQH
Iron	mg/Kg	--	28000 JK	1700 JK	930	1100
Lead	mg/Kg	--	14 JK	1.3 JK	0.51 JQ	0.74



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Metals (continued)						
Magnesium	mg/Kg	--	11000 JK	1700 JK	450	660
Manganese	mg/Kg	--	280 JK	80 JK	41 JH	59 JH
Mercury	mg/Kg	--	0.0078 JQ	0.0019 U	0.0018 U	0.0019 U
Nickel	mg/Kg	--	26 JK	1.8 JK	0.14 UB	0.14 UB
Potassium	mg/Kg	--	3500 JH	240 JH	81 JQK	140 JK
Selenium	mg/Kg	--	0.35 UJL	0.31 UJL	0.3 U	0.32 U
Silver	mg/Kg	--	0.16 U	0.14 U	0.14 U	0.15 U
Sodium	mg/Kg	--	1700 JH	310 JH	340	320 JH
Strontium	mg/Kg	--	82	17	12 JK	11 JK
Thallium	mg/Kg	--	0.91 JQ	0.33 U	0.32 U	0.34 U
Uranium	mg/Kg	--	0.75	0.12 JQ	0.093 JQ	0.12 JQ
Vanadium	mg/Kg	--	33	3.4 JK	2.5	2.8
Zinc	mg/Kg	--	51 JK	4.2 JK	0.13 UB	2
PCBs						
PCB-1016	mg/Kg	--	0.0022 U	0.0019 U	0.0019 U	0.00002 U
PCB-1221	mg/Kg	--	0.012 U	0.01 U	0.01 U	0.00011 U
PCB-1232	mg/Kg	--	0.0094 U	0.008 U	0.0081 U	0.000084 U
PCB-1242	mg/Kg	--	0.0017 U	0.0015 U	0.0015 U	0.000015 U
PCB-1248	mg/Kg	--	0.0035 U	0.003 U	0.003 U	0.000031 U
PCB-1254	mg/Kg	--	0.0031 U	0.0026 U	0.0027 U	0.000028 U
PCB-1260	mg/Kg	--	0.019 U	0.016 U	0.016 U	0.00017 U
PCB-1262	mg/Kg	--	0.023 U	0.02 U	0.02 U	0.00021 U
Polychlorinated biphenyls, Total	mg/Kg	--	0.0017 U	0.0015 U	0.0015 U	0.000015 U



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Pesticides						
4,4'-DDD	mg/Kg	--	0.0023 U	0.0019 U	0.002 U	0.00002 U
4,4'-DDE	mg/Kg	--	0.002 U	0.0017 U	0.0017 U	0.000018 U
4,4'-DDT	mg/Kg	--	0.0026 U	0.0022 U	0.0022 U	0.000023 U
Aldrin	mg/Kg	--	0.0018 U	0.0016 U	0.0016 U	0.000016 U
alpha-BHC	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.000012 U
alpha-Chlordane	mg/Kg	--	0.0022 U	0.0019 U	0.0019 U	0.00002 U
beta-BHC	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.000013 U
Chlordane (technical)	mg/Kg	--	0.0021 U	0.0018 U	0.0018 U	0.000019 U
delta-BHC	mg/Kg	--	0.0012 U	0.001 U	0.001 U	0.000011 U
Dieldrin	mg/Kg	--	0.002 U	0.0017 U	0.0017 U	0.000017 U
Endosulfan I	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.000012 U
Endosulfan II	mg/Kg	--	0.0021 U	0.0018 U	0.0018 U	0.000019 U
Endosulfan sulfate	mg/Kg	--	0.0024 U	0.002 U	0.002 U	0.000021 U
Endrin	mg/Kg	--	0.0021 U	0.0018 U	0.0018 U	0.000019 U
Endrin aldehyde	mg/Kg	--	0.0022 U	0.0019 U	0.0019 U	0.000019 U
Endrin ketone	mg/Kg	--	0.0022 U	0.0018 U	0.0019 U	0.000019 U
gamma-BHC (Lindane)	mg/Kg	--	0.0013 U	0.0011 U	0.0011 U	0.000012 U
gamma-Chlordane	mg/Kg	--	0.0018 U	0.0015 U	0.0015 U	0.000016 U
Heptachlor	mg/Kg	--	0.0013 U	0.0011 U	0.0011 U	0.000012 U
Heptachlor epoxide	mg/Kg	--	0.0016 U	0.0014 U	0.0014 U	0.000015 U
Methoxychlor	mg/Kg	--	0.011 U	0.0096 U	0.0097 U	0.0001 U
Toxaphene	mg/Kg	--	0.1 U	0.087 U	0.088 U	0.00091 U



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RCI						
Cyanide, Reactive	mg/Kg	--	0.086 U	0.086 U	0.086 U	0.086 U
Flashpoint	Degrees F	--	212 >	212 >	212 >	212 >
pH	SU	--	8.42 JK	8.09 JK	8.6 JK	8.47 JK
Sulfide, Reactive	mg/Kg	--	41 JQ	20 JQ	14 UJK	20 JQK
SVOCs						
1,2,4-Trichlorobenzene	mg/Kg	--	0.003 U	0.0025 U	0.0025 U	0.0026 U
1,2-Dichlorobenzene	mg/Kg	--	0.0042 U	0.0036 U	0.0037 U	0.0038 U
1,3-Dichlorobenzene	mg/Kg	--	0.0022 U	0.0018 U	0.0019 U	0.0019 U
1,4-Dichlorobenzene	mg/Kg	--	0.0032 U	0.0027 U	0.0027 U	0.0028 U
2,4,5-Trichlorophenol	mg/Kg	--	0.014 U	0.012 U	0.012 U	0.013 U
2,4,6-Trichlorophenol	mg/Kg	--	0.0038 U	0.0032 U	0.0032 U	0.0034 U
2,4-Dichlorophenol	mg/Kg	--	0.0054 U	0.0046 U	0.0047 U	0.0048 U
2,4-Dimethylphenol	mg/Kg	--	0.012 U	0.01 U	0.01 U	0.011 U
2,4-Dinitrophenol	mg/Kg	--	0.0066 U	0.0057 U	0.0057 UJK	0.0059 UJK
2,4-Dinitrotoluene	mg/Kg	--	0.0051 U	0.0043 U	0.0044 U	0.0045 U
2,6-Dinitrotoluene	mg/Kg	--	0.0041 U	0.0035 U	0.0036 U	0.0037 U
2-Chloronaphthalene	mg/Kg	--	0.0017 U	0.0015 U	0.0015 U	0.0015 U
2-Chlorophenol	mg/Kg	--	0.0028 U	0.0024 U	0.0024 U	0.0025 U
2-Methylnaphthalene	mg/Kg	--	0.0039 U	0.0033 U	0.0033 U	0.0034 U
2-Methylphenol	mg/Kg	--	0.0045 U	0.0039 U	0.0039 U	0.004 U
2-Nitroaniline	mg/Kg	--	0.0069 U	0.0059 U	0.0059 U	0.0061 U



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SVOCs (continued)						
2-Nitrophenol	mg/Kg	--	0.0055 U	0.0047 U	0.0047 U	0.0049 U
3 & 4 Methylphenol	mg/Kg	--	0.0039 U	0.0033 U	0.0034 U	0.0035 U
3,3'-Dichlorobenzidine	mg/Kg	--	0.014 U	0.012 U	0.012 U	0.013 U
3-Nitroaniline	mg/Kg	--	0.01 U	0.0086 U	0.0087 U	0.009 U
4,6-Dinitro-2-methylphenol	mg/Kg	--	0.007 U	0.006 U	0.006 U	0.0062 U
4-Bromophenyl phenyl ether	mg/Kg	--	0.004 U	0.0034 U	0.0034 U	0.0036 U
4-Chloro-3-methylphenol	mg/Kg	--	0.022 U	0.019 U	0.019 U	0.02 U
4-Chloroaniline	mg/Kg	--	0.0082 U	0.007 U	0.0071 U	0.0073 U
4-Chlorophenyl phenyl ether	mg/Kg	--	0.0025 U	0.0022 U	0.0022 U	0.0023 U
4-Nitroaniline	mg/Kg	--	0.016 U	0.013 U	0.014 U	0.014 U
4-Nitrophenol	mg/Kg	--	0.0071 U	0.0061 U	0.0062 U	0.0064 U
Acenaphthene	mg/Kg	--	0.002 U	0.0017 U	0.0017 U	0.0018 U
Acenaphthylene	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.0013 U
Anthracene	mg/Kg	--	0.0018 U	0.0015 U	0.0016 U	0.0016 U
Benzidine	mg/Kg	--	0.013 U	0.011 U	0.011 U	0.011 U
Benzo[a]anthracene	mg/Kg	--	0.0019 U	0.0017 U	0.0017 U	0.0017 U
Benzo[a]pyrene	mg/Kg	--	0.0023 U	0.0019 U	0.002 U	0.002 U
Benzo[b]fluoranthene	mg/Kg	--	0.0024 U	0.0021 U	0.0021 U	0.0022 U
Benzo[g,h,i]perylene	mg/Kg	--	0.0071 U	0.0061 U	0.0061 U	0.0064 U
Benzo[k]fluoranthene	mg/Kg	--	0.0021 U	0.0018 U	0.0018 U	0.0019 U
Benzyl alcohol	mg/Kg	--	0.0082 U	0.007 U	0.0071 U	0.0073 U



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SVOCs (continued)						
Bis(2-chloroethoxy)methane	mg/Kg	--	0.002 U	0.0017 U	0.0017 U	0.0018 U
Bis(2-chloroethyl)ether	mg/Kg	--	0.0023 U	0.002 U	0.002 U	0.0021 U
Bis(2-chloroisopropyl) ether	mg/Kg	--	0.012 U	0.011 U	0.011 U	0.011 U
Bis(2-ethylhexyl) phthalate	mg/Kg	--	0.0075 U	0.0064 U	0.0065 U	0.0067 U
Butyl benzyl phthalate	mg/Kg	--	0.0087 U	0.0074 U	0.0075 U	0.0078 U
Carbazole	mg/Kg	--	0.0044 U	0.0037 U	0.0038 U	0.0039 U
Chrysene	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.0013 U
Dibenz(a,h)anthracene	mg/Kg	--	0.0051 U	0.0044 U	0.0044 U	0.0045 U
Dibenzofuran	mg/Kg	--	0.0025 U	0.0021 U	0.0022 U	0.0022 U
Diethyl phthalate	mg/Kg	--	0.012 U	0.01 U	0.01 U	0.011 U
Dimethyl phthalate	mg/Kg	--	0.0069 U	0.0059 U	0.0059 U	0.0061 U
Di-n-butyl phthalate	mg/Kg	--	0.0036 U	0.0031 U	0.0031 U	0.0032 U
Di-n-octyl phthalate	mg/Kg	--	0.0027 U	0.0023 U	0.0023 U	0.0024 U
Ethane, 1,1,2,2-tetrachloro-	mg/Kg	--			0.24 T J N	0.22 T J N
Fluoranthene	mg/Kg	--	0.0044 U	0.0037 U	0.0038 U	0.0039 U
Fluorene	mg/Kg	--	0.0033 U	0.0028 U	0.0029 U	0.003 U
Hexachlorobenzene	mg/Kg	--	0.0021 U	0.0018 U	0.0018 U	0.0019 U
Hexachlorobutadiene	mg/Kg	--	0.0027 U	0.0023 U	0.0023 U	0.0024 U
Hexachlorocyclopentadiene	mg/Kg	--	0.0065 U	0.0055 U	0.0056 UJK	0.0058 UJK
Hexachloroethane	mg/Kg	--	0.0032 U	0.0028 U	0.0028 U	0.0029 U
Indeno[1,2,3-cd]pyrene	mg/Kg	--	0.0049 U	0.0042 U	0.0042 U	0.0044 U
Isophorone	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.0013 U



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SVOCs (continued)						
Naphthalene	mg/Kg	--	0.0019 U	0.0016 U	0.0016 U	0.0017 U
Nitrobenzene	mg/Kg	--	0.0042 U	0.0036 U	0.0036 U	0.0037 U
N-Nitrosodimethylamine	mg/Kg	--	0.0059 U	0.005 U	0.0051 U	0.0052 U
N-Nitrosodi-n-propylamine	mg/Kg	--	0.0031 U	0.0027 U	0.0027 U	0.0028 U
N-Nitrosodiphenylamine	mg/Kg	--	0.0027 U	0.0023 U	0.0023 U	0.0024 U
Pentachlorophenol	mg/Kg	--	0.0056 U	0.0048 U	0.0048 U	0.005 U
Phenanthrene	mg/Kg	--	0.007 U	0.0059 U	0.006 U	0.0062 U
Phenol	mg/Kg	--	0.006 U	0.0051 U	0.0051 U	0.0053 U
Polydimethyl Siloxane TIC	mg/Kg	--	0.047 U	0.04 U	0.04 U	0.042 U
Pyrene	mg/Kg	--	0.0026 U	0.0022 U	0.0022 U	0.0023 U
Tentatively Identified Compound	mg/Kg	--	0 None	0 None		
Total Cyanide						
Cyanide, Total	mg/Kg	--	0.095 UB	0.09 UB	0.1 UB	0.098 UB
VOCs						
1,1,1-Trichloroethane	mg/Kg	--	0.001 U	0.00089 U	0.0009 U	0.00093 U
1,1,2,2-Tetrachloroethane	mg/Kg	--	0.0012 U	0.001 U	0.0011 U	0.0011 U
1,1,2-Trichloroethane	mg/Kg	--	0.001 U	0.00088 U	0.00089 U	0.00092 U
1,1-Dichloroethane	mg/Kg	--	0.0012 U	0.001 U	0.0011 U	0.0011 U
1,1-Dichloroethene	mg/Kg	--	0.0017 U	0.0015 U	0.0015 U	0.0015 U
1,2-Dichloroethane	mg/Kg	--	0.0013 U	0.0011 U	0.0011 U	0.0011 U
1,2-Dichloroethene, Total	mg/Kg	--	0.0027 U	0.0023 U	0.0023 U	0.0024 U



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VOCs (continued)						
1,2-Dichloropropane	mg/Kg	--	0.001 U	0.00086 U	0.00086 U	0.0009 U
2-Butanone (MEK)	mg/Kg	--	0.0027 UJK	0.0023 UJK	0.0023 U	0.0024 U
2-Hexanone	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.0013 U
4-Methyl-2-pentanone (MIBK)	mg/Kg	--	0.0021 U	0.0018 U	0.0018 U	0.0019 U
Acetone	mg/Kg	--	0.0023 UJK	0.002 UJK	0.002 UJK	0.0021 UJK
Benzene	mg/Kg	--	0.00089 U	0.00076 U	0.00077 U	0.00079 U
Bromodichloromethane	mg/Kg	--	0.00093 U	0.00079 U	0.0008 U	0.00083 U
Bromoform	mg/Kg	--	0.0019 U	0.0016 U	0.0017 U	0.0017 U
Bromomethane	mg/Kg	--	0.0012 U	0.001 U	0.001 U	0.001 U
Carbon disulfide	mg/Kg	--	0.00077 U	0.00066 U	0.00067 U	0.00069 U
Carbon tetrachloride	mg/Kg	--	0.0016 U	0.0014 U	0.0014 U	0.0014 U
Chlorobenzene	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.0012 U
Chlorobromomethane	mg/Kg	--	0.0025 U	0.0021 U	0.0022 U	0.0022 U
Chloroethane	mg/Kg	--	0.002 U	0.0017 U	0.0017 U	0.0018 U
Chloroform	mg/Kg	--	0.00093 U	0.00079 U	0.0008 U	0.00083 U
Chloromethane	mg/Kg	--	0.0023 U	0.002 UJL	0.002 U	0.0021 U
cis-1,2-Dichloroethene	mg/Kg	--	0.0012 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	mg/Kg	--	0.00076 U	0.00065 U	0.00066 U	0.00068 U
Dibromochloromethane	mg/Kg	--	0.0013 U	0.0011 U	0.0011 U	0.0012 U
Ethylbenzene	mg/Kg	--	0.0014 U	0.0012 U	0.0012 U	0.0013 U
Methylene Chloride	mg/Kg	--	0.0031 U	0.0026 U	0.0027 U	0.0028 U



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VOCs (continued)						
m-Xylene & p-Xylene	mg/Kg	--	0.0021 U	0.0018 U	0.0018 U	0.0019 U
o-Xylene	mg/Kg	--	0.0016 U	0.0014 U	0.0014 U	0.0014 U
Styrene	mg/Kg	--	0.001 U	0.00086 U	0.00086 U	0.0009 U
Tetrachloroethene	mg/Kg	--	0.001 U	0.00086 U	0.00086 U	0.0009 U
Toluene	mg/Kg	--	0.0019 U	0.0017 U	0.0017 U	0.0017 U
trans-1,2-Dichloroethene	mg/Kg	--	0.0016 U	0.0014 U	0.0014 U	0.0014 U
trans-1,3-Dichloropropene	mg/Kg	--	0.00082 U	0.0007 U	0.0007 U	0.00073 U
Trichloroethene	mg/Kg	--	0.002 U	0.0017 U	0.0017 U	0.0018 U
Vinyl acetate	mg/Kg	--	0.0013 U	0.0011 UJL	0.0011 U	0.0012 U
Vinyl chloride	mg/Kg	--	0.0013 U	0.0011 U	0.0011 U	0.0011 U
Xylenes, Total	mg/Kg	--	0.0016 U	0.0014 U	0.0014 U	0.0014 U

Notes:

Shaded cells indicate a concentration that exceeds the background sample (RR01) concentration.

Bold values indicate a detected concentration.

Definition of Qualifiers:

'B' indicates a detection in an associated laboratory or field blank.

'H' indicates a high bias

'J' indicates an estimated value

'K' indicates and unknown bias

'L' indicates a low bias

'N' indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

'R' indicates a rejected result

'T' indicates the result is a Tentatively Identified Compound and is an estimated value.

'U' indicates not detected at the associated concentration.

