EVALUATION OF FISH TISSUE DATA FROM SELECTED SITES IN LOUISIANA, OKLAHOMA AND TEXAS

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EXECUTIVE SUMMARY

Edible fish tissue from 11 sites, (eight waterbodies), in Louisiana, Oklahoma and Texas was analyzed for bioaccumulative pollutants. The fish samples were collected in 1990 and 1991 by the Texas Water Commission, the Louisiana Department of Environmental Quality, the Oklahoma Water Resources Board and the Oklahoma State Department of Health. The pollutants analyzed included 22 pesticide components, 20 polychlorinated biphenyls (PCBs) and 44 polycyclic aromatic hydrocarbons. Mercury was the only metal analyzed.

The purpose of this one-time screening study was to identify waterbodies where elevated levels of toxic pollutants in edible fish tissue may be a concern. Fish tissue data was evaluated with State specific screening levels calculated using recent EPA guidance.

Screening levels were exceeded at 9 of 11 sites. Total PCB screening levels were exceeded at 7 of the 9 sites. Mercury screening levels were also exceeded at 7 of the 9 sites, while the dieldrin screening level was exceeded at 1 site.

Six waterbodies were identified where elevated levels of toxic pollutants may be a concern. These waterbodies are:

- The Ouachita River in Louisiana (mercury and PCBs)
- The Red River in Louisiana (mercury and PCBs)
- Bird Creek in Oklahoma (PCBs)
- The Angelina River above Lake Sam Rayburn (mercury and PCBs)
- The Rio Grande at El Paso (PCBs)
- The San Antonio River, downstream of San Antonio at Elmendorf, Texas (mercury, PCBs and dieldrin)

INTRODUCTION

Background

As a followup to EPA's National Study of Chemical Residues in Fish, (EPA 1992), edible fish tissue from 11 sites, (eight waterbodies), in Louisiana, Oklahoma and Texas were analyzed for bioaccumulative pollutants. The fish samples were collected in 1990 and 1991 by the Texas Water Commission, the Louisiana Department of Environmental Quality, the Oklahoma Water Resources Board and the Oklahoma State Department of Health.

Originally, edible fish samples were to be analyzed by contractors at the EPA laboratory in Duluth, Minnesota. Following problems with the analytical contract, the samples were transferred to the Geochemical and Environmental Research Group, (GERG), at Texas A&M University where the samples were analyzed. Edible fish tissue samples analyzed were composites of 2 to 11 fish of the same species.

The study was conducted in response to concerns over human health risks from toxic pollutants in edible fish tissue. Fish are an important human exposure route for toxic pollutants. These pollutants can bioaccumulate in fish through contaminated water, sediment and food.

Purpose of the Study

The purpose of this one-time screening study was to identify waterbodies where elevated levels of toxic pollutants in edible fish tissue may be a concern. Steps taken to achieve this purpose were 1) collection of composite samples of several fish species; 2) chemical analysis of edible tissue samples; and 3) evaluation of resultant data using pollutant specific screening levels.

MATERIALS AND METHODS

Site Selected and Fish Collected

Waterbodies to be sampled were selected because of concerns about potential for bioaccumulation from point sources and nonpoint sources of pollution. Sites were selected by State and EPA staff.

Eleven sites were sampled for fish; five in Louisiana, two in Oklahoma and four in Texas. Game or commercial fish were targeted for collection. Samples of three different species of fish were targeted for collection from each site. The actual number of species collected per site ranged from one to four. Fish samples collected were composites of 2 to 11 fish of one species. Table 1 lists sites and fish samples that were collected. Appendix 1 provides detailed information on the fish collected for analysis.

Table 1. Fish Samples Collected

Ouachita River downstream of Louisiana/Arkansas State Line
- 3 White Crappie (Pomoxis annularis)
- 3 Smallmouth Buffalo (Ictiobus bubalus)
- 3 Channel Catfish (Ictalurus punctatus)

Ouachita River at Monroe, Louisiana
- 4 Carp (Cyprinus carpio)
- 3 Largemouth Bass (Micropterus salmoides)
- 3 Channel Catfish (Ictalurus punctatus)

Red River at Shreveport, Louisiana
- 4 Striped Bass (Morone saxatilis)
- 4 Smallmouth Buffalo (Ictiobus bubalus)

Red River downstream of Shreveport, Louisiana
- 4 White Bass (Morone chrysops)
- 3 Smallmouth Buffalo (Ictiobus bubalus)
- 5 Channel Catfish (Ictalurus punctatus)

Red River near Natchitoches, Louisiana
- 5 White Bass (Morone chrysops)
- 4 Bigmouth Buffalo (Ictiobus cyprinellus)
- 4 Channel Catfish (Ictalurus punctatus)

Arcadia Lake near Central State Park Area, Oklahoma
- 7 Largemouth Bass (Micropterus salmoides)
- 7 White Crappie (Pomoxis annularis)
- 5 Black Bullhead (Ictalurus melas)

Bird Creek downstream of Mingo Creek, Oklahoma
- 5 River Carpsucker (Carpets carpio)
- 2 Carp (Cyprinus carpio)
- 4 White Crappie (Pomoxis annularis)
- 2 White Bass (Morone chrysops)

Angelina River upstream of Lake Sam Rayburn, Texas
- 5 Spotted Gar (Lepisosteus oculatus)
- 3 Largemouth Bass (Micropterus salmoides)
- 4 Freshwater Drum (Aplodinotus grunniens)
- 4 White Crappie (Pomoxis annularis)

Arroyo Colorado, Texas
- 2 White Crappie (Pomoxis annularis)

Rio Grande at El Paso, Texas
- 11 Longear Sunfish (Lepomis megalotis)
- 5 River Carpsucker (Carpoides carpio)

San Antonio River downstream of San Antonio at Elmendorf, Texas
- 2 Largemouth Bass (Micropterus salmoides)
- 3 Longnose Gar (Lepisosteus osseus)
- 2 Redhorse Sucker (Moxostoma congestum)

Sampling Procedures

Fish were collected by electroshocking, netting (gill nets and hoop nets) and by hook and line fishing. Fish selected for analysis were measured and weighed, wrapped in aluminum foil, labeled and frozen. A site survey form was completed by field personnel which described the site and fish collection. Appendix 1 lists information from the site survey forms including location, collection method and the length and weight of fish collected.

Frozen composite samples were shipped on ice to the EPA Laboratory in Duluth, Minnesota. Later, the samples were shipped frozen to the GERG Laboratory at Texas A&M University in College Station, Texas.

Chemical Analysis

Samples were processed and analyzed by the GERG Laboratory at Texas A&M University. Samples were filleted, ground and homogenized by the Laboratory prior to analysis.

The chemicals analyzed included 22 pesticide components, 20 polychlorinated biphenyls (PCBs) and 44 polycyclic aromatic hydrocarbons (PAHs). Mercury was the only metal analyzed Analytical results are listed in Appendix 2.

For analysis of pesticides, PCBs and PAHs, the tissue samples were analyzed using the NOAA Status and Trends Method (MacLeod et al., 1985) with minor revisions (Brooks et al., 1989; Wade et al., 1988).

For mercury analysis, tissue samples were digested with concentrated, high purity nitric acid, followed by cold vapor atomic absorption spectrometry.

Screening Levels

The fish tissue data was evaluated with screening levels developed from EPA guidance, (EPA 1995a), and FDA fish tissue criteria. FDA criteria were used to evaluate levels of chlordane, endrin, mirex ~~and mercury~~ because the FDA criteria were more stringent than screening levels calculated using EPA's approach. While calculated screening levels were used to evaluate DDT and its breakdown metabolites (DDE and DDD), an FDA criterion was used to evaluate total DDTs. Screening levels used for evaluating data are listed in tables 2 - 4. The units for screening levels are parts per million (ppm) or milligrams per kilogram (mg/kg).

Table 2. Screening Levels for Louisiana

CHEMICAL	SF $(mg/kg/day)^{-1}$	RfD (mg/kg/day)	SCREENING LEVEL (ppm)
Aldrin	17	---	0.021
Benzo[a]pyrene	7.3	---	0.048
Biphenyl	---	0.0003	1.1
Chlordane	---	---	0.30 a
DDE, DDD & DDT	---	---	5 a
4,4'-DDE	0.34	---	1.0
4,4'-DDD	0.24	---	1.5
4,4'-DDT	0.34	---	1.0
Dieldrin	16	---	0.022
Endrin	---	---	0.30 b
Heptachlor	4.5	---	0.078
Heptachlor Epoxide	9.1	---	0.038
Hexachlorobenzene	1.6	---	0.022
alpha Lindane	6.3	---	C.056
beta Lindane	1.8	---	0.019
gamma Lindane	---	0.00C3	1.1
Mercury	---	0.00006	0.21
Mirex	---	---	0.10 c
Total PCBs	7.7	---	0.045

a. FDA criteria, 55 FR 14361.
b. FDA criteria, 52 FR 18025.
c. FDA criteria, 43 FR 14736.

Table 3. Screening Levels for Oklahoma

CHEMICAL	SF $(mg/kg/day)^{-1}$	RfD (mg/kg/day)	SCREENING LEVEL (ppm)
Aldrin	17	---	0.063
Benzo[a]pyrene	7.3	---	0.15
Biphenyl	---	0.0003	3.2
Chlordane	---	---	0.30 a
DDE, DDD & DDT	---	---	5.0 a
4,4'-DDE	0.34	---	3.2
4,4'-DDD	0.24	---	4.5
4,4'-DDT	0.34	---	3.2
Dieldrin	16	---	0.067
Endrin	---	---	0.30 b
Heptachlor	4.5	---	0.24
Heptachlor Epoxide	9.1	---	0.12
Hexachlorobenzene	1.6	---	0.67
alpha Lindane	6.3	---	0.17
beta Lindane	1.8	---	0.60
gamma Lindane	---	0.0003	3.2
Mercury	---	0.00006	0.65
Mirex	---	---	0.10 c
Total PCBs	7.7	---	0.14

a. FDA criteria, 55 FR 14361.
b. FDA criteria, 52 FR 18025.
c. FDA criteria, 43 FR 14736.

Table 4. Screening Levels for Texas

CHEMICAL	SF $(mg/kg/day)^{-1}$	RfD (mg/kg/day)	SCREENING LEVEL (ppm)
Aldrin	17	---	0.041
Benzo[a]pyrene	7.3	---	0.096
Biphenyl	---	0.0003	2.1
Chlordane	---	---	0.30 a
DDE, DDD & DDT	---	---	5.0 a
4,4'-DDE	0.34	---	2.1
4,4'-DDD	0.24	---	2.9
4,4'-DDT	0.34	---	2.1
Dieldrin	16	---	0.044
Endrin	---	---	0.30 b
Heptachlor	4.5	---	0.16
Heptachlor Epoxide	9.1	---	0.077
Hexachlorobenzene	1.6	---	0.44
alpha Lindane	6.3	---	0.11
beta Lindane	1.8	---	0.39
gamma Lindane	---	0.0003	2.1
Mercury	---	0.00006	0.42
Mirex	---	---	0.10 c
Total PCBs	7.7	---	0.091

a. FDA criteria, 55 FR 14361.
b. FDA criteria, 52 FR 18025.
c. FDA criteria, 43 FR 14736.

Two equations listed in the EPA guidance were used to calculate screening levels, one for chemicals considered carcinogens and one for chemicals considered noncarcinogens. These equations have been widely used and also serve as the basis for development of water quality criteria. For noncarcinogens the equation is:

$$SV_n = (RfD \cdot BW)/CR$$

where

SV_n = Screening value for a noncarcinogen (mg/kg; ppm)
RfD = Oral reference dose (mg/kg/day)
BW = Mean body weight of the general population or subpopulation of concern (kg)
CR = Mean daily consumption rate of the species of interest by the general population or subpopulation of concern averaged over a 70 year lifetime (kg/day)

For carcinogens the equation is:

$$SV_c = [(RL/SF) \bullet BW]/CR$$

where

SV_c = Screening value for a carcinogen (mg/kg; ppm)
RL = Maximum acceptable risk level (dimensionless)
SF = Oral cancer slope factor $(mg/kg/day)^{-1}$

and BW and CR are defined above.

EPA's Integrated Risk Information System (IRIS) database is a good source of toxicological data. IRIS was utilized to obtain values for oral reference doses for noncarcinogens and oral cancer slope factors for carcinogens.

Fish tissue consumption rates used in developing screening levels were those used in State surface water quality standards to develop criteria to protect human health. The Louisiana consumption rate was 20 grams/day. The Oklahoma consumption rate was 6.5 grams/day. The Texas consumption rate was 10 grams/day. State health agencies in Louisiana and Texas use consumption rates of 30 grams/day, (approximately one 1/2 pound meal per week), in evaluating fish tissue data. Use of these higher consumption rates would lower the screening levels by a factor of 1.5 for the Louisiana screening levels and by a factor of 3 for the Texas screening levels. The risk level used for calculating screening levels for carcinogens was 1×10^{-4}.

Screening Levels for Mercury

Mercury screening levels were calculated based on a RfD value of 6×10^{-5} mg/kg/day for methylmercury. The 1995 EPA guidance states:

> The EPA has recently reevaluated the RfD for methylmercury, primarily because of concern about evidence that the fetus is at increased risk of adverse neurological effects from exposure to methylmercury (Marsh et al., 1987; Piotrowski and Inskip, 1981; NAS, 1991; WHO, 1976, 1990). On May 1, 1995, IRIS was updated to include an oral RfD of 1×10^{-4} mg/kg/day based on developmental neurological effects in human infants. An oral RfD of 3×10^{-4} mg/kg/day for chronic systemic effects of methylmercury among the general adult population was available in IRIS until May 1, 1995; however, it was not listed in the IRIS update on that date. For the purposes of calculating an SV [screening value] for methylmercury that is protective of fetuses and nursing infants, the EPA Office of Water has chosen to continue to use the general adult population RfD of 3×10^{-4} mg/kg/day for chronic systemic effects of methylmercury until a value is relisted in IRIS, and to reduce this value by a factor of 5 to derive an RfD of 6×10^{-5} mg/kg/day for developmental effects among infants. This factor is based on experimental results that suggest a possible fivefold increase in fetal sensitivity to methylmercury exposure. This more protective approach recommended by the EPA Office of Water was deemed to be most prudent at this time. This approach should be considered interim until such time as the Agency has reviewed new studies on the chronic and developmental effects of methylmercury.

Screening Levels for Polychlorinated Biphenyls

Polychlorinated biphenyls, (PCBs), have been classified as probable human carcinogens. The cancer slope factor for Aroclor 1260 was used to calculate a screening value for total PCBs. (Aroclor 1260 is the name of a common PCB mixture formulated for commercial use). Screening levels for Louisiana, Oklahoma and Texas were 0.045, 0.14 and 0.091 ppm, respectively. The FDA tolerance level for PCBs in fish and shellfish is 2 ppm, (21 CFR 109.30).

Screening Levels for Polycyclic Aromatic Hydrocarbons

While several polycyclic aromatic hydrocarbons, (PAHs), have been classified as probable human carcinogens, benzo[a]pyrene is the only PAH for which an oral cancer slope factor is currently listed in IRIS. Provisional EPA guidance for assessing PAHs provides toxicity equivalence factors for six PAHs relative to

benzo[a]pyrene (EPA 1993). These factors can be used to compare a potency weighted concentration for seven PAHs with the screening value for benzo[a]pyrene. This potency equivalency concentration (PEC) is calculated from the equation:

$$PEC = \Sigma (RP \bullet C)$$

where,

PEC = Potency Equivalency Concentration (ppm)
RP = Relative potency of the PAH to benzo[a]pyrene
C = Concentration of the PAH (ppm)

and relative potency factors are listed in table 5. The screening levels for benzo[a]pyrene were also used to evaluate potency equivalency concentrations.

Table 5. Relative Potency Factors for Selected PAHs, (EPA 1993).

COMPOUND	RELATIVE POTENCY
Benzo[a]pyrene	1.0
Benz[a]anthracene	0.1
Benzo[b]fluoranthene	0.1
Benzo[k]fluoranthene	0.01
Chrysene	0.001
Dibenz[a,h]anthracene	1.0
Indeno[1,2,3-cd]pyrene	0.1

RESULTS AND DISCUSSION

Sites Exceeding Screening Levels

Table 6 lists sites that exceeded screening levels. Screening levels were exceeded at 9 of 11 sites. Total PCB screening levels were exceeded at 7 sites. Mercury screening levels were also exceeded at 7 sites, while the dieldrin screening level was exceeded at 1 site.

Of sites in Louisiana, screening levels for mercury and PCBs were exceeded at two sites on the Ouachita River, and three sites on the Red River. Screening levels for PCBs were exceeded for samples collected from Bird Creek in Oklahoma. Of sites in Texas, screening levels were exceeded at the Angelina River, (mercury and PCBs), the Rio Grande, (PCBs), and the San Antonio River, (mercury, PCBs and dieldrin). Screening levels were not exceeded for Arcadia Lake, Oklahoma and the Arroyo Colorado, Texas.

Table 6. Sites Exceeding Screening Levels

SITE	CHEMICAL	FISH SPECIES	CONCENTRATION (ppm)
Ouachita River below the Louisiana/Arkansas State Line	Mercury	White Crappie	1.19
	Mercury	Smallmouth Buffalo	0.523
	Mercury	Channel Catfish	0.574
Ouachita River at Monroe, Louisiana	PCBs	Largemouth Bass	0.053
	Mercury	Largemouth Bass	1.43
	Mercury	Channel Catfish	0.740
Red River at Shreveport, Louisiana	PCBs	Striped Bass	0.0826
	PCBs	Smallmouth Buffalo	0.212
	Mercury	Striped Bass	0.350
Red River below Shreveport, Louisiana	PCBs	White Bass	0.0867
	Mercury	Smallmouth Buffalo	0.223
	Mercury	Channel Catfish	0.268
	Mercury	White Bass	0.737
Red River near Natchitoches, Louisiana	Mercury	White Bass	0.648
	Mercury	Bigmouth Buffalo	0.422
	Mercury	Channel Catfish	0.291
Bird Creek below Mingo Creek, Oklahoma	PCBs	River Carpsucker	0.180
	PCBs	White Bass	0.232
	PCBs	Carp	0.184*
Angelina River above Lake Sam Rayburn, Texas	PCBs	Spotted Gar	0.223
	Mercury	Spotted Gar	0.473*
	Mercury	Largemouth Bass	0.480*
Rio Grande at El Paso, Texas	PCBs	River Carpsucker	0.111
San Antonio River below San Antonio at Elmendorf, Texas	PCBs	Largemouth Bass	0.421
	PCBs	Longnose Gar	2.98
	Dieldrin	Longnose Gar	0.0447
	Mercury	Longnose Gar	0.760
	Mercury	Largemouth Bass	0.449

* Mean of two analyses.

Ouachita River, Louisiana

The two sites on the Ouachita River in Louisiana exceeded the screening level for mercury of 0.21 ppm. At the Ouachita River downstream of the Louisiana/Arkansas state line, the screening levels were exceeded for white crappie (Pomoxis annularis), smallmouth buffalo (Ictiobus bubalus) and channel catfish (Ictalurus punctatus). The concentrations for these species were 1.19, 0.523 and 0.574 ppm, respectively. The average concentration for these three species was 0.762 ppm. Additionally, the white crappie sample exceeded the FDA action level of 1 ppm.

Further downstream at Monroe, Louisiana, largemouth bass (Micropterus salmoides) exceeded the mercury screening level and the FDA action level with a concentration of 1.43 ppm. Channel catfish (Ictalurus punctatus) exceeded the screening level with a concentration of 0.74 ppm. The concentration in carp (Cyprinus carpio) was below the screening level with a concentration of 0.12 ppm. The average concentration was 0.763 ppm.

Several studies have documented elevated levels of mercury in the Ouachita River. These studies led Louisiana and Arkansas health agencies to issue fish consumption advisories in 1991 and 1992 (ADPCE 1994, LDEQ 1994).

Additionally, largemouth bass from Monroe exceeded the screening level for total PCBs of 0.045 ppm. The total PCB concentration for the sample was 0.053 ppm. Total PCB concentrations for the other two samples were 0.027 and 0.011 ppm for the carp and channel catfish samples, respectively. The average concentration was 0.0301 ppm.

Red River, Louisiana

The screening level for mercury of 0.21 ppm was exceeded at all three sites on the Red River. At Shreveport, Louisiana, striped bass (Morone saxatilis) exceeded the screening level, (0.350 ppm), while smallmouth buffalo did not, (0.147 ppm). The average concentration for two species was 0.249 ppm.

Downstream of Shreveport all three species collected exceeded the screening level. Mercury concentrations for white bass (Morone chrysops), smallmouth Buffalo (Ictiobus bubalus) and channel catfish (Ictalurus punctatus) were 0.737, 0.223 and 0.268 ppm, respectively. The average concentration for three species was 0.409 ppm.

Similarly, all three species collected near Natchitoches exceeded the screening level. Mercury concentrations for white bass, bigmouth buffalo (Ictiobus cyprinellus) and channel catfish were 0.648, 0.422 and 0.291 ppm, respectively. The average concentration for three species was 0.454 ppm.

None of the samples from the Red River exceeded the FDA action level for mercury of 1 ppm.

The screening level for total PCBs, (0.045 ppm), was exceeded at two of the three sites on the Red River in Louisiana. At Shreveport, Louisiana, screening levels were exceeded for the two species sampled. PCB concentrations for striped bass (Morone saxatilis), and smallmouth buffalo (Ictiobus bubalus), were 0.083 and 0.21 ppm, respectively.

Downstream of Shreveport, total PCB screening levels were exceeded for white bass (Morone chrysops), (0.087 ppm). Total PCB concentrations for smallmouth buffalo (Ictiobus bubalus) and channel catfish (Ictalurus punctatus) at this site were 0.029 and 0.024 ppm, respectively. The average concentration was 0.0465 ppm.

The PCB screening level was not exceeded in the three fish samples collected from the Red River near Natchitoches, Louisiana. Even so, the concentration of total PCBs in white bass, (0.044 ppm), almost equaled the screening level. Total PCB concentrations in bigmouth buffalo (Ictiobus cyprinellus) and channel catfish were 0.023 and 0.009 ppm, respectively.

None of the fish samples from the Red River exceeded the FDA tolerance level for PCBs in fish and shellfish of 2 ppm.

Bird Creek, Oklahoma

Three of four samples collected from Bird Creek, Oklahoma exceeded the screening level for total PCBs of 0.14 ppm. The highest PCB concentration was 0.232 ppm, found in a sample of white bass (Morone chrysops). Total PCB concentrations in river carpsucker (Carpoides carpio) and carp (Cyprinus carpio) were 0.180 and 0.184 ppm, respectively. The screening level was not exceeded in a sample of white crappie (Pomoxis annularis), which contained 0.053 ppm. The average concentration of four species was 0.162 ppm.

None of the fish samples from Bird Creek exceeded the FDA tolerance level for PCBs in fish and shellfish of 2 ppm.

Angelina River, Texas

One of four samples collected from the Angelina River above Lake Sam Rayburn, Texas exceeded the screening level for total PCBs of 0.091 ppm. Total PCB levels in a sample of spotted gar (Lepisosteus oculatus) were 0.223 ppm. Total PCB concentrations in largemouth bass (Micropterus salmoides), freshwater drum (Aplodinotus grunniens) and white crappie (Pomoxis annularis) were 0.0111, 0.0154 and 0.0074 ppm, respectively. The average concentration of four species was 0.0642 ppm.

Two of four samples exceeded the screening level of 0.42 ppm for mercury. Mercury concentrations in spotted gar and largemouth bass were 0.473 and 0.480 ppm, respectively. Mercury concentrations in freshwater drum and white crappie were 0.263 and 0.388 ppm, respectively. The average concentration was 0.401 ppm.

A summary of fish tissue data in Texas can be found in The State of Texas Water Quality Inventory (TNRCC 1994). Included is a summary of fish tissue data for the Angelina River above Lake Sam Rayburn, (Texas segment 0611). PCBs were detected in 2 of 4 samples, with a maximum concentration of 0.130 ppm. Mercury was detected in 4 of 4 samples, with concentrations ranging from 0.12 to 0.54 ppm. (The summary did not specify species or whether the sample was fillet or whole fish samples).

Additional PCB data indicate that concentrations downstream in Lake Sam Rayburn fish are lower. PCBs levels in fish collected from Lake Sam Rayburn in December, 1986 were documented in National Study of Chemical Residues in Fish (EPA 1992). Concentrations were 0.00105 ppm for a fillet sample of white bass and 0.0123 ppm for a whole fish sample of channel catfish. The State of Texas did not detect PCBs in three fish samples taken from the lake, (TNRCC 1994, detection limit of 0.040 ppm).

Concentrations of mercury in Lake Sam Rayburn fish found in the national study were 0.68 ppm for the white bass fillet and 0.10 ppm for the whole sample of channel catfish. Mercury concentrations in 3 fish analyzed by the State of Texas ranged from 0.051 to 0.372 ppm.

Rio Grande at El Paso, Texas

One of two samples collected from the Rio Grande at El Paso, Texas exceeded the total PCBs screening level. The total PCB concentration in a sample of river carpsucker (Carpoides carpio) was 0.111 ppm, while the concentration in a sample of longear sunfish (Lepomis megalotis) was 0.0825 ppm. The average concentration of two species was 0.0968 ppm.

Additional data from the Rio Grande in El Paso did not confirm elevated levels of PCBs. In November 1992 carp (Cyprinus carpio) and channel catfish (Ictalurus punctatus) were collected at Courchesne Bridge and at Zaragosa International Bridge for both fillet and whole fish tissue analysis. Samples were analyzed for seven PCB mixtures, (Arochlor 1016, 1221, 1232, 1242, 1248, 1254, and 1260). Concentrations were below the detection limit of 0.04 ppm, (Davis et al., 1994).

San Antonio River, Texas

Two of three samples collected from the San Antonio River at Elmendorf, Texas exceeded the screening level for total PCBs. One of the samples, longnose gar (Lepisosteus osseus), also exceeded the FDA tolerance level for PCBs in fish and shellfish

of 2 ppm, with a concentration of 2.98 ppm. The total PCB concentration in a sample of largemouth bass (Micropterus salmoides) was 0.421 ppm. The total PCB concentration for a sample of redhorse sucker (Moxostoma congestum) was 0.0774 ppm. The average concentration of three species was 1.16 ppm.

Additional data supports the finding of elevated PCB levels. PCB levels in fish collected in July, 1987 were 0.860 ppm for a fillet sample of 2 longnose gar and 0.279 ppm for a whole fish sample of 3 carp (EPA 1992). The State of Texas Water Quality Inventory (TNRCC 1994) discussed elevated PCB levels in fish and listed additional fish tissue data for the upper San Antonio River, (Texas segment 1911). PCBs were detected in 6 of 13 fish tissue samples, with a maximum concentration of 3.43 ppm.

Longnose gar and largemouth bass exceeded the mercury screening level with concentrations of 0.760 ppm and 0.449 ppm, respectively. The mercury concentration of the redhorse sucker was 0.261 ppm. The average concentration was 0.490 ppm. Mercury concentrations found in the national study were 0.66 ppm for longnose gar (fillet) and 0.08 ppm for a whole carp sample (EPA 1992). The State of Texas detected mercury in 12 of 14 fish samples, with a maximum concentration of 0.63 ppm (TNRCC 1994).

Longnose gar also exceeded the dieldrin screening level of 0.044 ppm with a concentration of 0.0447 ppm. Dieldrin concentrations for largemouth bass and redhorse sucker were 0.0141 and 0.00637 ppm, respectively. The average concentration was 0.0217 ppm.

Dieldrin concentrations found in the national study were 0.089 ppm for a fillet sample of longnose gar and 0.053 ppm for a whole fish sample of carp (EPA 1992). The State of Texas listed dieldrin as detected in 9 of 13 fish samples, with a maximum concentration of 0.0710 ppm (TNRCC 1994).

FDA Criteria for Edible Fish Tissue

Fish samples from three sites exceeded FDA criteria. The FDA action level for mercury of 1.0 ppm was exceeded at the two Ouachita River sites, (one species for each site). The FDA tolerance level for PCBs of 2 ppm was exceeded at the San Antonio River for a sample of gar.

FDA criteria for edible fish tissue are often used to evaluate fish tissue data. However, FDA criteria are developed primarily for interstate commerce. They often take economic impacts into account and are not always protective of local subsistence fishermen or sports fishermen. FDA has criteria for only 11 toxic pollutants.

Toxicity of Polychlorinated Biphenyls

Screening levels for PCBs were exceeded at 7 of the 11 sites sampled. The oral cancer slope factor of 7.7 $(mg/kg/day)^{-1}$ used to evaluate the data is based on testing of commercial PCB mixture Arochlor 1260. EPA is currently updating its toxicity assessment for PCBs and may revise the oral cancer slope factor used to evaluate PCB data (EPA 1996). It is anticipated that the update will be completed in September 1996 and published in a final report titled PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures.

Mercury Contamination of Fish Tissue

Mercury is ubiquitous in the environment. Methylmercury, the most toxic form of mercury, can bioaccumulate in fish tissue up to a million times or more above concentrations found in the water column. Elevated levels in fish tissue appear to be widespread nationally. As of September 1994, 34 States have fish consumption advisories due to mercury. EPA is presently developing information on the nature and extent of mercury contamination in fish (EPA 1995b).

Waterbodies where Bioaccumulation may be a Concern

Six waterbodies were identified where elevated levels of toxic pollutants may be a concern. These waterbodies are:

- The Ouachita River in Louisiana (mercury and PCBs)
- The Red River in Louisiana (mercury and PCBs)
- Bird Creek in Oklahoma (PCBs)
- The Angelina River above Lake Sam Rayburn (mercury and PCBs)
- The Rio Grande at El Paso (PCBs)
- The San Antonio River, downstream of San Antonio at Elmendorf, Texas (mercury, PCBs and dieldrin)

Identification of these waterbodies was based on at least one fish tissue sample exceeding a pollutant specific screening level. In considering whether to issue fish consumption advisories, State health agencies consider additional factors such as the amount and consistency of available data and the amount of fishing activity. EPA will work cooperatively with States to collect and evaluate data necessary for fish advisory decisions.

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Appendix 1

Sample Collection Information

SITE NAME: Ouachita River below Arkansas State Line

COUNTY/PARRISH, STATE: Union and Morehouse Parrishes, Louisiana

LATITUDE/LONGITUDE: 33° 00′ 00" 92° 04′ 00"

SITE DESCRIPTION: Ouachita River from mile markers 216 to 219.

COLLECTION METHOD: Electroshocking, hook and line.

COLLECTORS: Louisiana Department of Environmental Quality - K. Cormier, D. McNeill, C. Bates

SAMPLING DATE: September 5, 1990, October 12, 1990 (catfish)

FISH COLLECTED:

Sample DF019422 - 3 White Crappie (Pomoxis annularis)
Length and Weight: 1) 29.2 cm, 363 g
2) 29.2 cm, 318 g
3) 29.2 cm, 227 g

Sample DF019423 - 3 Smallmouth Buffalo (Ictiobus bubalus)
Length and Weight: 1) 38.7 cm, 862 g
2) 38.7 cm, 862 g
3) 34.3 cm, 544 g

Sample DF019424 - 3 Channel Catfish (Ictalurus punctatus)
Length and Weight: 1) 38.1 cm, 454 g
2) 41.9 cm, 454 g
3) 31.8 cm, 136 g

SITE NAME: Ouachita River at Monroe, Louisiana

COUNTY/PARRISH, STATE: Ouachita Parrish, Louisiana

LATITUDE/LONGITUDE: 32° 32′ 30" 92° 07′ 30"

SITE DESCRIPTION: Ouachita River 2 miles south of Monroe and 1 mile north of D'Arbonne Bayou.

COLLECTION METHOD: Electroshocking

COLLECTORS: Louisiana Department of Environmental Quality - K. Cormier, C. Bates, D. McNeill

SAMPLING DATE: September 4, 1990 & October 5, 1990 (catfish)

FISH COLLECTED:

Sample DF019419 - 4 Carp (Cyprinus carpio)
Length and Weight:
1) 41.9 cm, 771 g
2) 40.6 cm, 385 g
3) 40.6 cm, 771 g
4) 30.5 cm, 272 g

Sample DF019420 - 3 Largemouth Bass (Micropterus salmoides)
Length and Weight:
1) 44.5 cm, 1179 g
2) 41.9 cm, 998 g
3) 48.3 cm, 1452 g

Sample DF019421 - 3 Channel Catfish (Ictalurus punctatus)
Length and Weight:
1) 26.7 cm, 136 g
2) 35.1 cm, 408 g
3) 28.2 cm, 181 g

SITE NAME: Red River at Shreveport

COUNTY/PARRISH, STATE: Caddo Parrish, Louisiana

LATITUDE/LONGITUDE: 32° 30′ 30" 93° 43′ 00"

SITE DESCRIPTION: Red River at Shreveport, from Twelve Mile Bayou to about 2.5 miles below mouth of Twelve Mile Bayou

COLLECTION METHOD: Electroshocking

COLLECTORS: Louisiana Department of Environmental Quality - Tom Hardaway, Kirk Cormier, Matt Andrus

SAMPLING DATE: September 6, 1990

FISH COLLECTED:

Sample DF019401 - 4 Striped Bass (Morone saxatilis)
Length and Weight:
1) 53.3 cm, 1219 g
2) 47.0 cm, 680 g
3) 50.1 cm, 1077 g
4) 53.3 cm, 1270 g

Sample DF019402 - 4 Smallmouth Buffalo (Ictiobus bubalus)
Length and Weight:
1) 27.3 cm, 226 g
2) 26.0 cm, 226 g
3) 24.7 cm, 181 g
4) 24.1 cm, 136 g

SITE NAME: Red River below Shreveport, Louisiana

COUNTY/PARRISH, STATE: Red River Parrish, Louisiana

LATITUDE/LONGITUDE: 32° 11′ 93° 27′

SITE DESCRIPTION: Red River at mouth of Loggy Bayou

COLLECTION METHOD: Hoop nets and gill net

COLLECTORS: Louisiana Department of Environmental Quality - Tom Hardaway, Lewis Still

SAMPLING DATE: September 17-18, 1990

FISH COLLECTED:

Sample DF019404 - 4 White Bass (Morone chrysops)
Length and Weight
1) 34.3 cm, 567 g
2) 38.1 cm, 726 g
3) 35.5 cm, 680 g
4) 35.5 cm, 680 g

Sample DF019405 - 3 Smallmouth Buffalo (Ictiobus bubalus)
Length and Weight
1) 33.0 cm, 454 g
2) 34.3 cm, 567 g
3) 35.6 cm, 794 g

Sample DF019406 - 5 Channel Catfish (Ictalurus punctatus)
Length and Weight
1) 29.8 cm, 227 g
2) 26.0 cm, 227 g
3) 24.7 cm, 113 g
4) 31.7 cm, 340 g
5) 33.6 cm, 340 g

SITE NAME: Red River near Natchitoches, Louisiana

COUNTY/PARRISH, STATE: Natchitoches County, Louisiana

LATITUDE/LONGITUDE: 31° 50′ 51" 93° 05′ 45"

SITE DESCRIPTION: Red River at the mouth of Bayou Pierre

COLLECTION METHOD: Hoop nets and gill nets

COLLECTORS: Louisiana Department of Environmental Quality - Tom Hardaway, Lewis Still

SAMPLING DATE: September 24-25, 1990

FISH COLLECTED:

Sample DF019407 - 5 White Bass (Morone chrysops)
Length and Weight:
1) 32.4 cm, 500 g
2) 32.4 cm, 544 g
3) 36.8 cm, 748 g
4) 38.1 cm, 725 g
5) 35.5 cm, 680 g

Sample DF019408 - 4 Bigmouth Buffalo (Ictiobus cyprinellus)
Length and Weight:
1) 28.5 cm, 368 g
2) 31.1 cm, 453 g
3) 30.4 cm, 453 g
4) 35.5 cm, 725 g

Sample DF019409 - 4 Channel Catfish (Ictalurus punctatus)
Length and Weight:
1) 36.8 cm, 453 g
2) 31.1 cm, 255 g
3) 32.4 cm, 283 g
4) 33.0 cm, 283 g

SITE NAME: Arcadia Lake near Central State Park Area

COUNTY/PARRISH, STATE: Oklahoma County, Oklahoma

LATITUDE/LONGITUDE: 35° 37′ 57" 97° 23′ 04"

SITE DESCRIPTION: Arcadia Lake in area south of boat ramp.

COLLECTION METHOD: Gill net - 600 feet, 2" and 3" mesh.

COLLECTORS: Oklahoma State Department of Health - J. Pigg, R. Parham, J. Wright

SAMPLING DATE: October 10-11, 1990

FISH COLLECTED:

Sample DF019810 - 7 Largemouth Bass (Micropterus salmoides)
Length and Weight:
1) 41.9 cm, 1355 g
2) 40.6 cm, 892 g
3) 39.4 cm, 853 g
4) 36.2 cm, 700 g
5) 35.6 cm, 645 g
6) 38.1 cm, 753 g
7) 36.8 cm, 607 g

Sample DF019811 - 7 White Crappie (Pomoxis annularis)
Length and Weight:
1) 31.8 cm, 445 g
2) 25.4 cm, 255 g
3) 26.7 cm, 220 g
4) 24.1 cm, 188 g
5) 26.7 cm, 222 g
6) 26.7 cm, 230 g
7) 24.8 cm, 199 g

Sample DF019812 - 5 Black Bullhead (Ictalurus melas)
Length and Weight:
1) 31.8 cm, 389 g
2) 29.2 cm, 320 g
3) 25.4 cm, 206 g
4) 24.1 cm, 169 g
5) 29.2 cm, 255 g

SITE NAME: Bird Creek downstream of Mingo Creek

COUNTY/PARRISH, STATE: Rogers County, Oklahoma

LATITUDE/LONGITUDE: 26° 12′ 00" 95° 45′ 30"

SITE DESCRIPTION: Bird Creek pool at highway 167 bridge.

COLLECTION METHOD: Elecroshocking

COLLECTORS: Oklahoma Water Resources Board - Chuck Warren, Phil Moershel

SAMPLING DATE: June 20, 1991

FISH COLLECTED:

Sample Composite 1 - 5 River Carpsucker (Carpoides carpio)
Length and Weight:
1) 37 cm, 652 g
2) 33 cm, 510 g
3) 28 cm, 326 g
4) 26 cm, 240 g
5) 24 cm, 184 g

Sample Composite 2 - 2 Carp (Cyprinus carpio)
Length and Weight:
1) 53 cm, 2240 g
2) 29 cm, 312 g

Sample Composite 3 - 4 White Crappie (Pomoxis annularis)
Length and Weight:
1) 21 cm, 128 g
2) 24 cm, 198 g
3) 19 cm, 56 g
4) 17 cm, 56 g

Sample Composite 4 - 2 White Bass (Morone chrysops)
Length and Weight:
1) 24 cm, 184 g
2) 16 cm, 43 g

SITE NAME: Angelina River downstream of Paper Mill Creek

COUNTY/PARRISH, STATE: Angelina and Nacogdoches Counties, Texas

LATITUDE/LONGITUDE: 31° 26′ 30" 94° 37′ 18"

SITE DESCRIPTION: Angelina River downstream of the confluences of upper and lower Paper Mill Creek.

COLLECTION METHOD: Electroshocking

COLLECTORS: Texas Water Commission: Suzanne Myers, Jeff Kirkpatrick

SAMPLING DATE: August 21, 1990

FISH COLLECTED:

Sample DF024108 - 5 Spotted Gar (Lepisosteus oculatus)
Length:
1) 48.6 cm
2) 53.5 cm
3) 52.5 cm
4) 46.2 cm
5) 57.2 cm

Sample DF019703 - 3 Largemouth Bass (Micropterus salmoides)
Length:
1) 37.8 cm
2) 35.7 cm
3) 27.3 cm

Sample DF019701 - 4 Freshwater Drum (Aplodinotus grunniens)
Length:
1) 33.0 cm
2) 30.4 cm
3) 22.0 cm
4) 21.0 cm

Sample DF019702 - 4 White Crappie (Pomoxis annularis)
Length:
1) 30.5 cm
2) 18.8 cm
3) 15.9 cm
4) 15.9 cm

SITE NAME: Arroyo Colorado

COUNTY/PARRISH, STATE: Cameron County, Texas

LATITUDE/LONGITUDE: 26° 11′ 42" 97° 36′ 06"

SITE DESCRIPTION: 0.25 miles upstream and 0.25 downstream of bridge at the Port of Harlingen.

COLLECTION METHOD: Electroshocking

COLLECTORS: Texas Water Commission: Jeff Kirkpatrick, David Petrick

SAMPLING DATE: July 18, 1991

FISH COLLECTED:
Sample DF019714 - 2 White Crappie (Pomoxis annularis)
Length: 1) 33 cm
2) 39 cm

SITE NAME: Rio Grande in El Paso

COUNTY/PARRISH, STATE: El Paso County, Texas

LATITUDE/LONGITUDE: 31° 40′ 00" 106° 20′ 00"

SITE DESCRIPTION: Rio Grande upstream of the Zaragosa Bridge.

COLLECTION METHOD: Electroshocking

COLLECTORS: Texas Water Commission: Dave Buzan

SAMPLING DATE: June 6, 1990

FISH COLLECTED:

Sample DF019708 - 11 Longear Sunfish (Lepomis megalotis)

Length and Weight:
1) 12 cm, 40 g
2) 11 cm, 40 g
3) 10 cm, 30 g
4) 9 cm, 10 g
5) 9 cm, 10 g
6) 9 cm, 10 g
7) 11 cm, 30 g
8) 8 cm, 10 g
9) 8 cm, 10 g
10) 8 cm, 10 g
11) 15 cm, 85 g

Sample DF019709 - 4 River Carpsucker (Carpoides carpio)

Length and Weight:
1) 22 cm, 130 g
2) 18 cm, 80 g
3) 16 cm, 50 g
4) 15 cm, 40 g

SITE NAME: San Antonio River at Elmendorf, Texas

COUNTY/PARRISH, STATE: Bexar County, Texas

LATITUDE/LONGITUDE: 29° 14′ 15" 98° 21′ 43"

SITE DESCRIPTION: San Antonio River at Loop 1604 bridge, 2.8 miles south south-west of Elmendorf, Texas.

COLLECTION METHOD: Electroshocking.

COLLECTORS: Texas Water Commission - Jeff Kirkpatrick, Dave Buzan, Augie De La Cruz. EPA Region 6 - Carl Young.

SAMPLING DATE: July 30, 1990

FISH COLLECTED:

Sample DF019704 - 2 Largemouth Bass (Micropterus salmoides)
Length and Weight: 1) 36.1 cm, 666 g
2) 27.2 cm, 303 g

Sample DF019705 - 3 Longnose Gar (Lepisosteus osseus)
Length and Weight: 1) 64.5 cm. 819 g
2) 58.9 cm, 593 g
3) 73.9 cm, 1443 g

Sample DF019706 - 2 Redhorse Sucker (Moxostoma congestum)
Length and Weight: 1) 28.7 cm, 252 g
2) 29.7 cm, 312 g

Appendix 2

Analytical Results

GERG
Geochemical and Environmental Research Group
833 Graham Road
College Station, Texas 77845
TEXAS A&M UNIVERSITY
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FAX: (409) 690-0059
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11 January 1994

Mr. Phil Crocker
Grants and Audit Section (6M-PG)
U.S. E.P.A., Region 6
1445 Ross Avenue (Fountain Place)
Dallas, Texas 75202-2733

Dear Phil,

In reference to your letter of 2 December 1993 regarding clarifications for the EPA fish tissue results, the following responses to your questions as addressed are presented.

1. The following table identifies all of the abbreviated terms used in the data.

TERM	DESCRIPTION	COMMENT	
LABSAMP	Lab Sample No.		
SRMID			
SAMPSET	Sample Set Desc.		
SAMPID	Sponsor Sample No.		
ADGDAT	Acid Dig. Date		
HGDGDAT	Hg Dig. Date		
SAMPTYPE	Sample Type	SAMP	Sample
		LDUP	Lab Duplicate
		SPKLEV	Spike Level
		MS	Matrix Spike
		SRMLEV	Standard Reference Material Amount
		SRM	Standard Reference Material
		BLANK	Lab Blank

PON	PO/ Inv. No.		
WETWT	Wet Wt. Rcvd.		
ADWT	Acid Dig. DW		
HGDWT	Hg Dig. DW		
PCTMOIS	% Moisture		
MATXCOD	Sample Matrix		
UNITTM	Conc. Units		
UNITQUAL	Wet/Dry Wt.		
V	V PPM		
Hg	Hg PPM		
COMMENTS			
LAB	LABID		

2. Pesticide, PCB and PAH analytical results are reported on a wet weight basis.

3. The table which lists sample numbers, species, etc. has been updated with the additional information you requested.

4. The trace metal data have been converted to a wet weight basis and are included in the revised technical report and on diskette in WK1 format.

5. The percent moisture values and corresponding results for selected samples have been corrected by the trace metal lab.

6. The SRMID column identifies the specific standard reference material and appears in the SRMID field only when used. The HGDWT column has been deleted.

7. A narrative QA summary has been appended to the end of this report.

8. The Q series samples, as described in the QA narrative, indicate quality assurance samples for internal tracking.

Please contact me if the above responses, clarifications, and corrections do not fulfill your requirements for the project. I would be pleased to assist you with any further questions you might have in order to complete this project.

Sincerely,

Gary A. Wolff, Ph.D
Associate Research Scientist

GAW
enclosures
xc: J. Brooks, GERG
T. Wade, GERG
B.Presley/P.Boothe, OCN
C. Kennicutt,III, GERG

The Geochemical and
Environmental Research Group

Texas A&M University

EPA Region 6
Bioaccumulation Study

TRACE METALS AND ORGANICS
RESULTS FOR TISSUE SAMPLES

January 11, 1994

Technical Report #93-145

QA Summary

Pesticides PCB 198 surrogate recovery for sample C10642 was 130.5%. This surrogate is not used to quantitate any of the analytes and was probably the result of matrix interference. Recoveries of analytes in spike blanks and matrix spikes indicate the method was in a state of control with recoveries ranging from 61 to 128, with most analyte recoveries between 80-100%. There were matrix interferences for 2, 4 DDE (Q1269) PCB 170 (Q6269, Q6271, Q6268), and PCB 180 (Q6330). There is a contaminant (phthalate) in procedural blank Q6270 that interfere with PCB 170. Duplicate analyses were acceptable.

Aromatic Hydrocarbons

Surrogate recoveries for perylene D12 surrogate was 29.7% and 39.8% for procedural blanks Q6266 and Q6270. This surrogate is only used to quantitate perylene, which is known to be very labile. Spike matrix (Q6273) had matrix interference with the phenanthrene D10 surrogate. For this spike matrix chrysene D10 was used to quantitate the analytes that are not really quantitated using phenanthrene D10. All procedural blanks were acceptable. The % recoveries of analytes in spiked blanks and spiked samples was 70 to 129 with most values between 80 and 120 indicating the method was in a state-of-control. Duplicate analyses were acceptable.

EPA BIOACCUMULATION SAMPLE INFORMATION

LABNO	SAMPNO	DATE COLL	DATE REC	SAMPLE DESCRIPTION	LOCATION
4980	DF024108	8/21/90	10/28/92	5 SPOTTED GAR	Angelina River, TX
4981	DF019703	8/21/90	10/28/92	3 LARGEMOUTH BASS	Angelina River, TX
4982	DF019701	8/21/90	10/28/92	4 FRESTHWATER DRUM	Angelina River, TX
4983	DF019702	8/21/90	10/28/92	WHITE CRAPPIE	Angelina River, TX
4984	DF019714	7/18/90	10/28/92	2 WHITE CRAPPIE	Arroyo Colorado, TX
4985	DF019708	6/6/90	10/28/92	11 LONGEAR SUNFISH	Rio Grande, El Paso
4986	DF019709	6/6/90	10/28/92	4 RIVER CARPSUCKER	Rio Grande, El Paso
4987	DF019419	6/6/90	10/28/92	4 CARP	Ouachita River, Monroe
4988	DF019420	9/4/90	10/28/92	3 LARGEMOUTH BASS	Ouachita River, Monroe
4989	DF019421	9/4/90	10/28/92	3 CHANNEL CATFISH	Ouachita River, Monroe
4990	DF019422	9/5/90	10/28/92	3 WHITE CRAPPIE	Ouachita River, state line
4991	DF019423	9/5/90	10/28/92	3 SMALLMOUTH BUFFALO	Ouachita River, state line
4992	DF019424	9/5/90	10/28/92	3 CHANNEL CATFISH	Ouachita River, state line
4993	DF019409	2/24-25/90	10/28/92	4 CHANNEL CATFISH	Red River, Natch.
10635	DF019401	9/6/90	12/23/92	4 BASS FILET	Red River, S.P.
10636	DF019402	9/6/90	12/23/92	4 SM BUFFALO FILET	Red River, S.P.
10637	DF019404	9/17-18/90	12/23/92	4 STRIPED BASS FILET	Red River, below S.P.
10638	DF019405	9/17-18/90	12/23/92	3 SM BUFFALO FILET	Red River, below S.P.
10639	DF019406	9/17-18/90	12/23/92	5 Chan Cat	Red River, below S.P.
10640	DF019407	9/24-25/90	12/23/92	5 WHITE BASS FILET	Red River, Natch.
10641	DF019408	9/24-25/90	12/23/92	4 BM BUFFALO FILET	Red River, Natch.
10642	DF019704	7/30/90	12/23/92	2 LM BASS FILET	San Antonio River,Elmendorf
10643	DF019705	7/30/90	12/23/92	3 LONGNOSE GAR FILET	San Antonio River,Elmendorf
10644	DF019706	7/30/90	12/23/92	2 REDHORSE SUCKERS FILET	San Antonio River,Elmendorf
10645	DF019810	10/16-17/90	12/23/92	7 LM BASS FILET	Arcadia Lake Central SP
10646	DF019811	10/16-17/90	12/23/92	7 CRAPPIE FILET	Arcadia Lake Central SP
10647	DF019812	10/16-17/90	12/23/92	5 Bl BULLHEAD FILET	Arcadia Lake Central SP
11922	Comp #1	6/20/90	12/08/92	5 River Carpsucker(1-5)	Bird Creek, dwnstr Mingo Crk, OK
11923	Comp #2	6/20/90	12/08/92	2 Common Carp(6,7)	Bird Creek, dwnstr Mingo Crk, OK
11924	Comp #3	6/20/90	12/08/92	4 White Crappie(8-11)	Bird Creek, dwnstr Mingo Crk, OK
11925	Comp#4	6/20/90	12/08/92	2 White Bass(12,13)	Bird Creek, dwnstr Mingo Crk, OK

EPA BIOACCUMUL DATA - TRACE METALS

LABSAMP	SRMID	SAMPSET	SAMPID	ADGDAT	SAMPTYPE	PON	WETWT	ADWT	PCTMOIS	MATXCOD
METHOD				021						
DLDRY								021	003	
4980		EPA/SURVEY #1	DF024108	4/13/93	SAMP	92-050	20.22	0.2006	73.59	TISSUE
4980-DUP		EPA/SURVEY #1	DF024108	4/13/93	LDUP	92-050	28.28	0.2242	74.54	TISSUE
4981		EPA/SURVEY #1	DF019703	4/13/93	SAMP	92-050	21.76	0.204	80.10	TISSUE
4981-DUP		EPA/SURVEY #1	DF019703	4/13/93	LDUP	92-050	28.06	0.2064	80.15	TISSUE
4982		EPA/SURVEY #1	DF019701	4/13/93	SAMP	92-050	17.3	0.2099	78.32	TISSUE
SPIKE		EPA/SURVEY #1	DF019701	4/13/93	SPKLEV	92-050				TISSUE
4982-SPK		EPA/SURVEY #1	DF019701	4/13/93	MS	92-050	16.89	0.1948	78.27	TISSUE
4983		EPA/SURVEY #1	DF019702	4/13/93	SAMP	92-050	13.03	0.1963	78.20	TISSUE
SPIKE		EPA/SURVEY #1	DF019702	4/13/93	SPKLEV	92-050				TISSUE
4983-SPK		EPA/SURVEY #1	DF019702	4/13/93	MS	92-050	14.31	0.1934	79.25	TISSUE
4984		EPA/SURVEY #1	DF019714	4/13/93	SAMP	92-050	7.53	0.2029	80.88	TISSUE
4985		EPA/SURVEY #1	DF019708	4/13/93	SAMP	92-050	12.31	0.2059	75.14	TISSUE
4986		EPA/SURVEY #1	DF019709	4/13/93	SAMP	92-050	13.16	0.1961	75.84	TISSUE
4987		EPA/SURVEY #1	DF019419	4/13/93	SAMP	92-050	31.09	0.2044	76.55	TISSUE
4988		EPA/SURVEY #1	DF019420	4/13/93	SAMP	92-050	32.92	0.2011	77.34	TISSUE
4989		EPA/SURVEY #1	DF019421	4/13/93	SAMP	92-050	19.39	0.2101	79.16	TISSUE
4990		EPA/SURVEY #1	DF019422	4/13/93	SAMP	92-050	29.27	0.205	82.00	TISSUE
4991		EPA/SURVEY #1	DF019423	4/13/93	SAMP	92-050	30.31	0.1919	79.21	TISSUE
4992		EPA/SURVEY #1	DF019424	4/13/93	SAMP	92-050	37.47	0.1955	77.77	TISSUE
4993		EPA/SURVEY #1	DF019409	4/13/93	SAMP	92-050	34.71	0.1932	79.20	TISSUE
10635		EPA/SURVEY #2	DF019401	8/10/93	SAMP	92-050-A	13.58	0.1941	73.12	TISSUE
10636		EPA/SURVEY #2	DF019402	8/10/93	SAMP	92-050-A	17.36	0.1979	76.61	TISSUE
10637		EPA/SURVEY #2	DF019404	8/10/93	SAMP	92-050-A	17.99	0.1962	77.27	TISSUE
10637-DUP		EPA/SURVEY #2	DF019404	8/10/93	LDUP	92-050-A		0.2	77.27	TISSUE
10638		EPA/SURVEY #2	DF019405	8/10/93	SAMP	92-050-A	15.53	0.1966	73.47	TISSUE
10639		EPA/SURVEY #2	DF019406	8/10/93	SAMP	92-050-A	35.13	0.197	78.71	TISSUE
SPIKE		EPA/SURVEY #2	DF019406	8/10/93	SPKLEV	92-050-A				TISSUE
10639-SPK		EPA/SURVEY #2	DF019406	8/10/93	MS	92-050-A		0.2	78.71	TISSUE
10640		EPA/SURVEY #2	DF019407	8/10/93	SAMP	92-050-A	15.74	0.1971	73.76	TISSUE
10641		EPA/SURVEY #2	DF019408	8/10/93	SAMP	92-050-A	16.38	0.1951	73.99	TISSUE
10642		EPA/SURVEY #2	DF019704	8/10/93	SAMP	92-050-A	13.56	0.1943	71.68	TISSUE
10643		EPA/SURVEY #2	DF019705	8/10/93	SAMP	92-050-A	15.15	0.1914	66.93	TISSUE
10644		EPA/SURVEY #2	DF019706	8/10/93	SAMP	92-050-A	17.56	0.1937	75.97	TISSUE
10645		EPA/SURVEY #2	DF019810	8/10/93	SAMP	92-050-A	39.42	0.2004	80.26	TISSUE
10645-DUP		EPA/SURVEY #2	DF019810	8/10/93	LDUP	92-050-A		0.1929	80.26	TISSUE

EPA BIOACCUMULATION DATA - TRACE METALS

LABSAMP	SRMID	SAMPSET	SAMPID	ADGDAT	SAMPTYPE	PON	WETWT	ADWT	PCTMOIS	MATXCOD
10646		EPA/SURVEY #2	DF019811	8/10/93	SAMP	92-050-A	37.12	0.1976	80.87	TISSUE
SPIKE		EPA/SURVEY #2	DF019811	8/10/93	SPKLEV	92-050-A				TISSUE
10646-SPK		EPA/SURVEY #2	DF019811	8/10/93	MS	92-050-A		0.1979	80.87	TISSUE
10647		EPA/SURVEY #2	DF019812	8/10/93	SAMP	92-050-A	35.44	0.1914	82.39	TISSUE
11922		EPA/SURVEY #1	COMPOSITE #1	9/28/93	SAMP	92-050	21.40	0.2021	79.81	TISSUE
11922-DUP		EPA/SURVEY #1	COMPOSITE #1	9/28/93	LDUP	92-050	21.40	0.2082	79.81	TISSUE
11923		EPA/SURVEY #1	COMPOSITE #2	9/28/93	SAMP	92-050	26.33	0.2056	79.32	TISSUE
SPKLEV		EPA/SURVEY #1	COMPOSITE #2	9/28/93	SPKLEV	92-050	26.33		79.32	TISSUE
11923-SPK		EPA/SURVEY #1	COMPOSITE #2	9/28/93	MS	92-050	26.33	0.2043	79.32	TISSUE
11924		EPA/SURVEY #1	COMPOSITE #3	9/28/93	SAMP	92-050	19.42	0.2096	79.56	TISSUE
11924-DUP		EPA/SURVEY #1	COMPOSITE #3	9/28/93	LDUP	92-050	19.42	0.2006	79.56	TISSUE
11925		EPA/SURVEY #1	COMPOSITE #4	9/28/93	SAMP	92-050	13.70	0.2103	78.39	TISSUE
SPKLEV		EPA/SURVEY #1	COMPOSITE #4	9/28/93	SPKLEV	92-050	13.70		78.39	TISSUE
11925-SPK		EPA/SURVEY #1	COMPOSITE #4	9/28/93	MS	92-050	13.70	0.2032	78.39	TISSUE
SRMLEV	NRCC DORM1	EPA/SURVEY #1		4/13/93	SRMLEV	92-050				TISSUE
DORM-A	NRCC DORM1	EPA/SURVEY #1		4/13/93	SRM	92-050		0.1982		TISSUE
DORM-B	NRCC DORM1	EPA/SURVEY #1		4/13/93	SRM	92-050		0.1932		TISSUE
DORM-1-AN	NRCC DORM1	EPA/SURVEY #1		9/28/93	SRM	92-050		0.2107		TISSUE
SRMLEV	NIST 1566a	EPA/SURVEY #1		4/13/93	SRMLEV	92-050				TISSUE
NBS-OYS-A	NIST 1566a	EPA/SURVEY #1		4/13/93	SRM	92-050		0.1974		TISSUE
NBS-OYS-D	NIST 1566a	EPA/SURVEY #1		4/13/93	SRM	92-050		0.1854		TISSUE
NBS-OYS-DS	NIST 1566a	EPA/SURVEY #2		8/10/93	SRM	92-050-A		0.2023		TISSUE
NBS-OYS-DY	NIST 1566a	EPA/SURVEY #2		8/10/93	SRM	92-050-A		0.1928		TISSUE
NBS-OYS-AO	NIST 1566a	EPA/SURVEY #1		9/28/93	SRM	92-050		0.1942		TISSUE
SRMLEV	NRCC DOLT2	EPA/SURVEY #1		4/13/93	SRMLEV	92-050				TISSUE
DOLT-2-DR	NRCC DOLT2	EPA/SURVEY #2		8/10/93	SRM	92-050-A		0.2011		TISSUE
DOLT-2-DX	NRCC DOLT2	EPA/SURVEY #2		8/10/93	SRM	92-050-A		0.1949		TISSUE
DOLT2-AM	NRCC DOLT2	EPA/SURVEY #1		9/28/93	SRM	92-050		0.2003		TISSUE
BLANK-B		EPA/SURVEY #1		4/13/93	BLANK	92-050		1		TISSUE
BLANK-C		EPA/SURVEY #1		4/13/93	BLANK	92-050		1		TISSUE
BLANK-DN		EPA/SURVEY #2		8/10/93	BLANK	92-050-A		1		TISSUE
BLANK-DP		EPA/SURVEY #2		8/10/93	BLANK	92-050-A		1		TISSUE
BLANK-DV		EPA/SURVEY #2		8/10/93	BLANK	92-050-A		1		TISSUE
BLANK-DW		EPA/SURVEY #2		8/10/93	BLANK	92-050-A		1		TISSUE
BLANK-AK		EPA/SURVEY #1		9/28/93	BLANK	92-050		1		TISSUE
BLANK-AL		EPA/SURVEY #1		9/28/93	BLANK	92-050		1		TISSUE

EPA BIOACCUMUL DATA - TRACE METALS

LABSAMP	UNITTM	UNITQUAL	V dry	V wet	Hg dry	Hg wet
METHOD			021		021	
DLDRY			0.4		0.03	
4980	PPM	DRY/WET	0.244	0.064	1.801	0.476
4980-DUP	PPM	DRY/WET	0.477	0.122	1.848	0.470
4981	PPM	DRY/WET	0.000	0.000	2.389	0.475
4981-DUP	PPM	DRY/WET	0.000	0.000	2.441	0.485
4982	PPM	DRY/WET	0.000	0.000	1.213	0.263
SPIKE	PPM	DRY	20.534		0.504	
4982-SPK	PPM	DRY	19.306		1.618	
4983	PPM	DRY/WET	0.137	0.030	1.780	0.388
SPIKE	PPM	DRY	20.683		0.515	
4983-SPK	PPM	DRY	18.885		2.348	
4984	PPM	DRY/WET	0.000	0.000	1.334	0.255
4985	PPM	DRY/WET	0.204	0.051	0.351	0.087
4986	PPM	DRY/WET	0.130	0.031	0.366	0.088
4987	PPM	DRY/WET	0.000	0.000	0.497	0.117
4988	PPM	DRY/WET	0.000	0.000	6.304	1.428
4989	PPM	DRY/WET	0.000	0.000	3.551	0.740
4990	PPM	DRY/WET	0.169	0.030	6.595	1.187
4991	PPM	DRY/WET	0.203	0.042	2.515	0.523
4992	PPM	DRY/WET	0.090	0.020	2.583	0.574
4993	PPM	DRY/WET	0.000	0.000	1.399	0.291
10635	PPM	DRY/WET	0.00	0.000	1.303	0.350
10636	PPM	DRY/WET	0.20	0.048	0.627	0.147
10637	PPM	DRY/WET	0.15	0.034	3.148	0.716
10637-DUP	PPM	DRY/WET	0.06	0.014	3.332	0.757
10638	PPM	DRY/WET	0.20	0.054	0.839	0.223
10639	PPM	DRY/WET	0.37	0.079	1.260	0.268
SPIKE	PPM	DRY	20.00		0.25	
10639-SPK	PPM	DRY	20.23		1.490	
10640	PPM	DRY/WET	0.39	0.103	2.470	0.648
10641	PPM	DRY/WET	0.00	0.000	1.624	0.422
10642	PPM	DRY/WET	0.00	0.000	1.587	0.449
10643	PPM	DRY/WET	0.24	0.081	2.300	0.760
10644	PPM	DRY/WET	0.00	0.000	1.086	0.261
10645	PPM	DRY/WET	0.00	0.000	1.148	0.227
10645-DUP	PPM	DRY/WET	0.32	0.062	0.941	0.186

EPA BIOACCUMULATION DATA - TRACE METALS

LABSAMP	UNITTM	UNITQUAL	V dry	V wet	Hg dry	Hg wet
10646	PPM	DRY/WET	0.74	0.141	0.950	0.182
SPIKE	PPM	DRY	20.21		0.25	
10646-SPK	PPM	DRY	19.09		1.173	
10647	PPM	DRY/WET	0.32	0.056	0.961	0.169
11922	PPM	DRY/WET	0.46	0.093	0.476	0.096
11922-DUP	PPM	DRY/WET	0.32	0.064	0.473	0.096
11923	PPM	DRY/WET	0.26	0.054	0.489	0.101
SPKLEV	PPM	DRY	19.58		0.979	
11923-SPK	PPM	DRY	19.55		1.466	
11924	PPM	DRY/WET	0.37	0.076	0.264	0.054
11924-DUP	PPM	DRY/WET	0.11	0.023	0.260	0.053
11925	PPM	DRY/WET	0.10	0.021	0.898	0.194
SPKLEV	PPM	DRY	19.69		0.738	
11925-SPK	PPM	DRY	19.86		1.494	
SRMLEV	PPM	DRY			0.798	
DORM-A	PPM	DRY	0.000		0.819	
DORM-B	PPM	DRY	0.000		0.753	
DORM-1-AN	PPM	DRY	0.47		0.704	
SRMLEV	PPM	DRY	4.68		0.0642	
NBS-OYS-A	PPM	DRY			0.077	
NBS-OYS-D	PPM	DRY	4.334		0.064	
NBS-OYS-DS	PPM	DRY	3.76		0.061	
NBS-OYS-DY	PPM	DRY	4.27		0.064	
NBS-OYS-AO	PPM	DRY	4.96		0.059	
SRMLEV	PPM	DRY			1.99	
DOLT-2-DR	PPM	DRY	0.19		2.323	
DOLT-2-DX	PPM	DRY	0.25		2.227	
DOLT2-AM	PPM	DRY	0.00		1.986	
BLANK-B	TOTMCG		0.000		0.000	
BLANK-C	TOTMCG		0.054		0.000	
BLANK-DN	TOTMCG		0.01		0	
BLANK-DP	TOTMCG		0.07		0	
BLANK-DV	TOTMCG		0.07		0	
BLANK-DW	TOTMCG		0.00		0	
BLANK-AK	TOTMCG		0.02		0.001	
BLANK-AL	TOTMCG		0.04		0.001	

EPA/STATE BIOACCUMULATION SURVEY - PESTICIDE & PCB ANALYSIS

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF024108	DF019703	DF019701	DF019702	DF019714	DF019708	DF019709	DF019419
DUPLICATE OF LAB SAMPLE #	C4980P	C4981P	C4982P	C4983P	C4984P	C4985P	C4986P	C4987P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PAGE #	M1221	M1221	M1221	M1221	M1221	M1221	M1221	M1221
EXTRACTION DATE	08/17/93	08/17/93	08/17/93	08/17/93	08/17/93	08/17/93	08/17/93	08/17/93
ANALYSIS DATE	09/22/93	09/22/93	09/22/93	09/22/93	09/22/93	09/22/93	09/22/93	09/22/93
DBOFB% (recov.)	74.9%	70.6%	73.1%	73.1%	71.2%	72.3%	67.8%	74.2%
PCB#103% (recov.)	74.3%	76.1%	75.4%	74.8%	75.1%	74.1%	70.4%	76.3%
PCB#198% (recov.)	72.7%	70.8%	72.1%	70.0%	72.1%	71.6%	70.3%	75.7%
TOTAL BHC'S	1.91	0.00	0.23	0.00	0.30	0.87	1.57	0.33
TOTAL CHLORDANES	14.28	0.56	0.98	0.29	5.85	6.39	8.89	18.51
TOTAL DDT'S	30.54	0.65	2.13	0.37	127.24	37.73	41.13	52.55
TOTAL PCB'S	222.7	11.1	15.4	7.4	56.6	82.5	111.3	26.6
ALPHA-BHC	0.47	0.00	0.00	0.00	0.00	0.00	0.44	0.00
HCB	0.74	0.06	0.11	0.05	0.08	0.39	0.68	0.24
BETA-BHC	0.00	0.00	0.00	0.00	0.04	0.08	0.14	0.12
GAMMA-BHC	1.44	0.00	0.23	0.00	0.26	0.78	0.99	0.22
DELTA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
HEPTA-EPOXIDE	0.20	0.00	0.06	0.00	0.13	0.08	0.07	0.43
OXYCHLORDANE	0.76	0.00	0.08	0.00	0.09	0.65	0.43	0.75
GAMMA-CHLORDANE	1.23	0.00	0.00	0.00	1.33	0.91	2.41	4.51
ALPHA-CHLORDANE	2.24	0.15	0.33	0.11	2.38	1.98	2.60	5.01
TRANS-NONACHLOR	6.60	0.41	0.51	0.18	1.91	2.20	2.42	5.26
CIS-NONACHLOR	3.25	0.00	0.00	0.00	0.00	0.57	0.86	2.54
ALDRIN	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00
DIELDRIN	0.84	0.00	0.19	0.00	4.57	1.79	2.59	0.94
ENDRIN	0.40	0.00	0.26	0.00	2.59	0.00	0.00	0.31
MIREX	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.75
2,4'DDE (O,P'DDE)	0.00	0.00	0.00	0.00	2.83	0.43	0.43	0.29
4,4'DDE (P,P'DDE)	26.00	0.65	1.76	0.37	109.40	30.85	29.34	42.58
2,4'DDD (O,P'DDD)	0.66	0.00	0.08	0.00	1.58	0.19	0.76	0.38
4,4'DDD (P,P'DDD)	2.85	0.00	0.29	0.00	8.38	5.06	8.27	8.93
2,4'DDT (O,P'DDT)	0.43	0.00	0.00	0.00	1.50	0.00	0.88	0.00
4,4'DDT (P,P'DDT)	0.60	0.00	0.00	0.00	3.56	1.20	1.45	0.38

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF024108	DF019703	DF019701	DF019702	DF019714	DF019708	DF019709	DF019419
DUPLICATE OF								
LAB SAMPLE #	C4980P	C4981P	C4982P	C4983P	C4984P	C4985P	C4986P	C4987P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PCB#8 (CL2)	0.0	0.0	0.0	0.0	0.0	7.3	3.1	0.0
PCB#18 (CL3)	0.0	0.0	0.0	0.0	0.1	0.4	1.0	0.0
PCB#28 (CL3)	1.2	0.1	0.2	0.0	0.4	0.0	1.4	0.2
PCB#44 (CL4)	0.0	0.0	0.1	0.0	0.8	0.5	2.3	0.5
PCB#52 (CL4)	4.1	0.0	0.7	0.0	1.3	2.3	4.9	1.4
PCB#66 (CL4)	0.9	0.0	0.0	0.0	0.2	0.4	0.9	0.2
PCB#101 (CL5)	6.7	0.2	0.1	0.0	1.2	3.7	4.3	0.0
PCB#105 (CL5)	10.0	1.8	2.9	1.4	0.0	0.8	1.2	0.5
PCB#110/77 (CL5/4)	4.1	0.0	0 0	0.0	2.2	2.6	4.9	0.7
PCB#118/108/149(CL5/5/6)	8.1	0.2	0.2	0.2	0.4	2.7	3.8	0.5
PCB#128 (CL6)	2.4	0.0	0.0	0.0	4.8	0.5	0.8	0.7
PCB#138 (CL6)	16.1	0.8	0.7	0.4	10.8	4.2	4.9	2.7
PCB#126 (CL5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCB#153 (CL6)	28.2	0.6	0.7	0.3	3.6	3.9	4.3	1.8
PCB#170 (CL7)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCB#180 (CL7)	14.7	0.4	0.4	0.2	1.2	8.7	16.1	1.5
PCB#187/182/159(CL7/7/6)	5.6	0.0	0.0	0.0	0.0	1.1	0.7	0.8
PCB#195 (CL8)	1.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1
PCB#206 (CL9)	1.3	0.0	0.1	0.0	0.0	0.1	0.1	0.1
PCB#209 (CL10)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MISCELLANEOUS INFORMATION

Type of matrix	TIS	TIS	TIS	TIS	TIS	TIS	TIS	TIS
Type of sample	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP
Dry wt.	1.383	1.068	1.182	1.097	0.994	1.253	1.198	1.250
Wet wt.	5.249	5.151	5.099	5.095	4.933	5.194	4.756	5.170
Wt. units	g	g	g	g	g	g	g	g
Volume amt.								
Vol. units								
Wet or dry wt. analysis	WET	WET	WET	WET	WET	WET	WET	WET
Dry wt. %	26.35	20.73	23.19	21.53	20.14	24.12	25.19	24.18
Moisture %	73.65	79.27	76.81	78.47	79.86	75.88	74.81	75.82
Organism used	5 SPOTTED G3	LARGEMOUT4	FRESTHWATWHITE	CRAPP2	WHITE CRA11	LONGEAR 4	RIVER CAR	4 CARP
Fraction used								
Lipid %	4.180	0.425	0.704	0.276	0.265	2.116	2.670	3.593

BLANK Laboratory Blank
LDUP Lab QA Duplicate
MS Matrix Spike
BS Spiked Blank

EPA/STATE BIOACCUMULATION SURVEY - PESTICIDE & PCB ANALYSIS

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF019420	DF019421	DF019422	DF019423	DF019424	DF019409	DF019401	DF019402
DUPLICATE OF LAB SAMPLE #	C4988P	C4989P	C4990P	C4991P	C4992P	C4993P	C10635P	C10636P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PAGE #	M1221	M1221	M1221	M1221	M1221	M1221	M1222	M1222
EXTRACTION DATE	08/17/93	08/17/93	08/17/93	08/17/93	08/17/93	08/17/93	08/19/93	08/19/93
ANALYSIS DATE	09/22/93	09/22/93	09/22/93	09/22/93	09/22/93	09/22/93	09/24/93	09/24/93
DBOFB% (recov.)	75.3%	72.2%	72.9%	67.1%	71.0%	71.3%	71.1%	80.8%
PCB#103% (recov.)	78.9%	75.4%	77.9%	72.1%	72.8%	74.3%	96.1%	102.6%
PCB#198% (recov.)	78.3%	73.0%	74.7%	70.3%	70.3%	74.4%	119.7%	125.1%
TOTAL BHC'S	0.26	0.00	0.00	0.00	0.41	0.00	3.28	0.00
TOTAL CHLORDANES	8.74	1.81	0.37	2.10	2.11	2.00	25.41	30.92
TOTAL DDT'S	44.07	10.68	1.16	3.80	3.80	37.87	132.37	96.51
TOTAL PCB'S	53.0	11.2	6.9	14.0	13.7	9.6	82.64	212.45
ALPHA-BHC	0.15	0.00	0.00	0.00	0.18	0.00	0.00	0.00
HCB	0.12	0.11	0.05	0.11	0.18	0.12	1.13	0.40
BETA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GAMMA-BHC	0.11	0.00	0.00	0.00	0.23	0.00	3.28	0.00
DELTA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTA-EPOXIDE	0.33	0.10	0.00	0.19	0.14	0.00	2.80	1.64
OXYCHLORDANE	0.78	0.13	0.00	0.21	0.16	0.00	1.20	1.13
GAMMA-CHLORDANE	0.52	0.26	0.00	0.35	0.20	0.47	3.37	8.22
ALPHA-CHLORDANE	1.32	0.38	0.11	0.55	0.23	0.40	5.63	7.87
TRANS-NONACHLOR	4.26	0.66	0.26	0.79	0.85	0.79	8.25	7.76
CIS-NONACHLOR	1.52	0.28	0.00	0.00	0.53	0.33	4.17	4.30
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	1.16	0.20	0.08	0.46	0.39	0.30	6.16	4.24
ENDRIN	0.28	0.00	0.00	0.00	0.00	0.00	0.00	1.48
MIREX	2.34	0.31	0.00	0.00	0.43	5.92	3.40	1.87
2,4'DDE (O,P'DDE)	0.24	0.00	0.00	0.18	0.00	0.00	0.79	0.56
4,4'DDE (P,P'DDE)	31.13	8.20	0.91	2.26	2.56	32.57	98.47	65.22
2,4'DDD (O,P'DDD)	0.19	0.00	0.00	0.00	0.12	0.17	0.59	0.82
4,4'DDD (P,P'DDD)	6.95	1.79	0.19	1.11	0.94	4.20	14.70	19.79
2,4'DDT (O,P'DDT)	0.36	0.00	0.00	0.00	0.00	0.00	4.70	2.45
4,4'DDT (P,P'DDT)	5.19	0.69	0.07	0.25	0.19	0.94	13.11	7.67

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DFO19420	DFO19421	DFO19422	DFO19423	DFO19424	DFO19409	DFO19401	DFO19402
DUPLICATE OF LAB SAMPLE #	C4988P	C4989P	C4990P	C4991P	C4992P	C4993P	C10635P	C10636P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PCB#8 (CL2)	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1.17
PCB#18 (CL3)	0.0	0.0	0.0	0.0	0.0	0.0	0.00	3.03
PCB#28 (CL3)	0.1	0.0	0.0	0.0	0.1	0.0	0.36	5.70
PCB#44 (CL4)	0.3	0.0	0.0	0.0	0.4	0.0	1.40	3.09
PCB#52 (CL4)	1.6	0.3	0.0	0.0	0.5	0.0	0.72	5.25
PCB#66 (CL4)	0.4	0.1	0.0	0.0	0.1	0.0	0.73	2.64
PCB#101 (CL5)	2.2	0.0	0.1	0.4	0.1	0.0	2.24	7.99
PCB#105 (CL5)	0.9	0.2	0.8	1.8	1.2	0.0	1.70	0.00
PCB#110/77 (CL5/4)	1.3	0.3	0.1	0.2	0.4	0.1	5.15	13.48
PCB#118/108/149(CL5/5/6)	1.3	0.3	0.2	0.6	0.5	0.0	2.28	4.38
PCB#128 (CL6)	0.7	0.2	0.1	0.2	0.2	0.7	2.12	2.08
PCB#138 (CL6)	6.0	1.2	0.4	0.9	0.9	2.0	6.50	16.14
PCB#126 (CL5)	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00
PCB#153 (CL6)	4.2	0.9	0.3	0.5	0.6	0.5	5.96	21.96
PCB#170 (CL7)	0.0	0.0	0.0	0.0	0.0	0.0	0.95	3.75
PCB#180 (CL7)	2.6	0.4	0.2	0.3	0.2	0.2	8.36	10.89
PCB#187/182/159(CL7/7/6)	2.4	0.2	0.0	0.4	0.0	0.0	2.57	6.71
PCB#195 (CL8)	0.1	0.0	0.0	0.0	0.0	0.0	0.36	0.82
PCB#206 (CL9)	0.3	0.1	0.1	0.3	0.5	0.0	0.49	0.39
PCB#209 (CL10)	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00

MISCELLANEOUS INFORMATION

Type of matrix	TIS	TIS	TIS	TIS	TIS	TIS	TIS	TIS
Type of sample	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP
Dry wt.	1.374	1.016	0.959	1.190	1.094	1.082	1.383	1.187
Wet wt.	5.384	5.112	5.036	5.215	5.076	5.032	5.007	5.246
Wt. units	g	g	g	g	g	g	g	g
Volume amt.								
Vol. units								
Wet or dry wt. analysis	WET	WET	WET	WET	WET	WET	WET	WET
Dry wt. %	25.52	19.87	19.05	22.82	21.56	21.50	27.63	22.63
Moisture %	74.48	80.13	80.95	77.18	78.44	78.50	72.37	77.37
Organism used	3 LARGEMOUT	3 CHANNEL C	3 WHITE CRA	3 SMALLMOUT	3 CHANNEL C	4 CHANNEL CB	ASS FILET SM	BUFFALO
Fraction used								
Lipid %	2.307	1.259	0.531	1.628	2.122	0.729	2.148	1.544

BLANK Laboratory Blank
LDUP Lab QA Duplicate
MS Matrix Spike
BS Spiked Blank

EPA/STATE BIOACCUMULATION SURVEY - PESTICIDE & PCB ANALYSIS

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF019404	DF019405	DF019406	DF019407	DF019408	DF019704	DF019705	DF019706
DUPLICATE OF LAB SAMPLE #	C10637P	C10638P	C10639P	C10640P	C10641P	C10642P	C10643P	C10644P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PAGE #	M1222	M1222	M1222	M1222	M1222	M1222	M1222	M1222
EXTRACTION DATE	08/19/93	08/19/93	08/19/93	08/19/93	08/19/93	08/19/93	08/19/93	08/19/93
ANALYSIS DATE	09/24/93	09/24/93	09/24/93	09/24/93	09/24/93	09/24/93	09/24/93	09/24/93
DBOFB% (recov.)	67.6%	88.2%	82.9%	63.5%	73.8%	87.1%	53.7%	57.2%
PCB#103% (recov.)	89.9%	99.2%	97.3%	98.9%	97.7%	96.8%	85.5%	93.4%
PCB#198% (recov.)	110.2%	126.3%	116.8%	110.7%	110.2%	130.5%	85.9%	74.7%
TOTAL BHC'S	0.00	0.00	0.00	0.00	0.00	5.62	17.65	0.00
TOTAL CHLORDANES	20.94	4.47	5.90	15.07	4.32	72.78	193.16	14.42
TOTAL DDT'S	418.05	103.07	100.76	230.74	199.66	110.63	849.47	28.13
TOTAL PCB'S	86.74	28.81	24.16	44.36	23.05	420.58	2983.15	77.38
ALPHA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HCB	0.40	0.31	0.21	0.30	0.27	0.43	2.52	0.00
BETA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GAMMA-BHC	0.00	0.00	0.00	0.00	0.00	5.62	12.85	0.00
DELTA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	4.80	0.00
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTA-EPOXIDE	0.43	0.30	0.00	1.15	0.75	3.62	9.80	1.94
OXYCHLORDANE	0.92	0.00	0.00	0.00	0.00	5.61	20.28	1.61
GAMMA-CHLORDANE	2.06	0.66	1.15	1.50	0.87	5.36	21.18	2.25
ALPHA-CHLORDANE	5.24	1.23	1.75	3.93	1.61	13.58	39.80	3.84
TRANS-NONACHLOR	9.02	1.33	2.25	5.25	1.09	32.64	78.85	3.35
CIS-NONACHLOR	3.28	0.96	0.75	3.23	0.00	11.97	23.26	1.44
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	2.28	0.75	0.36	6.38	2.98	14.08	44.70	6.37
ENDRIN	4.59	1.63	1.19	4.00	2.63	0.00	0.00	0.00
MIREX	11.45	2.12	7.84	4.12	0.98	0.25	4.05	0.00
2,4'DDE (O,P'DDE)	2.55	0.40	0.00	0.55	0.51	0.00	5.36	0.00
4,4'DDE (P,P'DDE)	324.33	79.92	78.06	158.18	154.75	58.10	661.79	15.70
2,4'DDD (O,P'DDD)	1.26	0.50	0.44	0.79	0.85	0.56	4.36	0.24
4,4'DDD (P,P'DDD)	49.99	14.18	15.18	55.27	29.29	26.92	137.04	6.75
2,4'DDT (O,P'DDT)	6.46	1.22	0.57	1.79	1.36	8.52	20.00	2.63
4,4'DDT (P,P'DDT)	33.47	6.87	6.50	14.16	12.89	16.54	20.92	2.82

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF019404	DF019405	DF019406	DF019407	DF019408	DF019704	DF019705	DF019706
DUPLICATE OF								
LAB SAMPLE #	C10637P	C10638P	C10639P	C10640P	C10641P	C10642P	C10643P	C10644P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PCB#8 (CL2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PCB#18 (CL3)	0.00	0.00	0.10	0.08	0.00	0.00	0.38	0.00
PCB#28 (CL3)	1.30	0.00	0.25	0.00	0.00	0.62	4.43	0.53
PCB#44 (CL4)	1.02	0.00	0.29	0.34	0.37	1.82	4.53	0.83
PCB#52 (CL4)	1.57	3.88	0.34	0.00	0.00	3.51	7.83	0.51
PCB#66 (CL4)	1.34	0.00	0.32	0.26	0.00	1.49	13.48	0.51
PCB#101 (CL5)	2.53	0.92	0.72	0.98	0.00	10.16	47.55	1.73
PCB#105 (CL5)	0.00	0.00	0.55	0.00	0.00	4.13	65.76	1.00
PCB#110/77 (CL5/4)	6.55	1.07	0.86	4.01	0.00	19.20	59.09	4.68
PCB#118/108/149(CL5/5/6)	2.06	0.21	0.50	0.63	0.00	11.37	122.35	1.93
PCB#128 (CL6)	3.56	1.40	0.41	1.94	1.98	2.60	31.93	0.71
PCB#138 (CL6)	9.96	2.73	2.16	6.50	3.77	29.01	191.10	4.95
PCB#126 (CL5)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PCB#153 (CL6)	6.82	1.63	1.42	3.96	1.51	37.20	340.62	5.88
PCB#170 (CL7)	1.00	0.82	1.00	1.16	0.71	7.62	134.92	1.95
PCB#180 (CL7)	4.08	0.57	1.01	1.70	0.41	65.75	282.20	11.12
PCB#187/182/159(CL7/7/6)	2.84	0.00	0.96	1.23	0.78	12.81	85.58	1.85
PCB#195 (CL8)	0.21	0.00	0.00	0.11	0.00	1.76	14.51	0.47
PCB#206 (CL9)	0.31	0.00	0.00	0.16	0.00	1.03	12.00	0.35
PCB#209 (CL10)	0.00	0.00	0.00	0.00	0.00	0.17	2.01	0.00
MISCELLANEOUS INFORMATION								
Type of matrix	TIS	TIS	TIS	TIS	TIS	TIS	TIS	TIS
Type of sample	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP
Dry wt.	1.258	1.156	1.095	1.357	1.145	1.149	1.464	0.998
Wet wt.	5.048	5.122	5.159	5.128	5.164	5.099	5.367	5.076
Wt. units	g	g	g	g	g	g	g	g
Volume amt.								
Vol. units								
Wet or dry wt. analysis	WET	WET	WET	WET	WET	WET	WET	WET
Dry wt. %	24.93	22.56	21.23	26.46	22.18	22.53	27.27	19.67
Moisture %	75.07	77.44	78.77	73.54	77.82	77.47	72.73	80.33
Organism used	STRIPED BASSM	BUFFALO	UNKNOWN WHITE BASS	BM BUFFALO	LM BASS	FILLOGNOSE GARRED	HORSE SU	
Fraction used								
Lipid %	3.351	1.910	1.415	3.190	2.464	0.858	6.838	0.536

BLANK Laboratory Blank
LDUP Lab QA Duplicate
MS Matrix Spike
BS Spiked Blank

EPA/STATE BIOACCUMULATION SURVEY - PESTICIDE & PCB ANALYSIS

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF019810	DF019811	DF019812	Composite #1	Composite #2	Composite #3	Composite #4	Q6266P
DUPLICATE OF LAB SAMPLE #	C10645P	C10646P	C10647P	C11922P	C11923P	C11924P	C11925P	Q6266P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PAGE #	M1222	M1222	M1222	M1231	M1231	M1231	M1231	M1221
EXTRACTION DATE	08/19/93	08/19/93	08/19/93	09/09/93	09/09/93	09/09/93	09/09/93	08/17/93
ANALYSIS DATE	09/24/93	09/24/93	09/24/93	10/13/93	10/13/93	10/13/93	10/13/93	09/22/93
DBOFB% (recov.)	57.0%	74.9%	65.5%	68.4%	60.8%	66.0%	67.4%	71.6%
PCB#103% (recov.)	80.6%	76.2%	70.1%	87.9%	70.2%	65.5%	65.1%	75.7%
PCB#198% (recov.)	61.6%	58.8%	62.2%	109.0%	71.9%	52.2%	54.9%	75.3%
TOTAL BHC'S	0.00	0.00	0.00	1.14	1.14	1.35	1.38	0.00
TOTAL CHLORDANES	47.21	7.81	68.33	23.56	21.16	15.61	25.61	0.00
TOTAL DDT'S	19.39	2.19	29.98	10.07	6.13	3.80	8.06	0.06
TOTAL PCB'S	71.73	11.25	107.39	180.0	162.5	53.0	232.0	2.3
ALPHA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HCB	0.22	0.13	0.24	0.16	0.16	0.13	0.15	0.03
BETA-BHC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GAMMA-BHC	0.00	0.00	0.00	1.14	1.14	1.22	1.38	0.00
DELTA-BHC	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00
HEPTACHLOR	0.00	0.00	0.00	0.00	0.07	0.19	0.10	0.00
HEPTA-EPOXIDE	1.11	0.46	1.03	1.08	1.06	0.92	0.95	0.00
OXYCHLORDANE	3.05	0.00	1.74	0.72	1.08	0.46	1.18	0.00
GAMMA-CHLORDANE	3.25	1.23	9.31	4.36	4.10	2.67	2.59	0.00
ALPHA-CHLORDANE	9.94	2.21	18.23	5.28	5.17	4.43	6.45	0.00
TRANS-NONACHLOR	19.74	2.35	26.30	9.26	7.14	5.01	10.68	0.00
CIS-NONACHLOR	10.12	1.56	11.72	2.86	2.54	1.92	3.67	0.00
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	7.19	1.37	5.34	3.15	2.56	2.39	2.43	0.00
ENDRIN	0.00	0.00	0.00	0.16	0.00	0.08	0.00	0.00
MIREX	0.00	0.00	0.14	0.13	0.08	0.03	0.07	0.00
2,4'DDE (O,P'DDE)	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.00
4,4'DDE (P,P'DDE)	12.48	1.36	22.40	7.58	4.97	2.87	6.59	0.06
2,4'DDD (O,P'DDD)	0.00	0.00	0.00	0.18	0.16	0.08	0.17	0.00
4,4'DDD (P,P'DDD)	5.91	0.83	5.74	1.49	1.01	0.69	0.83	0.00
2,4'DDT (O,P'DDT)	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00
4,4'DDT (P,P'DDT)	1.00	0.00	0.67	0.81	0.00	0.15	0.48	0.00

PROJECT DESCRIPTOR	EPA DF019810	EPA DF019811	EPA DF019812	EPA Composite #1	EPA Composite #2	EPA Composite #3	EPA Composite #4	EPA Q6266P
DUPLICATE OF LAB SAMPLE #	C10645P	C10646P	C10647P	C11922P	C11923P	C11924P	C11925P	Q6266P
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PCB#8 (CL2)	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
PCB#18 (CL3)	0.00	0.00	0.00	0.4	0.2	0.2	0.0	0.0
PCB#28 (CL3)	0.00	0.00	0.28	1.6	0.5	0.4	0.3	0.0
PCB#44 (CL4)	0.95	0.21	1.17	1.7	1.4	1.0	1.0	0.0
PCB#52 (CL4)	0.86	0.00	1.15	2.5	1.6	1.3	1.8	0.0
PCB#66 (CL4)	0.53	0.00	0.68	1.7	0.6	0.4	0.8	0.0
PCB#101 (CL5)	2.44	0.25	3.53	3.8	4.0	1.9	6.0	0.0
PCB#105 (CL5)	1.73	0.00	2.45	2.0	2.5	1.1	3.6	0.0
PCB#110/77 (CL5/4)	5.91	0.69	7.9[illegible]	4.2	5.6	2.7	9.8	0.0
PCB#118/108/149(CL5/5/6)	3.35	0.43	4.35	5.5	7.3	2.1	8.2	0.0
PCB#128 (CL6)	1.05	0.16	1.47	1.0	1.0	0.5	2.4	0.0
PCB#138 (CL6)	6.03	0.78	9.49	7.6	7.5	3.0	13.0	0.1
PCB#126 (CL5)	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
PCB#153 (CL6)	6.88	0.94	10.85	7.3	7.4	2.5	10.7	0.0
PCB#170 (CL7)	1.23	0.60	1.62	1.7	1.3	0.5	2.3	0.0
PCB#180 (CL7)	3.95	0.51	5.94	MI	MI	7.6	MI	0.0
PCB#187/182/159(CL7/7/6)	2.06	0.27	3.59	2.4	2.1	0.7	2.3	0.0
PCB#195 (CL8)	0.38	0.00	0.66	0.4	0.2	0.1	0.2	0.0
PCB#206 (CL9)	0.34	0.00	0.60	0.4	0.2	0.1	0.2	0.0
PCB#209 (CL10)	0.00	0.00	0.22	0.0	0.0	0.0	0.0	0.0

MISCELLANEOUS INFORMATION

Type of matrix	TIS	TIS	TIS	TIS	TIS	TIS	TIS	TIS
Type of sample	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	SAMP	BLANK
Dry wt.	1.090	1.039	0.951	1.068	1.179	1.080	1.144	
Wet wt.	5.052	5.186	5.077	5.030	5.345	5.073	5.024	5.114
Wt. units	g	g	g	g	g	g	g	g
Volume amt.								
Vol. units								
Wet or dry wt. analysis	WET	WET	WET	WET	WET	WET	WET	WET
Dry wt. %	21.58	20.04	18.73	21.23	22.05	21.28	22.76	
Moisture %	78.42	79.96	81.27	78.77	77.95	78.72	77.24	
Organism used	LM BASS FIL	CRAPPIE FIL	Bl BULLHEAD	River Carps	Common Carp	White Crapp	White Bass(12,13)	
Fraction used								
Lipid %	1.246	0.450	0.811	4.411	3.971	3.112	2.540	

BLANK Laboratory Blank
LDUP Lab QA Duplicate
MS Matrix Spike
BS Spiked Blank

EPA/STATE BIOACCUMULATION SURVEY - PESTICIDE & PCB ANALYSIS

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	Q6267P	Q6267P	DFO19424	DFO19424	DFO19424	Q6270P	Q6271P	Q6271P
DUPLICATE OF			C4992P	C4992P	C4992P			
LAB SAMPLE #	Q6267P	Q6267P	Q6268P	Q6269P	Q6269P	Q6270P	Q6271P	Q6271P
UNITS	ug/Kg	%	ug/Kg	ug/Kg	%	ug/Kg	ug/Kg	%
PAGE #	M1221	M1221	M1221	M1221	M1221	M1222	M1222	M1222
EXTRACTION DATE	08/17/93	08/17/93	08/17/93	08/17/93	08/17/93	08/19/93	08/19/93	08/19/93
ANALYSIS DATE	09/22/93	09/22/93	09/22/93	09/22/93	09/22/93	09/24/93	09/24/93	09/24/93
DBOFB% (recov.)	76.0%	76.0%	75.0%	72.2%	72.2%	84.0%	75.0%	75.0%
PCB#103% (recov.)	78.0%	78.0%	78.5%	74.5%	74.5%	85.6%	80.2%	80.2%
PCB#198% (recov.)	75.0%	75.0%	73.5%	72.9%	72.9%	65.9%	64.9%	64.9%
TOTAL BHC'S	114.38		0.42	24.32		0.00	136.26	
TOTAL CHLORDANES	227.44		2.55	45.73		0.00	221.44	
TOTAL DDT'S	172.35		4.13	32.18		0.00	170.66	
TOTAL PCB'S	1678.3	94	16.9	336.5	93	3.35	1640.21	93
ALPHA-BHC	26.45	79	0.16	5.47	81	0.00	29.62	89
HCB	38.39	95	0.17	7.44	92	0.00	37.91	94
BETA-BHC	23.04	69	0.00	4.34	67	0.00	21.63	65
GAMMA-BHC	29.90	91	0.26	6.35	96	0.00	39.20	120
DELTA-BHC	34.99	98	0.00	8.17	117	0.00	45.82	128
HEPTACHLOR	29.41	78	0.00	6.14	84	0.00	33.54	89
HEPTA-EPOXIDE	27.49	84	0.19	5.10	78	0.00	25.95	80
OXYCHLORDANE	44.52	97	0.23	9.15	100	0.00	43.56	95
GAMMA-CHLORDANE	33.95	87	0.27	6.64	85	0.00	31.33	81
ALPHA-CHLORDANE	33.88	93	0.30	6.05	82	0.00	31.73	87
TRANS-NONACHLOR	28.30	92	1.13	6.53	94	0.00	25.95	84
CIS-NONACHLOR	29.89	91	0.44	6.12	87	0.00	29.39	90
ALDRIN	32.30	88	0.00	6.06	84	0.00	27.52	75
DIELDRIN	32.25	85	0.57	6.36	81	0.00	32.33	85
ENDRIN	32.31	90	0.00	7.00	100	0.00	34.58	96
MIREX	33.83	99	0.38	7.04	99	0.00	28.03	82
2,4'DDE (O,P'DDE)	30.40	85	0.00	2.99	MI	0.00	26.38	74
4,4'DDE (P,P'DDE)	31.02	90	2.93	7.69	76	0.00	26.86	78
2,4'DDD (O,P'DDD)	11.73	84	0.16	2.36	82	0.00	8.44	61
4,4'DDD (P,P'DDD)	37.13	91	0.81	7.80	86	0.00	41.64	103
2,4'DDT (O,P'DDT)	31.39	97	0.00	4.77	76	0.00	31.46	98
4,4'DDT (P,P'DDT)	30.69	96	0.24	6.58	102	0.00	35.88	112

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	Q6267P	Q6267P	DF019424	DF019424	DF019424	Q6270P	Q6271P	Q6271P
DUPLICATE OF			C4992P	C4992P	C4992P			
LAB SAMPLE #	Q6267P	Q6267P	Q6268P	Q6269P	Q6269P	Q6270P	Q6271P	Q6271P
UNITS	ug/Kg	%	ug/Kg	ug/Kg	%	ug/Kg	ug/Kg	%
PCB#8 (CL2)	53.9	104	0.0	9.4	92	0.00	47.70	92
PCB#18 (CL3)	40.8	93	0.0	7.8	91	0.00	46.39	106
PCB#28 (CL3)	42.5	103	0.1	8.2	100	0.00	43.34	105
PCB#44 (CL4)	49.3	99	0.4	9.9	98	0.00	50.74	102
PCB#52 (CL4)	51.6	103	0.5	10.7	104	0.00	52.81	106
PCB#66 (CL4)	43.6	97	0.2	8.5	96	0.00	45.66	102
PCB#101 (CL5)	40.7	100	0.2	7.0	87	0.00	43.49	107
PCB#105 (CL5)	37.3	92	1.8	8.7	95	0.00	41.40	102
PCB#110/77 (CL5/4)	47.5	103	0.5	9.8	104	0.00	50.94	111
PCB#118/108/149(CL5/5/6)	41.7	98	0.6	8.6	97	0.00	41.80	99
PCB#128 (CL6)	44.5	96	0.1	9.1	98	0.00	41.65	90
PCB#138 (CL6)	41.9	97	1.0	8.9	95	0.00	40.20	93
PCB#126 (CL5)	45.7	101	0.0	9.2	103	0.00	43.89	97
PCB#153 (CL6)	54.4	76	0.9	11.7	79	0.00	51.77	72
PCB#170 (CL7)	23.2	MI	0.0	3.9	MI	MI	21.57	MI
PCB#180 (CL7)	29.6	94	0.3	6.1	96	0.00	29.26	93
PCB#187/182/159(CL7/7/6)	44.0	95	0.0	9.3	102	0.00	42.47	92
PCB#195 (CL8)	41.4	95	0.0	8.1	94	0.00	36.67	84
PCB#206 (CL9)	41.1	89	0.6	8.2	86	0.00	34.62	75
PCB#209 (CL10)	43.9	99	0.0	8.6	99	0.00	36.40	82

MISCELLANEOUS INFORMATION

Type of matrix	TIS	T'S	TIS	TIS	TIS	TIS	TIS	TIS
Type of sample	BS	BS	LDUP	MS	MS	BLANK	BS	BS
Dry wt.			1.126	1.057	1.057			
Wet wt.	1.000	1.000	5.215	5.110	5.110	5.125	1.000	1.000
Wt. units	g	g	g	g	g	g	g	g
Volume amt.								
Vol. units								
Wet or dry wt. analysis	WET	WET	WET	WET	WET	WET	WET	WET
Dry wt. %			21.59	20.69	20.69			
Moisture %			78.41	79.31	79.31			
Organism used			3 CHANNEL C3	CHANNEL C3	CHANNEL CATFISH			
Fraction used								
Lipid %			2.418	1.7083	1.7083			

BLANK Laboratory Blank
LDUP Lab QA Duplicate
MS Matrix Spike
BS Spiked Blank

EPA/STATE BIOACCUMULATION SURVEY - PESTICIDE & PCB ANALYSIS

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF019810	Q6327P	Q6328P	Q6328P	Composite #2	Composite #2	Composite #2
DUPLICATE OF	C10645P				C11923P	C11923P	C11923P
LAB SAMPLE #	Q6272P	Q6327P	Q6328P	Q6328P	Q6329P	Q6330P	Q6330P
UNITS	ug/Kg	ug/Kg	ug/Kg	%	ug/Kg	ug/Kg	%
PAGE #	M1222	M1231	M1231	M1231	M1231	M1231	M1231
EXTRACTION DATE	08/19/93	09/09/93	09/09/93	09/09/93	09/09/93	09/09/93	09/09/93
ANALYSIS DATE	09/24/93	10/13/93	10/13/93	10/13/93	10/13/93	10/13/93	10/13/93
DBOFB% (recov.)	69.8%	63.4%	65.5%	65.5%	65.4%	67.2%	67.2%
PCB#103% (recov.)	90.2%	61.7%	65.8%	65.8%	61.7%	61.4%	61.4%
PCB#198% (recov.)	70.7%	52.3%	59.0%	59.0%	53.6%	47.0%	47.0%
TOTAL BHC'S	0.00	0.00	102.61		1.51	21.51	
TOTAL CHLORDANES	29.78	0.00	223.73		29.26	63.62	
TOTAL DDT'S	9.43	0.00	162.12		7.95	33.29	
TOTAL PCB'S	42.14	2.3	1659.3	94	206.0	441.5	86
ALPHA-BHC	0.00	0.00	26.04	78	0.00	5.33	81
HCB	0.11	0.02	36.08	90	0.27	7.93	98
BETA-BHC	0.00	0.00	20.32	61	0.00	4.05	62
GAMMA-BHC	0.00	0.00	28.82	88	1.51	6.97	90
DELTA-BHC	0.00	0.00	27.43	77	0.00	5.16	73
HEPTACHLOR	0.00	0.00	32.85	88	0.08	6.72	90
HEPTA-EPOXIDE	0.76	0.00	25.60	79	1.31	6.50	84
OXYCHLORDANE	1.79	0.00	44.28	97	1.52	9.19	90
GAMMA-CHLORDANE	2.43	0.00	31.10	80	5.69	9.94	76
ALPHA-CHLORDANE	6.84	0.00	33.94	93	7.25	11.51	88
TRANS-NONACHLOR	11.99	0.00	27.31	89	10.04	12.32	85
CIS-NONACHLOR	5.97	0.00	28.65	87	3.37	7.44	75
ALDRIN	0.00	0.00	32.34	88	0.00	6.42	88
DIELDRIN	3.60	0.00	32.80	87	3.27	8.46	79
ENDRIN	0.00	0.00	32.78	91	0.00	6.53	92
MIREX	0.00	0.00	31.34	92	0.11	5.46	80
2,4'DDE (O,P'DDE)	0.00	0.00	28.66	80	0.00	4.02	57
4,4'DDE (P,P'DDE)	6.60	0.00	30.07	87	6.48	10.49	81
2,4'DDD (O,P'DDD)	0.00	0.00	8.95	64	0.22	1.90	63
4,4'DDD (P,P'DDD)	2.83	0.00	37.05	91	1.25	7.30	78
2,4'DDT (O,P'DDT)	0.00	0.00	29.62	92	0.00	4.75	75
4,4'DDT (P,P'DDT)	0.00	0.00	27.76	87	0.00	4.83	76

PROJECT	EPA	EPA	EPA	EPA	EPA	EPA	EPA
DESCRIPTOR	DF019810	Q6327P	Q6328P	Q6328P	Composite #2	Composite #2	Composite #2
DUPLICATE OF	C10645P				C11923P	C11923P	C11923P
LAB SAMPLE #	Q6272P	Q6327P	Q6328P	Q6328P	Q6329P	Q6330P	Q6330P
UNITS	ug/Kg	ug/Kg	ug/Kg	%	ug/Kg	ug/Kg	%
PCB#8 (CL2)	0.00	0.0	41.2	79	0.0	9.6	93
PCB#18 (CL3)	0.00	0.0	37.2	85	0.3	8.3	94
PCB#28 (CL3)	0.00	0.0	42.4	103	0.8	8.9	102
PCB#44 (CL4)	0.63	0.0	49.7	100	2.4	11.6	104
PCB#52 (CL4)	0.59	0.0	50.5	101	2.1	11.3	98
PCB#66 (CL4)	0.35	0.0	42.9	96	0.7	8.3	87
PCB#101 (CL5)	1.56	0.0	40.8	100	5.5	11.2	90
PCB#105 (CL5)	0.95	0.0	40.2	99	3.0	9.0	82
PCB#110/77 (CL5/4)	3.34	0.0	51.7	112	7.3	14.5	98
PCB#118/108/149(CL5/5/6)	1.82	0.0	42.2	100	8.7	14.8	89
PCB#128 (CL6)	0.59	0.0	44.6	96	1.3	8.6	83
PCB#138 (CL6)	3.40	0.0	41.6	97	9.4	13.6	73
PCB#126 (CL5)	0.00	0.0	45.3	100	0.0	8.0	89
PCB#153 (CL6)	3.61	0.0	52.7	73	9.6	16.1	61
PCB#170 (CL7)	0.88	0.0	40.7	97	1.7	8.0	81
PCB#180 (CL7)	2.18	0.0	28.3	90	MI	MI	MI
PCB#187/182/159(CL7/7/6)	1.21	0.0	44.5	96	2.8	9.7	83
PCB#195 (CL8)	0.25	0.0	40.2	92	0.3	6.8	77
PCB#206 (CL9)	0.24	0.0	36.1	78	0.3	6.1	65
PCB#209 (CL10)	0.00	0.0	40.9	92	0.0	6.6	75

MISCELLANEOUS INFORMATION

Type of matrix	TIS	TIS	TIS	TIS	TIS	TIS	TIS
Type of sample	LDUP	BLANK	BS	BS	LDUP	MS	MS
Dry wt.	1.071				1.151	1.086	1.086
Wet wt.	5.015	5.121	1.000	1.000	5.193	5.059	5.059
Wt. units	g	g	g	g	g	g	g
Volume amt.							
Vol. units							
Wet or dry wt. analysis	WET	WET	WET	WET	WET	WET	WET
Dry wt. %	21.35				22.17	21.47	21.47
Moisture %	78.65				77.83	78.53	78.53
Organism used	LM BASS FILET				Common Carp	Common Carp	Common Carp(6,7)
Fraction used							
Lipid %	0.810				4.299		

BLANK Laboratory Blank
LDUP Lab QA Duplicate
MS Matrix Spike
BS Spiked Blank

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:					
ID:	DF024108	DF019703	DF019701	DF019702	DF019714
LABSAMNO:	C4980	C4981	C4982	C4983	C4984
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1221	M1221	M1221	M1221	M1221
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.25	5.15	5.10	5.10	4.93
DRYWT:	1.38	1.07	1.18	1.10	0.99
VOL:					
ACEND10:	83.0	83.0	84.4	83.6	76.7
CHRYD12:	75.3	75.4	82.1	78.0	77.7
NAPHD8:	73.7	72.8	80.0	85.7	75.9
PERYD12:	55.6	58.2	57.1	68.7	60.1
PHEND10:	79.7	80.9	84.9	86.0	79.4
INTFLAG:					
PON.					
CATNO:	M1221/2	M1221/2	M1221/2	M1221/2	M1221/2

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF024108		DF019703		DF019701		DF019702		DF019714	
LABSAMNO:	C4980		C4981		C4982		C4983		C4984	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
PNA Analyte	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
NAPHTHALENE	9.91		4.05		3.84		4.42		4.76	
C1-NAPHTHALENES	9.50		4.01		4.34		3.36		5.41	
C2-NAPHTHALENES	7.62		3.67		4.19		2.29		5.02	
C3-NAPHTHALENES	9.95		5.88		5.74		4.84		7.64	
C4-NAPHTHALENES	0.00		3.58		0.00		0.00		5.46	
BIPHENYL	2.43		1.56		2.16		2.00		1.93	
ACENAPHTHYLENE	0.43		0.14		0.16		0.08		0.09	
ACENAPHTHENE	16.44		2.02		3.05		1.35		1.43	
FLUORENE	11.89		2.27		3.04		1.83		1.83	
C1-FLUORENES	3.12		0.71		0.00		1.09		1.73	
C2-FLUORENES	0.00		0.00		0.00		2.32		2.72	
C3-FLUORENES	0.00		0.00		0.00		1.89		3.07	
PHENANTHRENE	11.05		4.94		3.62		4.60		4.90	
ANTHRACENE	2.74		1.01		0.81		0.85		0.72	
C1-PHEN_ANTHR	0.00		0.00		0.93		1.00		1.18	
C2-PHEN_ANTHR	0.00		0.00		0.00		0.99		1.30	
C3-PHEN_ANTHR	0.00		0.00		0.00		0.00		0.00	
C4-PHEN_ANTHR	0.00		0.00		0.00		0.00		0.00	
DIBENZOTHIO	2.03		0.80		0.72		0.58		0.65	
C1-DIBEN	0.00		0.00		0.00		0.39		1.18	
C2-DIBEN	0.00		0.00		0.00		0.00		1.30	
C3-DIBEN	0.00		0.00		0.00		0.00		0.00	
FLUORANTHENE	2.13		1.38		0.94		1.41		3.15	
PYRENE	0.95		0.90		0.42		0.63		1.27	
C1-FLUORAN_PYR	0.00		0.00		0.00		0.00		0.00	
BENaANTHRACENE	0.22		0.20		0.15		0.11		0.06	
CHRYSENE	0.24		0.24		0.09		0.35		0.61	
C1-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C2-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C3-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C4-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
BENbFLUORAN	0.12		0.13		0.05		0.07		0.14	
BENkFLUORAN	0.12		0.13		0.05		0.07		0.14	
BENePYRENE	0.12		0.12		0.05		0.07		0.08	
BENaPYRENE	0.15		0.12		0.12		0.15		0.09	
PERYLENE	0.21		0.08		0.08		0.11		0.10	
I123cdPYRENE	0.04		0.08		0.05		0.09		0.08	
DBahANTHRA	0.09		0.03		0.06		0.04		0.06	
BghiPERYLENE	0.07		0.06		0.04		0.12		0.08	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF024108		DF019703		DF019701		DF019702		DF019714	
LABSAMNO:	C4980		C4981		C4982		C4983		C4984	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
Analyte (Cont)	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
2-METHYLNAPH	4.87		2.01		2.35		1.77		2.87	
1-METHYLNAPH	4.63		2.00		1.99		1.59		2.54	
2,6-DIMETHNAPH	1.17		0.69		0.62		0.61		1.36	
2,3,5-TRIMETHNAPH	1.53		0.81		0.73		1.11		1.41	
1-METHYLPHEN	0.45		0.28		0.19		0.18		0.79	
Surrogate Recoveries										
NAPHD8:	73.70		72.81		80.04		85.70		75.91	
ACEND10:	83.04		82.99		84.39		83.65		76.65	
PHEND10:	79.67		80.90		84.88		85.99		79.41	
CHRYD12:	75.33		75.44		82.13		78.05		77.68	
PERYD12:	55.61		58.22		57.05		68.66		60.05	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas Jackson

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:					
ID:	DFO19708	DFO19709	DFO19419	DFO19420	DFO19421
LABSAMNO:	C4985	C4986	C4987	C4988	C4989
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1221	M1221	M1221	M1221	M1221
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.19	4.76	5.17	5.38	5.11
DRYWT:	1.25	1.20	1.25	1.37	1.02
VOL:					
ACEND10:	75.0	80.4	88.4	81.8	76.0
CHRYD12:	68.3	71.1	81.7	79.4	69.9
NAPHD8:	64.0	77.7	77.6	75.0	72.7
PERYD12:	57.5	51.0	64.2	62.5	56.2
PHEND10:	74.9	80.6	82.1	82.6	79.8
INTFLAG:					
PON:					
CATNO:	M1221/2	M1221/2	M1221/2	M1221/2	M1221/2

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas Jackson

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	0		0		0		0		0	
ID:	DFO19708		DFO19709		DFO19419		DFO19420		DFO19421	
LABSAMNO:	C4985		C4986		C4987		C4988		C4989	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
PNA. Analyte	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
NAPHTHALENE	7.79		6.87		5.67		7.87		4.82	
C1-NAPHTHALENES	12.18		17.77		7.01		8.02		3.91	
C2-NAPHTHALENES	14.41		39.49		3.95		4.56		3.21	
C3-NAPHTHALENES	21.35		58.64		7.06		6.67		5.40	
C4-NAPHTHALENES	11.42		44.79		9.52		6.46		0.00	
BIPHENYL	2.43		3.54		1.25		1.33		1.53	
ACENAPHTHYLENE	0.25		2.28		0.23		0.27		0.11	
ACENAPHTHENE	1.37		3.79		0.62		0.42		0.23	
FLUORENE	1.00		2.44		1.58		0.53		0.48	
C1-FLUORENES	5.36		15.28		1.83		1.86		0.00	
C2-FLUORENES	3.93		10.34		0.00		3.60		0.00	
C3-FLUORENES	2.47		8.13		0.00		0.00		0.00	
PHENANTHRENE	2.31		3.43		1.68		1.23		0.56	
ANTHRACENE	0.53		0.35		0.69		0.45		0.34	
C1-PHEN_ANTHR	2.47		3.45		1.58		0.54		0.00	
C2-PHEN_ANTHR	2.02		2.46		1.32		0.79		0.00	
C3-PHEN_ANTHR	0.00		0.00		0.00		0.00		0.00	
C4-PHEN_ANTHR	0.00		0.00		0.00		0.00		0.00	
DIBENZOTHIO	1.29		2.13		0.44		0.36		0.29	
C1-DIBEN	1.82		4.09		0.90		0.00		0.00	
C2-DIBEN	1.83		5.72		0.00		0.00		0.00	
C3-DIBEN	0.71		2.94		0.00		0.00		0.00	
FLUORANTHENE	0.59		1.11		1.38		0.68		0.33	
PYRENE	0.59		0.67		1.06		0.85		0.47	
C1-FLUORAN_PYR	0.00		0.00		0.00		0.00		0.00	
BENaANTHRACENE	0.14		0.27		0.08		0.09		0.15	
CHRYSENE	0.17		0.19		0.54		0.29		0.28	
C1-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C2-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C3-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C4-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
BENbFLUORAN	0.13		0.08		0.06		0.05		0.07	
BENkFLUORAN	0.13		0.08		0.06		0.05		0.07	
BENePYRENE	0.11		0.10		0.10		0.09		0.11	
BENaPYRENE	0.10		0.20		0.07		0.08		0.10	
PERYLENE	0.11		0.09		0.12		0.14		0.16	
I123cdPYRENE	0.04		0.08		0.02		0.04		0.06	
DBahANTHRA	0.02		0.04		0.03		0.04		0.07	
BghiPERYLENE	0.11		0.12		0.03		0.05		0.08	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas J. Jackson

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	0		0		0		0		0	
ID:	DFO19708		DFO19709		DFO19419		DFO19420		DFO19421	
LABSAMNO:	C4985		C4986		C4987		C4988		C4989	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
Analyte (Cont)	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
2-METHYLNAPH	6.35		10.68		4.28		5.10		2.42	
1-METHYLNAPH	5.83		7.09		2.73		2.92		1.49	
2,6-DIMETHNAPH	4.06		14.31		1.22		1.12		0.81	
2,3,5-TRIMETHNAPH	3.58		13.91		1.05		0.91		0.33	
1-METHYLPHEN	0.46		0.85		0.38		0.35		0.20	
Surrogate Recoveries										
NAPHD8:	63.97		77.65		77.58		74.95		72.73	
ACEND10:	74.95		80.40		88.42		81.81		75.98	
PHEND10:	74.93		80.57		82.09		82.64		79.84	
CHRYD12:	68.33		71.08		81.74		79.42		69.95	
PERYD12:	57.46		50.97		64.24		62.53		56.15	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas J. Jackson

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:					
ID:	DFO19422	DFO19423	DFO19424	DFO19409	DFO19401
LABSAMNO:	C4990	C4991	C4992	C4993	C10635
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1221	M1221	M1221	M1221	M1222
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.04	5.22	5.08	5.03	5.01
DRYWT:	0.96	1.19	1.09	1.08	1.38
VOL:					
ACEND10:	76.7	81.0	75.2	101.4	75.5
CHRYD12:	66.3	68.9	66.6	84.6	66.5
NAPHD8:	71.9	69.4	71.7	94.7	67.3
PERYD12:	62.7	59.4	59.1	80.8	62.6
PHEND10:	72.6	77.3	75.5	93.7	74.7
INTFLAG:					
PON:					
CATNO:	M1221/2	M1221/2	M1221/2	M1221/2	M1221/2

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas J. Jackson

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF019422		DF019423		DF019424		DF019409		DF019401	
LABSAMNO:	C4990		C4991		C4992		C4993		C10635	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
PNA Analyte	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
NAPHTHALENE	4.49		4.16		5.59		3.02		7.65	
C1-NAPHTHALENES	3.93		3.82		7.22		3.10		12.65	
C2-NAPHTHALENES	2.20		3.30		5.68		4.49		9.99	
C3-NAPHTHALENES	4.45		5.57		6.46		7.18		13.49	
C4-NAPHTHALENES	6.13		6.51		3.06		5.58		6.60	
BIPHENYL	1.21		1.25		1.29		0.92		1.97	
ACENAPHTHYLENE	0.22		0.14		0.25		0.07		0.74	
ACENAPHTHENE	0.15		0.45		0.43		1.47		1.03	
FLUORENE	0.40		0.23		0.62		1.28		1.41	
C1-FLUORENES	0.78		0.00		1.00		1.05		1.89	
C2-FLUORENES	1.99		0.00		0.00		1.47		5.15	
C3-FLUORENES	0.00		0.00		0.00		0.00		4.12	
PHENANTHRENE	0.63		0.88		0.91		2.70		2.11	
ANTHRACENE	0.12		0.16		0.40		0.69		0.84	
C1-PHEN_ANTHR	0.00		1.29		0.00		2.55		3.06	
C2-PHEN_ANTHR	0.00		1.76		0.00		0.00		2.67	
C3-PHEN_ANTHR	0.00		0.00		0.00		0.00		5.62	
C4-PHEN_ANTHR	0.00		0.00		0.00		0.00		0.00	
DIBENZOTHIO	0.25		0.38		0.37		0.34		0.94	
C1-DIBEN	0.00		0.00		0.00		0.00		0.00	
C2-DIBEN	0.00		0.00		0.00		0.00		5.33	
C3-DIBEN	0.00		0.00		0.00		0.00		5.07	
FLUORANTHENE	0.53		0.48		0.36		5.31		0.96	
PYRENE	0.62		0.56		0.51		1.68		0.82	
C1-FLUORAN_PYR	0.00		0.00		0.00		0.00		0.00	
BENaANTHRACENE	0.16		0.12		0.08		0.32		0.24	
CHRYSENE	0.20		0.43		0.31		0.34		0.92	
C1-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C2-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C3-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C4-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
BENbFLUORAN	0.06		0.07		0.08		0.04		0.03	
BENkFLUORAN	0.06		0.07		0.08		0.04		0.03	
BENePYRENE	0.08		0.11		0.15		0.08		0.11	
BENaPYRENE	0.12		0.15		0.19		0.12		0.13	
PERYLENE	0.11		0.08		0.09		0.14		0.31	
I123cdPYRENE	0.04		0.06		0.06		0.03		0.05	
DBahANTHRA	0.09		0.02		0.03		0.08		0.05	
BghiPERYLENE	0.05		0.10		0.06		0.06		0.05	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF019422		DF019423		DF019424		DF019409		DF019401	
LABSAMNO:	C4990		C4991		C4992		C4993		C10635	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
Analyte (Cont)	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
2-METHYLNAPH	2.35		2.26		4.33		1.75		8.15	
1-METHYLNAPH	1.58		1.56		2.89		1.35		4.50	
2,6-DIMETHNAPH	0.68		1.10		1.51		1.01		3.43	
2,3,5-TRIMETHNAPH	0.33		0.52		0.57		1.45		2.41	
1-METHYLPHEN	0.37		0.21		0.24		0.45		1.38	
Surrogate Recoveries										
NAPHD8:	71.87		69.42		71.68		94.67		67.27	
ACEND10:	76.70		81.00		75.15		101.36		75.52	
PHEND10:	72.56		77.29		75.51		93.70		74.70	
CHRYD12:	66.30		68.94		66.63		84.61		66.53	
PERYD12:	62.72		59.38		59.13		80.80		62.56	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas D. Jackson

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:					
ID:	DF019402	DF019404	DF019405	DF019406	DF019407
LABSAMNO:	C10636	C10637	C10638	C10639	C10640
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1222	M1222	M1222	M1222	M1222
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.25	5.05	5.12	5.16	5.13
DRYWT:	1.19	1.26	1.16	1.10	1.36
VOL:					
ACEND10:	77.9	76.0	77.1	75.7	75.9
CHRYD12:	71.5	69.9	71.3	71.6	71.4
NAPHD8:	72.1	67.3	73.6	73.8	71.0
PERYD12:	65.0	62.9	62.4	67.7	67.4
PHEND10:	80.4	75.7	70.5	75.8	76.7
INTFLAG:					
PON:					
CATNO:	M1221/2	M1221/2	M1221/2	M1221/2	M1221/2

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas L. Wade

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF019402		DF019404		DF019405		DF019406		DF019407	
LABSAMNO:	C10636		C10637		C10638		C10639		C10640	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
PNA Analyte	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
NAPHTHALENE	9.02		3.56		2.78		3.58		2.68	
C1-NAPHTHALENES	18.58		5.88		4.80		3.81		5.42	
C2-NAPHTHALENES	12.33		5.61		4.47		2.81		5.27	
C3-NAPHTHALENES	17.32		9.32		7.89		5.96		10.95	
C4-NAPHTHALENES	11.89		10.63		7.49		0.00		10.48	
BIPHENYL	1.73		2.46		1.98		1.70		1.75	
ACENAPHTHYLENE	1.21		0.90		0.25		0.65		0.34	
ACENAPHTHENE	1.65		7.64		3.00		2.09		1.15	
FLUORENE	2.82		10.83		5.06		2.84		1.85	
C1-FLUORENES	3.95		3.40		3.42		1.67		3.01	
C2-FLUORENES	6.95		4.03		3.61		2.83		4.12	
C3-FLUORENES	4.90		3.85		0.00		3.07		4.72	
PHENANTHRENE	4.72		16.76		8.48		3.45		2.52	
ANTHRACENE	1.27		4.87		2.78		2.98		1.28	
C1-PHEN_ANTHR	3.86		3.93		5.93		1.82		3.42	
C2-PHEN_ANTHR	3.47		2.02		1.72		1.21		2.53	
C3-PHEN_ANTHR	4.60		0.00		3.91		0.00		0.00	
C4-PHEN_ANTHR	0.00		0.00		1.19		0.00		0.00	
DIBENZOTHIO	1.31		2.43		1.23		0.49		0.71	
C1-DIBEN	4.00		2.17		1.73		0.83		2.02	
C2-DIBEN	8.22		3.70		2.93		0.00		4.41	
C3-DIBEN	5.92		3.06		2.34		0.00		4.27	
FLUORANTHENE	2.09		14.06		9.35		5.99		3.20	
PYRENE	1.23		2.69		2.45		1.55		0.97	
C1-FLUORAN_PYR	0.00		0.00		0.00		0.00		0.00	
BENaANTHRACENE	0.11		0.38		0.19		0.44		0.16	
CHRYSENE	0.54		0.75		0.46		0.33		0.29	
C1-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C2-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C3-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C4-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
BENbFLUORAN	0.11		0.08		0.04		0.08		0.07	
BENkFLUORAN	0.11		0.08		0.04		0.08		0.07	
BENePYRENE	0.07		0.10		0.05		0.14		0.12	
BENaPYRENE	0.05		0.16		0.09		0.11		0.09	
PERYLENE	0.07		0.06		0.05		0.09		0.15	
I123cdPYRENE	0.06		0.06		0.03		0.07		0.05	
DBahANTHRA	0.06		0.06		0.11		0.09		0.02	
BghiPERYLENE	0.03		0.07		0.06		0.05		0.08	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

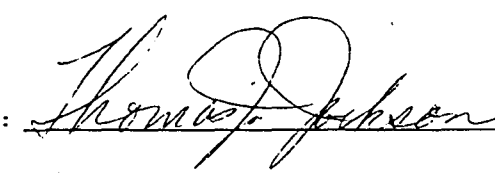
EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF019402		DF019404		DF019405		DF019406		DF019407	
LABSAMNO:	C10636		C10637		C10638		C10639		C10640	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
Analyte (Cont)	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
2-METHYLNAPH	11.85		3.64		2.73		2.37		3.33	
1-METHYLNAPH	6.73		2.24		2.07		1.44		2.09	
2,6-DIMETHNAPH	3.92		1.75		1.59		0.86		1.53	
2,3,5-TRIMETHNAPH	4.11		1.65		1.51		1.03		2.32	
1-METHYLPHEN	1.48		2.02		1.46		0.56		2.48	
Surrogate Recoveries										
NAPHD8:	72.13		67.28		73.64		73.77		71.05	
ACEND10:	77.93		75.98		77.14		75.72		75.87	
PHEND10:	80.35		75.75		70.47		75.85		76.75	
CHRYD12:	71.55		69.89		71.29		71.56		71.38	
PERYD12:	64.98		62.95		62.37		67.71		67.39	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas Jackson

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:					
ID:	DF019408	DF019704	DF019705	DF019706	DF019810
LABSAMNO:	C10641	C10642	C10643	C10644	C10645
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1222	M1222	M1222	M1222	M1222
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.16	5.10	5.37	5.08	5.05
DRYWT:	1.15	1.15	1.46	1.00	1.09
VOL:					
ACEND10:	87.7	75.6	75.8	81.9	83.1
CHRYD12:	82.5	72.3	73.6	73.1	79.6
NAPHD8:	80.8	72.6	70.7	74.5	83.1
PERYD12:	72.3	66.6	67.0	65.0	69.2
PHEND10:	87.6	76.7	75.2	77.3	83.0
INTFLAG:					
PON:					
CATNO:	M1221/2	M1221/2	M1221/2	M1221/2	M1221/2

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: 

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF019408		DF019704		DF019705		DF019706		DF019810	
LABSAMNO:	C10641		C10642		C10643		C10644		C10645	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
PNA Analyte	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
NAPHTHALENE	2.51		2.81		3.92		6.99		2.30	
C1-NAPHTHALENES	5.91		5.84		10.10		9.55		5.21	
C2-NAPHTHALENES	7.20		10.21		10.71		7.91		4.84	
C3-NAPHTHALENES	12.55		15.26		12.30		7.14		6.88	
C4-NAPHTHALENES	10.08		8.79		5.35		6.52		0.00	
BIPHENYL	1.69		1.65		2.92		1.64		0.65	
ACENAPHTHYLENE	0.18		0.18		0.17		0.13		0.12	
ACENAPHTHENE	1.23		0.65		1.10		0.56		0.25	
FLUORENE	1.58		1.04		1.59		0.77		0.41	
C1-FLUORENES	3.72		2.35		4.05		1.36		0.00	
C2-FLUORENES	6.07		5.42		14.84		2.79		0.00	
C3-FLUORENES	2.92		4.49		8.13		2.91		0.00	
PHENANTHRENE	2.84		3.61		2.52		1.36		0.50	
ANTHRACENE	0.99		0.55		0.94		0.19		0.45	
C1-PHEN_ANTHR	3.07		4.12		7.69		1.57		0.00	
C2-PHEN_ANTHR	2.31		5.68		5.65		2.24		0.00	
C3-PHEN_ANTHR	0.00		4.64		0.00		1.48		0.00	
C4-PHEN_ANTHR	0.00		0.00		0.00		0.00		0.00	
DIBENZOTHIO	0.87		1.39		1.86		0.56		0.14	
C1-DIBEN	2.46		3.16		5.60		1.53		0.00	
C2-DIBEN	4.15		5.95		12.43		2.85		0.00	
C3-DIBEN	3.25		4.86		11.62		2.31		0.00	
FLUORANTHENE	2.96		1.05		0.79		0.49		0.35	
PYRENE	1.03		1.00		0.49		0.44		0.56	
C1-FLUORAN_PYR	0.00		0.00		0.00		0.00		0.00	
BENaANTHRACENE	0.12		0.17		0.33		0.19		0.10	
CHRYSENE	0.30		0.39		0.21		0.19		0.14	
C1-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C2-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C3-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
C4-CHRYSENES	0.00		0.00		0.00		0.00		0.00	
BENbFLUORAN	0.05		0.13		0.16		0.10		0.14	
BENkFLUORAN	0.05		0.13		0.16		0.10		0.14	
BENePYRENE	0.06		0.10		0.13		0.12		0.09	
BENaPYRENE	0.18		0.08		0.20		0.17		0.09	
PERYLENE	0.10		0.09		0.19		0.06		0.08	
I123cdPYRENE	0.04		0.05		0.09		0.03		0.06	
DBahANTHRA	0.05		0.03		0.04		0.06		0.05	
BghiPERYLENE	0.06		0.05		0.09		0.07		0.02	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	0		0		0		0		0	
ID:	DF019408		DF019704		DF019705		DF019706		DF019810	
LABSAMNO:	C10641		C10642		C10643		C10644		C10645	
UNIT:	ng/g		ng/g		ng/g		ng/g		ng/g	
Analyte (Cont)	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL	Conc	DB QUAL
2-METHYLNAPH	3.36		3.55		5.85		5.94		3.19	
1-METHYLNAPH	2.55		2.29		4.25		3.61		2.02	
2,6-DIMETHNAPH	2.04		3.33		2.65		2.60		1.25	
2,3,5-TRIMETHNAPH	2.59		3.12		2.77		1.49		1.02	
1-METHYLPHEN	1.88		0.98		6.06		0.53		0.18	
Surrogate Recoveries										
NAPHD8:	80.79		72.56		70.67		74.49		83.05	
ACEND10:	87.70		75.55		75.79		81.90		83.10	
PHEND10:	87.58		76.71		75.21		77.32		83.00	
CHRYD12:	82.54		72.30		73.56		73.06		79.65	
PERYD12:	72.29		66.63		66.97		64.99		69.22	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas Jackson

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:			PROC BLANK	SPIKED BLANK	DUPLICATE
ID:	DF019811	DF019812	-900	-901	DF019424
LABSAMNO:	C10646	C10647	Q6266	Q6267	Q6268
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1222	M1222	M1221	M1221	M1221
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	TISSUE	TISSUE	QCBLANK	QCTISSUE	TISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.19	5.08	10.00	10.00	5.22
DRYWT:	1.04	0.95	10.00	10.00	1.13
VOL:					
ACEND10:	73.6	82.8	70.8	82.1	87.5
CHRYD12:	72.2	79.1	77.0	83.3	82.5
NAPHD8:	71.3	78.3	71.8	75.8	76.3
PERYD12:	64.0	61.1	29.7	47.5	65.3
PHEND10:	73.0	82.7	75.1	90.5	83.7
INTFLAG:					
PON:					
CATNO:	M1221/2	M1221/2	M1221/2	M1221/2	M1221/2

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas D. Jackson

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	0	0	PROC BLANK	SPIKED BLANK	DUPLICATE
ID:	DF019811	DF019812	-900	-901	DF019424
LABSAMNO:	C10646	C10647	Q6266	Q6267	Q6268
UNIT:	ng/g	ng/g	ng/g	%	ng/g
PNA Analyte	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL	% Recov DB QUAL	Conc DB QUAL
NAPHTHALENE	1.88	2.42	0.97	114.5	4.76
C1-NAPHTHALENES	2.21	2.60	0.86	NA	6.18
C2-NAPHTHALENES	2.01	2.68	0.00	NA	4.73
C3-NAPHTHALENES	5.54	5.40	0.00	NA	7.46
C4-NAPHTHALENES	0.00	0.00	0.00	NA	4.75
BIPHENYL	0.68	0.80	0.58	121.6	1.49
ACENAPHTHYLENE	0.22	0.11	0.20	92.3	0.14
ACENAPHTHENE	0.29	0.26	0.12	98.0	0.18
FLUORENE	0.44	0.51	0.12	112.4	0.49
C1-FLUORENES	0.00	0.00	0.00	NA	1.25
C2-FLUORENES	0.00	0.00	0.00	NA	4.19
C3-FLUORENES	0.00	0.00	0.00	NA	0.00
PHENANTHRENE	0.50	0.62	0.21	90.8	0.82
ANTHRACENE	0.16	0.51	0.06	85.7	0.47
C1-PHEN_ANTHR	0.00	0.00	0.00	NA	0.00
C2-PHEN_ANTHR	0.00	0.00	0.00	NA	0.00
C3-PHEN_ANTHR	0.00	0.00	0.00	NA	0.00
C4-PHEN_ANTHR	0.00	0.00	0.00	NA	0.00
DIBENZOTHIO	0.23	0.17	0.06	70.2	0.32
C1-DIBEN	0.00	0.00	0.00	NA	0.00
C2-DIBEN	0.00	0.00	0.00	NA	0.00
C3-DIBEN	0.00	0.00	0.00	NA	0.00
FLUORANTHENE	0.23	0.43	0.19	109.5	0.44
PYRENE	0.32	0.67	0.16	108.3	0.59
C1-FLUORAN_PYR	0.00	0.00	0.00	NA	0.00
BENaANTHRACENE	0.16	0.15	0.04	109.6	0.17
CHRYSENE	0.14	0.14	0.14	117.0	0.51
C1-CHRYSENES	0.00	0.00	0.00	NA	0.00
C2-CHRYSENES	0.00	0.00	0.00	NA	0.00
C3-CHRYSENES	0.00	0.00	0.00	NA	0.00
C4-CHRYSENES	0.00	0.00	0.00	NA	0.00
BENbFLUORAN	0.03	0.05	0.03	127.0	0.11
BENkFLUORAN	0.03	0.05	0.03	127.0	0.11
BENePYRENE	0.13	0.13	0.05	105.1	0.08
BENaPYRENE	0.06	0.02	0.07	119.1	0.16
PERYLENE	0.14	0.07	0.04	111.5	0.07
I123cdPYRENE	0.05	0.02	0.02	116.2	0.11
DBahANTHRA	0.06	0.03	0.03	122.0	0.07
BghiPERYLENE	0.03	0.03	0.04	116.2	0.09

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

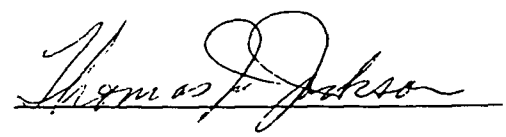
EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	0	0	PROC BLANK	SPIKED BLANK	DUPLICATE
ID:	DF019811	DF019812	-900	-901	DF019424
LABSAMNO:	C10646	C10647	Q6266	Q6267	Q6268
UNIT:	ng/g	ng/g	ng/g	%	ng/g
Analyte (Cont)	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL	% Recov DB QUAL	Conc DB QUAL
2-METHYLNAPH	1.42	1.60	0.51	128.8	3.76
1-METHYLNAPH	0.79	1.00	0.35	125.0	2.42
2,6-DIMETHNAPH	0.68	0.92	0.26	100.0	1.41
2,3,5-TRIMETHNAPH	0.62	0.47	0.20	129.1	0.79
1-METHYLPHEN	0.25	0.19	0.12	82.8	0.26
Surrogate Recoveries					
NAPHD8:	71.34	78.29	71.82	75.81	76.35
ACEND10:	73.62	82.81	70.81	82.15	87.47
PHEND10:	73.04	82.66	75.12	90.47	83.71
CHRYD12:	72.17	79.14	76.97	83.31	82.53
PERYD12:	64.01	61.13	29.68	47.52	65.34

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:	SPIKED MATRIX	PROC BLANK	SPIKED BLANK	DUPLICATE	SPIKED MATRIX
ID:	DF019424	-900	-901	DF019810	DF019810
LABSAMNO:	Q6269	Q6270	Q6271	Q6272	Q6273
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1221	M1222	M1222	M1222	M1222
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	QCTISSUE	QCBLANK	QCTISSUE	TISSUE	QCTISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.11	10.00	10.00	5.02	5.20
DRYWT:	1.06	10.00	10.00	1.07	1.10
VOL:					
ACEND10:	83.7	81.4	82.9	81.1	84.3
CHRYD12:	82.1	79.9	78.0	74.8	88.5
NAPHD8:	73.7	77.7	82.8	76.4	76.8
PERYD12:	61.9	39.8	49.7	66.9	62.3
PHEND10:	91.2	85.3	88.4	79.9	596.3 M
INTFLAG:					
PON:					
CATNO:	M1221/2	M1221/2	M1221/2	M1221/2	M1221/2

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: 

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	SPIKED MATRIX		PROC BLANK		SPIKED BLANK		DUPLICATE		SPIKED MAT	
ID:	DF019424		-900		-901		DF019810		DF019810	
LABSAMNO:	Q6269		Q6270		Q6271		Q6272		Q6273	
UNIT:	%		ng/g		%		ng/g		%	
PNA Analyte	% Recov	DB QUAL	Conc	DB QUAL	% Recov	DB QUAL	Conc	DB QUAL	% Recov	DB QUAL
NAPHTHALENE	105.1		0.81		101.2		2.64		110.8	
C1-NAPHTHALENES	NA		0.71		NA		4.43		NA	
C2-NAPHTHALENES	NA		0.00		NA		3.66		NA	
C3-NAPHTHALENES	NA		0.00		NA		4.95		NA	
C4-NAPHTHALENES	NA		0.00		NA		0.00		NA	
BIPHENYL	116.1		0.68		110.0		1.00		117.3	
ACENAPHTHYLENE	93.0		0.06		86.4		0.24		89.8	
ACENAPHTHENE	94.8		0.12		94.5		0.35		91.8	
FLUORENE	109.0		0.22		103.1		0.38		107.4	
C1-FLUORENES	NA		0.00		NA		0.00		NA	
C2-FLUORENES	NA		0.00		NA		0.00		NA	
C3-FLUORENES	NA		0.00		NA		0.00		NA	
PHENANTHRENE	89.1		0.18		86.0		0.44		96.8	
ANTHRACENE	86.1		0.10		86.4		0.43		98.5	
C1-PHEN_ANTHR	NA		0.00		NA		0.00		NA	
C2-PHEN_ANTHR	NA		0.00		NA		0.00		NA	
C3-PHEN_ANTHR	NA		0.00		NA		0.00		NA	
C4-PHEN_ANTHR	NA		0.00		NA		0.00		NA	
DIBENZOTHIO	78.1		0.10		74.0		0.21		99.5	
C1-DIBEN	NA		0.00		NA		0.00		NA	
C2-DIBEN	NA		0.00		NA		0.00		NA	
C3-DIBEN	NA		0.00		NA		0.00		NA	
FLUORANTHENE	110.2		0.08		103.3		0.30		119.3	
PYRENE	105.0		0.10		99.8		0.55		116.8	
C1-FLUORAN_PYR	NA		0.00		NA		0.00		NA	
BENaANTHRACENE	113.1		0.02		101.6		0.10		100.9	
CHRYSENE	123.3		0.05		112.3		0.32		110.8	
C1-CHRYSENES	NA		0.00		NA		0.00		NA	
C2-CHRYSENES	NA		0.00		NA		0.00		NA	
C3-CHRYSENES	NA		0.00		NA		0.00		NA	
C4-CHRYSENES	NA		0.00		NA		0.00		NA	
BENbFLUORAN	126.7		0.01		125.3		0.13		110.1	
BENkFLUORAN	126.7		0.01		113.6		0.13		110.1	
BENePYRENE	104.3		0.03		96.0		0.12		90.1	
BENaPYRENE	124.8		0.06		109.1		0.11		124.4	
PERYLENE	110.4		0.03		107.8		0.15		104.3	
I123cdPYRENE	106.3		0.03		91.7		0.06		81.5	
DBahANTHRA	118.1		0.01		101.3		0.10		92.4	
BghiPERYLENE	111.8		0.03		97.3		0.04		91.0	

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas F. Jodson

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	SPIKED MATRIX	PROC BLANK	SPIKED BLANK	DUPLICATE	SPIKED MATRIX
ID:	DF019424	-900	-901	DF019810	DF019810
LABSAMNO:	Q6269	Q6270	Q6271	Q6272	Q6273
UNIT:	%	ng/g	%	ng/g	%
Analyte (Cont)	% Recov DB QUAL	Conc DB QUAL	% Recov DB QUAL	Conc DB QUAL	% Recov DB QUAL
2-METHYLNAPH	124.1	0.41	126.9	2.82	122.9
1-METHYLNAPH	123.9	0.30	122.4	1.61	128.9
2,6-DIMETHNAPH	96.7	0.25	93.3	1.16	98.2
2,3,5-TRIMETHNAPH	126.9	0.15	120.2	0.71	126.7
1-METHYLPHEN	82.1	0.12	78.9	0.31	94.0
Surrogate Recoveries					
NAPHD8:	73.70	77.69	82.76	76.36	76.79
ACEND10:	83.70	81.37	82.92	81.07	84.29
PHEND10:	91.19	85.31	88.44	79.89	596.34 M
CHRYD12:	82.12	79.92	77.97	74.78	88.50
PERYD12:	61.87	39.77	49.69	66.87	62.33

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas J. Jackson

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:	LAB REF OIL	LAB REF OIL			
ID:	-700	-700	COMPOSITE #1	COMPOSITE #2	COMPOSITE #3
LABSAMNO:	W9265	W9295	C11922	C11923	C11924
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1221	M1222	M1231	M1231	M1231
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	QCSBLANK	QCSBLANK	TISSUE	TISSUE	TISSUE
SUBMAT:	EV OIL	EV OIL			
SAMPLWT:					
WETWT:	1.00	1.00	5.03	5.35	5.07
DRYWT:	1.00	1.00	1.07	1.18	1.08
VOL:					
ACEND10:	121.5	109.7	70.8	63.7	61.9
CHRYD12:	129.6	115.3	66.4	55.5	52.5
NAPHD8:	100.4	95.5	70.4	66.5	60.4
PERYD12:	96.7	90.1	49.5	49.1	50.2
PHEND10:	130.1	119.7	67.9	63.9	62.6
INTFLAG:					
PON:					
CATNO:	M1221/2	M1221/2	M1231	M1231	M1231

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas J. Jackson

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	LAB REF OIL	LAB REF OIL	0	0	0
ID:	-700	-700	COMPOSITE #1	COMPOSITE #2	COMPOSITE #3
LABSAMNO:	W9265	W9295	C11922	C11923	C11924
UNIT:	ng/AMPULE	ng/AMPULE	ng/g	ng/g	ng/g
PNA Analyte	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL
NAPHTHALENE	520.72	496.95	6.91	4.98	6.58
C1-NAPHTHALENES	2441.34	2407.37	15.91	3.67	9.83
C2-NAPHTHALENES	2295.02	2213.59	8.21	5.09	5.28
C3-NAPHTHALENES	1978.65	1926.87	7.56	6.75	9.26
C4-NAPHTHALENES	1129.09	1115.61	0.00	0.00	0.00
BIPHENYL	193.86	199.60	1.90	1.12	1.41
ACENAPHTHYLENE	0.97	2.35	0.48	0.26	0.43
ACENAPHTHENE	14.07	16.12	2.35	0.56	0.63
FLUORENE	88.71	91.10	0.86	0.67	0.50
C1-FLUORENES	216.12	213.39	0.00	0.00	0.00
C2-FLUORENES	357.94	344.19	0.00	0.00	0.00
C3-FLUORENES	334.45	370.43	0.00	0.00	0.00
PHENANTHRENE	207.49	200.31	0.99	0.97	1.93
ANTHRACENE	4.39	3.76	0.72	0.19	0.68
C1-PHEN_ANTHR	494.95	490.30	0.00	0.00	0.00
C2-PHEN_ANTHR	594.63	569.16	0.00	0.00	0.00
C3-PHEN_ANTHR	523.56	483.64	0.00	0.00	0.00
C4-PHEN_ANTHR	271.12	227.49	0.00	0.00	0.00
DIBENZOTHIO	177.73	166.32	0.29	0.18	0.36
C1-DIBEN	359.43	347.04	0.00	0.00	0.00
C2-DIBEN	528.20	518.39	0.00	0.00	0.00
C3-DIBEN	496.80	455.40	0.00	0.00	0.00
FLUORANTHENE	10.69	5.33	0.36	0.30	0.64
PYRENE	12.55	10.00	0.24	0.36	0.56
C1-FLUORAN_PYR	79.68	77.24	0.00	0.00	0.00
BENaANTHRACENE	5.26	4.88	0.21	0.14	0.10
CHRYSENE	57.90	52.74	0.36	0.29	0.58
C1-CHRYSENES	89.01	92.98	0.00	0.00	0.00
C2-CHRYSENES	116.43	109.82	0.00	0.00	0.00
C3-CHRYSENES	24.95	25.16	0.00	0.00	0.00
C4-CHRYSENES	18.42	16.95	0.00	0.00	0.00
BENbFLUORAN	3.90	2.88	0.07	0.08	0.09
BENkFLUORAN	3.90	2.88	0.08	0.15	0.10
BENePYRENE	10.07	9.50	0.12	0.34	0.17
BENaPYRENE	2.22	1.98	0.09	0.10	0.22
PERYLENE	2.09	1.59	0.30	0.28	0.32
I123cdPYRENE	1.01	1.24	0.15	0.09	0.20
DBahANTHRA	1.82	2.00	0.14	0.15	0.09
BghiPERYLENE	3.78	3.59	0.08	0.11	0.10

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	LAB REF OIL	LAB REF OIL	0	0	0
ID:	-700	-700	COMPOSITE #1	COMPOSITE #2	COMPOSITE #3
LABSAMNO:	W9265	W9295	C11922	C11923	C11924
UNIT:	ng/g	ng/g	ng/g	ng/g	ng/g
Analyte (Cont)	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL	Conc DB QUAL
2-METHYLNAPH	1315.50	1303.41	10.46	2.02	6.06
1-METHYLNAPH	1125.84	1103.96	5.45	1.65	3.77
2,6-DIMETHNAPH	642.22	646.47	2.71	1.48	1.77
2,3,5-TRIMETHNAPH	418.67	427.46	0.66	0.51	0.74
1-METHYLPHEN	161.33	146.19	0.26	0.30	0.22
Surrogate Recoveries					
NAPHD8:	100.42	95.47	70.42	66.55	60.43
ACEND10:	121.47	109.73	70.82	63.68	61.87
PHEND10:	130.14	119.71	67.87	63.86	62.58
CHRYD12:	129.62	115.29	66.41	55.47	52.49
PERYD12:	96.69	90.08	49.46	49.15	50.17

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas J. Jackson

EPA BIOACCUMULATION STUDY - GENERAL INFORMATION - M1221/2

INVEST#:		PROC BLANK	SPIKED BLANK	DUPLICATE	SPIKED MATRIX
ID:	COMPOSITE #4	-900	-901	COMPOSITE #2	COMPOSITE #2
LABSAMNO:	C11925	Q6327	Q6328	Q6329	Q6330
METHOD:	GCMS	GCMS	GCMS	GCMS	GCMS
QCBATCH:	M1231	M1231	M1231	M1231	M1231
LAB:	GERG	GERG	GERG	GERG	GERG
MATRIX:	TISSUE	QCBLANK	QCTISSUE	QCTISSUE	QCTISSUE
SUBMAT:					
SAMPLWT:					
WETWT:	5.02	10.00	10.00	5.35	5.06
DRYWT:	1.14	10.00	10.00	1.18	1.09
VOL:					
ACEND10:	67.0	68.1	74.0	69.0	67.8
CHRYD12:	62.5	59.7	70.0	58.3	68.2
NAPHD8:	72.6	65.8	84.7	64.4	67.1
PERYD12:	48.4	28.2	26.2	42.2	40.7
PHEND10:	65.7	63.4	86.3	68.0	82.0
INTFLAG:					
PON:					
CATNO:	M1231	M1231	M1231	M1231	M1231

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: 

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA - M1221/2

INVEST#:	0	PROC BLANK	SPIKED BLANK	DUPLICATE	SPIKED MATRI
ID:	COMPOSITE #4	-900	-901	COMPOSITE #2	COMPOSITE #2
LABSAMNO:	C11925	Q6327	Q6328	Q6329	Q6330
UNIT:	ng/g	ng/g	%	ng/g	%
PNA Analyte	Conc DB QUAL	Conc DB QUAL	% Recov DB QUAL	Conc DB QUAL	% Recov DB QUAL
NAPHTHALENE	8.18	1.80	86.8	5.22	103.7
C1-NAPHTHALENES	12.80	0.84	NA	3.74	NA
C2-NAPHTHALENES	5.93	0.00	NA	4.00	NA
C3-NAPHTHALENES	0.00	0.00	NA	10.75	NA
C4-NAPHTHALENES	0.00	0.00	NA	0.00	NA
BIPHENYL	1.34	0.93	109.5	1.32	114.2
ACENAPHTHYLENE	0.37	0.08	103.9	0.12	102.7
ACENAPHTHENE	0.62	0.24	111.0	0.76	106.2
FLUORENE	0.60	0.19	107.0	0.61	106.9
C1-FLUORENES	0.00	0.00	NA	0.00	NA
C2-FLUORENES	0.00	0.00	NA	0.00	NA
C3-FLUORENES	0.00	0.00	NA	0.00	NA
PHENANTHRENE	1.11	0.30	88.4	1.09	85.6
ANTHRACENE	0.22	0.08	82.6	0.51	79.7
C1-PHEN_ANTHR	0.00	0.00	NA	0.00	NA
C2-PHEN_ANTHR	0.00	0.00	NA	0.00	NA
C3-PHEN_ANTHR	0.00	0.00	NA	0.00	NA
C4-PHEN_ANTHR	0.00	0.00	NA	0.00	NA
DIBENZOTHIO	0.42	0.08	71.7	0.28	71.8
C1-DIBEN	0.00	0.00	NA	0.00	NA
C2-DIBEN	0.00	0.00	NA	0.00	NA
C3-DIBEN	0.00	0.00	NA	0.00	NA
FLUORANTHENE	0.39	0.13	82.7	0.35	84.2
PYRENE	0.45	0.12	79.3	0.46	79.4
C1-FLUORAN_PYR	0.00	0.00	NA	0.00	NA
BENaANTHRACENE	0.09	0.02	99.5	0.45	97.7
CHRYSENE	0.57	0.07	113.8	0.47	107.3
C1-CHRYSENES	0.00	0.00	NA	0.00	NA
C2-CHRYSENES	0.00	0.00	NA	0.00	NA
C3-CHRYSENES	0.00	0.00	NA	0.00	NA
C4-CHRYSENES	0.00	0.00	NA	0.00	NA
BENbFLUORAN	0.15	0.04	101.8	0.07	91.7
BENkFLUORAN	0.17	0.05	98.2	0.08	102.1
BENePYRENE	0.10	0.06	88.2	0.13	83.7
BENaPYRENE	0.18	0.05	93.0	0.44	91.8
PERYLENE	0.43	0.23	112.4	0.41	100.4
I123cdPYRENE	0.04	0.04	88.5	0.09	82.5
DBahANTHRA	0.17	0.04	105.6	0.07	99.8
BghiPERYLENE	0.06	0.06	96.0	0.13	92.6

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas J. Jackson

EPA BIOACCUMULATION STUDY - AROMATIC HYDROCARBON DATA (CONT)- M1221/2

INVEST#:	0	PROC BLANK	SPIKED BLANK	DUPLICATE	SPIKED MATRIX
ID:	COMPOSITE #4	-900	-901	COMPOSITE #2	COMPOSITE #2
LABSAMNO:	C11925	Q6327	Q6328	Q6329	Q6330
UNIT:	ng/g	ng/g	%	ng/g	%
Analyte (Cont)	Conc DB QUAL	Conc DB QUAL	% Recov DB QUAL	Conc DB QUAL	% Recov DB QUAL
2-METHYLNAPH	8.45	0.52	109.1	1.99	123.3
1-METHYLNAPH	4.35	0.32	104.2	1.75	108.9
2,6-DIMETHNAPH	2.26	0.21	110.9	0.95	108.2
2,3,5-TRIMETHNAPH	1.03	0.23	112.7	1.74	122.3
1-METHYLPHEN	0.17	0.16	72.7	0.48	72.0
Surrogate Recoveries					
NAPHD8:	72.60	65.79	84.73	64.43	67.08
ACEND10:	67.02	68.09	73.97	68.99	67.81
PHEND10:	65.74	63.37	86.31	68.00	81.98
CHRYD12:	62.49	59.72	69.96	58.33	68.18
PERYD12:	48.35	28.22	26.17	42.19	40.73

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATIO

INVEST#:	LAB REF OIL
ID:	20762
LABSAMNO:	W29523
METHOD:	GCMS
QCBATCH:	M1231
LAB:	GERG
MATRIX:	QCSBLANK
SUBMAT:	EV OIL
SAMPLWT:	
WETWT:	1.00
DRYWT:	1.00
VOL:	
ACEND10:	113.1
CHRYD12:	113.6
NAPHD8:	93.1
PERYD12:	116.3
PHEND10:	116.3
INTFLAG:	
PON:	
CATNO:	M1231

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL:

EPA BIOACCUMULATIO

INVEST#:	LAB REF OIL
ID:	20762
LABSAMNO:	W29523
UNIT:	ng/g
PNA Analyte	Conc DB QUAL
NAPHTHALENE	603.79
C1-NAPHTHALENES	2402.47
C2-NAPHTHALENES	2155.14
C3-NAPHTHALENES	1680.26
C4-NAPHTHALENES	1037.59
BIPHENYL	200.71
ACENAPHTHYLENE	2.55
ACENAPHTHENE	17.96
FLUORENE	89.87
C1-FLUORENES	243.75
C2-FLUORENES	328.30
C3-FLUORENES	318.51
PHENANTHRENE	246.12
ANTHRACENE	4.54
C1-PHEN_ANTHR	527.03
C2-PHEN_ANTHR	584.57
C3-PHEN_ANTHR	452.38
C4-PHEN_ANTHR	265.87
DIBENZOTHIO	151.27
C1-DIBEN	289.65
C2-DIBEN	376.06
C3-DIBEN	392.46
FLUORANTHENE	5.20
PYRENE	10.25
C1-FLUORAN_PYR	84.79
BENaANTHRACENE	5.23
CHRYSENE	54.33
C1-CHRYSENES	97.69
C2-CHRYSENES	87.28
C3-CHRYSENES	25.57
C4-CHRYSENES	17.85
BENbFLUORAN	4.53
BENkFLUORAN	5.06
BENePYRENE	10.26
BENaPYRENE	2.14
PERYLENE	3.26
I123cdPYRENE	0.95
DBahANTHRA	1.77
BghiPERYLENE	4.25

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: 

EPA BIOACCUMULATIO

INVEST#:	LAB REF OIL
ID:	20762
LABSAMNO:	W29523
UNIT:	ng/g

Analyte (Cont)	Conc	DB	QUAL
2-METHYLNAPH	1318.49		
1-METHYLNAPH	1083.98		
2,6-DIMETHNAPH	773.72		
2,3,5-TRIMETHNAPH	413.36		
1-METHYLPHEN	172.90		

Surrogate Recoveries	
NAPHD8:	93.07
ACEND10:	113.12
PHEND10:	116.31
CHRYD12:	113.55
PERYD12:	116.31

LABNAME: GERG/TAMU DATE: 08-Oct-93 LAB APPROVAL: Thomas P. Jackson