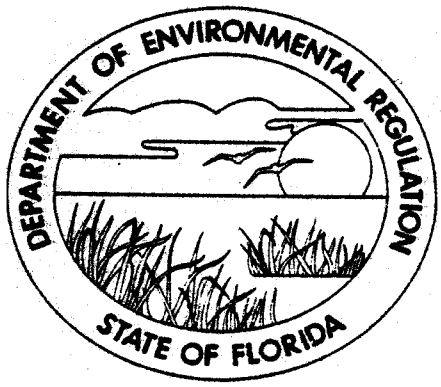


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BIOASSAYS OF THE CITY OF DAYTONA BEACH (BETHUNE POINT)

SEWAGE TREATMENT PLANT

DAYTONA BEACH, VOLUSIA COUNTY, FLORIDA

NPDES #FL0025984

SAMPLED 3/9/82

Biological Section
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May 3, 1982

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EXECUTIVE SUMMARY

City of Daytona Beach (Bethune Point) STP, NPDES #FL0025984, on 10 to 12 March, 1982.

All three effluents (pre-chlorinated, chlorinated and de-chlorinated) from this municipal waste treatment facility proved to be acutely toxic to the test organism, Mysidopsis bahia, with 48 hour LC_{50} values of 44.8%, 39.9% and 46.2%, respectively. The toxicity may be attributed partly, but not solely, to the presence of ammonia in the effluents. Toxic concentrations of residual chlorine were measured in the higher test concentrations of the chlorinated effluent. Chemical analyses indicated the presence of g-BHC (Lindane) in the effluent at a concentration of 0.12 ug/l. This concentration is sufficient to have adversely affected the test organisms, according to published literature.

INTRODUCTION

The City of Daytona Beach (Bethune Point) Sewage Treatment Plant is located on the Halifax River at Shady Place, in the south portion of Daytona Beach, Volusia County, Florida (Fig. 1). This municipal facility treats domestic wastes from a population of approximately 120,000 using contact stabilization, clarification, filtration, dentification and chlorination. Sludge is disposed of on pasture land. A complete schematic flow diagram of this facility is presented in Figure 2. The average discharge from this facility is 14.8 MGD, resulting in hydraulic overloading of the plant's 12.0 MGD design capacity. Discharge (NPDES Outfall #001) is to the Halifax River through a pipe 84' offshore and 5' deep.

To evaluate the existence and extent of toxicity of this effluent to the biota of the receiving waters, the Biological Section performed static acute toxicity bioassays on grab samples, on 10 to 12 March, 1982. The results of these tests are presented in this report.

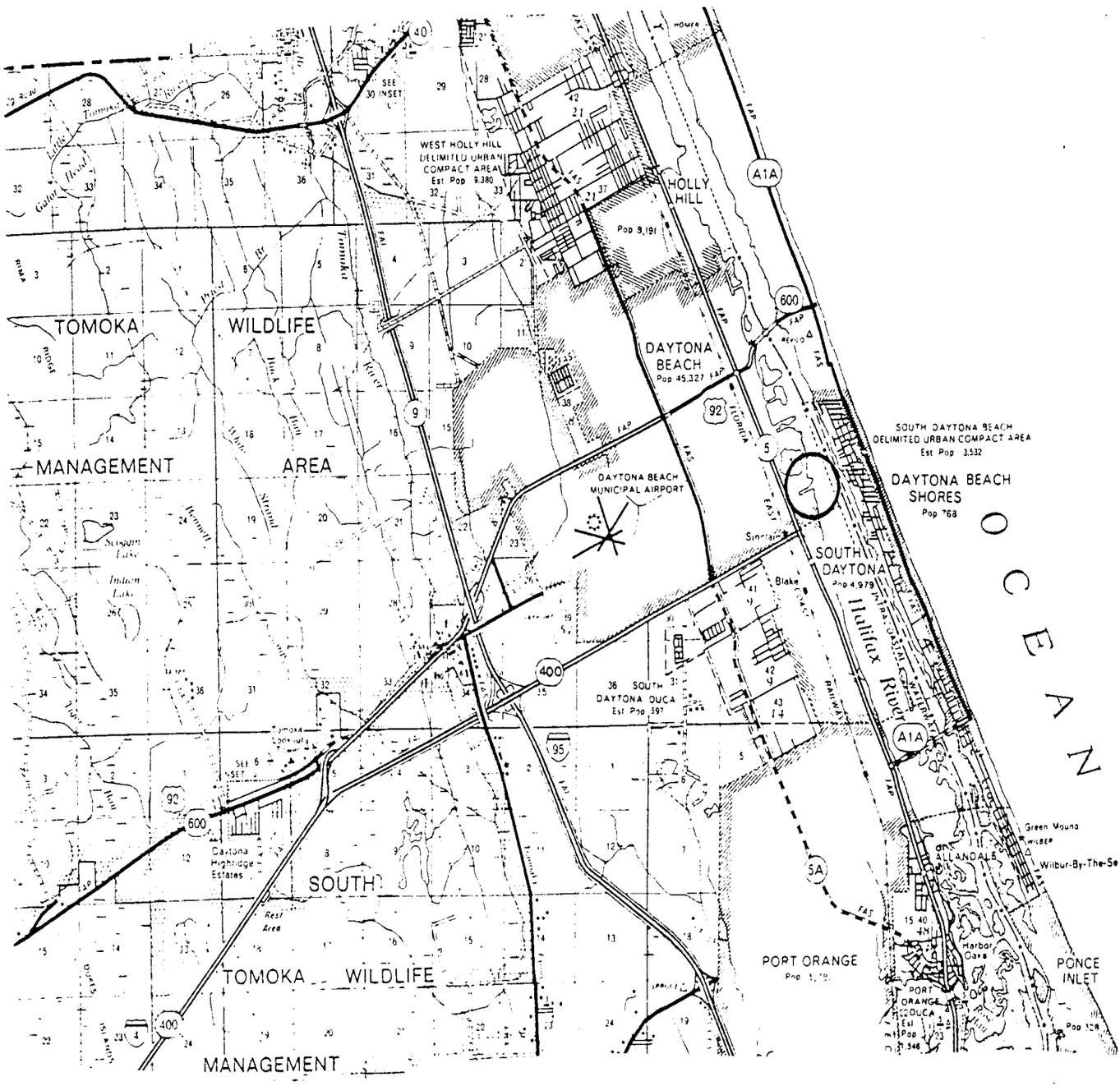


Figure 1. Portions of Volusia County, Florida, including city of Daytona Beach and study area.

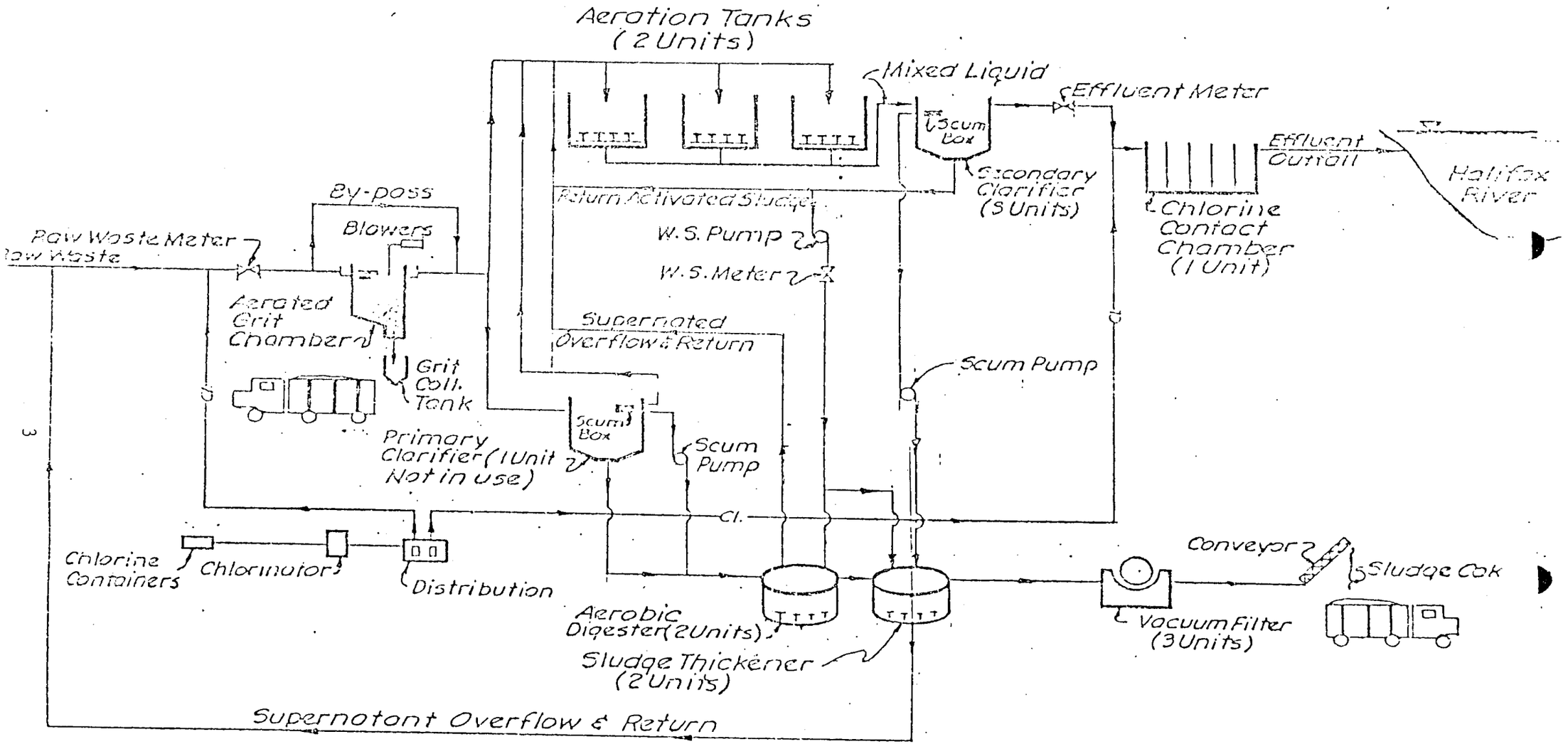


Figure 2

BETHUNE POINT SEWAGE TREATMENT PLANT

SCHEMATIC FLOW DIAGRAM

METHODS AND MATERIALS

Test methods used to conduct these static bioassays are extensively described by Peltier (1978). The organism selected for this study is among those recommended by Peltier (1978) and the U.S.EPA (1978). The life history and maintenance procedures used to culture the organism are detailed below.

History and Maintenance of Bioassay Organisms

Mysidopsis bahia (mysid shrimp) - In September, 1978, approximately 300 adult mysid shrimp were obtained from the EPA laboratory in Gulf Breeze, Florida. The mysids are cultured under a 16:8 hour light-dark cycle in 10 and 15 gallon all glass aquaria equipped with undergravel filtration and aeration. The mysid shrimp are cultured over a wide range of salinities (10-30 ppt) to minimize acclimation periods to low or high salinity effluents. Seawater is obtained from the FSU Marine Laboratory located at Turkey Point, Florida (salinity range 17-31 ppt) and partial water changes are performed weekly. Freshwater, for dilution of the seawater as necessary, is obtained from a deep well near the DER laboratory. The mysids are fed twice daily with freshly hatched Artemia (brine shrimp) and are kept at a constant temperature of 22°C plus or minus 1°. Ten to fifteen day old (three-quarter adult size) mysids were used in this test.

To ensure the uniform sensitivity of these test organisms to toxic substances, the Biological Section conducts monthly standard reference toxicant bioassays using sodium lauryl sulfate as the reference toxicant.

Test Methods

Three separate 48 hour static acute toxicity bioassays were performed on pre-chlorinated and chlorinated samples of effluent from the Daytona Beach (Bethune Point) STP. The tests were performed from 1400 hours on 10 March to 1400 hours on 12 March, 1982.

The samples were collected by Mr. Louis Ley of DER's St. Johns River District at 1600 hours on 9 March, 1982, using standard wastewater sampling procedures. Separate samples were obtained for chemical and biological testing. Samples for metal analysis were preserved with HNO_3. Samples for organic chemical analysis and for the bioassays were unpreserved. The samples were iced and transported to the DER laboratory in Tallahassee for analysis within 24 hours of collection.

To differentiate between the toxicity resulting from chlorine and the toxicity associated with some other component of the effluent, the Biological Section adopted the following test procedure:

Test #1. Pre-Chlorinated Effluent (Table 2). This test was performed on an effluent sample collected at the end of the treatment process but prior to chlorination, and was intended to evaluate the toxicity of the effluent without the added toxic effects of chlorine.

Test #2. Chlorinated Effluent (Table 3). This test was performed on an effluent sample collected at the point of discharge.

Test #3. De-chlorinated Effluent (Table 4). This test was performed on a subsample of the chlorinated effluent sample in which the chlorine had been neutralized. De-chlorination was accomplished by adding a calculated amount of 0.025 N sodium thiosulfate. This test was intended to evaluate the combined toxicity of the effluent and the chlorine reaction products.

Saltwater for dilution of the effluent samples was obtained from the FSU Marine Laboratory at Turkey Point (salinity = 25 ppt). For test concentrations of 56% and below, this diluent was mixed directly with the effluent, achieving a range of final salinities (12 ppt to 23 ppt). For the 100% effluent test concentrations, freshly autoclaved artificial sea salts (Ocean 50®) were added until salinities of approximately 7 ppt were achieved (the lower limit of mysid shrimp salinity tolerance). A series of 5 control groups (Table 5) were then used to ensure that any mortality in the test organisms was not the result of toxic properties associated with the diluent, the artificial sea salts, or the salinity range. The control groups included: Turkey Point seawater (salinity = 25 ppt), artificial sea salt (Ocean 50®) adjusted well water (salinity = 7 ppt), and a salinity control consisting of Turkey Point seawater and well water (salinity = 12 ppt). Additionally, two control groups were added consisting of sea salt adjusted 100% pre-chlorinated sample and sea salt adjusted well water, with their pH's adjusted with hydrochloric acid to the original pH of the sample. Since sea salts increase the pH, thereby increasing the amount of toxic unionized ammonia, these additional controls were necessary to ensure that any mortality was not the result of an artificial rise in pH. The concentration series selected for this study (Table 1) is that recommended by the APHA (1980).

Two replicates of each test concentration and of the controls were used to test with Mysidopsis bahia. Immediately prior to the bioassays, a suitable number of mysids were transferred by net from the 10 ppt, 15 ppt, 20 ppt, and 25 ppt salinity aquaria to culture dishes for observation and selection of individuals for the tests. Ten to fifteen day old (three-quarter adult size) mysids were used in these tests. Individual mysid shrimp were siphoned using a glass tube, carefully examined for injury, and transferred to wide mouth quart jars, each containing 500 ml of the appropriate concentration. For each concentration, the mysid shrimp were pre-acclimated to within 4 ppt salinity. Five organisms were loaded per test chamber, giving ten per concentration. Based on the recommendations of EPA (1978), the mysids were fed brine shrimp (Artemia) nauplii at the rate of approximately 10 to 20 nauplii per mysid per day to minimize cannibalism.

Dissolved oxygen, pH, temperature, and the number of live organisms were recorded for each test chamber at 0 hours, 24 hours, and 48 hours. The salinity of each test concentration was recorded at the beginning and end of the test. Ammonia concentrations, including total and unionized fractions (expressed in mg/l as N and as NH_3, respectively), were recorded in the seawater control and the 100% effluent test concentrations at the beginning and end of the test. Total ammonia concentrations were determined using an Orion® specific ion probe and an Orion Ionalyzer®. The unionized fraction was then determined based on the total ammonia concentrations, and the pH, temperature, and salinity of the sample. These values were recorded on the bioassay data forms and are presented in Tables 2 through 5.

Table 1. Concentration Series and Volumes Used for These Static Bioassays

Mysidopsis bahia (mysid shrimp)

Concentration	Dilution Water	Effluent	Total Volume
Control	500 ml	---	500 ml
5.6%	472 ml	28 ml	500 ml
10.0%	450 ml	50 ml	500 ml
18.0%	410 ml	90 ml	500 ml
32.0%	340 ml	160 ml	500 ml
56.0%	220 ml	280 ml	500 ml
100.0%	---	500 ml	500 ml

Table 2. Data recorded during 48 hour, *Mysidopsis bahia*, static acute toxicity bioassay of Daytona Beach (Bethune Point) Sewage Treatment Plant, Daytona Beach, Volusia County, Florida, NPDES #FL0025984, on 10 to 12 March, 1982.

Test #1. Pre-Chlorinated Sample

Concentration or %	Number of Live Organisms			Dissolved Oxygen (mg/ℓ)			pH			Temperature (°C)			NH_3/NH_3+NH_4 (mg/ℓ)		Salinity (ppt)	
	0	24	48	0	24	48	0	24	48	0	24	48	0	48	0	48
5.6%	5	5	5	8.0	7.0	6.7	7.9	7.8	7.8	19.5	19.5	19.5				
5.6%	5	5	5	8.0	6.9	6.6	7.9	7.8	7.8						23.0	24.0
10.0%	5(4)[a]	4	4	8.0	6.8	6.7	7.9	7.8	7.8	19.5	19.5	19.5				
10.0%	5	5	5	7.9	6.8	6.6	7.9	7.8	7.8						22.0	23.0
18.0%	5	5	5	7.8	6.7	6.3	7.9	7.8	7.8	19.5	19.3	19.2				
18.0%	5	5	5	7.8	6.6	6.3	7.9	7.8	7.8						20.5	21.5
32.0%	5	5	4(5)[a]	7.7	6.8	6.7	7.8	7.8	7.8	19.5	19.3	19.2				
32.0%	5	5	4	7.7	6.8	6.7	7.8	7.8	7.8						17.5	18.0
56.0%	5	4	2	7.7	7.0	7.0	7.7	7.8	7.9	19.6	19.3	19.2				
56.0%	5	3	0	7.7	7.0	7.1	7.6	7.8	7.9						12.0	12.5
100.0%	5	1(2)[a]	0	7.2	7.2	7.3	8.1	8.0	8.1	20.1	19.4	19.2	.35/7.4	.17/3.8		
100.0%	5	3	0	7.1	7.2	7.3	8.0	8.0	8.1						7.0	7.5

Remarks: [a] Numbers in parentheses used in calculations since organisms had jumped from containers.

Table 3. Data recorded during 48 hour, Mysidopsis bahia, static acute toxicity bioassay of Daytona Beach (Bethune Point) Sewage Treatment Plant, Daytona Beach, Volusia County, Florida, NPDES #FL0025984, on 10 to 12 March, 1982.

Test #2 Chlorinated Sample[a]

Concentration or %	Number of Live Organisms			Dissolved Oxygen (mg/ℓ)			pH			Temperature (°C)			NH_3/NH_3+NH_4 (mg/ℓ)		Salinity (ppt)	
	0	24	48	0	24	48	0	24	48	0	24	48	0	48	0	48
5.6%	5	5	5	7.8	7.0	6.8	8.0	7.8	7.8	19.2	19.3	19.0			23.5	24.0
5.6%	5	5	5	7.8	7.0	6.8	8.0	7.8	7.8							
10.0%	5	5	5	7.7	6.9	6.9	8.0	7.8	7.9	19.2	19.0	19.0			22.5	23.0
10.0%	5	5	5	7.7	6.9	6.9	8.0	7.8	7.9							
18.0%	5	5	5	7.7	7.0	7.0	7.9	7.8	7.9	19.0	19.0	19.0			21.0	21.0
18.0%	5	5	5	7.7	7.1	6.9	7.9	7.8	7.9							
32.0%	5	5	5	7.7	7.3	7.0	7.8	7.9	7.9	19.5	19.0	19.0			18.0	18.0
32.0%	5	5	4	7.7	7.4	6.7	7.8	7.9	7.9							
56.0%	5	1	0	7.5	7.8	7.2	7.6	7.9	8.0	19.6	19.0	19.0			12.0	12.5
56.0%	5	0	0	7.4	7.9	7.3	7.6	7.9	8.0							
100.0%	5	0	0	7.2	8.3	7.8	8.0	8.1	8.2	19.7	19.0	19.0	.26/7.1	.21/3.9	7.0	7.5
100.0%	6[b]	0	0	7.2	8.3	7.9	8.0	8.1	8.2							

Remarks:

a Total Residual Chlorine: 5.6% = 0.05mg/1
18.0% = 0.12mg/1
56.0% = 0.38mg/1
100.0% = 0.8mg/1 (HACH DPD Method)

b Extra organism loaded by mistake, allowed to remain.

Table 4. Data recorded during 48 hour, Mysidopsis bahia, static acute toxicity bioassay of Daytona Beach (Bethune Point) Sewage Treatment Plant, Daytona Beach, Volusia County, Florida, NPDES #FL0025984, on 10 to 12 March, 1982.

Test #3 De-Chlorinated Sample[a]

Concentration or %	Number of Live Organisms			Dissolved Oxygen (mg/ℓ)			pH			Temperature (°C)			NH_3/NH_3+NH_4 (mg/ℓ)		Salinity (ppt)	
	0	24	48	0	24	48	0	24	48	0	24	48	0	48	0	48
5.6%	5	5	5	8.0	7.1	6.9	8.0	7.8	7.9	19.2	19.0	19.0				
5.6%	5	5	5	8.0	7.1	6.9	8.0	7.8	7.9						23.5	24.0
10.0%	5	5	5	8.0	7.1	6.9	8.0	7.8	7.9	19.2	19.0	19.0				
10.0%	5	5	5	8.0	7.1	6.9	8.0	7.8	7.9						22.5	23.0
18.0%	5(4)[b]	4	4	7.9	6.9	6.9	8.0	7.8	7.9	19.0	19.0	19.0				
18.0%	5	5	5	7.9	6.9	6.9	8.0	7.8	7.9						20.5	21.5
32.0%	5	5	5	7.9	6.1	7.0	7.9	7.8	7.8	19.0	19.0	19.0				
32.0%	5(4)[b]	4	3	7.9	6.2	7.0	7.9	7.8	7.8						17.5	18.0
56.0%	5	5	1	7.9	6.6	7.2	7.8	7.8	7.9	18.8	19.0	19.0				
56.0%	5(4)[b]	4	0	7.9	6.6	7.2	7.8	7.8	7.9						12.0	12.5
100.0%	5	4	0	7.9	6.8	7.4	8.3	8.1	8.0	19.2	19.0	19.0	.49/7.1	.13/3.8		
100.0%	5	3	1	7.9	6.8	6.2	8.3	8.1	8.0						7.0	7.5

Remarks:

[a] Total Residual Chlorine after de-chlorination: <0.01mg/l (HACH DPD Method)

[b] Numbers in parentheses used in calculations since organisms either jumped from containers or were cannibalized.

Table 5 . Data recorded during 48 hour, Mysidopsis bahia, static acute toxicity bioassay of Daytona Beach (Bethune Point) Sewage Treatment Plant, on 10 to 12 March, 1982.

Control Series

Concentration or %	Number of Live Organisms			Dissolved Oxygen (mg/ℓ)			pH			Temperature (°C)			NH_3/NH_3+NH_4 (mg/ℓ)		Salinity (ppt)	
	0	24	48	0	24	48	0	24	48	0	24	48	0	48	0	48
Seawater Control	5	5	5	7.9	7.2	6.7	7.8	7.7	7.8	19.0	19.7	19.5	0/.04	0/0		
Seawater Control	5	5	5	7.9	7.1	6.7	7.8	7.7	7.8						24.5	26.0
Sea Salts Control	5	5	5	8.7	7.7	7.6	8.5	8.3	8.1	19.7	19.5	19.5				
Sea Salts Control	5	5	5	8.8	7.7	7.6	8.5	8.3	8.1						7.0	7.5
Salinity Control	5(4)[a]	4	4	8.1	7.3	7.5	7.9	7.8	7.9	19.5	19.5	19.5				
Salinity Control	5	5	5	8.3	7.3	7.5	7.9	7.8	7.9						12.0	12.5
Sea Salts pH Adjusted	5	5	5	8.5	7.6	7.6	7.4	7.8	7.9	19.8	19.5	19.5				
Sea Salts pH Adjusted	5	5	4(5)[b]	8.7	7.6	7.6	7.4	7.8	7.9						7.0	7.5
100% Effluent $pH_{Adj.}$[c]	5	1	0	7.1	7.2	7.3	7.4	7.8	7.9	19.7	19.5	19.2	.07/7.4	.11/3.8		
100% Effluent $pH_{Adj.}$	5	2	0	7.0	7.2	7.3	7.4	7.8	7.9						7.0	7.0

Remarks:

[a] Number in parentheses used in calculations since one organism was cannibalized between 0 and 24 hours.
[b] Number in parentheses used in calculations since one organism jumped out between 24 and 48 hours.
[c] Pre-chlorinated effluent used.

Table 6. LC_{50} Data for Bioassay of Daytona Beach (Bethune Point) Sewage Treatment Plant, on 10 to 12 March, 1982.

Organism	Method of Data Analysis	24 LC_{50} and 95% Confidence Intervals	48 Hour LC_{50} and 95% Confidence Intervals
Test #1: M.bahia Pre-chlorinated Sample	Binomial	100% (32 and∞), b	44.4% (32 and 100)
	Moving Average	100% (0 and∞), b	44.8% (36 and 57)
	Probit	91.9% (67 and 236),b	44.8% (36 and 56)
Test #2: M. bahia Chlorinated Sample	Binomial	44.9% (32 and 56)	39.9% (32 and 56)
	Moving Average	a	a
	Probit	a	a
Test #3: M. bahia De-Chlorinated Sample	Binomial	a	42.3% (32 and 56)
	Moving Average	a	45.1% (33 and 62)
	Probit	a	46.2% (35 and 61)

[a] Due to an insufficient number of dead organisms, or to the irregular distribution of mortality, an LC_{50} value cannot be calculated using this method of statistical analysis.

[b] Due to the distribution of mortality, the LC_{50} value calculated by this method of statistical analysis does not meet the criteria established by the Committee on Methods for Toxicity Tests with Aquatic Organisms.

RESULTS AND DISCUSSION

All three samples of effluent from the Daytona Beach (Bethune Point) Sewage Treatment Plant were similarly toxic to the test organism, Mysidopsis bahia. The calculated 48 hour LC_{50} values for the pre-chlorinated effluent were 44.4% to 44.8% (Table 6). The chlorinated effluent was slightly more toxic to the shrimp, with a 48 hour LC_{50} value of 39.9% (Table 6). The de-chlorinated effluent proved to be very similar in toxicity to the pre-chlorinated effluent, with 48 hour LC_{50} values of 42.3% to 46.2% (Table 6). The 96 hour LC_{50}'s for these effluents would be less than or equal to their 48 hour values.

The cause of this toxicity cannot be attributed solely to the presence of total or unionized ammonia. The concentrations of total ammonia determined in these effluents were below the level reported to be toxic to certain aquatic organisms (Thurston and Russo 1981). However, the concentrations of unionized ammonia (.26 to .49 mg/l, Tables 2,3 and 4) were above the level reported as toxic. But, these unionized ammonia concentrations were directly the result of artifically raising the pH by salinity adjusting the 100% effluents. A control was included to ensure that any mortality was not the result of this artifical rise in pH that would result in an artificial rise in toxic unionized ammonia. This control consisted of an 100% pre-chlorinated salinity adjusted sample with its pH adjusted with hydrochloric acid to that of the original sample (Table 5). Since the amount of unionized ammonia is highly dependent upon pH, the concentration of unionized ammonia in this control was determined to be below the reported toxic level. However, all organisms had died in this control by hour 48, identical to the mortality observed in the unadjusted pH sample. This suggests that the mortalities observed in these samples were not caused solely by unionized ammonia, but to additional components of the effluent.

The slightly increased toxicity caused by the chlorinated effluent can likely be attributed to the added toxic effects of the chlorine residual present in this sample. Chlorine residuals of 0.38 mg/l and 0.8 mg/l measured in the 56% and 100% test concentrations of this effluent (Table 3) are above the level reported as toxic to certain aquatic organisms (U.S. EPA 1976). The toxicity of the de-chlorinated sample (Table 4), equal to the toxicity of the pre-chlorinated sample, again cannot be attributed to a single factor, but may be due in part, to the presence of ammonia (as discussed above).

The DER Chemistry Section has chemically characterized a sample of this effluent for metals and organics, the results of which are presented in Table 7. The results of the organic analyses indicated the presence of g-BHC (Lindane) at a concentration of 0.12 ug/l. The specific toxicity of Lindane to the mysid shrimp is unknown, however, a 96 hour LC_{50} of 0.17 ug/l was determined for the pink shrimp, Penaeus duorarum, and a 48 hour LC_{50} of 0.4 ug/l was determined for the brown shrimp, Penaeus aztecus (U.S. EPA 1976). Based on these data, the concentration of 0.12 ug/l Lindane determined in this effluent may have had an adverse effect on the test organisms.

The metal analyses detected zinc in the effluent, at a concentration of 33 ug/l (Table 7). This concentration is considerably lower than the levels reported to be acutely toxic to certain aquatic organisms (U.S. EPA 1976).

The toxicity, therefore, of these effluent samples may be attributed, in part, to the presence of ammonia and Lindane, and to chlorine residual in the chlorinated sample.

DISCUSSION OF THE TOXICITY CRITERIA

The toxicity standards of Chapters 17-3 and 17-4, F.A.C., are complex. Because of this complexity, they will be briefly reviewed here so that these test results may be more readily compared with the standards. For legal purposes, however, the language of the Florida Administrative Code should be consulted directly.

The two basic concepts utilized in the standards are acute and chronic toxicity, (defined in 17-3.021(1) and (3), respectively). Simplifying the actual F.A.C. language somewhat, acute toxicity is defined as the presence of a substance in a concentration one-third as great as that concentration which kills one-half of the test organisms in 96 hours, i.e., one-third of the 96 hour LC_{50}. Chronic toxicity is similarly defined as one-twentieth of the 96 hour LC_{50}. Therefore, if a test solution kills one-half or more of a group of test organisms in 96 hours, it must contain at least three times the defined "acutely toxic" concentration and at least twenty times the "chronically toxic" concentration of some sustance or substances. If a test solution causes that same mortality in less than 96 hours, (for example, in 24 or 48 hours), it is at least as toxic as the example given above, and actually is probably considerably more toxic.

The particular restrictions applied to a given discharger depend upon the existence of a mixing zone, whether as a specific part of the permit or based on the existence of a currently valid permit predating the language in Chapter 17-4 requiring mixing zone designation. In the absence of a mixing zone, the general criteria for surface waters (17-3.061) are applicable at all points, beginning at the point of discharge. This section prohibits the discharge of substances in concentrations which are chronically toxic (17-3.061(2)(o)); that is the concentrations cannot exceed one-twentieth of the 96 hour LC_{50} as discussed above. If a mixing zone does exist, then this chronic toxicity standard is only applicable from the edge of the mixing zone and beyond. Within the mixing zone, the less stringent acute toxicity standard of the minimum criteria for all waters (17-3.051(1)(d)) applies: one-third of the 96 hour LC_{50}. The acute toxicity standard does not apply, however, to each point within a mixing zone, but rather to the average of a number of points within a mixing zone, based on the provisions of the surface water mixing zones section of Chapter 17-4 (17-4.244(4)). At the same time, though, this same rule prohibits waste concentrations within the mixing zone (i.e., at any point within the mixing zone), from exceeding the 96 hour LC_{50}. Therefore, at any point within a mixing zone, including the point of discharge, one-half of the test organisms cannot be killed in 96 hours.

From the above discussion, it should be clear that if the least stringent toxicity standard, the 96 hour LC_{50}, is exceeded at any point, from the point of discharge outwards, by any discharger, then a violation of the standards has occurred. This is an important consideration since the test procedure here reported involves the measurement of the 50% lethal concentration, and not some fraction of that concentration. Any discharger required to meet the one-twentieth of the 96 hour LC_{50} standard is therefore being tested very leniently. Any reduction in the test period from 96 hours provides an added degree of leniency to a discharger.

A number of different dilutions were examined in order to determine by how much, if any, the discharge exceeds the 96 hour LC_{50} standard. For example, if the sample, after two-fold dilution with diluent (a 33% concentration), kills one-half of the test organisms after 96 hours, then the sample is three times as toxic as is allowed by that standard. Similarly, if a 5% solution of the sample kills 50% of the organisms, the sample is twenty times as toxic as is allowed. Toxicities are reported here in that manner, i.e., in terms of the percentage dilution of the test sample. The smaller the percentage which is reported means a correspondingly greater toxicity.

Note that even if a discharger receives a very large mixing zone, the regulations require that the maximum toxicity at any point within the mixing zone be restricted to the 96 hour LC_{50}. The results here reported are based on actual effluent samples, representative of the effluent concentration which enters waters of the state at the point of discharge. If it is demonstrated that, under the conditions existing at the point of discharge, effluent concentrations will be less than at the actual sampling point (if the two points are different), the reported bioassay results will reflect the reduced discharge concentration.

With respect to the species of organisms used in these tests, the language of the F.A.C. indicates that they should be "significant to the indigenous aquatic community". All species used in these tests are significant to the indigenous aquatic community since they are sensitive to toxic substances which may be expected to impact the indigenous community.

The toxicity reported here is in excess of allowable limits.

Table 7. Results of Chemical Analyses Performed on Effluent from the Daytona Beach Sewage Treatment Plant, NPDES #FL0025984, collected on March 9, 1982.

Organics

Acid Extractables:	None Detected
Base Neutral Extractables:	None Detected
Pesticide Extractables:	g-BHC (Lindane) 0.12µg/l

Metals

Antimony	None Detected
Arsenic	None Detected
Beryllium	None Detected
Cadmium	None Detected
Chromium	None Detected
Copper	None Detected
Lead	None Detected
Mercury	None Detected
Nickel	None Detected
Selenium	None Detected
Silver	None Detected
Thallium	None Detected
Zinc	33µg/l

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