DIAGNOSTIC EVALUATION
CORNELIA WASTEWATER TREATMENT PLANT
CORNELIA, GEORGIA
MARCH 20-24, 1995

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region IV

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- SECTION 1 -

Introduction

During March 20-24, 1995, representatives of the EPA, Region IV, Environmental Services Division and the Georgia Environmental Protection Division (EPD) conducted a Diagnostic Evaluation (DE) at the Cornelia Wastewater Treatment Plant (WWTP) in Cornelia, Georgia. The DE was requested by the Water Management Division and was conducted in support of the Municipal Water Pollution Prevention (MWPP) Program. The WWTP had experienced performance problems and was operating under a Consent Order which expired on July 31, 1995. The WWTP has been unable to achieve ammonia reductions and will be required to meet effluent NH_3-N limitations upon the expiration of the Consent Order.

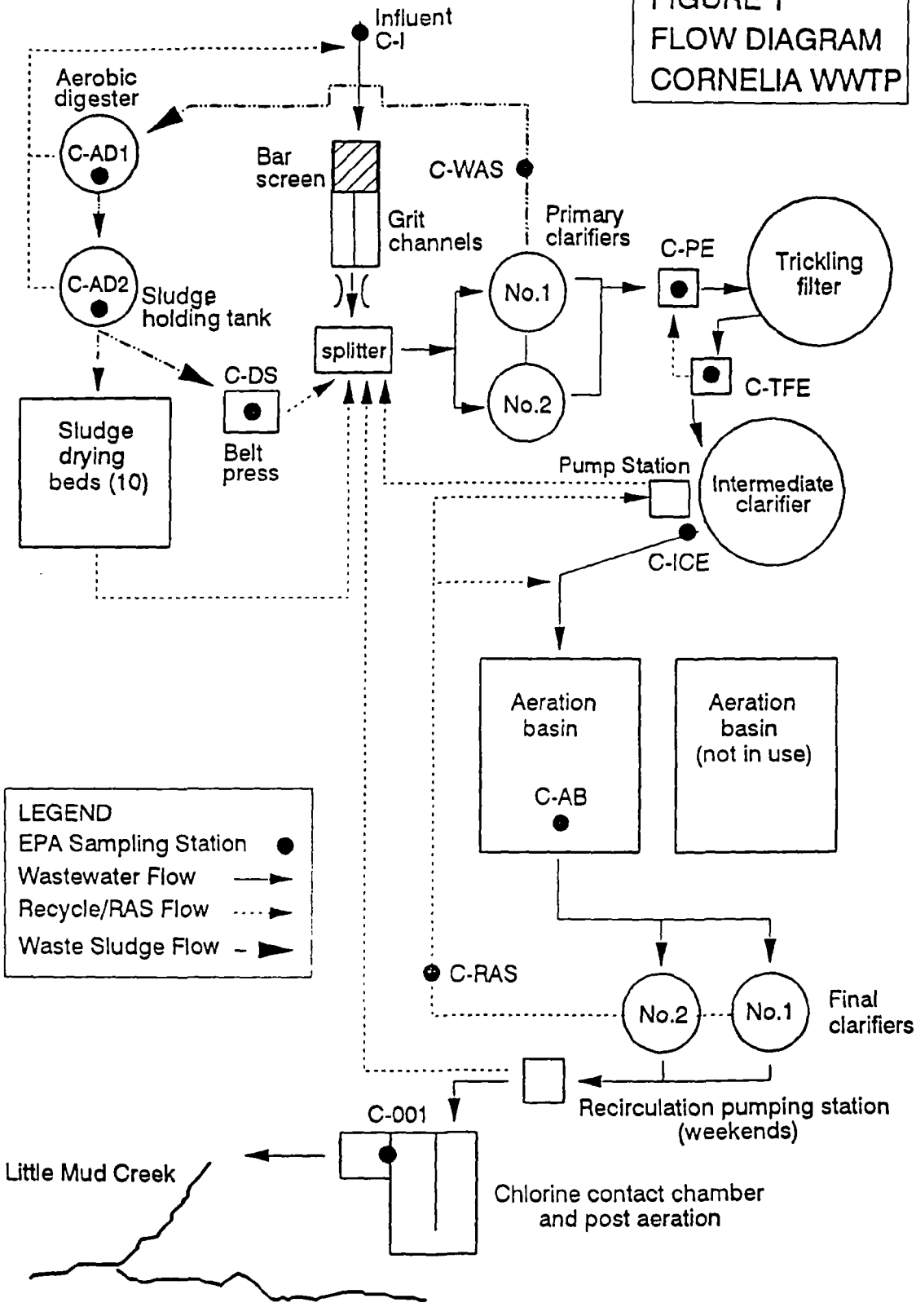
The 3.0 mgd (design) WWTP consists of screening/grit removal units, two primary clarifiers, two trickling filters (one in operation), one intermediate clarifier, two aeration basins (one in operation), two final clarifiers, one chlorine contact chamber, and post aeration. Waste sludge is stabilized in two anaerobic digesters and dewatered on 20 sand drying beds. Treated wastewater is discharged through outfall 001 into the South Fork of Little Mud Creek. A flow diagram of the WWTP is shown in Figure 1.

Objectives

The objectives of the DE were to:

- Evaluate the overall operations of the WWTP including process control testing, operating strategies, and all routine sampling and analyses.
- Review past records of plant performance and historical plant data.
- Characterize the influent, intermediate, and effluent wastewater streams.
- Conduct process control testing of the biological treatment process and collect in-plant samples.

FIGURE 1
FLOW DIAGRAM
CORNELIA WWTP



2A

- Evaluate the organic and hydraulic loadings to unit processes and compare the results with accepted design criteria.

- Evaluate the facility's pretreatment program.

Participants in the study were:

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- SECTION 2 -

Summary of Findings

1. From March 1994 through February 1995, the effluent NH_3-N concentrations ranged from 18 to 42 mg/l. These concentrations far exceed the proposed future monthly average NH_3-N limit of 1.5 mg/l. The proposed NH_3-N limits will take effect upon the expiration of the Consent Order (6/30/95). The city manager has filed for an extension of the Consent Order.

2. The City has contracted with Piedmont, Olsen, and Hensley, Inc., of Atlanta to upgrade the existing facility to achieve ammonia reductions to within the proposed permit limits and eventually remove phosphorus. A detailed listing of the proposed upgrades is included in Section 4 of this report.

3. A summary of the WWTP self-monitoring data from March 1994 through February 1995 indicated that the plant effluent was generally within NPDES permit limits. Several permit excursions occurred during July through September 1994 for BOD_5, TSS, dissolved oxygen, and pH.

4. The maximum average monthly flow during March 1994 through February 1995 was 2.33 mgd, which was approximately 78 percent of the 3 mgd design flow. During the weekdays, the WWTP receives approximately 60 percent industrial flow from 11 industrial users. The largest volume of flow originates from Fieldale Farms, a poultry processing and rendering facility. During the weekends, the influent wastewater originates from primarily domestic sources.

5. Fieldale Farms installed a new pretreatment system, consisting of ultra-filtration (UF) units, which was scheduled to start up during the summer of 1994. Due to numerous design problems, the start-up was continuously delayed and the UF system has recently been abandoned. A conventional dissolved air flotation (DAF) system will reportedly replace the UF system with testing to begin by September of 1995.

6. An overall summary of the EPA sampling results is as follows:

   The final effluent BOD_5 and TSS concentrations were <4 and 5.5 mg/l, respectively, indicating good carbonaceous biological

treatment. The plant effluent was within NPDES permit limits for these parameters. The monthly and weekly average permit limits are 30 and 45 mg/l, respectively, for both parameters.

- The NH_3-N concentration was reduced from 57 to 40 mg/l through the activated sludge process, indicating that very little nitrification occurred.

- Twelve metals were detected in the final effluent, including three priority pollutants: nickel (7 ug/l), zinc (56 ug/l), and mercury (0.23 ug/l).

- The BOD_5, TSS, and NH_3-N concentrations from Fieldale Farms were 320, 100, and 31 mg/l, respectively. The NH_3-N concentration originating from Ethicon, the second largest industrial user, was significantly higher (130 mg/l, estimated). Ethicon discharges approximately 0.13 mgd, which is less than 10 percent of the daily flow to the WWTP.

7. The BOD_5 and TSS removals in the primary clarifiers of 22 and 31 percent, respectively, were less than the typical removals expected. This may have been due to high surface overflow rates caused by unmeasured flow splits to each clarifier and/or a high solids loading due to the large volume of recycle flow which was pumped upstream of the primary clarifiers. The recycled wastewater included the intermediate and final clarifier waste sludge, the belt press filtrate, and the filtrate from the sludge drying beds.

8. The BOD_5 removals through the trickling filter were higher than the typical removals expected. Observations during the DE indicated a good, healthy biological growth on the filter media, good flow distribution, and no strong odors or filter ponding.

9. The activated sludge system was operated with a high mean-cell-residence-time (MCRT), a high detention time, and a slightly low food-to-microorganism (F/M) ratio for combined trickling filter/activated sludge systems. The measured F/M ratio of 0.47 was slightly less than the recommended range of 0.5-1.2. However, the low F/M ratio did not appear to adversely affect BOD_5 removals. The MCRT of 8-13 days exceeded the recommended range of 2-6 days. The detention time of 6.7 hours also exceeded the recommended detention time of 2-4 hours.

- SECTION 3 -

Recommendations

1. Flow equalization should be strongly considered so that flows and subsequent loadings into the biological treatment process are consistent at all times, particularly during weekends when Fieldale Farms is closed.

2. All industrial contributions should be carefully monitored. A reliable pretreatment system for Fieldale Farms is imperative if adequate and consistent biological treatment is expected at the City's WWTP.

3. An evaluation of the overall operating parameters and EPA process control tests indicates that for the current system, the operating staff should consider gradually decreasing the MCRT, while carefully increasing the aeration basin DO levels. For the aeration basin, the minimum recommended DO levels for nitrification are between 2-3 mg/l. The oxygen requirements should be evaluated and additional aeration equipment may be necessary until the upgrades are complete.

4. Once the MCRT is lowered in the activated sludge process, and the aeration basin DO concentrations are increased to provide for nitrification, the return sludge flow should be increased significantly to prevent denitrification from occurring in the final clarifiers. The return sludge flow should be maintained between 75-150 percent of plant flow. Careful monitoring of the sludge blanket depths will also be imperative.

5. Once nitrification begins to occur, the alkalinity requirements should be carefully monitored and the magnesium hydroxide feed rates adjusted accordingly. The influent into the aeration basin should be sampled regularly for alkalinity. Approximately 7.14 mg/l of alkalinity is required per 1 mg/l of NH_3-N removed.

6. The facility should consider providing a means of measuring flow for the following in-plant streams:

   - Intermediate clarifier and final clarifier sludge recycles to the primary clarifier.
   - Influent into each primary clarifier. This would provide a more accurate means of directing the appropriate flow splits between the primary clarifiers.
   - Recirculation to the trickling filters.

7. The WWTP staff should consider sampling the influent on the weekends to determine the weekend wastewater characteristics.

- SECTION 4 -

Plant Performance/Pretreatment/Upgrades

- Plant Performance: March 1994 - February 1995

A summary of the WWTP self-monitoring data for the conventional parameters, reported from March 1994 through February 1995, is shown in Table 4-1. The overall data indicated that the plant effluent was generally within NPDES permit limits for the conventional parameters. During this reporting period, permit excursions occurred for BOD_5, TSS, DO, and pH as follows:

- The monthly average BOD_5 concentration during August 1994 of 36 mg/l exceeded the permit limit of 30 mg/l while the TSS concentration of 39 mg/l exceeded the permit limit of 30 mg/l.

- The minimum effluent DO concentrations during July, August, and September were 5.8, 5.6, and 4.4 mg/l, respectively. These DO concentrations were below the minimum permit limit of 6.0 mg/l.

- The minimum pH values during July and August 1994 of 3.8 and 3.6 standard units (SUs), respectively, were below the minimum permit limit of 6.0 SUs.

The maximum of the average monthly flows during March 1994 through August February 1995 was 2.33 mgd, which was approximately 78 percent of the 3 mgd design flow. During the weekdays, the WWTP receives approximately 60 percent industrial flow. During the weekends, the influent wastewater originates from primarily domestic sources.

From March 1994 through February 1995, the effluent NH_3-N concentrations ranged from 18.2 to 41.9 mg/l. Partial NH_3-N reductions occurred during June through November 1994. During March, April, and May 1994 and February 1995 the NH_3-N concentrations increased through the treatment process, indicating that the influent organic nitrogen was possibly being converted to NH_3-N in the process.

The effluent NH_3-N concentrations far exceeded the proposed future monthly average NH_3-N limit of 1.5 mg/l. The proposed limits will take effect upon the expiration of the Consent Order (6/30/95). The city manager has filed for an extension of the Consent Order.

Table 4-1
Summary of Self-Monitoring Data
Cornelia WWTP
Cornelia, Georgia

Month	Influent Flow	Influent pH (SUs)		Effluent pH (SUs)		Influent (mg/l)			Effluent (mg/l)		
	mgd	Min	Max	Min	Max	BOD	TSS	Ammonia	BOD	TSS	Ammonia
March 94	2.10	6.6	9.8	6.6	7.7	355	136	12.6	30	21	24.5
April	2.12	5.2	9.0	6.1	7.7	353	136	22.2	22	15	24.4
May	2.15	7.1	9.9	7.0	7.6	232	103	20.9	10	7	27.3
June	2.31	6.3	9.1	6.3	7.8	262	160	37.7	16	12	33.1
July	2.18	6.3	8.1	3.8	7.4	257	146	55.4	22	18	28.1
August	2.33	6.7	8.9	3.6	7.7	264	132	38.3	36	39	18.2
September	2.00	6.9	9.1	6.7	7.7	361	190	36.4	23	26	18.7
October	1.95	6.8	9.1	6.9	7.6	252	96	37.8	10	9	36.2
November	1.79	6.9	9.0	6.0	7.5	280	130	40.2	9	10	32.8
December	1.82	7.1	12.7	6.6	8.0	356	135	42.4	11	9	41.9
January 95	1.99	6.8	10.1	6.3	7.4	395	99	37.7	9	6	35.6
February	2.09	6.9	9.5	6.2	7.7	322	117	25.5	9	8	39.7
Permit Limits[1]	3.0/ 3.8			6.0	9.0				30/ 45	30/ 45	1.5/ 2.3

[1]Except for pH, permit limits are monthly/weekly averages. Flow and pH limits are from Consent Order. NH_3-N limits are from the future permit and are not currently effective.

Table 4-1 (continued)
Summary of Self-Monitoring Data
Cornelia WWTP
Cornelia, Georgia

Month	Effluent D.O. (mg/l)	Effluent TRC (mg/l)	Effluent Fecal Coliform (Col/100 ml)
	Minimum	Maximum	
March 94	6.6	0.9	93.4
April	6.4	1.0	61.5
May	6.0	0.9	38.7
June	6.0	1.4	152.2
July	5.8	0.4	170.9
August	5.6	1.0	69.3
September	4.4	1.9	69.4
October	6.2	1.3	109.9
November	6.3	0.9	73.9
December	7.0	1.3	72.1
January 95	6.4	0.8	19.8
February	7.9	1.2	22.8
Permit Limits	6.0	REPORT	200 monthly avg. 400 weekly avg.

The average monthly BOD_5, TSS, and NH_3-N influent concentrations are also shown in Table 4-1. The average monthly influent BOD_5 concentration ranged from 232 to 395 mg/l during the 12-month period. Domestic influent BOD_5 concentrations from 220 to 400 mg/l are generally considered to be of medium to high strength[1]. The average monthly influent NH_3-N concentration ranged from 12.6 to 55.4 mg/l. Medium to high strength influent NH_3-N concentrations range from 25-50 mg/l[1]. The high strength concentrations for BOD_5 and NH_3-N were attributed to the high percentage of industrial flow.

Pretreatment

During the weekdays, the WWTP receives approximately 60 percent industrial flow from 11 industrial users. The largest volume of flow originates from Fieldale Farms, a poultry processing and rendering facility. A list of the industrial users is included in Appendix E. As part of the DE, the pretreatment facility at Fieldale Farms was visited by EPA. The existing treatment plant at Fieldale consisted of screening, grease removal, flow equalization, and solids separation with four quadracell solids separators. The solids from the quadracell units were hauled to the Habersham County Landfill for final disposal, while the pretreated wastewater was discharged into the city's collection system for further treatment.

A new pretreatment system, consisting of ultra-filtration (UF) units, was scheduled to start up during the summer of 1994. Due to numerous design problems, the start-up was continuously delayed and most recently, the UF system has been abandoned. A conventional dissolved air flotation (DAF) system will reportedly replace the UF system with testing to begin by September of 1995. The city manager has filed for an extension of the Consent Order until Fieldale begins operation of their replacement pretreatment facility.

During the DE, grab samples were collected by EPA from the discharges from Fieldale Farms and Ethicon. The results are included in Appendix D. The BOD_5, TSS, and NH_3-N concentrations from Fieldale were 320, 100, and 31 mg/l, respectively. The NH_3-N concentration originating from Ethicon was significantly higher (130 mg/l, estimated). Ethicon discharges approximately 0.13 mgd, which is less 10 percent of the daily flow to the WWTP.

- Scheduled Improvements and Upgrades

The city has contracted with Piedmont, Olsen, and Hensley, Inc., of Atlanta to upgrade the existing facility to meet ammonia limits and eventually remove

phosphorus. The proposed upgrades are summarized in a December 1994 "Design Development Report"[5] prepared by Piedmont, Olsen, and Hensley. The proposed upgrades are as follows:

- Addition of a new mechanical bar screen with 3/4-inch openings, upstream of the existing manual bar screen.
- Addition of an 18-inch Parshall flume downstream of the new mechanical bar screen.
- Intermediate and final clarifier sludge pumping directly to the digesters, rather than upstream of the primary clarifiers.
- Addition of baffles in the primary clarifiers to prevent short-circuiting.
- Removal of the existing trickling filter from the process train.
- Conversion of the existing intermediate clarifier into a "pre-aeration" basin.
- Addition of a lime feed system to provide the alkalinity required for nitrification.
- Conversion of the existing two aeration basins into a total of six treatment "cells." The concrete walls will be repaired and the electrical power distribution system will be modified.
- Addition of jet aeration equipment to provide the necessary oxygen to the aeration basins.
- Addition of new return sludge pumps to increase the pumping capacity required for extended aeration systems.
- Addition of new tertiary sand filters downstream of the recirculation pumping station. The existing recirculation pumping station will feed the new effluent tertiary sand filters.
- Addition of two sand drying beds for sludge dewatering. One portable belt filter press will be available on an as-needed basis to provide supplemental sludge dewatering.

- SECTION 5 -

EPA Sampling Results

▸ Description of EPA Sampling Stations

The EPA sampling stations are listed in Table 5-1 and are presented in Figure 1 (page 2). Composite samples were collected of the raw influent, the primary clarifier effluent, the trickling filter effluent, the intermediate clarifier effluent, and the final effluent. The composite samples were collected over two 24-hour periods during March 20-22, 1995. Grab samples were collected at the remaining stations.

A complete description of the EPA sampling methods, sampling equipment, and analytical parameters is listed in Appendix A. A complete listing of all EPA analytical results is attached in Appendix D.

▸ EPA Analytical Results: Conventional Pollutants

The EPA analytical results for the conventional pollutants are presented in Table 5-2. The data for the primary effluent, trickling filter effluent, intermediate clarifier effluent, and final effluent are the average of two composite samples collected during March 20-22, 1995. The data for the raw influent are the average of a combination of single grab samples and composite samples as indicated in the footnotes of Table 5-2. The following is a summary of the EPA sampling results:

- The raw influent concentrations for BOD_5, COD, and alkalinity of 293, 575, and 237 mg/l, respectively, were reflective of a medium to high strength wastewater. Domestic influent BOD_5 concentrations ranging from 220 to 400 mg/l are generally considered to be of medium to high strength.[1] Influent COD concentrations ranging from 500 to 1000 mg/l are considered to be of medium to high strength.[1] Domestic influent alkalinity concentrations greater than 200 mg/l are considered to be high strength.[1] The strength of the influent wastewater may be attributed to the high percentage of industrial flow.

- The alkalinity concentrations were 280 mg/l in the primary clarifier effluent and 315 mg/l in both the trickling filter and intermediate clarifier effluents. Approximately 200 lbs/day of magnesium hydroxide

Table 5-1
EPA Sampling Stations
Cornelia WWTP

EPA Station ID	EPA Station Location
C-I	Raw Influent, upstream of bar screen
C-PE	Primary Clarifier Effluent
C-TFE	Trickling Filter Effluent
C-ICE	Intermediate Clarifier Effluent
C-001	Final Effluent
C-AB	Aeration Basin
C-RAS	Return Activated Sludge
C-WAS	Waste Sludge
C-AD1	Aerobic Digester No. 1
C-AD2	Aerobic Digester No. 2
C-RFP, C-REC	Recycle from Belt Filter Press
C-DS	Dewatered Sludge from Belt Press
P-F	Pretreatment Discharge from Fieldale Farms
C-ET	Pretreatment Discharge from Ethicon
C-LE	Leachate from landfill adjacent to WWTP

Table 5-2
EPA Analytical Results
Conventional Pollutants

PARAMETER	RAW INFLUENT (C-I)	PRIMARY EFFLUENT (C-PE)	TRICKLING FILTER EFFLUENT (C-TFE)	INTERMEDIATE CLARIFIER EFFLUENT (C-ICE)	FINAL EFFLUENT (C-001)
	mg/l	mg/l	mg/l	mg/l	mg/l
BOD_5	293[a]	230	115	70	4[u]
$sBOD_5$	230[a]	180[c]	44[c]	40[c]	2.5[u,c]
Alkalinity	237[a]	280	315	315	245
TSS	127[a]	87	140	40	5.5
NH_3-N	21[b]	43	60	57	40
NO_3-NO_2	0.42[b]	0.28	<0.31	0.44	4.2
TKN	52[b]	57	62	60	53
T-P	6.5[b]	8.0	7.9	7.1	6.1
COD	575[b]	420[c]	--	--	26[c]
Oil & Grease	12[b]	--	--	--	5[u]
pH (SU)	6.6-9.6[d]	8.1	7.7	7.6	6.9-7.3[e]
Temperature (^oC)	22	22	22	20	16.99-18.76[e]

Except where indicated, the results are the average of two 24-hour composite samples collected 3/20-22/95. [a]Average of one grab (3/21/95) and two composites (3/21-22/95). [b]Average of two single grab samples collected 3/21 and 3/22/95. [c]From single composite sample (3/20-21/95). [d]From continuous recording pH meter for 3/20-22/95. [e]From Hydrolab continuous monitor 3/20-21/95. [u]The material was analyzed for but not detected. The number shown is the minimum quantitation limit.
-- Not analyzed.

was added upstream of the primary clarifiers to provide additional alkalinity.

- The NH_3-N concentrations increased from 21 mg/l in the raw influent to 60 and 57 mg/l in the trickling filter effluent and intermediate clarifier effluent, respectively. These increases were due to the conversion of organic nitrogen to NH_3-N. The final effluent NH_3-N concentration was 40 mg/l, indicating that very little nitrification occurred through the activated sludge process.

- The BOD_5 concentration was reduced from 293 mg/l in the raw influent to 115 mg/l in the trickling filter effluent and 70 mg/l in the intermediate clarifier effluent.

- The soluble BOD_5 concentration was reduced from 230 mg/l in the raw influent to 44 mg/l in the trickling filter effluent and 40 mg/l in the intermediate clarifier effluent. This indicated good carbonaceous BOD_5 removal through the trickling filters.

- The final effluent BOD_5 and TSS concentrations were <4 and 5.5 mg/l, respectively, indicating good carbonaceous biological treatment throughout the WWTP. The plant effluent was within NPDES permit limits for these parameters. The monthly and weekly average permit limits are 30 and 45 mg/l, respectively, for both parameters.

- The raw influent total phosphorus concentration of 6.5 mg/l remained virtually unchanged throughout the treatment process as the final effluent concentration was 6.1 mg/l.

- The raw influent pH ranged from 6.6 to 9.6 standard pH units (SUs). The final effluent pH ranged from 6.9 to 7.3 SUs. The pH limits from the Administrative Order were 6 to 9 SUs.

- The effluent dissolved oxygen (DO) concentrations ranged from 6.81 to 7.05 mg/l while the effluent temperature ranged from 16.99 to 18.76°C.

- EPA Analytical Results: Metals

The EPA analytical results for metals are presented in Table 5-3. The overall results did not indicate significant concentrations or trends for any of the metals. Except for the raw influent, the results are the averages of two 24-hour composite samples collected during March 20-22, 1995. The results for the raw influent are from two single grab samples collected March 21 and 22, 1995. A complete listing of the analytical results for these parameters and the corresponding minimum detection limits are included in Appendix D. The following is a summary of the EPA sampling results for these parameters:

- Sixteen metals were detected in the raw influent, including five priority pollutants. The highest influent priority pollutant metal was zinc at 95 ug/l. The metal with the highest concentration in the influent was sodium at 68 mg/l. The influent metals concentrations were below levels which have been shown to be inhibitory to activated sludge processes.[4]

- Twelve metals were detected in the final effluent, including three priority pollutants: nickel (7 ug/l), zinc (56 ug/l), and mercury (0.23 ug/l).

Table 5-3
EPA Analytical Results
Metals

PARAMETER	INFLUENT (C-I)[a]	Toxic Level[b]	FINAL EFFLUENT (C-001)
	ug/l	ug/l	ug/l
Barium	21		3.2
Chromium**	52[c]	2000	--
Copper**	18	1000	--
Molybdenum	20		25
Nickel**	12	1000	7.0
Strontium	61		29
Titanium	10		--
Zinc**	95	1000	56
Mercury**	0.28	2	0.23
Aluminum	795		66
Manganese	58	1000	69
	mg/l	mg/l	mg/l
Calcium	45		16
Magnesium	3.2		14
Iron	0.86	35	0.09
Sodium	68		54
Potassium	28		24

[a]Average of two single grab samples collected 3/21/95 and 3/22/95. [b]Concentrations which may adverserely affect the activated sludge process at continuous loadings.[4] [c]From single grab sample collected 3/21/95. -- The material was analyzed for but not detected. The minimum quantitation limit is shown in Appendix D. ** Priority pollutant.

- SECTION 6 -

Wastewater Treatment Unit Processes

▸ Preliminary Treatment

The preliminary treatment units consisted of one manually cleaned bar screen with 1/4-inch openings and dual grit channels for grit removal. The bar screen was checked once per hour and cleaned as necessary. The grit was manually removed from the grit channels once per week. The screenings and grit were disposed of in the Habersham County Landfill.

Chlorine was added at a rate of 50 lbs/day upstream of the bar screen for odor control. Digester supernatant was also returned upstream of the bar screen. Oxygen was provided at the upstream end of the grit channels with a diffused air system for odor control. The influent pH was monitored with a continuous recording pH meter at the downstream section of the grit channel.

Influent wastewater flow was measured downstream of the grit channel with a 9-inch Parshall flume in conjunction with a TN Technologies flow meter and a Chessel 24-hour chart recorder. An EPA installed ISCO Model 3230 flow meter averaged 2.61 mgd during the period 3/20-22/94. The WWTP flow meter averaged 2.41 mgd during this same period, which was approximately 8 percent lower than the EPA measured flow. The EPA accepted accuracy range for flow measuring devices is ± 10 percent of actual flow.

▸ Primary Clarifiers

Wastewater from the grit channels was split between to circular, center feed, rim take-off primary clarifiers. Clarifier No. 1 was 55 feet in diameter and 8 feet deep. Clarifier No. 2 was 46 feet in diameter and 5 feet deep. The only control of flow splits between the primary clarifiers was by manually adjusting gate valve settings.

Recycle flows upstream of the primary clarifiers included combined intermediate and final clarifier waste sludge, belt press filtrate, and recirculation from the final clarifiers (weekends only). There was no method of determining the daily volume of in-plant recycles.

Approximately 200 pounds per day of magnesium hydroxide was added upstream of the primary clarifiers to provide additional alkalinity.

Sludge and surface scum from the primary clarifiers were pumped to the No. 1 digester with one 75 gpm piston pump and one variable speed auger pump (160 gpm maximum). The primary clarifier sludge blanket depths were maintained at a target level of ≤ 1 foot.

The primary clarifier operating parameters are shown in Table 6-1. The parameters were based on the EPA sampling results, the estimated total flow to both clarifiers (the flow to each clarifier was not measurable), and the total capacity of the clarifiers. The ranges shown in Table 6-1 for the detention time and the surface overflow rate were calculated using estimated recycle flows with one and two intermediate clarifier sludge pumps operating continuously.

The detention time of 1.5-1.7 hours was within the typical range of 1.5-2.0 hours.[1] The maximum possible surface overflow rate of 824 gpd/sq-ft exceeded the typical range of 589-786 gpd/sq ft.[1] However, this was calculated assuming that both intermediate clarifier return sludge pumps were operating continuously, which is generally not the case. Therefore, the calculated maximum surface overflow rate was higher than the actual overflow rate.

The BOD_5 and TSS removals of 22 and 31 percent, respectively, were less than the typical removals expected. This may have been caused by the problem of unknown flow splits to each clarifier and the additional loadings from the recycled intermediate and final clarifier sludge. If a flow measurement system were located upstream of each primary clarifier, it would allow for appropriate flow splits to each clarifier.

Table 6-1
Primary Clarifier Operating Parameters
Cornelia WWTP

Parameter	Measured Value	Recommended
Detention Time (hrs)	1.5[a] 1.7[b]	1.5-2.0[c]
Surface Overflow Rate (gpd/sq-ft)	713[b] 824[a]	589-786[c]
Percent BOD_5 Removal	22	25-35[d]
Percent TSS Removal	31	50-65[d]

[a]Two 250-gpm intermediate clarifier return sludge pumps operating continuously
[b]One 250-gpm intermediate clarifier return sludge pump operating at 75 percent capacity
[c]Metcalf & Eddy, Inc.[1]
[d]EPA Troubleshooting Manual[2]

Trickling Filter

Wastewater from the primary clarifiers flowed to a 150-foot diameter trickling filter for the first stage of biological treatment. A portion of the trickling filter effluent was recirculated back to the head of the filter from a pumping station located downstream from the filter. The pumping station contained two 1400-gpm pumps and one 1800-gpm pump which diverted the trickling filter effluent either to the intermediate clarifier or back to the head of the trickling filter. There was no flow measurement system for determining the daily volume of recirculated flow.

The trickling filter operating parameters are presented in Table 6-2. The operating parameters were well within the typical ranges. The hydraulic loading ranged from 277 to 376 gpd/sq ft (estimated). High-rate trickling filters typically operate with a hydraulic loading between 230-900 gpd/sq-ft.[3] Since the volume of recirculated flow could not be accurately determined, the total flow to the filters was calculated using two separate flow determinations: the daily plant flow plus the pumping capacities of the recirculation pumps with one 1400-gpm pump operating continuously and also with two 1400-gpm pumps operating continuously. The estimated return sludge flow from the intermediate clarifier pumping station was also included in the hydraulic loading calculations.

The organic loading to the filter of approximately 32 lbs BOD_5/1000 cu ft/day was within the range of 30-150 lbs BOD_5/1000 cu ft/day for high-rate filters.[3]

Trickling filters are now generally classified according to use and the treatment provided rather than hydraulic or organic loading rates. Based on the existing treatment design, the Cornelia trickling filter best fits a "roughing" filter classification. Roughing filters can be used to reduce high strength industrial wastewaters prior to conventional biological processes such as activated sludge. Roughing filters generally provide 50 to 75 percent soluble BOD_5 removal and 30 to 45 percent total BOD_5 removal.[3] During the EPA study, the trickling filter removed 76 percent of the soluble BOD_5 and 50 percent of the total BOD_5, which indicated excellent biological treatment. These BOD_5 removals exceeded the typical removals expected for roughing filters. Observations during the DE indicated a good, healthy biological growth on the filter media, good flow distribution, and no strong odors or filter ponding conditions.

Table 6-2
Trickling Filter Operating Parameters
Cornelia WWTP

Parameter	Measured Value	Recommended[a]
Hydraulic Loading (gpd/sq-ft)	277[b] 376[c]	720-7200
Organic Loading (lbs BOD_5/1000 cu-ft/day)	32[d] 85[c]	75-200
Percent Soluble BOD_5 Removal	76	50-75[e]
Percent BOD_5 Removal	50	30-45[e] 40-80[f]

[a]Trickling filter design criteria for combined trickling filter/activated sludge system with an intermediate clarifier - WEF, Manual of Practice No. 8 [3]

[b]One 1400-gpm recirculation pump operating continuously plus estimated intermediate and final clarifier sludge recycle flow

[c]Two 1400-gpm recirculations pumps operating continuously plus estimated intermediate and final clarifier sludge recycle flow

[d]Does not include recirculation

[e]Roughing filters

[f]High rate filters

- Intermediate Clarifier

Wastewater from the trickling filter pumping station flowed to a circular, center feed, rim take-off intermediate clarifier for solids separation. The intermediate clarifier was 65 feet in diameter and approximately 9 feet deep. The sludge blanket depths were measured four times per day and the sludge removal rates were controlled by telescoping valves. The intermediate clarifier sludge was pumped upstream of the primary clarifiers using one of two 250-gpm pumps. The intermediate clarifier sludge pumping station also received waste sludge from the final clarifiers. There was no method of determining the volume of the combined intermediate and final clarifier sludge that was pumped to the head of the primary clarifiers.

The surface overflow rate for the intermediate clarifier during the EPA study was approximately 787 gpd/sq ft. The maximum recommended surface overflow rate for intermediate clarifiers following fixed film processes is 1498 gpd/sq ft.[3] The BOD_5 concentration was reduced from 115 mg/l in the trickling filter effluent to 70 mg/l in the discharge from the intermediate clarifier (Table 5-2). The TSS concentration was reduced from 140 mg/l in the trickling filter effluent to 40 mg/l in the discharge from the final clarifier, representing a 71 percent reduction.

- Aeration Basin

Following the intermediate clarifier, wastewater flowed into a 0.73 million-gallon aeration basin for biological treatment. An additional 0.73 million-gallon aeration basin was available but was not in operation. Aeration was provided with eight floating mechanical aerators. Return activated sludge from the final clarifiers was pumped to the head of the aeration basin. During the DE, the mixed liquor had a dark color with little surface foam.

The biological treatment process was operated with the following strategies and process control tests to optimize plant performance:

- The aeration basin mixed-liquor suspended solids (MLSS) and mixed-liquor volatile suspended solids (MLVSS) was analyzed five days per week. The MLSS concentrations ranged from 1900-3163 mg/l during February 1995. The MLVSS ranged from 87-94 percent of the MLSS during the same period. The facility MLSS/MLVSS data are the average of two grab samples collected five days per week of the discharge from the aeration basin.

- The mean-cell-residence-time (MCRT) and food-to-microorganism (F/M) ratio were calculated daily. The MCRT was maintained between 8-15 days, and the F/M ratio ranged from 0.17-0.37 during February 1995.

- Settlometer tests were conducted daily and the sludge volume index was calculated daily.

- Microscopic examinations of the MLSS were conducted approximately once per week.

- The aeration basin DO was monitored continuously with a Digital DO meter and a 24-hour chart recorder. The DO meter was located at the discharge end of the aeration basin, and the DO was maintained at concentrations less than 1 mg/l.

- The pH of the mixed liquor was measured daily and ranged from 6.3 to 7.5 SUs during February 1995. Approximately 250 lbs per day of magnesium hydroxide was added at the head of the aeration basin.

The aeration basin operating parameters, based on the WWTP data and the EPA sampling results, are presented in Table 6-3. The recommended operating parameters shown in Table 6-3 are based on the aeration basin design criteria for combined trickling filter/activated sludge systems that utilize an intermediate clarifier.

The overall operating parameters indicated a high MCRT and a high detention time with a slightly low F/M ratio. Combined trickling filter/activated sludge systems operate with a lower detention time and MCRT than conventional systems, while the F/M ratio is two to three times greater than those typically used for conventional systems.[4] For combined processes, the F/M ratio is calculated based on the primary effluent BOD_5 (neglecting removal through the trickling filter). The measured F/M of 0.47 was slightly less than the recommended range of 0.5-1.2. However, the low F/M did not appear to adversely affect biological performance.

The MCRT of 8-13 days exceeded the recommended range of 2-6 days. The detention time of 6.7 hours also exceeded the recommended detention time of 2-4 hours.

Table 6-3
Aeration Basin Operating Parameters
Cornelia WWTP

Parameter	Units	Measured Value	Recommended
MLSS	mg/l	2050	1500-4000[a]
MLVSS	mg/l	1750	--
Percent MLVSS	%	85	70-80[b]
Detention Time	hours	6.7[c]	2-4[a,c]
F/M Ratio	lbs BOD_5 per lb MLVSS	0.47[d]	0.5-1.2[a,d]
MCRT	days	8-13[e]	2-6

[a]Aeration basin design criteria for combined trickling filter/activated sludge system with an intermediate clarifier - WEF, Manual of Practice No. 8 [3]
[b]EPA, Aerobic Manual[4]
[c]Does not include return sludge flow
[d]F/M = lbs primary effluent BOD_5 per lb MLVSS
[e]WWTP data (high and low) for period 2/1-28/95

Table 6-4
EPA Process Control Test Results
Cornelia WWTP

Parameter		Units	Measured Value	Recommended
Dissolved Oxygen		mg/l	0.04-0.34[e] 0.02-0.24[f]	1-3[a] 2-3[b]
pH		standard pH units	6.89-6.92[e] 7.14-7.25[f]	
Temperature		° C	17.39-17.44[e] 17.63-20.01[f]	
O_2 Uptake Rate		mg/l/min	0.51	0.5-1.0[c]
Respiration Rate		mg/gm MLVSS/hr	17.5	> 12[c]
Settlometer:	SSV_5 SSV_{30} SSV_{60}	ml/l	900 (350)[d] 480 (170)[d] 330 (140)[d]	600-800[c] 400-500[c] 300-400[c]

[a]EPA, Aerobic Manual[4]
[b]Recommended DO levels for nitrification. WEF, Manual of Practice No. 11 [6]
[c]EPA, Process Control Testing Manual[7]
[d]Numbers in parentheses are results for 50-percent diluted settlometer
[e]From profile of aeration basin at various locations in basin.
[f]From Hydrolab continuous monitor on 3/21-22/95 at discharge from aeration basin at depth of 5.4 feet.

All of the other operating parameters were within the recommended ranges for combined systems. The volatile fraction of the MLSS was 85 percent, which exceeded the typical 70-80 percent range.[4]

The aeration basin influent TKN and total phosphorus concentrations were elevated for the biological process. The influent BOD_5/TKN and BOD_5/T-P ratios were 1.2/1 and 10/1, respectively, based on the EPA sampling results of the aeration basin influent (see Table 6-2). The recommended BOD_5 to TKN and BOD_5 to total phosphorus ratios are 20 to 1 and 100 to 1, respectively.[3]

A summary of the EPA process control tests for the aeration basin is presented in Table 6-4 (page 26). EPA process control tests of the aeration basin mixed liquor included a DO/pH/temperature profile, oxygen uptake tests, respiration rates, settlometer tests, and microscopic examinations. The DO/pH/temperature profile was conducted at five locations throughout the basin. These parameters were measured at depths of approximately one and five feet. A summary of the EPA process control tests is as follows:

- The overall process control tests indicated low DOs (< 1 mg/l) throughout the aeration basin, an initially slow settling sludge, and normal oxygen uptake and respiration rates. All of the DO concentrations were below 0.34 mg/l. The overall recommended DO range for activated sludge systems is between 1 and 3 mg/l.[4] The minimum recommended DO levels for nitrification is between 2-3 mg/l.[6] When the DO concentration in the mixed liquor is too low, the settleability and quality of the activated sludge may be poor. Poor settling sludge has been associated with DO concentrations below 0.5 mg/l. Filamentous bulking problems may also be associated with low DO concentrations in the activated sludge.[4]

- The temperature/pH profile indicated stable readings throughout the aeration basin. The pH measured 6.89-6.92 SUs at each location and the temperature of the mixed liquor was 17.39-17.44°C.

- The EPA settlometer tests conducted from samples collected of the aeration basin effluent indicated an initially slow settling sludge with a clear supernatant. The settled sludge volume of 900 ml/l after five minutes was well above the normal range of 600-800 ml/l. However, after thirty minutes the sludge settled to 480 ml/l, which was within the normal range of 400-500 ml/l.

- A diluted settlometer test was conducted using 50 percent mixed liquor and 50 percent deionized water. This resulted in a much faster settling sludge, indicating that the initial slow settling rate was not due to a predominance of filamentous bacteria.

An evaluation of the overall operating parameters and EPA process control tests indicates that for the current system, the operating staff should consider gradually lowering the MCRT, while carefully raising the aeration basin DO levels to the target 2-3 mg/l range for nitrification.

Previous experience with raising the DO levels at the Cornelia WWTP has reportedly resulted in sludge denitrifying in the clarifiers. Subsequently, high effluent TSS concentrations were observed. Because the existing biological process includes considerable contact time through the trickling filter and intermediate clarifier, the nitrifying bacteria should already be established in the wastewater that enters the activated sludge process. Consequently, the MCRT can be maintained at a lower level while still achieving a high degree of nitrification. However, due to the low DO concentration in the aeration basin, the nitrification process has been inhibited. This was apparent as the NH_3-N concentrations showed only partial reduction through the activated sludge process - from 57 mg/l in the intermediate clarifier effluent to 40 mg/l in the final effluent. By operating combined trickling filter/activated sludge systems with a lower MCRT, the operational problems associated with denitrification in the final clarifiers may be reduced or eliminated. The return sludge should also be carefully monitored and may have to be increased.

Once nitrification begins to occur, the alkalinity requirements should be carefully monitored and the magnesium hydroxide feed rates adjusted accordingly. Approximately 7.14 mg/l of alkalinity is required per 1 mg/l of NH_3-N removed.[3] The EPA sampling results indicated an intermediate clarifier effluent NH_3-N concentration of 57 mg/l (Table 5-2). At this concentration, approximately 407 mg/l of alkalinity would be required to provide adequate nitrification. The intermediate clarifier effluent alkalinity concentration was 315 mg/l prior to the addition of magnesium hydroxide.

- Final Clarifiers

Wastewater from the aeration basins flowed to two peripheral feed, rim take-off final clarifiers. The final clarifiers were 65 feet in diameter and 12 feet deep.

Return sludge was pumped to the head of the aeration basin with one of three 540-gpm return sludge pumps. The return sludge flow was maintained between 30-40 percent of plant flow (0.8-0.9 mgd) and was measured with an in-line flow meter. The return sludge was analyzed for TSS five days per week. Sludge was wasted from the return sludge line to the intermediate clarifier sludge well.

A summary of the final clarifier operating parameters is presented in Table 6-5. The detention time, including return sludge flow was 4.2 hours. The surface overflow rate and solids loading were 393 gpd/sq-ft and 8.8 lbs/sq-ft/day, respectively. These loadings indicated that the clarifiers were lightly loaded as the typical design surface overflow rate and solids loadings are 400-800 gpd/sq-ft and 15-30 lbs/sq-ft/day, respectively.[1]

If the MCRT is decreased in the activated sludge process, and the aeration basin DO concentrations are increased to provide for nitrification, the return sludge flow will probably have to be increased significantly to prevent denitrification from occurring in the final clarifiers. Extended aeration systems typically operate with a return sludge flow between 75-150 percent of plant flow.[1] Although the Cornelia facility is not operated in the extended aeration mode, the return sludge flows may need to be in this range to prevent operational problems such as denitrifying sludge. Careful monitoring of the sludge blanket depths will also be imperative.

A recirculation pumping station was located downstream of the final clarifiers to pump wastewater from the final clarifiers to the head of the plant. Under normal operations, the final effluent was only recirculated on the weekends, when Fieldale Farms was shut down. This was done to provide sufficient flow to the trickling filters to keep a healthy organic growth on the filter media.

- Disinfection/Post Aeration

Wastewater from the final clarifiers flowed to a chlorine contact chamber for disinfection. Chlorine was added at a rate of approximately 20 lbs/day. The volume of the contact basin was 53,000 gallons. At the EPA measured flow of 2.62 mgd, the contact time through the basin was 29 minutes. A review of self-monitoring data for fecal coliform bacteria (Table 4-1) showed that no permit violations occurred during 1994, indicating adequate disinfection.

Table 6-5
Final Clarifier Operating Parameters
Cornelia WWTP

Parameter	Units	Measured Value	Recommended[a]
Detention Time	hours	5.5[b] 4.2[c]	
Surface Overflow Rate	gal/sq-ft/day	393	400-800
Solids Loading	lbs/sq-ft/day	8.8	15-30
Return Sludge Flow	mgd % of plant flow	0.8 31	
Return Sludge TSS TVSS	mg/l	6950 6450	
Sludge Blanket Depth: No. 1 Clarifier No. 2 Clarifier	 ft ft	 4 3	 ≤3 ≤3

[a]Metcalf and Eddy[1]
[b] Does not includes return sludge flow
[c] Includes return sludge flow

Accumulated sludge was last removed from the bottom of the contact chamber in October of 1994. The sludge accumulation in the bottom of the contact basin is routinely checked by the WWTP staff and removed as needed.

Wastewater from the chlorine contact chamber was post-aerated in a step cascade prior to mixing with the receiving stream.

- Sludge Handling

Primary and secondary waste sludge was pumped from the primary clarifiers to two aerobic digesters operated in series. Each digester was 55 feet in diameter. The total capacity of the digesters was 511,400 gallons. Aeration was provided to the No. 1 digester with a diffused aeration system which was operated continuously. The No. 1 digester was also equipped with a mixer. The No. 2 digester served as a sludge holding tank. Supernatant from the digesters was returned upstream of the bar screen.

Sludge from the No. 2 digester was dewatered using 10 sludge drying beds, four of which were covered. A portable belt press had been in operation since February 1995. The filtrate from the belt press and drying beds was returned upstream of the primary clarifiers. The dewatered sludge was hauled to the Habersham County Landfill for final disposal.

During the DE, sludge samples were collected of the sludge cake from the belt press. The sludge was analyzed for metals and the analytical results are shown in Table 6-6. Although the WWTP disposes of sludge in the county landfill, the land application criteria from 40 CFR Part 503 are included in Table 6-6 for comparison. Except for molybenum, the metals concentrations met the criteria established in 40 CFR, Part 503 for a high quality sludge. Four of the metals were above the national mean concentrations: chromium, molybdenum, nickel, and zinc.

Table 6-6
EPA Analytical Results
Dewatered Sludge
Cornelia WWTP

Pollutant	Cornelia-Dewatered Sludge	Ceiling Concentration[a]	High Quality Concentration[a]	National Mean Concentration[b]
	mg/kg	mg/kg	mg/kg	mg/kg
ARSENIC	30[u]	75	41	0.099
CADMIUM	5.0[u]	85	39	6.9
CHROMIUM	250	3000	1200	118
COPPER	300	4300	1500	741
LEAD	65	840	300	134
MERCURY	2.1	57	17	5.2
MOLYBDENUM	62	75	18	9.2
NICKEL	44	420	420	42
SELENIUM	40[u]	100	36	5.1
ZINC	2000	7500	2800	1202

[a] 40 CFR, Part 503.13 [7]
[b] Federal Register [8]
[u] Material was analyzed for but not detected. The number shown is the minimum quantitation limit.

- REFERENCES -

1. Metcalf & Eddy, Inc., "Wastewater Engineering: Treatment, Disposal, Reuse." 3rd Edition, McGraw-Hill, Inc., New York, N.Y., 1991.

2. "Performance Evaluation and Troubleshooting at Municipal Wastewater Treatment Facilities." EPA-430/9-78-001, U.S. EPA, Washington, D.C., 1978.

3. "Design of Municipal Wastewater Treatment Plants." WEF Manual of Practice No. 8, Book Press, Inc., Brattleboro, VT., 1991.

4. "Aerobic Biological Wastewater Treatment Facilities, Process Control Manual", MD-14, U.S. EPA, Washington, D.C., 1977.

5. "Design Development Report, Cornelia Wastewater Treatment Plant Modifications." Piedmont, Olsen, Hensley, December, 1994.

6. "Operation of Municipal Wastewater Treatment Plants." WEF Manual of Practice No. 11, Water Pollution Control Federation, Alexandria, VA., 1990.

7. "Activated Sludge Process Control Testing Manual." U.S. EPA, Environmental Services Division, Region IV.

8. "40 CFR, 503.13," (b), (1), July 1, 1994.

9. "Federal Register". Volume 55, No. 218, November 1990.

APPENDIX A
EPA SAMPLING METHODOLOGIES
CORNELIA WWTP

EPA SAMPLING METHODOLOGIES FOR COMPOSITE SAMPLES AND CONTINUOUS MONITORING CORNELIA WWTP CORNELIA, GA

Sampling Station	Composite	Continuous	Equipment	Parameters Analyzed
Raw Influent (C-I)	X		ISCO Model 3700 Auto Sampler, 140 mls per 15 minutes	Conventional pollutants, Metals
		X	Analytical Instruments continuous recording meter	pH, Temperature
Primary Clarifier Effluent (C-PCE)	X		ISCO Model 3700 Auto Sampler, 120 mls per 15 minutes	Conventional Pollutants
Trickling Filter Effluent (C-TFE)	X		ISCO Model 2700 Auto Sampler, 145 mls per 15 minutes	Conventional Pollutants
Intermediate Clarifier Effluent (C-ICE)	X		ISCO Model 2700 Auto Sampler, 160 mls per 15 minutes	Conventional Pollutants
Aeration Basin (C-AB)		X	Hydrolab Model H20 Monitor YSI Model 54A meter and Field Probe for DO profile	pH, DO, Temperature DO, Temperature
Final Effluent (C-001)	X		ISCO Model 3700 Auto Sampler, 145 mls per 15 minutes	Conventional Pollutants, Metals
		X	Hydrolab Model H20 Monitor	pH, DO, Temperature

All sampling and chain-of-custody procedures were in accordance with the EPA, Region IV, Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual, February 1, 1991. All chemical analyses were conducted by the Region IV, Environmental Services Division laboratory in accordance with the Analytical Support Branch Laboratory Operations and Quality Control Manual, September, 1990.

APPENDIX B
DESIGN INFORMATION
CORNELIA WWTP

Design Information

Primary Clarifiers:

No. 1	Diameter	55 ft
	Depth	8 ft
	Surface Area	2376 sq ft
No. 2	Diameter	46 ft
	Depth	5 ft
	Surface Area	1662 sq ft
	Total Surface Area	4038 sq ft
	Total Volume	204,325

Trickling Filter:

Diameter	150 ft
Depth	8.8 ft
Volume	156,216 cu ft

Intermediate Clarifier:

Number	1
Diameter	65 ft
Surface Area	3318 sq ft
Depth	9 ft
Volume	223,338 gal

Aeration Basin

Number	2 (1 in operation)
Volume	98,490 cu ft, ea.
	730,670 gal, ea.

Final Clarifiers

Number	2
Diameter	65 ft, ea.
Depth	12 ft
Surface Area	3318 sq ft, ea.
Volume	297,824 gal, ea.

Chlorine Contact Chamber

Volume	53,000 gal

APPENDIX C
EPA CONTINUOUS DO/pH DATA FOR AERATION BASIN CORNELIA WWTP

Log File Name : CORNELIA WWTP AERATION BASIN
Setup Date (MMDDYY) : 032195
Setup Time (HHMMSS) : 162956
Starting Date (MMDDYY) : 032195
Starting Time (HHMMSS) : 164500
Stopping Date (MMDDYY) : 032295
Stopping Time (HHMMSS) : 164500
Interval (HHMMSS) : 001500
Warmup : Enable

==> Setup Variables and Calibration <==

Temperature : Centigrade
Specific Conductance/Resistivity : Specific Conductance,uS/cm,Salt,Auto range,
Salinity,Temperature compensated
% Sat : 760.0
DO : DO,Standard,Uncompensated
Turbidity : Ratio,Auto range
Depth/Level : Feet,Depth-100m
Buzzer : Disable
Stirrer : Enable

Date: 3/21/95

Time	Temp	pH	SpCond	Salin	DO	Depth	Batt
HHMMSS	deg C	units	uS/cm	ppt	mg/l	feet	volts
164500	19.19	7.24	925	0.5	0.06@	5.3	12.1
170000	19.17	7.24	927	0.5	0.09@	5.3	12.1
171500	19.14	7.25	930	0.5	0.07@	5.3	12.1
173000	19.12	7.25	933	0.5	0.15@	5.3	12.2
174500	19.09	7.25	933	0.5	0.11@	5.3	12.2
180000	19.05	7.25	935	0.5	0.13@	5.3	12.2
181500	19.02	7.25	938	0.5	0.07@	5.3	12.2
183000	18.99	7.25	939	0.5	0.08@	5.3	12.2
184500	18.95	7.25	939	0.5	0.12@	5.3	12.2
190000	18.91	7.25	942	0.5	0.07@	5.3	12.1
191500	18.88	7.25	942	0.5	0.10@	5.3	12.1
193000	18.86	7.25	943	0.5	0.15@	5.3	12.1
194500	18.82	7.25	945	0.5	0.08@	5.3	12.1
200000	18.79	7.25	946	0.5	0.07@	5.4	12.1
201500	18.76	7.25	946	0.5	0.08@	5.4	12.1
203000	18.73	7.25	947	0.5	0.08@	5.4	12.1
204500	18.71	7.24	948	0.5	0.15@	5.4	12.1
210000	18.68	7.24	949	0.5	0.09@	5.4	12.1
211500	18.65	7.24	948	0.5	0.12@	5.4	12.1
213000	18.62	7.24	948	0.5	0.08@	5.4	12.1
214500	18.60	7.24	948	0.5	0.08@	5.4	12.1
220000	18.56	7.23	947	0.5	0.17@	5.4	12.0
221500	18.54	7.23	946	0.5	0.11@	5.4	12.1
223000	18.51	7.23	945	0.5	0.11@	5.3	12.1
224500	18.47	7.23	945	0.5	0.11@	5.4	12.1
230000	18.45	7.23	944	0.5	0.14@	5.4	12.1
231500	18.42	7.22	944	0.5	0.09@	5.4	12.0
233000	18.39	7.22	943	0.5	0.09@	5.3	12.0
234500	18.37	7.21	940	0.5	0.13@	5.3	12.0

Date: 3/22/95

Time HHMMSS	Temp deg C	pH units	SpCond uS/cm	Salin ppt	DO mg/l	Depth feet	Batt volts
000000	18.33	7.21	940	0.5	0.08@	5.3	12.0
001500	18.31	7.21	937	0.5	0.14@	5.3	12.0
003000	18.28	7.21	937	0.5	0.05@	5.3	12.0
004500	18.25	7.20	935	0.5	0.08@	5.3	12.0
010000	18.22	7.20	933	0.5	0.15@	5.3	12.0
011500	18.19	7.20	933	0.5	0.13@	5.3	12.0
013000	18.16	7.20	931	0.5	0.09@	5.3	12.0
014500	18.14	7.20	930	0.5	0.17@	5.3	12.0
020000	18.10	7.19	928	0.5	0.17@	5.2	12.0
021500	18.08	7.19	928	0.5	0.16@	5.2	12.0
023000	18.05	7.19	926	0.5	0.12@	5.2	12.0
024500	18.01	7.19	923	0.5	0.10@	5.2	12.0
030000	17.99	7.18	924	0.5	0.08@	5.2	12.0
031500	17.96	7.18	921	0.5	0.24@	5.2	11.9
033000	17.93	7.18	920	0.5	0.08@	5.3	11.9
034500	17.91	7.18	920	0.5	0.13@	5.3	12.0
040000	17.88	7.18	920	0.5	0.20@	5.2	12.0
041500	17.85	7.18	918	0.5	0.14@	5.2	12.0
043000	17.83	7.18	919	0.5	0.09@	5.3	12.0
044500	17.81	7.18	919	0.5	0.06@	5.2	12.0
050000	17.78	7.18	918	0.5	0.10@	5.2	11.9
051500	17.77	7.18	917	0.5	0.13@	5.2	11.9
053000	17.75	7.18	917	0.5	0.14@	5.2	11.9
054500	17.73	7.18	917	0.5	0.11@	5.2	11.9
060000	17.71	7.18	916	0.5	0.10@	5.2	11.9
061500	17.70	7.18	916	0.5	0.16@	5.2	11.9
063000	17.67	7.18	916	0.5	0.09@	5.2	11.9
064500	17.66	7.18	915	0.5	0.21@	5.2	11.9
070000	17.64	7.18	914	0.5	0.06@	5.2	11.9
071500	17.64	7.17	912	0.5	0.12@	5.2	11.9
073000	17.63	7.17	912	0.5	0.11@	5.3	11.9
074500	17.63	7.17	910	0.5	0.07@	5.3	11.9
080000	17.65	7.17	909	0.5	0.05@	5.3	11.9
081500	17.67	7.17	907	0.5	0.13@	5.3	11.9
083000	17.70	7.16	906	0.5	0.07@	5.3	11.9
084500	17.73	7.16	902	0.5	0.12@	5.3	12.0
090000	17.77	7.16	899	0.5	0.17@	5.4	12.0
091500	17.82	7.16	896	0.5	0.13@	5.4	12.0
093000	17.89	7.15	892	0.5	0.11@	5.4	12.0
094500	17.95	7.15	888	0.5	0.13@	5.4	12.0
100000	18.03	7.15	883	0.5	0.12@	5.4	12.0
101500	18.11	7.14	880	0.5	0.19@	5.5	12.0
103000	18.20	7.14	875	0.5	0.15@	5.5	12.0
104500	18.29	7.14	872	0.5	0.13@	5.5	12.0
110000	18.32	7.15	872	0.5	0.02@	5.5	12.0
111500	18.48	7.17	870	0.5	0.13@	5.5	12.0
113000	18.59	7.17	870	0.5	0.03@	5.5	12.0
114500	18.62	7.17	869	0.5	0.02@	5.5	12.0
120000	18.83	7.18	869	0.5	0.03@	5.5	12.0
121500	18.87	7.18	870	0.5	0.05@	5.4	12.0
123000	18.95	7.18	869	0.5	0.05@	5.4	12.0

3/22/95 (continued)

Time HHMMSS	Temp deg C	pH units	SpCond uS/cm	Salin ppt	DO mg/l	Depth feet	Batt volts
124500	19.04	7.19	871	0.5	0.10@	5.4	12.0
130000	19.16	7.20	874	0.5	0.06@	5.4	12.0
131500	19.24	7.21	877	0.5	0.10@	5.4	12.1
133000	19.34	7.20	879	0.5	0.06@	5.4	12.1
134500	19.44	7.20	881	0.5	0.03@	5.4	12.1
140000	19.51	7.20	883	0.5	0.03@	5.4	12.1
141500	19.60	7.20	889	0.5	0.05@	5.3	12.1
143000	19.68	7.21	891	0.5	0.11@	5.3	12.1
144500	19.74	7.21	893	0.5	0.05@	5.3	12.1
150000	19.82	7.21	897	0.5	0.03@	5.3	12.1
151500	19.88	7.21	899	0.5	0.03@	5.3	12.1
153000	19.93	7.21	900	0.5	0.04@	5.3	12.1
154500	19.99	7.22	905	0.5	0.05@	5.3	12.1
160000	20.01	7.22	906	0.5	0.08@	5.3	12.1
161500	19.90	7.46	18	0.0	8.24@	0.2	12.2

STATISTICS:

Total Stats	Temp deg C	pH units	SpCond uS/cm	Salin ppt	DO mg/l	Depth feet	Batt volts
Out rng	2	2	2	2	2	2	2
Num rdg	95	95	95	95	95	95	95
Minimum	17.63	7.14	18.40	.0000	0.02	0.23	11.9
MMDDYY	032295	032295	032295	032295	032295	032295	032295
HHMMSS	073000	104500	161500	161500	114500	161500	074500
Maximum	20.01	7.46	948.7	.4955	8.24	5.48	12.2
MMDDYY	032295	032295	032195	032195	032295	032295	032195
HHMMSS	160000	161500	210000	210000	161500	114500	181500
Max chg	0.21	0.24	888.1	.4726	8.16	5.04	0.1
MMDDYY	032295	032295	032295	032295	032295	032295	032295
HHMMSS	120000	161500	161500	161500	161500	161500	161500
Mean	18.50	7.20	906.2	.4725	0.19	5.27	12.0
Std Dev	0.66	0.04	94.90	.0506	0.83	0.53	0.1

Log File Name : CORNELIA WWTP AERATION BASIN
Setup Date (MMDDYY) : 032195
Setup Time (HHMMSS) : 162956
Starting Date (MMDDYY) : 032195
Starting Time (HHMMSS) : 164500
Stopping Date (MMDDYY) : 032295
Stopping Time (HHMMSS) : 164500
Interval (HHMMSS) : 001500
Warmup : Enable

==> Setup Variables and Calibration <==

Temperature : Centigrade
Specific Conductance/Resistivity : Specific Conductance,uS/cm,Salt,Auto range,
Salinity,Temperature compensated
% Sat : 760.0
DO : DO,Standard,Uncompensated
Turbidity : Ratio,Auto range
Depth/Level : Feet,Depth-100m
Buzzer : Disable
Stirrer : Enable

Date: 3/21/95

Time HHMMSS	Temp deg C	pH units	SpCond uS/cm	Salin ppt	DO mg/l	Depth feet	Batt volts
164500	19.19	7.24	925	0.5	0.06@	5.3	12.1
170000	19.17	7.24	927	0.5	0.09@	5.3	12.1
171500	19.14	7.25	930	0.5	0.07@	5.3	12.1
173000	19.12	7.25	933	0.5	0.15@	5.3	12.2
174500	19.09	7.25	933	0.5	0.11@	5.3	12.2
180000	19.05	7.25	935	0.5	0.13@	5.3	12.2
181500	19.02	7.25	938	0.5	0.07@	5.3	12.2
183000	18.99	7.25	939	0.5	0.08@	5.3	12.2
184500	18.95	7.25	939	0.5	0.12@	5.3	12.2
190000	18.91	7.25	942	0.5	0.07@	5.3	12.1
191500	18.88	7.25	942	0.5	0.10@	5.3	12.1
193000	18.86	7.25	943	0.5	0.15@	5.3	12.1
194500	18.82	7.25	945	0.5	0.08@	5.3	12.1
200000	18.79	7.25	946	0.5	0.07@	5.4	12.1
201500	18.76	7.25	946	0.5	0.08@	5.4	12.1
203000	18.73	7.25	947	0.5	0.08@	5.4	12.1
204500	18.71	7.24	948	0.5	0.15@	5.4	12.1
210000	18.68	7.24	949	0.5	0.09@	5.4	12.1
211500	18.65	7.24	948	0.5	0.12@	5.4	12.1
213000	18.62	7.24	948	0.5	0.08@	5.4	12.1
214500	18.60	7.24	948	0.5	0.08@	5.4	12.1
220000	18.56	7.23	947	0.5	0.17@	5.4	12.0
221500	18.54	7.23	946	0.5	0.11@	5.4	12.1
223000	18.51	7.23	945	0.5	0.11@	5.3	12.1
224500	18.47	7.23	945	0.5	0.11@	5.4	12.1
230000	18.45	7.23	944	0.5	0.14@	5.4	12.1
231500	18.42	7.22	944	0.5	0.09@	5.4	12.0
233000	18.39	7.22	943	0.5	0.09@	5.3	12.0
234500	18.37	7.21	940	0.5	0.13@	5.3	12.0

Date: 3/22/95

Time HHMMSS	Temp deg C	pH units	SpCond uS/cm	Salin ppt	DO mg/L	Depth feet	Batt volts
000000	18.33	7.21	940	0.5	0.08@	5.3	12.0
001500	18.31	7.21	937	0.5	0.14@	5.3	12.0
003000	18.28	7.21	937	0.5	0.05@	5.3	12.0
004500	18.25	7.20	935	0.5	0.08@	5.3	12.0
010000	18.22	7.20	933	0.5	0.15@	5.3	12.0
011500	18.19	7.20	933	0.5	0.13@	5.3	12.0
013000	18.16	7.20	931	0.5	0.09@	5.3	12.0
014500	18.14	7.20	930	0.5	0.17@	5.3	12.0
020000	18.10	7.19	928	0.5	0.17@	5.2	12.0
021500	18.08	7.19	928	0.5	0.16@	5.2	12.0
023000	18.05	7.19	926	0.5	0.12@	5.2	12.0
024500	18.01	7.19	923	0.5	0.10@	5.2	12.0
030000	17.99	7.18	924	0.5	0.08@	5.2	12.0
031500	17.96	7.18	921	0.5	0.24@	5.2	11.9
033000	17.93	7.18	920	0.5	0.08@	5.3	11.9
034500	17.91	7.18	920	0.5	0.13@	5.3	12.0
040000	17.88	7.18	920	0.5	0.20@	5.2	12.0
041500	17.85	7.18	918	0.5	0.14@	5.2	12.0
043000	17.83	7.18	919	0.5	0.09@	5.3	12.0
044500	17.81	7.18	919	0.5	0.06@	5.2	12.0
050000	17.78	7.18	918	0.5	0.10@	5.2	11.9
051500	17.77	7.18	917	0.5	0.13@	5.2	11.9
053000	17.75	7.18	917	0.5	0.14@	5.2	11.9
054500	17.73	7.18	917	0.5	0.11@	5.2	11.9
060000	17.71	7.18	916	0.5	0.10@	5.2	11.9
061500	17.70	7.18	916	0.5	0.16@	5.2	11.9
063000	17.67	7.18	916	0.5	0.09@	5.2	11.9
064500	17.66	7.18	915	0.5	0.21@	5.2	11.9
070000	17.64	7.18	914	0.5	0.06@	5.2	11.9
071500	17.64	7.17	912	0.5	0.12@	5.2	11.9
073000	17.63	7.17	912	0.5	0.11@	5.3	11.9
074500	17.63	7.17	910	0.5	0.07@	5.3	11.9
080000	17.65	7.17	909	0.5	0.05@	5.3	11.9
081500	17.67	7.17	907	0.5	0.13@	5.3	11.9
083000	17.70	7.16	906	0.5	0.07@	5.3	11.9
084500	17.73	7.16	902	0.5	0.12@	5.3	12.0
090000	17.77	7.16	899	0.5	0.17@	5.4	12.0
091500	17.82	7.16	896	0.5	0.13@	5.4	12.0
093000	17.89	7.15	892	0.5	0.11@	5.4	12.0
094500	17.95	7.15	888	0.5	0.13@	5.4	12.0
100000	18.03	7.15	883	0.5	0.12@	5.4	12.0
101500	18.11	7.14	880	0.5	0.19@	5.5	12.0
103000	18.20	7.14	875	0.5	0.15@	5.5	12.0
104500	18.29	7.14	872	0.5	0.13@	5.5	12.0
110000	18.32	7.15	872	0.5	0.02@	5.5	12.0
111500	18.48	7.17	870	0.5	0.13@	5.5	12.0
113000	18.59	7.17	870	0.5	0.03@	5.5	12.0
114500	18.62	7.17	869	0.5	0.02@	5.5	12.0
120000	18.83	7.18	869	0.5	0.03@	5.5	12.0
121500	18.87	7.18	870	0.5	0.05@	5.4	12.0
123000	18.95	7.18	869	0.5	0.05@	5.4	12.0

APPENDIX D
COMPLETE LISTING OF EPA ANALYTICAL RESULTS
CORNELIA WWTP

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92983 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/21/95 1345 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
19J	MG/L	AMMONIA
0.44	MG/L	NITRATE-NITRITE NITROGEN
52J	MG/L	TOTAL KJELDAHL NITROGEN
6.7	MG/L	TOTAL-PHOSPHORUS
640	MG/L	CHEMICAL OXYGEN DEMAND
290	MG/L	ALKALINITY, TOTAL(AS CACO3)
350	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
260	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY,DISS
170	MG/L	TOTAL SUSPENDED SOLIDS

REMARKS*
SULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

REMARKS

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND AN IS MANAGEMENT SYSTEM
EPA-REGIO. / ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93027 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/21/95 1400 STOP: 03/22/95 1315

RESULTS	UNITS	PARAMETER
100	MG/L	TOTAL SUSPENDED SOLIDS
260	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
220	MG/L	ALKALINITY, TOTAL(AS CACO3)

52

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93110 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/22/95 1050 STOP: 03/22/95 0930

RESULTS	UNITS	PARAMETER
270A	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
200A	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY,DISS
110	MG/L	TOTAL SUSPENDED SOLIDS
200	MG/L	ALKALINITY, TOTAL(AS CACO3)

53

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND A YSIS MANAGEMENT SYSTEM
EPA-REGI IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93026 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/22/95 1315 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
23J	MG/L	AMMONIA
0.39	MG/L	NITRATE-NITRITE NITROGEN
52J	MG/L	TOTAL KJELDAHL NITROGEN
6.2	MG/L	TOTAL-PHOSPHORUS
510	MG/L	CHEMICAL OXYGEN DEMAND

54

'*REMARKS*** ***REMARKS***
:SULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

'*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92984 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/21/95 1340 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
13	MG/L	OIL AND GREASE

REMARKS*
ECOMMENDED HOLDING TIME EXCEEDED.

REMARKS

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND AN SIS MANAGEMENT SYSTEM
EPA-REGI(/ ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93028 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/22/95 1325 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
11	MG/L	OIL AND GREASE

25

REMARKS*
COMMENDED HOLDING TIME EXCEEDED.

REMARKS

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92985 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-PE COLLECTION START: 03/20/95 1300 STOP: 03/21/95 1300

RESULTS	UNITS	PARAMETER
44J	MG/L	AMMONIA
0.37	MG/L	NITRATE-NITRITE NITROGEN
51J	MG/L	TOTAL KJELDAHL NITROGEN
8.0	MG/L	TOTAL-PHOSPHORUS
420	MG/L	CHEMICAL OXYGEN DEMAND
230	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
180	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY,DISS
82J	MG/L	TOTAL SUSPENDED SOLIDS
280	MG/L	ALKALINITY, TOTAL(AS CACO3)

57

REMARKS*
ESULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

REMARKS

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93031 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-PE COLLECTION START: 03/21/95 1405 STOP: 03/22/95 1405

RESULTS	UNITS	PARAMETER
42J	MG/L	AMMONIA
0.18	MG/L	NITRATE-NITRITE NITROGEN
62J	MG/L	TOTAL KJELDAHL NITROGEN
7.9	MG/L	TOTAL-PHOSPHORUS
230	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
92	MG/L	TOTAL SUSPENDED SOLIDS
280	MG/L	ALKALINITY, TOTAL(AS CACO3)

8 5

*REMARKS*** ***REMARKS***
SULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92986 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-TFE COLLECTION START: 03/20/95 1330 STOP: 03/21/95 1330

RESULTS	UNITS	PARAMETER
60J	MG/L	AMMONIA
0.56	MG/L	NITRATE-NITRITE NITROGEN
61J	MG/L	TOTAL KJELDAHL NITROGEN
8.2	MG/L	TOTAL-PHOSPHORUS
120	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
44	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY,DISS
160	MG/L	TOTAL SUSPENDED SOLIDS
320	MG/L	ALKALINITY, TOTAL(AS CACO3)

55

REMARKS*
ESULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

REMARKS

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND `LYSIS MANAGEMENT SYSTEM
EPA-RE IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93032 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-TFE COLLECTION START: 03/21/95 1435 STOP: 03/22/95 1435

RESULTS	UNITS	PARAMETER
60J	MG/L	AMMONIA
0.05U	MG/L	NITRATE-NITRITE NITROGEN
63J	MG/L	TOTAL KJELDAHL NITROGEN
7.5	MG/L	TOTAL-PHOSPHORUS
110	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
120	MG/L	TOTAL SUSPENDED SOLIDS
310	MG/L	ALKALINITY, TOTAL(AS CACO3)

REMARKS* ***REMARKS***
SULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92987 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-ICE COLLECTION START: 03/20/95 1330 STOP: 03/21/95 1330

RESULTS	UNITS	PARAMETER
59J	MG/L	AMMONIA
0.59	MG/L	NITRATE-NITRITE NITROGEN
64J	MG/L	TOTAL KJELDAHL NITROGEN
7.2	MG/L	TOTAL-PHOSPHORUS
70	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
40	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY,DISS
44	MG/L	TOTAL SUSPENDED SOLIDS
310	MG/L	ALKALINITY, TOTAL(AS CACO3)

19

REMARKS*
ESULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

REMARKS

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93033 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-ICE COLLECTION START: 03/21/95 1450 STOP: 03/22/95 1450

RESULTS	UNITS	PARAMETER
54J	MG/L	AMMONIA
0.28	MG/L	NITRATE-NITRITE NITROGEN
56J	MG/L	TOTAL KJELDAHL NITROGEN
7.0	MG/L	TOTAL-PHOSPHORUS
69A	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
36	MG/L	TOTAL SUSPENDED SOLIDS
320	MG/L	ALKALINITY, TOTAL(AS CACO3)

REMARKS*
ESULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

REMARKS

FOOTNOTES*
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*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92982 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-001 COLLECTION START: 03/20/95 1300 STOP: 03/21/95 1300

RESULTS	UNITS	PARAMETER
33J	MG/L	AMMONIA
6.6A	MG/L	NITRATE-NITRITE NITROGEN
NAI	MG/L	TOTAL KJELDAHL NITROGEN
6.4	MG/L	TOTAL-PHOSPHORUS
26	MG/L	CHEMICAL OXYGEN DEMAND
210A	MG/L	ALKALINITY, TOTAL(AS CACO3)
4.0A	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
2.5U	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY,DISS
5.0	MG/L	TOTAL SUSPENDED SOLIDS

REMARKS* ***REMARKS***
ESULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93029 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-001 COLLECTION START: 03/21/95 1410 STOP: 03/22/95 1410

RESULTS	UNITS	PARAMETER
4.0U	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
6.0	MG/L	TOTAL SUSPENDED SOLIDS
280A	MG/L	ALKALINITY, TOTAL(AS CACO3)
46J	MG/L	AMMONIA
1.8	MG/L	NITRATE-NITRITE NITROGEN
53J	MG/L	TOTAL KJELDAHL NITROGEN
5.7A	MG/L	TOTAL-PHOSPHORUS

*REMARKS*** ***REMARKS***
RESULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

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PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93030 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-001 COLLECTION START: 03/22/95 1420 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
5.0U	MG/L	OIL AND GREASE

5 0

*REMARKS***
COMMENDED HOLDING TIME EXCEEDED.

REMARKS

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND A[illegible]VSIS MANAGEMENT SYSTEM
EPA-REGI V ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92971 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-AB COLLECTION START: 03/21/95 1117 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
2100A	MG/L	TOTAL SUSPENDED SOLIDS
2200A	MG/L	TOTAL SOLIDS
1700A	MG/L	VOLATILE TOTAL SOLIDS
1900A	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS

-99

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93024 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-AB COLLECTION START: 03/22/95 1120 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
2000	MG/L	TOTAL SUSPENDED SOLIDS
1600	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND A YSIS MANAGEMENT SYSTEM
EPA-REGI IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92972 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-RAS COLLECTION START: 03/21/95 1120 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
7900	MG/L	TOTAL SUSPENDED SOLIDS
8400	MG/L	TOTAL SOLIDS
7000	MG/L	VOLATILE TOTAL SOLIDS
7300	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS

87

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93021 SAMPLE TYPE: SLUDGE PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-RAS COLLECTION START: 03/22/95 1049 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
6000	MG/L	TOTAL SUSPENDED SOLIDS
5600	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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SAMPLE AND \LYSIS MANAGEMENT SYSTEM
EPA-RE IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92973 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-WAS COLLECTION START: 03/21/95 1124 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
3000	MG/L	TOTAL SUSPENDED SOLIDS
20000	MG/L	TOTAL SOLIDS
17000	MG/L	VOLATILE TOTAL SOLIDS
2900	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93022 SAMPLE TYPE: SLUDGE
SOURCE: CORNELIA WWTP
STATION ID: C-WAS

PROG ELEM: MCSI COLLECTED BY: T SIMPSON
CITY: CORNELIA ST: GA
COLLECTION START: 03/22/95 1055 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
16000	MG/L	TOTAL SUSPENDED SOLIDS
14000	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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SAMPLE AND LYSIS MANAGEMENT SYSTEM
EPA-REG IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92975 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-AD1 COLLECTION START: 03/21/95 1132 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
16000	MG/L	VOLATILE TOTAL SOLIDS
2000	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS
2000	MG/L	TOTAL SUSPENDED SOLIDS
22000	MG/L	TOTAL SOLIDS

72

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93020 SAMPLE TYPE: SLUDGE PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-AD1 COLLECTION START: 03/22/95 1040 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
10000	MG/L	TOTAL SUSPENDED SOLIDS
10000	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS
28000	MG/L	VOLATILE TOTAL SOLIDS
38000	MG/L	TOTAL SOLIDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE ANF 'ALYSIS MANAGEMENT SYSTEM
EPA-R N IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

* PROJECT NO. 95-0203 SAMPLE NO. 92976 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
* SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
* STATION ID: C-AD2 COLLECTION START: 03/21/95 1133 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
41000	MG/L	VOLATILE TOTAL SOLIDS
4000	MG/L	VOLATILE TOTAL SUSPENDED SOLIDS
4200	MG/L	TOTAL SUSPENDED SOLIDS
53000	MG/L	TOTAL SOLIDS

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92974 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-RFP COLLECTION START: 03/21/95 1128 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
230	MG/L	TOTAL SUSPENDED SOLIDS

2 3 1

FOOTNOTES*
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PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93019 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-REC COLLECTION START: 03/22/95 1028 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
370	MG/L	AMMONIA
0.72	MG/L	NITRATE-NITRITE NITROGEN
370J	MG/L	TOTAL KJELDAHL NITROGEN
50	MG/L	TOTAL-PHOSPHORUS
1600	MG/L	CHEMICAL OXYGEN DEMAND

REMARKS* ***REMARKS***
SULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

FOOTNOTES*
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92970 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: P-F COLLECTION START: 03/20/95 0700 STOP: 03/21/95 0700

RESULTS	UNITS	PARAMETER
31J	MG/L	AMMONIA
0.06	MG/L	NITRATE-NITRITE NITROGEN
74J	MG/L	TOTAL KJELDAHL NITROGEN
9.4A	MG/L	TOTAL-PHOSPHORUS
700	MG/L	CHEMICAL OXYGEN DEMAND
320	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
NA	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY,DISS
260	MG/L	ALKALINITY, TOTAL(AS CACO3)
100	MG/L	TOTAL SUSPENDED SOLIDS

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*REMARKS*** ***REMARKS***
SULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

*FOOTNOTES***
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92981 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: P-F COLLECTION START: 03/21/95 1030 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
5.0U	MG/L	OIL AND GREASE

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REMARKS*
ECOMMENDED HOLDING TIME EXCEEDED.

REMARKS

FOOTNOTES*
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SPECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93034 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-ET COLLECTION START: 03/21/95 0800 STOP: 03/22/95 0800

RESULTS	UNITS	PARAMETER
130J	MG/L	AMMONIA
0.48	MG/L	NITRATE-NITRITE NITROGEN
140J	MG/L	TOTAL KJELDAHL NITROGEN
9.1	MG/L	TOTAL-PHOSPHORUS
NA	MG/L	BIO-CHEMICAL OXYGEN DEMAND,5 DAY
NA	MG/L	TOTAL SUSPENDED SOLIDS
NA	MG/L	ALKALINITY, TOTAL(AS CACO3)
910	MG/L	CHEMICAL OXYGEN DEMAND

*REMARKS*** ***REMARKS***
SAMPLE CONTAINER RECEIVED

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND YSIS MANAGEMENT SYSTEM
EPA-REC IV ESD, ATHENS, GA. 06/15/95

PECIFIED ANALYSIS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92979 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-LE COLLECTION START: 03/21/95 1150 STOP: 00/00/00

RESULTS	UNITS	PARAMETER
7.7J	MG/L	AMMONIA
0.66	MG/L	NITRATE-NITRITE NITROGEN
7.7J	MG/L	TOTAL KJELDAHL NITROGEN
0 02U	MG/L	TOTAL-PHOSPHORUS
15	MG/L	CHEMICAL OXYGEN DEMAND

*REMARKS*** ***REMARKS***
SULTS ESTIMATED (J)-RECOMMENDED HOLDING TIMES EXCEEDED

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

ETALS DATA REPORT 04/27/95

PROJECT NO. 95-0203 SAMPLE NO. 92983 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/21/95 1345 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS
5.0U	SILVER
15U	ARSENIC
NA	BORON
19	*BARIUM*
2.5U	BERYLLIUM
2.5U	CADMIUM
5.0U	COBALT
5.0U	CHROMIUM
16	COPPER
17	MOLYBDENUM
10	NICKEL
20U	LEAD
15U	ANTIMONY
20U	SELENIUM
12U	TIN
48	STRONTIUM
25U	TELLURIUM
9.3	TITANIUM
50U	THALLIUM
5.0U	VANADIUM
5.0U	YTTRIUM
89	ZINC
NA	ZIRCONIUM
0.28	MERCURY
910	ALUMINUM
59	MANGANESE

MG/L	ANALYTICAL RESULTS
37	CALCIUM
3.3	MAGNESIUM
0.81	IRON
67	*SODIUM*
28	POTASSIUM

18

*REMARKS***

REMARKS

*FOOTNOTES***
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE ANL \LYSIS MANAGEMENT SYSTEM
EPA-RE I IV ESD, ATHENS, GA. 04/27/95

ETALS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93026 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-I COLLECTION START: 03/22/95 1315 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS
5.0U	SILVER
15U	ARSENIC
NA	BORON
23	BARIUM
2.5U	BERYLLIUM
2.5U	CADMIUM
5.0U	COBALT
52	CHROMIUM
20	COPPER
23	MOLYBDENUM
14	NICKEL
20U	LEAD
15U	ANTIMONY
20U	SELENIUM
12U	TIN
74	STRONTIUM
25U	TELLURIUM
11	TITANIUM
50U	THALLIUM
5.0U	VANADIUM
5.0U	YTTRIUM
100	ZINC
NA	ZIRCONIUM
0.27	MERCURY
680	ALUMINUM
57	MANGANESE

MG/L	ANALYTICAL RESULTS
52	CALCIUM
3.1	MAGNESIUM
0.90	IRON
69	SODIUM
27	POTASSIUM

82

*REMARKS*** ***REMARKS***

*FOOTNOTES***
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ETALS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 92982 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-001 COLLECTION START: 03/20/95 1300 STOP: 03/21/95 1300

UG/L	ANALYTICAL RESULTS
2.5U	SILVER
7.5U	ARSENIC
NA	BORON
3.4	BARIUM
1.2U	BERYLLIUM
1.2U	CADMIUM
2.5U	COBALT
2.5U	CHROMIUM
2.5U	COPPER
31	MOLYBDENUM
7.3	NICKEL
10U	LEAD
7.5U	ANTIMONY
10U	SELENIUM
6.2U	TIN
27	STRONTIUM
12U	TELLURIUM
2.5U	TITANIUM
25U	THALLIUM
2.5U	VANADIUM
2.5U	YTTRIUM
61	ZINC
NA	ZIRCONIUM
0.23	MERCURY
73	ALUMINUM
74	MANGANESE

MG/L	ANALYTICAL RESULTS
16	CALCIUM
15	MAGNESIUM
0.10	IRON
49	SODIUM
21	POTASSIUM

*REMARKS***

REMARKS

*FOOTNOTES***
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SAMPLE AND LYSIS MANAGEMENT SYSTEM
EPA-RE IV ESD, ATHENS, GA.

ET. DATA REPORT 04/27/95

PROJECT NO. 95-0203 SAMPLE NO. 93029 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-001 COLLECTION START: 03/21/95 1410 STOP: 03/22/95 1410

UG/L	ANALYTICAL RESULTS
2.5U	SILVER
7.5U	ARSENIC
NA	BORON
2.9	BARIUM
1.2U	BERYLLIUM
1.2U	CADMIUM
2.5U	COBALT
2.5U	CHROMIUM
2.5U	COPPER
18	MOLYBDENUM
6.6	NICKEL
10U	LEAD
7.5U	ANTIMONY
10U	SELENIUM
6.2U	TIN
30	STRONTIUM
12U	TELLURIUM
2.5U	TITANIUM
25U	THALLIUM
2.5U	VANADIUM
2.5U	YTTRIUM
50	ZINC
NA	ZIRCONIUM
0.22	MERCURY
58	ALUMINUM
63	MANGANESE

MG/L	ANALYTICAL RESULTS
16	CALCIUM
12	MAGNESIUM
0.088	IRON
59	SODIUM
27	POTASSIUM

*REMARKS***

REMARKS

*FOOTNOTES***
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

04/27/95

ETALS DATA REPORT

PROJECT NO. 95-0203 SAMPLE NO. 93025 SAMPLE TYPE: SLUDGE PROG ELEM: MCSI COLLECTED BY: T SIMPSON
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-DS COLLECTION START: 03/22/95 1250 STOP: 00/00/00

MG/KG	ANALYTICAL RESULTS
12	SILVER
30U	ARSENIC
NA	BORON
260	BARIUM
5.0U	BERYLLIUM
5.0U	CADMIUM
10U	COBALT
250	CHROMIUM
300	COPPER
62	MOLYBDENUM
44	NICKEL
65	LEAD
30U	ANTIMONY
40U	SELENIUM
25U	TIN
48	STRONTIUM
50U	TELLURIUM
110	TITANIUM
100U	THALLIUM
18	VANADIUM
10U	YTTRIUM
2000	ZINC
NA	ZIRCONIUM
2.1	MERCURY
13000	ALUMINUM
230	MANGANESE

MG/KG	ANALYTICAL RESULTS
18000	CALCIUM
3200	MAGNESIUM
16000	IRON
1000U	SODIUM
2000U	POTASSIUM
87	PERCENT MOISTURE

*REMARKS***

REMARKS

*FOOTNOTES***
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SAMPLE AND LYSIS MANAGEMENT SYSTEM
EPA-RE IV ESD, ATHENS, GA.

:TALS DATA REPORT 04/27/95

PROJECT NO. 95-0203 SAMPLE NO. 92980 SAMPLE TYPE: WASTEWATER PROG ELEM: MCSI COLLECTED BY: M BOWDEN
SOURCE: CORNELIA WWTP CITY: CORNELIA ST: GA
STATION ID: C-LE COLLECTION START: 03/21/95 1157 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS
5.0U	SILVER
15U	ARSENIC
NA	BORON
82	BARIUM
2.5U	BERYLLIUM
2.5U	CADMIUM
11	COBALT
5.0U	CHROMIUM
5.0U	COPPER
5.0U	MOLYBDENUM
10U	NICKEL
20U	LEAD
15U	ANTIMONY
20U	SELENIUM
12U	TIN
160	STRONTIUM
25U	TELLURIUM
5.0U	TITANIUM
50U	THALLIUM
5.0U	VANADIUM
5.0U	YTTRIUM
38	ZINC
NA	ZIRCONIUM
0.20U	MERCURY
77	ALUMINUM
2900	MANGANESE

MG/L	ANALYTICAL RESULTS
38	CALCIUM
6.2	MAGNESIUM
9.0	IRON
23	SODIUM
8.2	POTASSIUM

98

*REMARKS*** ***REMARKS***

*FOOTNOTES***
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APPENDIX E
LIST OF INDUSTRIAL USERS
CORNELIA WWTP

City of Cornelia
181 Larkin St. P.O. Box 217 Cornelia, GA 30531 (706) 778-8585 Fax (706) 778-2234

INDUSTRIES AVERAGE MONTHLY USUAGE

Cornelia Veneer Co - 215,600 gallons

Georgia Power Co - 28,100 gallons

Ken-Bar Mfg Co - 41,000 gallons

Ga Mountain Timber - 20,100 gallons

Cornelia Broom Co - 12,300 gallons

Bryson Auto Parts - 5200 gallons

Williams Bros Inc - 345,900 gallons

Short Mfg Co - 14.500 gallons

Ethicon Inc - 4,116,200 gallons

Fieldale Inc - 56,020,100 gallons

Nicolon Corp - 189,400 gallons

3-96

89