Tetra Tech EM Inc.

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September 7, 2004

Mr. Thomas Alcamo
Work Assignment Manager (SR-6J)
Remedial Response Unit No. 1
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Fish Tissue Sample Analytical Results**
Neal's Landfill Site, Monroe County, Indiana
Contract No. 68-W6-0037, Work Assignment No. 944-ANLA-05ZZ

Dear Mr. Alcamo:

Tetra Tech EM Inc. (Tetra Tech) is submitting analytical results for ten fish tissue samples collected on June 18, 2004, from Richland Creek near the State Road 43 bridge about 3 miles downstream of the above-referenced site. At your request, Tetra Tech, the U.S. Fish and Wildlife Service, and the Indiana Department of Environmental Management collaborated to perform the sampling event using electroshocking equipment and fillet sample processing procedures. The sampling reach was no more than about 100 meters upstream and downstream of the State Road 43 bridge location on Richland Creek. Severn Trent Laboratories, Inc. (STL), in West Sacramento, California, analyzed seven of the fish tissue fillet samples for polychlorinated biphenyls (PCB) as Aroclors using U.S. Environmental Protection Agency (EPA) SW-846 Method 8082. Axys Analytical Services, Ltd. (Axys), in Sidney, British Columbia, Canada, analyzed the other three fish tissue fillet samples for PCBs as individual congeners using EPA modified Method 1668A. Enclosure 1 summarizes the fish species sampled.

Tetra Tech validated the sample analytical results in general accordance with procedures discussed in EPA's "Contract Laboratory Program National Functional Guidelines for Organic Data Review" dated October 1999. The procedures were adjusted as necessary to meet the explicit requirements of EPA SW-846 Method 8082 and EPA modified Method 1668A. The analyses are discussed in turn below.

Enclosure 2 summarizes STL's analytical results for PCBs as Aroclors. After STL submitted its initial results, Tetra Tech asked STL to reanalyze samples Tt-NL3-007 and Tt-NL3-010 in order to achieve a lower reporting limit. The re-extraction of these two samples was performed after the expiration of the 14-day holding time for EPA Method 8082. However, PCBs are extremely stable, and EPA modified Method 1668A allows a 1-year holding time for frozen fish tissue. Therefore, no qualifications are warranted for the extended holding time for the two samples. No irregularities were observed in the results for the other quality control parameters (that is, the results for instrument performance checks, initial and continuing calibrations, blanks, surrogates, matrix spikes, and laboratory control samples). All the positive PCB results except those for samples Tt-NL3-003 and Tt-NL3-007 were below the calibration range. The extrapolations are flagged "J" to indicate that they are estimates. All the results

were reasonably good matches with the Aroclor 1248 standard mixture, so no further qualifications are warranted.

Enclosure 3 summarizes Axys's analytical results for PCB congeners on a wet weight basis. No irregularities were observed in the sample holding times or in the results for the other quality control parameters (that is, the results for holding times, instrument performance checks, initial and continuing calibrations, blanks, surrogates, internal standards, and laboratory control samples). Some chromatographic peaks did not pass all the congener identification tests, indicating that some or all of each peak was not a PCB congener. The associated results are flagged "K" to indicate that they are the maximum possible concentrations that could be detected.

The STL and Axys analytical results are usable for all purposes as qualified. If you have any questions regarding the fish tissue sample analytical results, please call me at (312) 946-6491.

Sincerely,

Jeffrey Lifka
Site Manager

Enclosures (3)

cc: Henry Thompson, EPA Project Officer (letter only)
Cora Stanley, EPA Contracting Officer (letter only)
Cheryl Hill, EPA Contract Specialist (letter only)
Lou Barinka, Tetra Tech Program Manager (letter only)
File

ENCLOSURE 1

SUMMARY OF FISH TISSUE SAMPLES COLLECTED FROM RICHLAND CREEK NEAR STATE ROAD 43 BRIDGE DURING JUNE 18, 2004, SAMPLING EVENT NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

(One Page)

SUMMARY OF FISH TISSUE SAMPLES COLLECTED FROM RICHLAND CREEK NEAR STATE ROAD 43 BRIDGE DURING JUNE 18, 2004, SAMPLING EVENT NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

Tetra Tech EM Inc. Sample ID Number	Feeding Guild	Fish Species	Sex	Length (mm)	Weight (g)	Fillet Weight (g)	Analytical Method
Tt-NL3-001	Benthic	Northern Hogsucker	Male	270	219	85	EPA SW-846 8082
Tt-NL3-002	Benthic	Northern Hogsucker	Male	261	196	65	EPA 1668A
Tt-NL3-003	Benthic	White Sucker	Male	246	163	76	EPA SW-846 8082
Tt-NL3-004	Benthic	Golden Redhorse	Male	319	391	167	EPA SW-846 8082
Tt-NL3-005	Pelagic	Smallmouth Bass	Female	289	335	150	EPA SW-846 8082
Tt-NL3-006	Pelagic	Rock Bass	Female	193	143	49	EPA 1668A
Tt-NL3-007	Pelagic	Rock Bass	Male	164	95	37	EPA SW-846 8082
Tt-NL3-008	Omnivorous	Creek Chub	Male	186	71	27	EPA 1668A
Tt-NL3-009	Omnivorous	Creek Chub	Male	176	76	30	EPA SW-846 8082
Tt-NL3-010	Omnivorous	Creek Chub	Male	207	103	42	EPA SW-846 8082

Notes:

EPA = U.S. Environmental Protection Agency
g = Gram
mm = Millimeter

ENCLOSURE 2

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYLS AS AROCLORS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

(One Page)

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYLS AS AROCLORS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

Analyte	Sample ID Number							
	Tt-NL3-001	Tt-NL3-003	Tt-NL3-004	Tt-NL3-004[a]	Tt-NL3-005	Tt-NL3-007	Tt-NL3-009	Tt-NL3-010
Polychlorinated Biphenyl Mixture (microgram per kilogram)								
Aroclor 1016	250 U	250 U	250 U	250 U	250 U	100 U	250 U	100 U
Aroclor 1221	250 U	250 U	250 U	250 U	250 U	100 U	250 U	100 U
Aroclor 1232	250 U	250 U	250 U	250 U	250 U	100 U	250 U	100 U
Aroclor 1242	250 U	250 U	250 U	250 U	250 U	100 U	250 U	100 U
Aroclor 1248	170 J	300	140 J	170 J	170 J	120	170 J	69 J
Aroclor 1254	250 U	250 U	250 U	250 U	250 U	100 U	250 U	100 U
Aroclor 1260	250 U	250 U	250 U	250 U	250 U	100 U	250 U	100 U
Total Lipids (percent)	0.78	3.6	1.3	NA	1.1	0.54	1.8	0.78

Notes:

[a] Laboratory duplicate sample

J = Result considered estimated for quality control reasons
NA = Not analyzed for
U = Mixture not detected; value presented is sample quantitation limit

ENCLOSURE 3

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

(Eight Pages)

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Congener 1	8.89	5.35	11.1
Congener 2	1.36	1.23	1.61
Congener 3	3.98	2.70	4.38
Congener 4	166	84.2	149
Congener 5	3.26	0.74	3.30
Congener 6	77.4	34.8	83.5
Congener 7	13.4	2.33	7.41
Congener 8	227	90.3	156
Congener 9	20.4	8.25	16.4
Congener 10	21.5	9.26	26.5
Congener 11	4.92	5.60	6.85
Congeners 12 and 13[a]	12.4	5.51	11.8
Congener 14	0.81 U	0.51 U	0.74 U
Congener 15	247	185	479
Congener 16	251	77.8	132
Congener 17	472	164	196
Congeners 18 and 30	591	332	523
Congener 19	347	123	249
Congeners 20 and 28	4,940	2,650	5,720
Congeners 21 and 33	416	119	358
Congener 22	1,370	742	1,410
Congener 23	2.65	1.13	0.95 U
Congener 24	58.1	16.3	61.2

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Congener 25	298	153	331
Congeners 26 and 29	518	331	634
Congener 27	220	81.7	194
Congener 31	2,140	893	2,560
Congener 32	602	235	390
Congener 34	24.6	13.3	25.4
Congener 35	1.44 U	1.01 U	1.13 U
Congener 36	1.25 U	2.99	0.99 U
Congener 37	725	549	1,180
Congener 38	6.58	3.41	3.85 K
Congener 39	20.3	6.59	13.5
Congeners 40, 41, and 71	2,200	645	1,100
Congener 42	1,760	632	1,460
Congener 43	105	79.7	152
Congeners 44, 47, and 65	5,840	2,650	5,880
Congeners 45 and 51	657	233	546
Congener 46	194	39.6	68.6
Congener 48	555	226	458
Congeners 49 and 69	4,620	2,810	5,040
Congeners 50 and 53	493	152	237
Congener 52	2,770	3,920	7,380
Congener 54	8.48	1.85	1.76
Congener 55	142	1.25 U	3.74 U
Congener 56	3,270	1,350	2,170

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Congener 57	52.8	28.8	45.2
Congener 58	31.6	12.9	23.6
Congeners 59, 62, and 75	677	366	678
Congener 60	3,190	1,490	2,850
Congeners 61, 70, 74, and 76	10,300	3,760	8,800
Congener 63	616	315	545
Congener 64	4,020	1,850	3,800
Congener 66	11,500	5,000	9,840
Congener 67	164	112	127
Congener 68	53.3	28.5	49.2
Congener 72	89.4	51.6	88.9
Congener 73	0.07 U	0.04 U	0.09 U
Congener 77	702	442	805
Congener 78	1.79 U	1.33 U	3.97 U
Congener 79	54.9	24.2	33.0
Congener 80	1.59 U	1.18 U	3.45 U
Congener 81	35.4	26.3	45.2
Congener 82	476	189	303
Congeners 83 and 99	5,060	3,040	2,530
Congener 84	512	178	378
Congeners 85, 116, and 117	2,460	1,220	1,290
Congeners 86, 87, 97, 108, 119, and 125	3,860	2,140	1,920
Congeners 88 and 91	567	273	412
Congener 89	40.0	5.04	4.65 K

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Congeners 90, 101, and 113	2,420	1,990	2,980
Congener 92	297	335	488
Congeners 93, 95, 98, 100, and 102	1,500	749	1,330
Congener 94	15.2	3.25	7.83
Congener 96	17.5	4.51	4.11
Congener 103	21.6	14.2	17.0
Congener 104	0.34 K	0.15 U	0.22 K
Congener 105	3,290	1,470	2,490
Congener 106	0.78 U	0.68 U	2.58 U
Congeners 107 and 124	167	93.4	157
Congener 109	491	246	345
Congeners 110 and 115	3,720	1,610	2,640
Congener 111	3.05	2.41 K	2.52 K
Congener 112	0.88 U	1.12 U	1.97 U
Congener 114	233	118	174
Congener 118	5,720	2,690	4,160
Congener 120	12.9	7.45	8.51
Congener 121	0.87 U	1.10 U	1.90 U
Congener 122	73.1	43.7	70.8
Congener 123	205	115	175
Congener 126	10.6	8.24	8.52
Congener 127	0.84 U	0.73 U	2.80 U
Congeners 128 and 166	248	122	198
Congeners 129, 138, 160, and 163	1,440	782	1,210

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Congener 130	46.8	51.5	66.2
Congener 131	9.62	3.65	4.75 K
Congener 132	164	93.4	112
Congener 133	24.2	16.9	24.8
Congeners 134 and 143	25.3	16.3	24.5
Congeners 135, 151, and 154	204	125	196
Congener 136	36.2	17.6	25.4 K
Congener 137	83.0	49.8	57.4
Congeners 139 and 140	20.7	12.0	12.9
Congener 141	69.0	110	134
Congener 142	0.96 U	1.05 U	1.53 U
Congener 144	25.8	18.1	31.3
Congener 145	0.02 U	0.03 K	0.05 U
Congener 146	240	151	270
Congener 147 and 149	559	361	693
Congener 148	1.33	1.08 K	1.04
Congener 150	0.78 K	0.48 K	0.52 K
Congener 152	0.90	0.23 K	0.57 K
Congeners 153 and 168	1,210	729	1,070
Congener 155	0.16 K	0.10 K	0.16 K
Congeners 156 and 157	158	94.1	103
Congener 158	118	68.1	81.2
Congener 159	4.46	4.50	6.52 K
Congener 161	0.68 U	0.74 U	1.09 U

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Congener 162	7.26	4.81	6.44
Congener 164	72.6	50.9	93.0
Congener 165	0.73 U	0.80 U	1.21 U
Congener 167	55.0	40.3	49.1
Congener 169	0.71 U	0.78 U	1.48 U
Congener 170	158	95.2	111
Congeners 171 and 173	44.6	27.0	26.7
Congener 172	40.7	28.7	36.9
Congener 174	91.9	95.7	129
Congener 175	6.78	3.51	5.01
Congener 176	10.3	6.65	8.00
Congener 177	67.0	82.0	99.4
Congener 178	58.0	43.3	50.0
Congener 179	37.5	22.2	33.2
Congeners 180 and 193	438	329	366
Congener 181	1.76 K	1.51	1.66
Congener 182	2.17 K	1.40 K	0.05 U
Congeners 183 and 185	115	75.1	84.8
Congener 184	0.13 K	0.15 K	0.09 K
Congener 186	0.01 U	0.01 U	0.04 U
Congener 187	565	371	912
Congener 188	0.37 K	0.40	0.48 K
Congener 189	7.37	6.38	5.94
Congener 190	43.8	30.4	28.6

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Congener 191	6.67	4.13	6.61
Congener 192	0.06 K	0.01 U	0.07 K
Congener 194	83.8	73.2	58.0
Congener 195	34.9	25.2	20.8 K
Congener 196	32.9	28.8	25.0
Congeners 197 and 200	10.1	8.75	8.25 K
Congeners 198 and 199	216	164	213
Congener 201	12.5	9.48	8.66
Congener 202	59.9	47.5	50.3
Congener 203	115	79.4	73.9
Congener 204	0.17 K	0.29 K	0.11
Congener 205	4.78	3.47	3.70 K
Congener 206	114	82.7	72.3
Congener 207	10.8 K	8.12 K	6.29
Congener 208	65.1	43.1	51.2
Congener 209	31.8	20.4	24.3
Total monochlorobiphenyl congeners	14.2	9.27	17.1
Total dichlorobiphenyl congeners	793	426	940
Total trichlorobiphenyl congeners	13,000	6,490	14,000
Total tetrachlorobiphenyl congeners	54,100	26,200	52,200
Total pentachlorobiphenyl congeners	31,200	16,600	21,900
Total hexachlorobiphenyl congeners	4,830	2,920	4,440
Total heptachlorobiphenyl congeners	1,690	1,220	1,900
Total octachlorobiphenyl congeners	571	439	429

SUMMARY OF FISH TISSUE SAMPLE ANALYTICAL RESULTS FOR POLYCHLORINATED BIPHENYL CONGENERS NEAL'S LANDFILL SITE, MONROE COUNTY, INDIANA

PCB Congener Detected	Sample ID Number		
	Tt-NL3-002 (ng/kg)	Tt-NL3-006 (ng/kg)	Tt-NL3-008 (ng/kg)
Total nonachlorobiphenyl congeners	179	126	130
Decachlorobiphenyl congener	31.8	20.4	24.3
Total PCB congeners	106,000	54,400	96,000
Total lipids (percent)	0.55	0.38	1.44

Notes:

Analytical data have been rounded to three significant figures.

K = Congener peak detected, but did not meet quantification criteria because of interference; value presented is the estimated maximum possible concentration.
ng/kg = Nanogram per kilogram (part per trillion)
PCB = Polychlorinated biphenyl
U = Congener not detected; value presented is sample quantitation limit

[a] Certain groups of congeners cannot be identified and quantitated separately by the analytical system used for U.S. Environmental Protection Agency modified Method 1668A. The method yields 159 distinct chromatographic peaks for the 209 congeners analyzed for.

Congeners 1 - 3 = Monochlorobiphenyls
Congeners 4 - 15 = Dichlorobiphenyls
Congeners 16 - 39 = Trichlorobiphenyls
Congeners 40 - 81 = Tetrachlorobiphenyls
Congeners 82 - 127 = Pentachlorobiphenyls
Congeners 128 - 169 = Hexachlorobiphenyls
Congeners 170 - 193 = Heptachlorobiphenyls
Congeners 194 - 205 = Octachlorobiphenyls
Congeners 206 - 208 = Nonochlorobiphenyls
Congener 209 = Decachlorobiphenyl