THREE MILE ISLAND AQUATIC STUDY

MONTHLY PROGRESS REPORT FOR SEPTEMBER 1989

Prepared For

GPU Nuclear Corporation
P. O. Box 480, Route 441 South
Middletown, Pennsylvania 17057

By

RMC Environmental Services
1921 River Road, P. O. Box 10
Drumore, Pennsylvania 17518

October 1989

INTRODUCTION

The objective of this monthly report is to document compliance with the nonradiological (aquatic) environmental monitoring programs specified in Sections 3.1.1a(4), 3.1.2a., and 4.6.1 of the Environmental Technical Specifications (ETS). These programs are being carried out as directed in the Environmental Controls Aquatic Sampling Manual. Program elements being conducted under contract to GPU Nuclear Corporation are benthic macroinvertebrates, ichthyoplankton, fish population dynamics (seine and electrofishing), creel surveys, and water quality. The purpose of these studies is to obtain a database sufficient to establish the natural fluctuations within the ecosystem, and identify any significant biological alterations resulting from the operation of the Three Mile Island Nuclear Station (TMINS).

Compliance with all programs specified in the ETS and detailed in the Aquatic Sampling Manual was achieved in September 1989 (Table 1). Manpower shortages resulted in changes to the TMINS Aquatic Sampling Schedule for September. The seine program was rescheduled from 20 to 18 September to accommodate other scheduled programs.

Data presented herein are considered provisional, pending subsequent proofing, analysis, and presentation in the annual report.

Benthic Macroinvertebrates

Objective: To assess the abundance, distribution, and diversity of benthic macroinvertebrates at three stations in the vicinity of TMINS.

Progress: Replicate (4) macroinvertebrate samples were collected at each of the three stations on 5 September 1989 (Table 1). Sorting of the 5 September samples and identification of the 6 July samples was completed. Identification of the 2 August samples was 50% complete.

Ichthyoplankton

Objective: To determine species composition, relative abundance, density, and seasonal and spatial distribution of ichthyoplankton at eight stations in the vicinity of TMINS.

Progress: Field sampling for ichthyoplankton was completed on 29 August 1989 (Table 1). All samples collected through August have been sorted; identifications have been completed through 21 August 1989. Analysis of the 29 August samples was initiated.

Seine

Objective: To assess species composition; relative abundance; seasonal and spatial distribution; condition

factor; occurrence of parasites, anomalies, and fish kills; and species diversity of fishes vulnerable to seine capture at six stations in the vicinity of TMINS.

Progress: Seine collections were taken at each of the six stations on 7 and 18 September 1989 (Table 1). Processing was completed through 16 August; work was initiated on the 7 September samples. Results of the August 1989 samples are being tabulated and will appear in the October report.

Results of the July 1989 samples are presented in Table 2. A total of 672 fish of 24 species was collected on 14 July. Most fish (176 specimens) were taken at Station 16A1, but most species (15) occurred at Station 10B5. Spotfin shiner, tessellated darter, spottail shiner, and pumpkinseed dominated the catch, comprising 72.3% of the total. Two young American shad were collected at Station 10B5.

Parasites and anomalies were observed on 87 fish of 10 species in July. Black spot, anchor worms (Lernaea), and leeches were most prevalent occurring chiefly on the spotfin shiner, bluntnose minnow, and tessellated darter.

Electrofishing

Objective: To assess species composition, relative abundance, occurrence of parasites and anomalies, and species diversity of fishes vulnerable to electrofisher captured at six stations in the vicinity of TMINS.

Progress: Electrofishing at six stations was completed on 12-13 and 26-27 September 1989 (Table 1). A combined total of 899 fish of 23 species was collected in September (Tables 3 and 4). Most fish (225 specimens) and most species (15) were taken at Stations 4A1 and 10A3, respectively. The catch was dominated by the pumpkinseed, bluegill, and green sunfish. Smallmouth bass, redbreast sunfish, and spottail shiner were also common. Ectoparasites and anomalies were observed on 134 fish of 13 species; anchor worms (Lernaea), skin infections, damaged fins, and leeches were most prevalent. Pumpkinseed, bluegill, and green sunfish were most commonly affected.

Creel Survey

Objective: To investigate the extent and success of sportfishing, and determine angler residence and use of catch, in the Susquehanna River near TMINS.

Progress: Creel surveys were conducted on 8, 10, 23, and 28 September 1989 (Table 1). Interviews consisted of 221 anglers who fished 450.18 hours, caught 658 fish, and harvested 148 fish (22.5% of the total catch) (Tables 5 through 8). The average catch per effort and harvest per effort were 1.46 and 0.33 fish per hour, respectively. Smallmouth bass and channel catfish were the predominant fishes caught (368 and 121 specimens, respectively). Fishing pressure was greatest in the General Reservoir with 138 anglers fishing a total of 271.42 hours. Most fish were caught (403) and harvested (59) from the General Reservoir and York Haven Generating Station areas, respectively. The highest catch per effort (3.36) and harvest per effort (1.04) occurred at the West Dam area. Anglers were predominantly residents of York or Dauphin counties, and the majority indicated that they eat or would eat a portion of their catch.

Water Quality Analysis

Objective: To measure select physical and chemical parameters of the Susquehanna River in the vicinity of TMINS concurrent with General Ecological Survey samples.

Progress: Water quality samples were collected on 18 September 1989 (Table 1) and forwarded to TMI-EC for

analysis of TDS. Selected water quality parameters were also measured at the sampling times and locations described in the Aquatic Sampling Manual.

TABLE 1

Sampling conducted in September 1989 in compliance with Three Mile Island Nuclear Station's Environmental Technical Specifications. X's equal week in which program/work was completed.

PROGRAM	SEPTEMBER			
	1-9	10-16	17-23	24-30
Benthic Macroinvertebrates	X			
Ichthyoplankton*				
Seine	X		X	
Electrofishing		X		X
Creel Survey	X	X	X	X
Water Quality Analysis	X			

* Field sampling (for 1989) was completed on 29 August 1989.

TABLE 2

Fishes taken by seine on 14 July 1989 near TMINS. Station prefix TM-SE- deleted from table.

Station	13B5	10B5	16A1	10A2	9B3	4A2	Total	% Catch
Time	1247	1155	0950	1030	1117	0907		
Air Temp(C)	25.5	23.0	22.5	23.0	24.0	22.0		
Water Temp(C)	20.0	22.0	20.7	21.1	21.2	18.1		
Dissolved Oxygen(mg/l)	8.2	8.3	7.7	8.2	8.0	7.3		
pH	7.4	6.6	7.0	6.8	6.9	7.4		
Secchi Disc(cm)	30.5	35.6	53.3	53.3	61.0	15.2		
River Stage(m)	1.59	1.59	1.59	1.59	1.59	1.59		
Weather	Partly Cloudy	Partly Cloudy	Clear	Partly Cloudy	Partly Cloudy	Partly Cloudy		
No. of Specimens	105	111	176	97	88	95	672	
No. of Species	11	15	13	12	5	13	24	
No. of Hauls	4	6	5	6	4	5	30	
American shad	-	2	-	-	-	-	2	0.3
Gizzard shad	-	3	-	-	-	-	3	0.4
Golden shiner	-	1	-	-	-	-	1	0.1
Comely shiner	-	-	1	-	-	-	1	0.1
Spottail shiner	28	9	15	3	20	2	77	11.4
Swallowtail shiner	-	1	-	-	-	-	1	0.1
Spotfin shiner	32	13	94	47	13	12	211	31.4
Mimic shiner	-	2	20	14	-	-	36	5.4
Bluntnose minnow	12	31	1	2	-	3	49	7.3
Fallfish	-	4	4	2	-	1	11	1.6
White sucker	-	-	-	-	-	1	1	0.1
Banded killifish	2	-	-	-	-	-	2	0.3
Rock bass	-	2	2	2	-	-	6	0.9
Redbreast sunfish	2	1	1	2	1	1	8	1.2
Green sunfish	-	-	-	-	-	11	11	1.6
Pumpkinseed	10	18	3	5	7	17	60	8.9
Bluegill	-	3	5	-	-	22	30	4.5
Lepomis hybrid	-	-	-	-	-	3	3	0.4
Smallmouth bass	1	-	-	1	-	-	2	0.3
Largemouth bass	-	-	-	-	-	1	1	0.1
White crappie	1	1	4	2	-	3	11	1.6
Black crappie	-	-	1	-	-	2	3	0.4
Tessellated darter	14	20	25	16	47	16	138	20.5
Shield darter	2	-	-	1	-	-	3	0.4
Walleye	1	-	-	-	-	-	1	0.1

TABLE 3

Fishes taken by the AC electrofisher on 12-13 September 1989 near TMINS. Station prefix TM-EL- deleted from table.

Station	4A1	13A1	10A3	9B5	10B3	11B1	Total
Time	1904	2018	2114	2209	2309	0015	
Duration(min)	25	24	23	24	25	27	
Air Temp(C)	22.0	22.0	22.5	20.5	21.5	19.7	
Water Temp(C)	25.1	26.1	26.0	26.1	25.9	25.9	
Dissolved Oxygen(mg/l)	10.2	10.6	9.7	10.4	9.2	8.8	
pH	8.5	8.7	8.5	8.7	8.9	8.6	
Conductivity(micromhos/cm)	450	450	500	450	350	325	
Secchi Disc(cm)	76.2	73.7	71.1	73.7	63.5	68.6	
Volts	210	210	205	205	215	215	
Amps	12.5	12.5	13.0	13.0	11.5	10.5	
Gizzard shad	-	1	-	-	1	-	2
Common carp	-	1	-	-	-	1	2
Golden shiner	-	-	-	-	-	3	3
Common shiner	-	-	-	-	-	1	1
Spottail shiner	2	-	2	1	20	-	25
Spotfin shiner	1	1	3	8	-	1	14
Bluntnose minnow	-	-	1	-	-	-	1
Quillback	1	-	-	1	3	7	12
Yellow bullhead	-	1	-	-	-	-	1
Channel catfish	-	2	-	-	2	-	4
Rock bass	4	10	4	-	-	-	18
Redbreast sunfish	8	20	10	7	3	-	48
Green sunfish	10	11	8	22	1	-	52
Pumpkinseed	46	10	22	8	16	9	111
Bluegill	32	5	8	21	28	23	117
Lepomis hybrid	12	-	1	-	-	-	13
Smallmouth bass	2	9	3	1	4	-	19
Largemouth bass	12	-	1	-	1	7	21
White crappie	-	1	-	1	-	-	2
Black crappie	-	1	1	-	-	-	2
Walleye	-	-	1	2	-	-	3
No. of Specimens	130	73	65	72	79	52	471
No. of Species	10	13	12	10	10	8	20

TABLE

Fishes taken by the AC electrofisher on 26-27 Sep ber NS. Station prefix TM- ted from table.

Stati	4A1	13A1	10A3	9E5	10	11B1	Total
Time	2051	2153	2247	0010		1855	
Dura)	23	22	25	19		25	
Air	15.3	15.0	14.5	13.		16.7	
Wate)	16.3	16.1	15.7	15.5	17.2	16.5	
Disso ygen(mg/1)	10.4	10.2	10.	0	11.5	10.0	
pH	NA	NA	NA	A	NA	NA	
Conductivi (micromhos/cm)	350	360	450	9	360	325	
Secchi Disc(cm)	86.4	63.5	58.4		81.3	106.7	
Volts	200	215	210	0	2	215	
Amps	8.0	10.0	10.0	10.0	10.	8.5	
American shad	-	1	-	-	-	-	1
Gizzard shad	1	1	1	-	5	-	8
Common carp	2	4	-	-	-	1	7
Golden shiner	-	-	-	-	1	6	7
Common shiner	-	-	-	-	-	2	2
Spottail shiner	-	-	6	6		1	19
Spotfin shiner	-	-	-	-		4	4
Mimic shiner	-	-	1	-		-	1
Quillback	1	-	-	-	1	-	2
White sucker	-	1	-	-	-	-	1
Yellow bullhead	-	1	-	-	-	-	1
Channel catfish	1	3	2	1	-	-	7
Rock bass	1	1	3			-	10
Redbreast sunfish	3	5	6		-	-	15
Green sunfish	3	5	10		-	1	29
Pumpkinseed	44	14	54	3	5	25	165
Bluegill	25	-	6	15	5	15	66
Lepomis hybrid	5	-	-	-	-	1	6
Smallmouth bass	-	29	14	6	2	-	51
Largemouth bass	8	-	-	-	-	4	12
White crappie	-	-	-	1	1	5	7
Black crappie	1	1	-	1	-	3	6
Walleye	-	-	-	-	1	-	1
No. of Specimens	95	66	103	69	27	68	428
No. of Species	11	12	10	10	9	11	22

NA = Not available

TABLE 5

Creel data reported for each survey day in September 1989, at the General Reservoir.

Day	8 Friday			10 Sunday			23 Saturday			28 Thursday			
River Stage	0.99			0.99			1.12			1.22			
Time - Morning (0900-1300), Midday (1301-1700), Evening (1701-2100)													
	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Totals
Weather	Fog	Overcast	Overcast	Haze	Prt cldy	Clear	Hvy rain	Hvy rain	Lt rain	Clear	Clear	Clear	
Air Temp (C)	19.30	23.00	23.70	27.00	32.50	28.30	21.00	15.00	11.50	11.00	17.00	16.00	
Water Temp (C)	22.50	24.70	24.70	25.70	28.00	28.50	22.00	21.00	20.50	16.00	17.00	16.30	
Anglers	14	8	6	36	13	13	13	12	0	13	8	2	
Fish Caught	47	75	18	96	25	32	41	20	0	14	35	0	
Fish Kept	9	12	5	6	2	2	4	5	0	3	10	0	
Hours Fished	24.25	30.00	12.00	76.75	19.50	18.50	35.17	15.00	.	13.50	22.75	4.00	
Catch/Effort (h)	1.94	2.50	1.50	1.25	1.28	1.73	1.17	1.33	.	1.04	1.54	0.00	
Species													
	R K	R K	R K	R K	R K	R K	R K	R K	R K	R K	R K	R K	C
Channel catfish	1	4 1	5 3	1	1	1	2	1			3	15 8	23
Rock bass	4 3	2 5	1	3			3					13 8	21
Sunfishes		6	1	6		2 2	1	2				18 2	20
Redbreast sunfish	2	2										4	4
Bluegill	1		2 1								3	2 5	7
Smallmouth bass	31 5	49 6	4 1	72 6	22	27 2	31 4	13 4		11	2 25 3	285 33	318
Largemouth bass				2								2	2
Crappies				6								6	6
Yellow perch											1 1	2	2
Totals Per Day													
Anglers	28			62			25			23		138	
Fish Caught	140			153			61			49		403	
Fish Kept	26			10			9			13		58	
Hours Fished	66.25			114.7			50.17			40.25		271.4	
Catch/Effort (h)	2.11			1.33			1.22			1.22		1.48	

K = Kept
R = Released
C = Total catch

TABLE 6

Creel data reported for each survey day in September 1989, at the West Dam.

Day	8 Friday			10 Sunday			23 Saturday			28 Thursday			
River Stage	0.99			0.99			1.12			1.22			
Time - Morning (0900-1300), Midday (1301-1700), Evening (1701-2100)													
	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Totals
Weather	Fog	Overcast	Overcast	Haze	Prt cldy	Clear	Overcast	Overcast	Overcast	Clear	Clear	Clear	
Air Temp (C)	18.00	23.30	22.00	28.00	31.50	30.00	22.70	14.70	11.50	11.00	16.00	17.30	
Water Temp (C)	22.30	24.00	24.30	25.00	28.50	29.50	22.00	21.00	19.70	15.70	16.30	16.50	
Anglers	0	1	2	1	2	3	1	0	0	0	0	0	
Fish Caught	0	21	14	16	1	1	5	0	0	0	0	0	
Fish Kept	0	.	9	6	.	1	2	0	0	0	0	0	
Hours Fished	.	5.25	4.00	3.00	1.00	1.50	2.50	.	.	.	.	.	
Catch/Effort (h)	.	4.00	3.50	5.33	1.00	0.67	2.00	.	.	.	.	.	

Species

	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	C
Channel catfish			12		3	8	8	4				1		2									23	15	38
Rock bass			1																				1		1
Bluegill													1										1		1
Smallmouth bass			8		2	1	2		1														13	1	14
Crappies								2																2	2
Walleye												2											2		2

Totals Per Day

Anglers	3		6		1		0		10			
Fish Caught	35		18		5		0		58			
Fish Kept	9		7		2		0		18			
Hours Fished	9.25		5.50		2.50		.		17.25			
Catch/Effort (h)	3.78		3.27		2.00		.		3.36			

K = Kept
R = Released
C = Total catch

TABLE 7

Creel data reported for each survey day in September 1989, at the East Dam.

Day	8 Friday			10 Sunday			23 Saturday			28 Thursday			
River Stage	0.99			0.99			1.12			1.22			
Time - Morning (0900-1300), Midday (1301-1700), Evening (1701-2100)													
	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Totals
Weather	Fog	Overcast	Prt cldy	Haze	Prt cldy	Clear	Overcast	Overcast	Overcast	Clear	Clear	Clear	
Air Temp (C)	18.70	23.00	22.30	27.00	31.00	31.00	22.00	13.70	11.00	11.30	17.00	18.70	
Water Temp (C)	21.70	22.70	22.00	24.70	26.00	27.00	21.50	20.50	20.00	15.70	17.00	16.70	
Anglers	0	0	0	2	2	4	0	0	0	0	0	0	
Fish Caught	0	0	0	7	22	13	0	0	0	0	0	0	
Fish Kept	0	0	0	1	12	.	0	0	0	0	0	0	
Hours Fished	.	.	.	6.50	5.00	3.50	.	.	.	.	.	.	
Catch/Effort (h)	.	.	.	1.08	4.40	3.71	.	.	.	.	.	.	
Species													
	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	C
Channel catfish							2	1														2	1	3
Rock bass									2														2	2
Sunfishes							4		10	10	3											17	10	27
Smallmouth bass											10											10		10
Totals Per Day																								
Anglers		0				8				0				0								8		
Fish Caught		0				42				0				0								42		
Fish Kept		0				13				0				0								13		
Hours Fished		.				15.00				.				.								15.00		
Catch/Effort (h)		.				2.80				.				.								2.80		

K = Kept
R = Released
C = Total catch

TABLE 8

Creel data reported for each survey day in September 1989, at the York Haven Generating Station.

Day	8 Friday			10 Sunday			23 Saturday			28 Thursday			
River Stage	0.99			0.99			1.12			1.22			
Time - Morning (0900-1300), Midday (1301-1700), Evening (1701-2100)													
	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Morning	Midday	Evening	Totals
Weather	Overcast	Prt cldy	Prt cldy	Haze	Prt cldy	Clear	Overcast	Hvy rain	Overcast	Clear	Clear	Clear	
Air Temp (C)	20.00	21.70	21.00	28.50	31.50	26.00	20.00	12.00	10.30	15.00	17.30	13.00	
Water Temp (C)	21.50	22.50	22.70	24.50	25.70	26.00	22.00	20.30	20.00	16.00	16.50	16.50	
Anglers	4	0	0	8	5	18	17	0	3	4	2	4	
Fish Caught	31	0	0	31	10	24	42	0	2	3	5	7	
Fish Kept	3	0	0	3	5	15	29	0	1	0	1	2	
Hours Fished	10.25	.	.	17.50	15.50	51.50	29.76	.	4.00	2.00	4.25	11.75	
Catch/Effort (h)	3.02	.	.	1.77	0.65	0.47	1.41	.	0.50	1.50	1.18	0.60	

Species

	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	R	K	C
Common carp	14						2	1	1	2	2		3						1		2		25	4	29
Channel catfish	12	3					25	1	1		1	6	1	7									40	17	57
Rock bass										1				9										10	10
Sunfishes										2													2		2
Redbreast sunfish												3		1										4	4
Bluegill												3		9			1							13	13
Smallmouth bass	2						1	1	3	1	3		6	1		1		3		1		3	23	3	26
Largemouth bass														1										1	1
Crappies												3												3	3
White crappie																						1		1	1
Walleye											1		3	1					2	1		1	6	3	9

Totals Per Day

Anglers	4	31	20	10	65
Fish Caught	31	65	44	15	155
Fish Kept	3	23	30	3	59
Hours Fished	10.25	84.50	33.76	18.00	146.5
Catch/Effort (h)	3.02	0.77	1.30	0.83	1.06

K = Kept
R = Released
C = Total catch