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DAEC
CEDAR RIVER WATER QUALITY STUDY
Monthly Report
March 1972

*Environmental Engineering
Study*

Submitted by:
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March 1972

INTRODUCTION

Samples were taken at all stations during the period. Provisional U. S. G. S. data from the Cedar Rapids gaging station indicates that the mean flow for the month of March was 4,850 cfs, well above the previous month's flow and about 82% of the 1931-60 median river flow. Maximum flows occurred during the middle of the month and gradually tapered off as the period progressed. Estimated flows at the time of sampling on March 15 and 27 were 6,120 and 3,760 cfs respectively.

SUMMARY OF OBSERVATIONS

The effects of runoff were evident throughout the period. Both alkalinity and hardness values were low at all stations, especially in the March 15 samples when river discharge was approaching the maximum for the month. Phosphate, ammonia and lignin and tannin concentrations remained high throughout the month. COD and color values, which were very high in the March 15 samples, declined somewhat by March 27 but were still generally above the levels observed in February. In spite of the high COD and BOD levels present, dissolved oxygen concentrations were over 80% of saturation in all but one sample.

Bacterial concentrations remained relatively constant throughout the period and appeared to be relatively unaffected by the increased runoff. Plankton populations were somewhat larger than those observed during February, ranging from about 2,800 to 6,400 organisms/ml. The diatom Cyclotella and unidentified flagellates were the dominant organisms.

Chemical Analysis
Biological Analysis
Physical Analysis

March 1972

DUANE ARNOLD ENERGY CENTER PROJECT
Chemical Analyses

Date 1972	Dissolved Oxygen - mg./l.	Carbon Dioxide as CaCO ₃ mg./l.	Alkalinity as CaCO ₃ mg./l.		pH	Hardness as CaCO ₃ mg./l.		Phosphates mg./l.		Nitrogen mg./l.		Iron	Lignins & Tannins - mg./l.	C.O.D. mg./l.
			Phenolphtha- lein	Total		Calcium	Total	Ortho	Total	NH ₃	NO ₃			
STATION NO. 1 - LEWIS ACCESS														
3-15	11.1	4	0	120	8.00	96	132	1.13	1.20	1.02	0.29	0.31	0.40	77.6
3-27	10.6	4	0	196	8.10	116	168	1.07	1.30	0.96	0.31	0.10	0.45	33.6
STATION NO. 2 - DAEC PLANT														
3-15	11.0	4	0	104	8.20	80	120	1.01	1.13	0.83	0.22	0.14	0.40	79.2
3-27	11.4	4	0	190	8.20	112	168	1.07	1.57	1.00	0.34	0.11	0.40	21.6
STATION NO. 3 - JOHN COMP FARM														
3-15	11.0	4	0	118	8.20	92	128	1.16	1.20	0.97	0.38	0.86	0.45	63.2
3-27	8.2	4	0	192	8.30	112	152	1.10	2.02	1.02	0.30	0.08	0.35	39.2
STATION NO. 4 - MOHAWK PARK														
3-15	10.9	4	0	110	8.20	108	128	0.92	1.16	0.73	0.34	0.57	0.60	68.8
3-27	11.0	4	0	186	8.25	100	152	1.07	1.20	1.02	0.35	0.15	0.35	34.4

DUANE ARNOLD ENERGY CENTER PROJECT
Physical Analysis

Date 1972	Temperature °C.	Turbidity J.T.U.	Color	SOLIDS mg./l.									
				Total	Total volatile	Total fixed	Total dissolved	Total suspended	Suspended fixed	Suspended volatile	Dissolved fixed	Dissolved volatile	
STATION NO. 1 - LEWIS ACCESS													
3-15	3.0	30	60	344	81	263	184	160	133	27	130	54	
3-27	3.4	16	40	359	122	237	297	62	31	31	206	91	
STATION NO. 2 - DAEC PLANT													
3-15	2.9	53	60	357	110	247	197	160	100	60	147	50	
3-27	3.2	16	40	369	85	284	323	46	25	21	259	64	
STATION NO. 3 - JOHN COMP FARM													
3-15	3.0	40	60	307	119	188	193	114	60	54	128	65	
3-27	4.0	17	30	430	142	288	298	132	90	42	198	100	
STATION NO. 4 - MOHAWK PARK													
3-15	3.1	40	60	355	117	238	197	158	112	46	126	71	
3-27	3.8	16	30	281	-	279	223	58	58	-	221	-	

DUANE ARNOLD ENERGY CENTER PROJECT
Biological Analysis

Date 1972	Biochemical Oxygen Demand mg./l.	Threshold Odor Number	BACTERIOLOGICAL ANALYSIS organisms/100 ml.			
			Total bacteria	Total coliform	Fecal coliform	Fecal Streptococci
STATION NO. 1 - LEWIS ACCESS						
3-15	15.6	10.0	33,000	3,000	190	190
3-27	10.2	7.5	130,000	2,200	360	50
STATION NO. 2 - DAEC PLANT						
3-15	13.8	13.0	23,000	3,000	220	220
3-27	14.4	7.5	-	1,700	430	50
STATION NO. 3 - JOHN COMP FARM						
3-15	12.0		21,000	3,000	180	180
3-27	7.2		60,000	100	150	40
STATION NO. 4 - MOHAWK PARK						
3-15	14.4	13.0	600,000	3,000	100	100
3-27	15.6	7.5	150,000	500	60	50

Table 2

PLANKTON COUNTS

Organisms per Milliliter
of Original Samples

Explanation of table:

Individual cells of all diatoms, including Melosira, were counted as one regardless of how they were grouped or connected.

The blue-green algae were counted by number of trichomes for Anabaena, Oscillatoria, and Phormidium. Agamenellum and Anacystis were counted as one by groups or masses of cells as they occurred.

Green algae were counted as individual cells except Actinastrum, Coelastrum, Dictyosphaerium, Pediastrum, and Tetraspora, which were counted for each cell mass as they normally occur. Westella, Scenedesmus, and Tetrastrum colonies, which consist of a normal grouping of four cells were counted as one.

The flagellates were counted by individual cells, except for the colonial forms, Eudorina, Gonium, Pandorina, Uroglenopsis, and Volvox, where each colony was counted as one.

STATION 1 - LEWIS ACCESS

Plankton Count
(Per Milliliter)

	March 15 1972	March 27
<u>Diatoms</u>		
1. Cyclotella	1,152	1,376
2. Diatoma	64	
3. Gyrosigma	64	
4. Melosira	128	
5. Meridion	192	96
6. Navicula	576	384
7. Nitzschia	448	96
8. Surirella	64	
9. Synedra	64	32
10. Unidentified	192	192
<u>Green Algae</u>		
1. Scenedesmus		96
2. Unidentified		32
<u>Flagellates</u>		
1. Chlamydomonas		288
2. Trachelomonas		32
3. Unidentified	320	960
TOTALS	3,264	3,584

STATION 2 - DAEC PLANT

Plankton Count
(Per Milliliter)

	March 15 1972	March 27
<u>Diatoms</u>		
1. Cyclotella	2,944	1,568
2. Diatoma	128	
3. Melosira	384	
4. Meridion	256	32
5. Navicula	1,920	384
6. Nitzschia	256	128
7. Surirella		64
8. Synedra		32
9. Unidentified	256	32
<u>Green Algae</u>		
1. Chlorella-like		64
2. Scenedesmus	128	
<u>Flagellates</u>		
1. Chlamydomonas		352
2. Unidentified	2,304	1,408
TOTALS	8,576	4,064

STATION 3 - JOHN COMP FARM

Plankton Count
(Per Milliliter)

	March 15 1972	March 27
<u>Diatoms</u>		
1. Cyclotella	2,560	1,280
2. Cymatopleura	128	
3. Melosira		64
4. Meridion		32
5. Navicula	512	352
6. Nitzschia	384	160
7. Synedra		32
8. Unidentified		32
<u>Green Algae</u>		
1. Unidentified		32
<u>Flagellates</u>		
1. Chlamydomonas		128
2. Unidentified	1,152	672
<u>Miscellaneous</u>		
1. Ciliate		32
TOTALS	4,736	2,816

STATION 4 - MOHAWK PARK

Plankton Count
(Per Milliliter)

	March 15 1972	March 27
<u>Diatoms</u>		
1. Cyclotella	2,944	1,152
2. Meridion	128	32
3. Navicula	1,152	480
4. Nitzschia	384	704
5. Surirella	128	
6. Synedra		96
7. Unidentified	384	32
<u>Green Algae</u>		
1. Scenedesmus		128
2. Selenastrum		32
<u>Flagellates</u>		
1. Chlamydomonas		96
2. Unidentified	1,024	1,344
<u>Miscellaneous</u>		
1. Ciliate		64
TOTALS	6,144	4,160

SUMMARY OF TOTAL COUNTS
PLANKTON

DUANE ARNOLD ENERGY CENTER PROJECT

Date 1972	March 15	March 27
	Lewis Access Bridge	
	3,260	3,580
	DAEC Plant	
	8,576	4,060
	John Comp Farm	
	4,740	2,820
	Mohawk Park Dock	
	6,140	4,160

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