COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Resources
Water Quality Management Program
Northeast Regional Office

DATE: August 3, 1992

SUBJECT: Aquatic Chemical and Biological Investigation
Swiftwater Creek
Connaught Laboratory - 6/16/92

TO: George M. Fetchko
Water Quality Management
Monitoring & Compliance Manager

THRU: Robert Bisignani
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FROM: Edward P. Kupsky 8-5-92
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On June 16, 1992, an aquatic chemical and biological investigation of Swiftwater Creek, Monroe County, was conducted to determine the effect of the Connaught Laboratory IW/sewage treatment plant on the stream. Assisting in the field collection of data and samples were Sherrill R. Wills, Water Pollution Biologist and Robert Bisignani, Water Quality Specialist for Monroe County. On September 15, 1991, a problem with an old chlorination system resulted in a fishkill in the stream downstream of Connaught. This system has since been abandoned and ozone is now used for effluent disinfection.

Chemical data are based on three (3) 500 ml non-composite grab samples: one left unfixed for regular chemical analysis; one fixed with 5 mls of HCL for metals analysis; and, one fixed with 5 mls H_2SO_4 for cyanide analysis. Temperatures, dissolved oxygen and pH were measured in the field.

Benthic macroinvertebrates were collected by kicking a 1 meter square area in both slow and fast riffle areas. An attempt was made to follow EPAs rapid bioassessment protocol by collecting approximately 100 organisms. However, instead of depositing the kicked material into a pan for random picking, the organisms were randomly picked from the screen itself. There was no need to randomize the areas of the screen picked since the entire collection was needed from numerous kicks to reach the 100 organism goal.

Fish were collected by electric fishing a representative section of stream approximately 50 meters in length overlapping the area at which the chemical and macrobenthic samples were collected.

Table I is a summary of the chemical data. Table II is a summary of the macrobenthic data. Table III is a summary of the fish data.

Station 1 Swiftwater Creek at Connaught Laboratories upstream of treatment plant discharge point, downstream of Pocono Mountain High School STP discharge point.

All of the measures of water quality, physiochemical, coliform, macrobenthic and fish indicated excellent quality existed at this station. The chemical data reflect typical naturally occurring conditions with low hardness and alkalinity and all of the measured heavy metals present at less than the detection level with the exceptions of aluminum and iron which are the predominant naturally occurring metals in the soils of the area. No measured parameters exceeded optimal criteria for macrobenthos or fish.

(1)

Twenty-three macrobenthic taxa were collected over one-half of which (13 taxa) were mayfly/stonefly/caddisfly species. These taxa are generally considered the most pollution sensitive.

Although only 2 taxa of fish were collected, they were the taxa representative of headwater unpolluted conditions: brown trout and mottled sculpins. The size range of the brown trout indicated that they were reproducing in the stream and the condition of the larger fish indicated that if not native to this stream, they had been present for a long period of time and had not been recently stocked.

Effluent from Connaught Laboratory Treatment Plant

The effluent was well within the permit requirements. The only measured parameters which were above aquatic life protection limits were zinc at 139.0 ug/l and copper at 52.0 ug/l. These values were in the effluent itself prior to stream dilution

Station 2 Swiftwater Creek approximately 50 meters downstream of Connaught Laboratories Treatment Plant discharge point.

This station was located at the point on the stream where the effluent from the treatment plant mixed completely with the stream water as determined by dye testing the effluent.

The chemical quality mirrored the upstream quality as dilution had dissipated any input from the treatment plant. As with the chemical quality, the macrobenthic and fish community were almost exactly similar to the ones found upstream. They were well within the degree of similarity expected in sampling biological communities.

In summary, there was no loss in the chemical and biological integrity of the stream when comparing upstream from and downstream from the discharge of the treatment plant.

Station 3 Swiftwater Creek at Route 314 Bridge.

Chemically and macrobenthically this station was similar to both upstream stations. In the fish collection, mottled sculpins were absent and a white sucker was collected. Also, most of the larger trout were stocked recently enough to allow for differention between them and native or hold over individuals. The shift to a lower stream gradient with many slow pools together with heavy stocking of trout may account for the absence of sculpins. The September 15, 1991 fishkill may also have contributed as scuplins may not yet have recolonized this far downstream from the resident upstream population.

Conclusions: Swiftwater Creek exhibited excellent chemical, coliform, macrobenthic and fish quality at the locations investigated. There was no measured depreciation of the water quality attributable to the discharge from the Connaught Laboratory Treatment Plant.

Recommendations: None.

EPK:kab

cc: R. Bisignani
Connaught Laboratory
Friends of Forest Hills Run

Table I: Physio-chemical data, Swiftwater Creek and Canaught Laboratories, Monroe Coun
6-16-92.

Parameter	Station 1	Canaught 2b	2	3
Temp (field)	11.5		12.3	14.1
Diss Oxygen (field)	11.6		10.2	9.7
pH (field)	7.49		7.04	7.71
Spec Cond	79	894	93	89
BOD 5	<0.4	1.0	<0.4	<0.4
pH (lab)	6.8	7.7	6.9	6.9
T Alk CaCO3	11	64	12	14
Tot Diss Sol	11	503	18	21
Susp Sol	11	13	14	9
Sett Sol	<0.4	<0.4	<0.4	<0.4
NH3-N	<0.02	0.04	<0.02	0.05
NO2-N	<0.004	<0.004	<0.004	<0.004
NO3-N	0.4	12.3	0.48	0.40
KJELD-N	<0.2	1.39	<0.2	<0.2
P tot	0.02	2.88	0.05	0.05
TOC	<1.0	3.2	<1.0	<1.0
CN, Free HBG. ~~mg~~/l	<1.0	18.0	<1.0	
CN, Tot	<0.001	0.019	<0.001	
Tot hardness CACO3	14	87	16	17
Cl	13	198	15	14
Cd ug/l	<0.2	0.3	<0.2	<0.2
Cr ug/l	<4.0	<4.0	<4.0	<4.0
Cu ug/l	<10.0	52.0	<10.0	<10.0
Fe ug/l	56.0	116	31	23
Pb ug/l	<4.0	<4.0	<4.0	<4.0
Mn ug/l	<10.0	<10.0	<10.0	<10.0
Ni ug/l	<25.0	<25.0	<25.0	<25.0
Zn ug/l	<10.0	139	<10.0	<10.0
Al ug/l	192.0	213	200	<135
MBAS	<0.5	<0.5	<0.5	<0.5
Mercury ug/l	<1.0	<1.0	<1.0	<1.0
Fecal Coliforms (MPN/100ml)	20	<20	20	<20
Fecal Strep (MPN/100ml)	40	<20	<20	40

ble II: Benthic macroinvertebrate enumeration, Swiftwater Creek, Monroe Co. 6-16-92

Taxa	Station Number/≈100 organisms 1	2	3
Oligochaeta		1	1
Ephemeroptera			
Epeorus	9	12	8
Stenonema vicarium	1		
S. rubrum		1	2
S. rubromaculatum	1		
Ephemerella sp 1	32	46	14
E. sp 2	10	1	1
E. sp 3	1	6	21
E. sp 4	2	1	6
E. sp 5		1	
Baetis sp 1	8	2	5
B. sp 2	1		
B. sp 3		1	
Isonychia			1
Paraleptophlebia	10	12	
Tricoptera			
Dolophiloides	9	9	22
Hydropsyche sp 1	5	9	5
H. sp 2		1	
Rhyacophila fuscula	2	2	

Taxa	Station 1	2	3
Psilotreta		1	
Odontoceridae sp	2		
Glossosoma			3
Neophylax	1	1	2
Pycnopsyche			2
Lepidostoma	1		
Diptera			
Hexatoma			
Tipulidae sp		1	1
Blephariceta		3	
Orthocladiinae sp	1	1	
Tanypodinae sp	1		1
Thienemanniyia	1		
Paratendipes	1		1
Chironomis		1	
Odonata			
Cordulegaster		2	
Lanthus		1	
Gomphidae sp			1
Megaloptera			
Nigronia			1
Plecoptera			
Pteronarcys	3		1
Leuctra			1
Isoperla holochlora		6	9

Taxa	Station 1	2	3
Phasganophora capitata	2	1	
Mollusca			
Gastropoda			
Physa	1		2
Pelecepoda			
Sphaerium		1	
Total taxa	23	26	23
Total individuals	105	124	111
EPT	13	15	12

ble III: Fish enumeration, Swiftwater Creek, 6-16-92

Taxa / size class		Station 1	Station 2	Station 3
own trout	0-3"	1	4	11
	3-6"	6	6	
	6-9"	8	4	4
	9-12"	4	4	2
	12+"			
ottled sculpin	0-3"	10	2	
rook trout	0-3"			
	3-6"			
	6-9"		1	
	9-12"		2	
	12+"			
hite Sucker	12+"			1
Total taxa		2	3	2