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Dames & Moore.
Miami Fort and Walter C. Beckjord Generating Stations 316(b) Study: Third and Fourth Quarterly Data Presentation, October 1, 1977 to March 31, 1978.

MIAMI FORT AND WALTER C. BECKJORD GENERATING STATIONS 316(b) STUDY

THIRD AND FOURTH QUARTER DATA PRESENTATION
OCTOBER 1, 1977 TO MARCH 31, 1978

FOR THE CINCINNATI GAS & ELECTRIC COMPANY

By:

DAMES & MOORE
Cincinnati, Ohio

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METHODS USED IN COLLECTION OF ENTRAINMENT AND IMPINGEMENT DATA FROM THE WALTER C. BECKJORD AND MIAMI FORT GENERATING STATIONS

ENTRAINMENT

Samples were taken from a tap into the circulating waterline before it entered the condenser water box. A pipe directed water from this tap into a 500-micron net (Wildco #30-50-500(N) with 49N Wildco bucket) suspended in a 55-gallon drum. The drum was fitted with an overflow at the top and a valved drain at the bottom. Sample volumes were calculated from the time duration of the sample (T_s), the time required to fill the drum to overflow (T_d) and volume of drum to overflow (V_d):

$$\text{Sample Volume} = \frac{T_s}{T_d} \times V_d$$

Samples were collected for 12-hour periods. At 1800 hours of the day prior to sample collection, plant personnel turned on the sampling apparatus. At 0600 hours the following day, Dames & Moore personnel arrived, washed the contents of the net into a bottle and reset the sampling apparatus. Dames & Moore personnel then returned at 1800 hours of the same day, collected the second sample and turned off the sampling apparatus; thus, two 12-hour samples covering a 24-hour period were taken.

Samples were preserved in 5-10 percent formalin; if a great deal of debris was present, rose bengal dye was added to aid in sorting. Samples were picked on a white enamel pan after washing and then identified to lowest possible taxon under a Bausch & Lomb dissecting scope. References used in identifications are listed in the Reference section.

Some problems were encountered in sampling at Miami Fort. Several times the valve in the sample line became clogged with debris and small clams. This reduced water flow to a trickle, making sample volume calculations unreliable, and presumably filtering out some larval fish.

IMPINGEMENT

At Beckjord generating station, two sluiceways drain the debris washed from an intake's traveling screens. For impingement sample collection, a device constructed by plant personnel was placed into each sluiceway. Each device consisted of a solid plate which deflected water and debris to flow

over horizontally laid wire mesh. The water filtered through the mesh leaving debris from screen washings lying on it. These devices measured 72-1/2 inches long by 17-3/8 inches wide with diamond-shaped mesh with dimensions of 1/4-inch by 7/8-inch.

At Miami Fort Generating Station, one intake structure services the entire station. Two lines of traveling intake screens parallel the river and each line of screens is drained by its own sluiceway. For impingement samples, four 2-foot by 2-foot screens of 3/8-inch wire mesh were laid in the downstream end of each sluiceway. A plate was used to deflect water flowing down the sluice up over these sampling screens. The water then filtered through the mesh and the debris was retained on the sample screens.

Ideally, at each plant, 12 hours prior to impingement sampling, the intake screens were thoroughly washed and then held until sampling was to be done. When Dames & Moore personnel arrived, the sampling devices were placed in the sluiceways and the intake screens rotated and washed for 30 to 35 minutes (one complete rotation of the traveling screens). The debris was then removed from the sampling screens. The fish were removed from the debris and then identified, weighed and measured in the field. If certain identification was not possible in the field, specimens were placed in 5-10 percent formalin, brought back to the laboratory, and identified using keys listed in the Reference section.

During times of rain and high water, particularly in spring and autumn, sampling did not always proceed according to plan. At these times, due to the great amount of debris in the river, plant personnel could not hold the screens for 12 hours without impairing plant operation. In these situations, arrangements were made to hold the screens for less than 12 hours and numbers of fish impinged during a 12-hour period were extrapolated from the reduced sampling time.

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1977

TABLE (1)

MONTHLY IMPINGEMENT SUMMARY FOR OCTOBER
MIAMI FORT GENERATING STATION

COMMON NAME	TOTAL NUMBER	PERCENT BY NUMBER	TOTAL WEIGHT (GMS)	PERCENT BY WEIGHT	LENGTH (MM) MIN	MEAN	MAX	'N'
GIZZARD SHAD	661	78.3	3,623	50.2	41	73	150	348
FRESHWATER DRUM	119	14.1	2,538	35.1	32	89	205	52
EMERALD SHINER	12	1.4	61	0.8	60	67	84	5
SKIPJACK HERRING	44	5.2	274	3.8	75	83	104	18
WHITE BASS	6	0.7	78	1.1		77		1
CARP	2	0.2	650	9.0		212		1
TOTALS	844	99.9	7,224	100.0				425

NUMBER OF DAYS SAMPLED DURING THIS MONTH WAS 4.

TABLE (2)

MONTHLY IMPINGEMENT SUMMARY FOR NOVEMBER
MIAMI FORT GENERATING STATION

COMMON NAME	TOTAL NUMBER	PERCENT BY NUMBER	TOTAL WEIGHT (GMS)	PERCENT BY WEIGHT	LENGTH (MM) MIN	MEAN	MAX	'N'
GIZZARD SHAD	921	94.4	7,823	91.2	39	79	197	705
FRESHWATER DRUM	41	4.2	356	4.2	34	76	100	29
SAUGER	2	0.2	15	0.2	85	94	102	2
BLACK CRAPPIE	1	0.1	4	0.05		61		1
BLUEGILL	2	0.2	4	0.05	47	49	50	2
EMERALD SHINER	1	0.1	10	0.1		90		1
WHITE CRAPPIE	4	0.4	4	0.05	44	52	54	3
PADDLEFISH	4	0.4	359	4.2	312	321	332	3
TOTALS	976	100.0	8,575	100.05				746

NUMBER OF DAYS SAMPLED DURING THIS MONTH WAS 2.

TABLE 3

MONTHLY IMPINGEMENT SUMMARY FOR DECEMBER
MIAMI FORT GENERATING STATION

COMMON NAME	TOTAL NUMBER	PERCENT BY NUMBER	TOTAL WEIGHT (GMS)	PERCENT BY WEIGHT	LENGTH (MM) MIN	MEAN	MAX	'N'
GIZZARD SHAD	500	76.7	14,421	60.1	97	159	200	289
FRESHWATER DRUM	113	17.3	2,158	9.0	91	124	223	91
EMERALD SHINER	3	0.5	31	0.1	–	101	–	1
SKIPJACK HERRING	3	0.5	86	0.4	–	145	–	1
RIVER CARPSUCKER	3	0.5	1,995	8.3	352	366	392	3
CARP	1	0.2	652	2.7	–	390	–	1
MOONEYE	1	0.2	24	0.1	–	147	–	1
WHITE BASS	28	4.3	4,634	19.3	127	191	332	16
TOTALS	652	100.2	24,001	100.0				403

NUMBER OF DAYS SAMPLED DURING THIS MONTH WAS 1-1/2.

TABLE 4

MONTHLY IMPINGEMENT SUMMARY FOR JANUARY 1978
MIAMI FORT GENERATING STATION

COMMON NAME	TOTAL NUMBER	PERCENT BY NUMBER	TOTAL WEIGHT (GMS)	PERCENT BY WEIGHT	LENGTH (MM) MIN	MEAN	MAX	'N'
GIZZARD SHAD	6,963	83.07	158,593	52.84	102	143	291	2,490
FRESHWATER DRUM	1.181	14.09	76,985	25.65	85	162	370	315
EMERALD SHINER	5	0.06	31	0.01	86	96	105	2
CARPSUCKER	55	0.66	42,439	14.14	109	343	463	16
SKIPJACK HERRING	2	0.02	31	0.01	-	114	-	1
CHANNEL CATFISH	11	0.13	298	0.10	90	128	220	4
PADDLEFISH	26	0.31	3,919	1.31	261	394	478	8
SAUGER	47	0.56	3,280	1.09	147	210	240	12
WHITE BASS	77	0.92	10,102	3.37	102	194	345	24
BLUEGILL	3	0.04	144	0.05	-	140	-	1
SMALLMOUTH BUFFALO	6	0.07	1,608	0.54	-	266	-	1
CARP	6	0.07	2,712	0.90	-	296	-	1
TOTALS	8,382	100.0	300,142	100.01				2,875

NUMBER OF DAYS SAMPLED DURING THIS MONTH WAS 2.

TABLE (5)
MONTHLY IMPINGEMENT SUMMARY FOR FEBRUARY 1978
MIAMI FORT GENERATING STATION

COMMON NAME	TOTAL NUMBER	PERCENT BY NUMBER	TOTAL WEIGHT (GMS)	PERCENT BY WEIGHT	LENGTH (MM) MIN	MEAN	MAX	'N'
GIZZARD SHAD	48	7.9	1,416	1.0	150	153	155	2
FRESHWATER DRUM	198	32.7	15,186	10.7	98	137	301	27
QUILLBACK CARPSUCKER	108	17.8	90,024	63.2	135	373	491	9
SAUGER	144	23.8	12,090	8.5	154	224	333	15
WHITE BASS	48	7.9	3,792	2.7	141	203	226	5
CARP	6	1.0	300	0.2	-	147	-	1
SILVER CHUB	18	3.0	156	0.1	82	102	132	3
CHANNEL CATFISH	12	2.0	10,944	7.7	111	292	473	2
RIVER CARPSUCKER	12	2.0	6.882	4.8	217	325	432	2
REDHORSE	6	1.0	1,512	1.1	-	260	-	1
GOLDEYE	6	1.0	180	0.1	-	157	-	1
TOTALS	606	100.1	142,482	100.1				68

NUMBER OF DAYS SAMPLED DURING THIS MONTH WAS 2.

TABLE (6)

MONTHLY IMPINGEMENT SUMMARY FOR MARCH 1978.
MIAMI FORT GENERATING STATION

COMMON NAME	TOTAL NUMBER	PERCENT BY NUMBER	TOTAL WEIGHT (GMS)	PERCENT BY WEIGHT	LENGTH (MM) MIN	MEAN	MAX	'N'
GIZZARD SHAD	1	0.4	37	0.1	-	156	-	1
SKIPJACK HERRING	9	3.7	172	0.4	122	133	164	8
FRESHWATER DRUM	137	56.8	13,037	30.1	87	182	465	111
QUILLBACK CARPSUCKER	27	11.2	20,931	48.3	152	364	586	24
SMALLMOUTH BUFFALO	3	1.2	148	0.3	128	157	186	2
SHORTHEAD REDHORSE	5	2.1	1,140	2.6	152	268	312	4
GOLDEN REDHORSE	2	0.8	512	1.2	201	255	308	2
CARP	2	0.8	127	0.3	135	153	170	2
CHANNEL CATFISH	7	2.9	661	1.5	79	210	282	5
FLATHEAD CATFISH	2	0.8	1,064	2.5	-	415	-	1
PADDLEFISH	6	2.5	790	1.8	361	420	531	4
MOONEYE	1	0.4	178	0.4	-	252	-	1
SAUGER	28	11.6	2,459	5.7	133	205	410	24
WHITE BASS	11	4.6	2,038	4.7	130	200	342	9
TOTALS	241	99.8	43,294	99.9				198

NUMBER OF DAYS SAMPLED DURING THIS MONTH WAS 1. THE SECOND SAMPLING WAS NOT ACCOMPLISHED DUE TO BROKEN EQUIPMENT. FOR THIS REASON, 1 DAY OF SAMPLING WAS DONE IN APRIL.

TABLE (7)

MONTHLY IMPINGEMENT SUMMARY FOR APRIL 1978
MIAMI FORT GENERATING STATION

COMMON NAME	TOTAL NUMBER	PERCENT BY NUMBER	TOTAL WEIGHT (GMS)	PERCENT BY WEIGHT	LENGTH (MM) MIN	MEAN	MAX	'N'
FRESHWATER DRUM	92	58.60	5,184	20.24	92	166	332	92
LONGNOSE GAR	1	0.64	116	0.45	-	401	-	1
BLACK BULLHEAD	1	0.64	22	0.09	-	117	-	1
QUILLBACK CARPSUCKER	21	13.38	16,478	64.32	112	358	571	21
SAUGER	15	9.55	742	2.90	127	186	260	15
LOGPERCH	1	0.64	9	0.04	-	98	-	1
PADDLEFISH	1	0.64	104	0.41	-	400	-	1
CHANNEL CATFISH	1	0.64	11	0.04	-	113	-	1
BLUEGILL	1	0.64	9	0.04	-	92	-	1
EMERALD SHINER	7	4.46	60	0.23	74	104	120	7
MOONEYE	10	6.37	176	0.69	125	135	143	10
GOLDEYE	1	0.64	27	0.11	-	145	-	1
WHITE BASS	2	1.27	283	1.10	199	204	209	2
HIGHFIN CARPSUCKER	2	1.27	1,589	6.20	290	372	454	2
RIVER CARPSUCKER	1	0.64	807	3.15	-	422	-	1
TOTALS	157	100.02	25,617	100.01				157

NUMBER OF DAYS SAMPLED DURING THIS MONTH WAS 1.