OERTEL, HOFFMAN, FERNANDEZ & COLE, P.A.

ATTORNEYS AT LAW

SUZANNE BROWNLESS
M. CHRISTOPHER BRYANT
R. L. CALEEN, JR.
C. ANTHONY CLEVELAND
TERRY COLE
ROBERT C. DOWNIE, II
MARTHA J. EDENFIELD
SEGUNDO J. FERNANDEZ
KENNETH F. HOFFMAN
KENNETH G. OERTEL
HAROLD F. X. PURNELL
PATRICIA A. RENOVITCH
SCOTT SHIRLEY
THOMAS G. TOMASELLO
W. DAVID WATKINS

SUITE C
2700 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

MAILING ADDRESS:
POST OFFICE BOX 6507
TALLAHASSEE, FLORIDA 32314-6507

TELEPHONE (904) 877-0099
FACSIMILE (904) 877-0981

JOHN H. MILLICAN
ENVIRONMENTAL CONSULTANT
(NOT A MEMBER OF THE FLORIDA BAR)

J. P. SUBRAMANI, PH. D., P.E.
ENVIRONMENTAL CONSULTANT
(NOT A MEMBER OF THE FLORIDA BAR)

December 17, 1990

Mr. Claire H. Fancy
Chief, Bureau of Air Regulation
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2499

Re: Container Corporation of America, Inc.

Dear Mr. Fancy:

Attached are 3 copies of the P. E. sealed analysis previously provided the Department on December 15, 1990. A fax of the title page was filed on Friday.

Thank you for all of the attention provided to the application.

Sincerely,

Terry Cole

Terry Cole

TC-letter.sj

Bruce Mitchell 12/17/90

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DEC 17 1990
DER - BAQM

NET EMISSIONS INCREASE ANALYSIS

FOR

CONTAINER CORPORATION OF AMERICA, INC.

Prepared For:

Container Corporation of America, Inc.
Fernandina Beach, Florida

Prepared By:

KBN Engineering and Applied Sciences, Inc.
1034 NW 57th Street
Gainesville, Florida 32605

David A. Buff, P.E.
David A. Buff
Florida P.E. # 19011

December 1990
90017A2

INTRODUCTION

This report was prepared by KBN for the purpose of determining whether the addition of the No. 8 Batch Digester and C-Line Brown Stock Washer to the CCA Fernandina Mill will require a PSD review prior to the issuance of air construction permits for these two emission sources.

The determination of whether PSD review is necessary was based on a conservative calculation of two factors as required under the Florida Administrative Code:

1. A determination was made of the actual emissions representative for the facility's operations in accordance with Rule 17-2.100(3) F.A.C.; and
2. A determination was made of the actual emission increases at the facility from the addition of the digester and washer. The facility was evaluated to determine if there will be any contemporaneous and creditable emission changes in conjunction with the addition of these two air sources.

Included in this Report is the following information:

1. Summary table of the calculations showing the projected total net emission increase or decrease from each affected source for each pollutant;
2. Summary table of the net emission increase for each pollutant as compared to the regulatory Significant Emission Rates found in Table 500-2, F.A.C.;
3. Calculations of the current actual emissions for each source, based on an average of emissions over a representative two-year period;
4. Calculations of the estimated emissions increase for each source resulting from the construction of the digester and washer; and
5. Calculation of the creditable emission reductions from Power Boiler No. 4.

The result of this analysis demonstrates that there will be no significant net emissions increase from the addition of the digester and washer at this facility. The analysis rigorously followed the procedures set forth in Rule 17-2.500(2)(e), F.A.C. Based on this analysis, PSD review is not required.

CCA Fernandina Mill--Proposed Batch Digester/Washer
Summary of Calculated Net Emissions Increases[a]

Regulated Pollutant	Net Emissions Increase	Significant Emission Rates from Table 500-2[a] (TPY)
Particulate (TSP)	-190.8	25
Particulate (PM10)	-152.6	15
Sulfur dioxide	29.4	40
Nitrogen oxides	14.1	40
Carbon monoxide	-305.5	100
Volatile organic compounds	-31.8	40
Lead	-0.03	0.6
Mercury	0.0014	0.1
Beryllium	0.0008	0.004
Fluorides	2.23	3
Sulfuric acid mist	-3.0	7
Total reduced sulfur	2.01	10
Asbestos	0.0	0.007
Vinyl Chloride	0.0	1

[a]Florida Administrative Code, Rule 17-2.500.

CCA Fernandina Mill--Proposed Batch Digester/Washer
Summary of Calculated Net Emission Increase Per Rule 17-2.500(2)(e)

Regulated Pollutant	Changes in Emissions (TPY)							TOTALS
	PB 4	PB 5	PB 7	RB 4	RB 5	SDT 4	SDT 5	
Particulate (TSP)	-235.4	4.8	5.3	20.6	7.2	4.8	1.9	-190.8
Particulate (PM10)	-186.0	3.0	3.5	15.5	5.4	4.3	1.7	-152.6
Sulfur dioxide	-421.8	67.1	263.6	53.0	64.7	1.3	1.5	29.4
Nitrogen oxides	-195.9	11.5	143.8	24.6	30.1	--	--	14.1
Carbon monoxide	-622.0	0.9	22.0	132.1	161.5	--	--	-305.5
Volatile organic compounds	-55.9	0.13	0.7	10.5	12.8	--	--	-31.8
Lead	-0.06	0.00022	0.0063	0.013	0.010	--	--	-0.03
Mercury	-0.0006	0.00006	0.0019	--	--	--	--	0.0014
Beryllium	-0.0017	0.000015	0.00072	0.00100	0.00077	--	--	0.0008
Arsenic	-0.016	0.00006	0.01	0.0035	0.0026	--	--	0.000
Fluorides	-0.00117	0.00016	2.23	--	--	--	--	2.23
Sulfuric acid mist	-19.4	3.1	12.1	0.69	0.53	--	--	-3.0
Total reduced sulfur	--	--	--	0.36	0.40	0.51	0.03	2.01[a]
Asbestos	--	--	--	--	--	--	--	0.0
Vinyl Chloride	--	--	--	--	--	--	--	0.0

[a]Includes 0.71 TPY TRS from proposed brown stock washer.

CURRENT ACTUAL EMISSIONS

Current actual emission calculations are based on actual mill operating data over the past 2 years (1988 and 1989). Emission sources operating during this period were consistently well within permitted emission limits. These sources include:

1. Power Boiler No. 5,
2. Power Boiler No. 7,
3. Recovery Boiler No. 4,
4. Recovery Boiler No. 5,
5. Smelt Dissolving Tank No. 4,
6. Smelt Dissolving Tank No. 5, and
7. Lime Kiln No. 4 (Startup date: December 1989).

I. Power Boiler No. 5

A. Particulate Matter (TSP)

Based on annual emissions for particulate matter as reported in the Annual Operating Reports, which were based on stack test data and operating hours.

1988--31.1 TPY
1989--63.0 TPY
Average: 47.1 TPY

B. PM10

No. 5 Power Boiler is controlled with an ESP. AP-42 does not contain particle size information for bark-fired boiler equipped with an ESP. Therefore, use AP-42 factor for coal-fired boiler with an ESP: 67% of PM is PM10.

47.1 TPY x 0.67 = 31.6 TPY

C. Sulfur Dioxide

1. Fuel Oil Burning

Usages of No. 6 fuel oil in No. 5 Power Boiler were 3.527 x 10^6 gal in 1988 and 2.999 x 10^6 gal in 1989. Fuel analyses for both years showed that actual sulfur content in fuel oil was 2.5%. Using AP-42 emission factor of 157 S pounds per 1,000 gal of fuel for utility boiler where S is the percent of sulfur content in fuel oil:

SO_2 emission factor = 157S lb/10^3 gal; S = 2.5%

No. 6 oil burning in No. 5 Power Boiler:

1988 -- 3.527x10^6 gal
1989 -- 2.999x10^6 gal
Average -- 3.263x10^6 gal

SO_2 = 3.263x10^6 gal x 157(2.5)/10^3 gal/2,000 = 640.4 TPY

2. Bark Burning

Bark burning in No. 5 Power Boiler:

1988 -- 357,000 TPY
1989 -- 347,495 TPY
Average -- 352,248 TPY

AP-42 emission factor for bark burning is 0.4 lb/ton dry bark

Wet bark is 50% moisture.
Dry Bark = 352,248 x 0.5 = 176,124 TPY
SO_2 = 176,124 TPY x 0.4 lb/ton / 2,000 = 35.2 TPY

3. Total

Total average SO_2 annual emission is sum of SO_2 due to oil and bark burning:
640.4 TPY + 35.2 TPY = 675.6 TPY

D. Nitrogen Oxides

1. Fuel Oil Burning

AP-42: 67 lb/10^3 gal
3.263x10^6 gal x 67/10^3 / 2,000 = 109.3 TPY

2. Bark Burning

From AP-42: 2.8 lb/ton bark
352,248 TPY x 2.8 lb/ton / 2,000 = 493.1 TPY

3. Total

109.3 + 493.1 = 602.4 TPY

E. Carbon Monoxide

1. Fuel Oil Burning

AP-42: 5 lb/10^3 gal
3.263x10^6 gal x 5/10^3 / 2,000 = 8.2 TPY

2. Bark Burning

From NCASI Technical Bulletin No. 109, September 1980, four wood-waste boilers were tested continuously for CO emissions. Boilers B and D operated at about 300,000 lb/hr steam, which is similar to Power Boiler No. 5 operation. The 1-hour CO tests ranged from 0.042 to 0.604 lb/10^6 Btu and averaged 0.27 lb/10^6 Btu. This average value was used as the emission factor to calculate actual CO emissions:
352,248 TPY bark x 2,000 lb/ton x 4,250 Btu/lb
= 2.994 x 10^{12} Btu/yr
2.994x10^{12} Btu/yr x 0.27 lb/10^6 Btu / 2,000
= 404.2 TPY

3. Total

8.2 + 404.2 = 412.4 TPY

F. Volatile Organic Compounds (non-methane)

1. Fuel Oil Burning

AP-42: 0.76 lb/10^3 gal

3.263×10^6 gal x 0.76 lb/10^3 gal / 2,000 = 1.2 TPY

2. Bark Burning

AP-42: 1.4 lb/ton bark

352,248 TPY x 1.4 lb/ton / 2,000 = 246.6 TPY

3. Total

1.2 + 246.6 = 247.8 TPY

G. Trace Elements (Lead, Mercury, Beryllium, Arsenic, Fluorides)

1. Fuel Oil Burning

From "Toxic Air Polluted Emission Factors--A Compilation for Selected Air Toxic Compounds and Sources," EPA-450/2-88-006.

a. Lead

Factor is 8.9 lb/10^{12} Btu (uncontrolled)

Fuel usage = 3.263×10^6 gal

Heating value = 145,000 Btu/gal

Heat input = 3.263×10^6 x 145,000

= 0.473×10^{12} Btu/yr

Pb = 0.473×10^{12} Btu/yr x 8.9 lb/10^{12} Btu / 2,000

= 0.0021 TPY

b. Mercury

Factor is 2.4 lb/10^{12} Btu (controlled by ESP)

Hg = 0.473×10^{12} x 2.4/10^{12} / 2,000 = 0.00057 TPY

c. Beryllium

Factor is 0.59 lb/10^{12} Btu (controlled by ESP)

Be = 0.473×10^{12} x 0.59/10^{12} / 2,000 = 0.00014 TPY

d. Arsenic

Factor is 2.28 lb/10^{12} Btu (controlled by ESP)

As = 0.473×10^{12} x 2.28/10^{12} / 2,000 = 0.00054 TPY

e. Fluorides

From "Emissions Assessment of Conventional Stationary Combustion Systems, Vol V: Industrial Combustion Sources," EPA-600/7-81-003a.

Factor is 2.7 pg/J = 6.27 lb/10^{12} Btu (uncontrolled)

F = 0.473×10^{12} x 6.27/10^{12} / 2,000 = 0.0015 TPY

2. Bark Burning

All factors based on EPA-600/7-81-003a, for a controlled wood-fired stoker boiler.

a. Lead

Factor is 50 pg/J = 116 lb/10^{12} Btu

2.994×10^{12} Btu/yr x 116 lb/10^{12} Btu / 2,000 = 0.174 TPY

b. Mercury
Not measured--no emission factor available.

c. Beryllium
Factor is <1 pg/J, or <2.3 lb/10^{12} Btu
2.994x10^{12} Btu/yr x 2.3 lb/10^{12} Btu / 2,000
= 0.0034 TPY

d. Arsenic
Factor is 12 pg/J = 27.9 lb/10^{12} Btu
2.994x10^{12} Btu/yr x 27.9 lb/10^{12} Btu / 2,000
= 0.042 TPY

e. Fluorides
Not measured--no emission factor available.

3. Totals

a.	Lead:	0.0021 + 0.174	= 0.176 TPY
b.	Mercury:	0.00057 + 0	= 0.00057 TPY
c.	Beryllium:	0.00014 + 0.0034	= 0.0035 TPY
d.	Arsenic:	0.00054 + 0.042	= 0.042 TPY
e.	Fluorides:	0.0015 + 0	= 0.0015 TPY

H. Sulfuric Acid Mist
Sulfuric acid mist is estimated as 3% of sulfur emissions
SO_2 = 675.6 TPY
Sulfur = 675.6x32/64 = 337.8 TPY
Sulfuric acid mist = 337.8 x 98/32 x 0.03 = 31.0 TPY

II. Power Boiler No. 7

A. PM (TSP)
From Annual Emissions Reports, based on actual stack test and operating hours:
1988 -- 40.38 TPY
1989 -- 91.36 TPY
Average -- 65.87 TPY

B. PM10
Power Boiler No. 7 is a pulverized coal-fired boiler equipped with ESP control. Based on AP-42, 67% of PM emissions are PM10.
65.87 x 0.67 = 44.13 TPY

C. Sulfur Dioxide
Power Boiler No. 7 burns compliance coal. Average sulfur content was 1.1 lb/10^6 Btu in 1988 and 1989. Total coal burned in the boiler was 248,621 tons in 1989 and 230,644 tons in 1988, for an average of 239,633 TPY.
The coal averages 12,500 Btu/lb.
239,633 TPY x 2,000 x 12,500 Btu/lb = 5.99x10^{12} Btu/yr
5.99x10^{12} Btu x 1.1 lb/10^6 Btu / 2,000 = 3,294.5 TPY

D. Nitrogen Oxides

AP-42 emission factor for dry-bottom pulverized coal boiler: 21 lb/ton.
Based on coal at 12,500 Btu/lb, this results in 0.84 lb/10^6 Btu.
Boiler is limited to 0.6 lb/10^9 Btu by NSPS. Therefore, use NSPS limit: 5.99x10^{12} Btu x 0.6 lb/10^6 Btu / 2,000 = 1,797.0 TPY

E. Carbon Monoxide

Based on compliance test, boiler limited to 93.60 lb/hr CO. Boiler oxygen monitor is set to maintain this level. This equates to emission rate of 0.092 lb/10^6 Btu.
5.99x10^{12} Btu x 0.092 lb/10^6 Btu / 2,000 = 275.5 TPY

F. Volatile Organic Compounds

From AP-42 factor, dry-bottom pulverized coal boiler: 0.07 lb/ton
239,633 TPY x 0.07 lb/ton / 2,000 = 8.39 TPY

G. Lead, Mercury, Beryllium, Arsenic, Fluorides

From EPA-450/2-88-006: Emission factors for trace elements are based on boilers equipped with ESP control.

1. Lead

Factor is 25 lb/10^{12} Btu
5.99x10^{12} Btu x 25 lb/10^{12} Btu / 2,000 = 0.075 TPY

2. Mercury

Factor is 8 lb/10^{12} Btu
5.99x10^{12} Btu x 8 lb/10^{12} Btu / 2,000 = 0.024 TPY

3. Beryllium

Factor is 3.0 lb/10^{12} Btu
5.99x10^{12} Btu x 3.0 lb/10^{12} Btu / 2,000 = 0.0090 TPY

4. Arsenic

Factor is 40.1 lb/10^{12} Btu
5.99x10^{12} Btu x 40.1 lb/10^{12} Btu / 2,000 = 0.12 TPY

5. Fluorides

From EPA-600/7-81-003a, for a dry-bottom coal-fired boiler (controlled)
Factor is 4 ng/J or 9,296 lb/10^{12} Btu
5.99x10^{12} Btu x 9,296 lb/10^{12} Btu / 2,000 = 27.84 TPY

H. Sulfuric Acid Mist

Estimate at 3% of sulfur emissions.
SO_2 = 3,294.5 TPY
Sulfur = 3,294.5 x 32/64 = 1,647.3 TPY
Sulfuric Acid Mist = 1,647.3 TPY x 98/32 x 0.03 = 151.3 TPY

III. Recovery Boiler No. 4

A. PM(TSP)

From annual emissions report, based on actual stack testing and operating hours:

1988 - 342 TPY
1989 - 194 TPY
Average - 268 TPY

B. PM10

Based on AP-42, Section 10.1, for non-direct contact recovery boiler with ESP: 75% of PM is PM10.
268 TPY x 0.75 = 201 TPY

C. Sulfur Dioxide

From NCASI draft technical bulletin, SO_2 emissions from 13 non-direct contact recovery boilers averaged 4.2 lb SO_2 per ton of pulp.

Pulp production: 1988 -- 689,388 TPY
1989 -- 696,909 TPY
Average -- 693,149 TPY

Liquor swapping currently adds an additional 95 TPD equivalent pulp production, or 34,675 TPY.
Therefore, total equivalent pulp production = 693,149 + 34,675 = 727,824 TPY
727,824 tons pulp x 4.2 lb/ton / 2,000 = 1,528.4 TPY
Prorate total emissions between the two recovery boilers based on black liquor solids (BLS) fired.

	No. 4 RB	No. 5 RB	Total	
1988 -	332,770	406,718	739,488	TPY
1989 -	340,337	415,967	756,304	TPY
Average -	336,554	411,343	747,896	TPY
	(45.0%)	(55.0%)		

Recovery Boiler No. 4: 1,528.4 TPY x 0.45 = 687.8 TPY

D. Nitrogen Oxides

From 1980 NCASI paper on NO_x emissions, NO_x emissions from three non-direct contact recovery boilers averaged 1.95 lb/ton ADUP.
Total NO_x = 727,824 TPY x 1.95 lb/ton / 2,000 = 709.6 TPY

Recovery Boiler No. 4 NO_x = 709.6 TPY x 0.45 = 319.3 TPY

E. Carbon Monoxide

Emission factor from AP-42: 11 lb/ton ADUP
Total CO = 693,149 TPY x 11 lb/ton / 2,000 = 3,812.3 TPY
Prorate total to Recovery Boiler No. 4 based on BLS fired:
3,812.3 TPY x 0.45 = 1,715.5 TPY

F. Volatile Organic Compounds

Based on NCASI Technical Bulletin No. 112, February 1981, three non-direct contact evaporator recovery boilers were tested. VOC ranged from 0.66 to 1.1 lb per ton pulp and averaged 0.83 lb/ton pulp.
Total VOC = 727,824 tons/yr pulp x 0.83/ton / 2,000 = 302.0 TPY

Recovery Boiler No. 4: 302.0 TPY x 0.45 = 135.9 TPY

G. Lead, Mercury, Beryllium, Arsenic, Fluorides

From "Application of Combustion Modifications to Industrial Combustion Equipment," EPA-600/7-79-015a. Represents one test from recovery boiler.

1. Lead

Factor is 3,900 lb/10^{12} dscf
Recovery Boiler No. 4 gas flow rate from stack test on 5/8/90 of 175,147 dscfm
175,147 dscfm x 60 min/hr x 3,900 lb/10^{12} dscf = 0.041 lb/hr
From Annual Emissions Report, Recovery Boiler No. 4 operated 8,450 hrs 1989, and 8,047 hrs in 1988, or an average of 8,249 hr/yr.
Pb = 0.041 lb/hr x 8,249 hr/yr / 2,000 = 0.17 TPY

2. Mercury

Below detectable limit.

3. Beryllium

Factor is 300 lb/10^{12} dscf
175,147 dscfm x 60 x 300/10^{12} = 0.0032 lb/hr
0.0032 lb/hr x 8,249 hr/yr / 2,000 = 0.013 TPY

4. Arsenic

Factor is <1,000 lb/10^{12} dscf
175,147 x 60 x 1,000/10^{12} = 0.011 lb/hr
0.011 lb/hr x 8,249 hr/yr / 2,000 = 0.045 TPY

5. Fluorides

Below detectable limits.

H. Sulfuric Acid Mist

Based on NCASI Technical Bulletin No. 106, April 1980. Average sulfuric acid concentration in exhaust gases of recovery boiler are reported as 0.81 ppm.

$$\frac{175{,}147\ ft^3}{min} \times \frac{60\ min}{hr} \times \frac{2{,}116.8\ lb_f}{ft^2} \times \frac{98\ lb_m\text{-}°R}{1{,}545\ ft\text{-}lb_f} \times \frac{1}{528°R} \times \frac{0.81}{10^6}$$

$$= 2.16\ lb/hr$$

2.16 lb/hr x 8,249 hr/yr / 2,000 = 8.91 TPY

I. Total Reduced Sulfur (TRS)

From annual emission reports, average TRS was 1.6 ppm in 1988 and 0.81 ppm in 1989, or average of 1.21 ppm.

$175{,}147 \times 60 \times 2{,}116.8 \times (34/1{,}545) \times (1/528) \times 1.21/10^6$
= 1.12 lb/hr

1.12 lb/hr x 8,249 hr/yr / 2,000 = 4.62 TPY

IV. Recovery Boiler No. 5

A. PM(TSP)

From Annual Emissions Reports, based on actual stack testing and operating hours:

1989 - 152 TPY
1988 - 35.4 TPY
Avg. - 93.7 TPY

B. PM10

Based on AP-42, Section 10.1, for non-direct contact recovery boiler with ESP: 75% of PM is PM10.
93.7 TPY x 0.75 = 70.3 TPY

C. Sulfur Dioxide

From Recovery Boiler No. 4 calculations:
1,528.4 TPY x 0.55 = 840.6 TPY

D. Nitrogen Oxides

Based on Recovery Boiler No. 4 calculations:
Recovery Boiler No. 5 NO_x = 709.6 TPY x 0.55 = 390.3 TPY

E. Carbon Monoxide

Based on Recovery Boiler No. 4 calculations:
3,812.3 TPY x 0.55 = 2,096.8 TPY

F. Volatile Organic Compounds

Based on Recovery Boiler No. 4 calculations:
302.0 TPY x 0.55 = 166.1 TPY

G. Lead, Mercury, Beryllium, Arsenic, Fluorides

From "Application of Combustion Modifications to Industrial Combustion Equipment," EPA-600/7-79-015a. Represents one test from recovery boiler.

1. Lead

Factor is 3,900 lb/10^{12} dscf
Recovery Boiler No. 5 gas flow rate from stack test 1/10/90 = 139,548 dscfm
139,548 dscfm x 60 min/hr x 3,900 lb/10^{12} dscf = 0.033 lb/hr
From Annual Emissions Report, Recovery Boiler No. 5 operated 8,434 hrs in 1989 and 7,661 hrs in 1988, or an average of 8,048 hr/yr.
Pb = 0.033 lb/hr x 8,048 hr/yr / 2,000 = 0.13 TPY

2. Mercury

Below detectable limit.

3. Beryllium

Factor is 300 lb/10^{12} dscf
139,548 dscfm x 60 x 300/10^{12} = 0.0025 lb/hr
0.0025 lb/hr x 8,048 hr/yr / 2,000 = 0.010 TPY

4. Arsenic

Factor is <1,000 lb/10^{12} dscf
139,548 x 60 x 1,000/10^{12} = 0.0084 lb/hr
0.0084 lb/hr x 8,048 hr/yr / 2,000 = 0.034 TPY

5. Fluorides

Below detectable limits.

H. Sulfuric Acid Mist

Based on NCASI Technical Bulletin No. 106, April 1980. Average sulfuric acid concentration in exhaust gases of recovery boiler are reported as 0.81 ppm.

$$\frac{139{,}548\ ft^3}{min} \times \frac{60\ min}{hr} \times \frac{2{,}116.8\ lb_f}{ft^2} \times \frac{98\ lb_m\text{-}°R}{1{,}545\ ft\text{-}lb_f} \times \frac{1}{528°R} \times \frac{0.81}{10^6}$$

$$= 1.72\ lb/hr$$

1.72 lb/hr x 8,048 hr/yr / 2,000 = 6.92 TPY

I. Total Reduced Sulfur

From Annual Emission Reports, average TRS was 1.82 ppm in 1989 and 1.7 ppm in 1988, or average of 1.76 ppm.

$139,548 \times 60 \times 2116.8 \times (34/1545) \times (1/528) \times 1.76/10^6$
= 1.30 lb/hr

1.30 lb/hr x 8,048 hr/yr / 2,000 = 5.23 TPY

V. Smelt Dissolving Tank No. 4

A. PM

From Annual Emission Reports, based on stack test and operating hours:

1989 - 24.7 TPY
1988 - 99.4 TPY
Avg. - 62.1 TPY

B. PM10

Smelt Dissolving Tank No. 4 is controlled by wet scrubber. Based on AP-42, Table 10.1-7, PM10 is 89.5% of PM emissions.

62.1 TPY x 0.895 = 55.6 TPY

C. SO_2

AP-42 factor is 0.2 lb/ton ADUP, uncontrolled. Conservatively, we have assumed 50% control for the wet scrubber.
Total SO_2 emissions = 727,824 tons x 0.2 lb/ton x 0.5 / 2,000
= 36.4 TPY
From Recovery Boiler No. 4 calculations, 45% of production through this boiler: 36.4 TPY x 0.45 = 16.4 TPY

D. TRS

From Annual Emission Reports, based on stack test and operating hours for 1989; based on permit limits for 1988:

1989 - 4.35 TPY
1988 - 8.90 TPY
Avg. - 6.63 TPY

VI. Smelt Dissolving Tank No. 5

A. PM

From Annual Emission Reports, based on stack test and operating hours:

1989 - 24.0 TPY
1988 - 25.3 TPY
Avg. - 24.7 TPY

B. PM10

Smelt Dissolving Tank No. 4 is controlled by wet scrubber. Based on AP-42, Table 10.1-7, PM10 is 89.5% of PM emissions.

24.7 TPY x 0.895 = 22.1 TPY

C. SO_2

From Smelt Dissolving Tank No. 4 calculations:
36.4 x 0.55 = 20.0 TPY

D. TRS

Based on stack test in 1988 and actual hours of operation in 1988 and 1989:

Stack test result = 0.11 lb/hr
Operating hours--1988 - 7,661 hrs
1989 - 8,434 hrs
Avg. - 8,048 hrs

Average TRS emissions = 0.11 lb/hr x 8,048 hr/yr / 2,000 = 0.44 TPY

VII. Lime Kiln No. 4

Since new lime kiln started operation in December 1989, there is no historical operating data. Therefore, actual emissions are assumed equal to permitted emissions:

PM -- 43.5 lb/hr, 190.0 TPY
PM10 -- 38.5 lb/hr, 168.2 TPY
SO_2 -- 26.8 lb/hr, 117.1 TPY
NO_x -- 187.7 lb/hr, 819.9 TPY
CO -- 78.8 lb/hr, 29.8 TPY
VOC -- 15.2 lb/hr, 44.7 TPY
TRS -- 2.63 lb/hr, 11.5 TPY

NET EMISSIONS INCREASE
DUE TO NEW BATCH DIGESTER AND BROWN STOCK WASHER

Net emission increases were calculated using the criteria in FAC 17-2.500 (2)(e). In all instances, future actual emissions will remain within the current permitted levels.

I. Power Boiler No. 5

PB No. 5, a combination oil/bark/woodwaste-fired boiler, will experience an increase in steam production, but future operation will remain within existing permitted levels. All of the increase is assumed to be from oil burning. The increase is calculated as 22.92 barrels per day of oil for 355 days per year, or 341,737 gallons per year.

A. Particulate Matter (TSP)
AP-42 factor is (10S+3) lb/1000 gal. (uncontrolled)
10(2.5)+3 = 28 lb/1000 gal
341,737 gal/yr x 28 lb/1000 gal / 2000 = 4.8 TPY

B. PM10
No. 5 Power Boiler is controlled with an ESP. AP-42 contains particle size information for oil-fired boiler equipped with ESP. The data show that 63% of PM is PM10.
4.8 TPY x 0.63 = 3.0 TPY

C. Sulfur Dioxide
Fuel analyses show that actual sulfur content in the fuel oil was 2.5% the last two years. Using AP-42 emission factor of 157 S pounds per 1,000 gal of fuel for utility boiler where S is the percent of sulfur content in fuel oil:

SO_2 emission factor = 157S lb/10^3 gal, S = 2.5%

SO_2 = 341,737 gal x 157(2.5)/10^3 gal / 2,000 = 67.1 TPY

D. Nitrogen Oxides
AP-42: 67 lb/10^3 gal
341,737 gal x 67/10^3 / 2,000 = 11.5 TPY

E. Carbon Monoxide
AP-42: 5 lb/10^3 gal
341,737 gal x 5/10^3 / 2,000 = 0.9 TPY

F. Volatile Organic Compounds (non-methane)
AP-42: 0.76 lb/10^3 gal
341,737 gal x 0.76 lb/10^3 gal / 2,000 = 0.13 TPY

G. Trace Elements (Lead, Mercury, Beryllium, Arsenic, Fluorides)
From "Toxic Air Polluted Emission Factors--A Compilation for Selected Air Toxic Compounds and Sources," EPA-450/2-88-006.

1. Lead
Factor is 8.9 lb/10^{12} Btu (uncontrolled)
Increased fuel usage = 341,737 gal
Heating value = 145,000 Btu/gal
Heat input = 341,737 x 145,000
= 0.05x10^{12} Btu/yr
Pb = 0.05x10^{12} Btu/yr x 8.9 lb/10^{12} Btu / 2,000
= 0.00022 TPY

2. Mercury
Factor is 2.4 lb/10^{12} Btu (controlled by ESP)
Hg = 0.05x10^{12} x 2.4/10^{12} / 2,000 = 0.00006 TPY

3. Beryllium
Factor is 0.59 lb/10^{12} Btu (controlled by ESP)
Be = 0.05x10^{12} x 0.59/10^{12} / 2,000 = 0.000015 TPY

4. Arsenic
Factor is 2.28 lb/10^{12} Btu (controlled by ESP)
As = 0.05x10^{12} x 2.28/10^{12} / 2,000 = 0.00006 TPY

5. Fluorides
From "Emissions Assessment of Conventional Stationary Combustion Systems, Vol V: Industrial Combustion Sources," EPA-600/7-81-003a.
Factor is 2.7 pg/J = 6.27 lb/10^{12} Btu (uncontrolled)
F = 0.05x10^{12} x 6.27/10^{12} / 2,000 = 0.00016 TPY

H. Sulfuric Acid Mist
Sulfuric acid mist is estimated as 3% of sulfur emissions
SO_2 = 67.1 TPY
Sulfur = 67.1 x 32/64 = 33.55 TPY
Sulfuric acid mist = 33.55 x 98/32 x 0.03 = 3.1 TPY

II. Power Boiler No. 7

Power Boiler No. 7 will experience an 8.0% increase in steam production, which results in approximately 56.0 additional tons of coal being burned per day. Actual emissions will increase by 8.0%.

Pollutant	Current Actual Emissions (TPY)	Increase in Actual Emissions (TPY)
PM(TSP)	65.87	5.3
PM10	44.13	3.53
SO_2	3,294.5	263.6
NO_x	1,797.0	143.76
CO	275.5	22.04
VOC	8.39	0.67
Pb	0.075	0.006
Hg	0.024	0.0019
Be	0.0090	0.00072
As	0.12	0.010
Fl	27.84	2.23
H_2SO_4	151.3	12.1

III. Recovery Boiler No. 4

The actual net increase in fuel input to the recovery boilers will be the equivalent of 155 tons per day of pulp. This is a 7.7% increase above current operating rates.

A. PM(TSP)
Current actual = 268 TPY
268 x 0.077 = 20.6 TPY

B. PM10
20.6 x 0.75 = 15.5 TPY

C. SO_2
687.8 x 0.077 = 53.0 TPY

D. NO_x
319.3 x 0.077 = 24.6 TPY

E. CO
1,715.5.9 x 0.077 = 132.1 TPY

F. VOC
135.9 x 0.077 = 10.5 TPY

G. Trace Metals
Pb--0.17 x 0.077 = 0.013 TPY
Hg--N/A
Be--0.013 x 0.077 = 0.0010 TPY
As--0.045 x 0.077 = 0.0035 TPY
Fl--N/A

H. Sulfuric Acid Mist
8.91 x 0.077 = 0.69 TPY

I. TRS
4.62 x 0.077 = 0.36 TPY

IV. Recovery Boiler No. 5

Similar to Recovery Boiler No. 4, operation of Recovery Boiler No. 5 will increase 7.7% over present operation.

A. PM(TSP)
93.7 x 0.077 = 7.2 TPY

B. PM10
7.2 x 0.75 = 5.4 TPY

C. SO_2
840.6 x 0.077 = 64.7 TPY

D. NO_x
390.3 x 0.077 = 30.1 TPY

E. CO
2,096.8 x 0.077 = 161.5 TPY

F. VOC
166.1 x 0.077 = 12.8 TPY

G. Trace Metals
Pb--0.13 x 0.077 = 0.010 TPY
Hg--N/A
Be--0.010 x 0.077 = 0.00077 TPY
As--0.034 x 0.077 = 0.0026 TPY
Fl--N/A

H. Sulfuric Acid Mist
6.92 x 0.077 = 0.53 TPY

I. TRS
5.23 x 0.077 = 0.40 TPY

V. Smelt Dissolving Tank No. 4 and No. 5

The smelt tanks will experience the same increase over current operating rates as the recovery boilers (7.7%).

	SDT No. 4 (TPY)		SDT No. 5 (TPY)	
Pollutant	Current	Increase	Current	Increase
PM	62.1	4.8	24.7	1.9
PM10	55.6	4.3	22.1	1.7
SO_2	16.4	1.3	20.0	1.5
TRS	6.63	0.51	0.44	0.03

VI. Lime Kiln No. 4

Since there is no historic operating data from the new lime kiln, the present and future actual emissions are assumed to be the current permitted allowables.

EMISSION REDUCTIONS -- POWER BOILER NO. 4

Base actual emissions on last 2 years (1985 - 1986) of sustained boiler operation.

A. Particulate Matter (TSP)

1986 - Stack tests of 2/18/86 and 10/28/86 - 65.8 lb/hr avg
Operating days = 264

PM = 264 days x 24 hr/day x 65.8 lb/hr / 2,000 lb/ton
= 208.5 TPY

1985 - Base on 1985 stack test - 75.9 lb/hr
Operating days = 288

PM = 288 x 24 x 75.9 / 2,000 = 262.3 TPY

Avg. = 235.4 TPY

B. PM10

Power Boiler No. 4 was controlled with mechanical collectors and fly ash injection. AP-42 states that PM10 is 79% of PM emissions.
235.4 TPY x 0.79 = 186.0 TPY

C. SO_2

1. Bark/Wood
Avg. = 78,367 tons/yr burned
Dry basis--moisture 50% -- 78,367 x 0.5 = 39,183.5 tons
AP-42: 0.4 lb/ton dry
39,183.5 tons x 0.4 lb/ton / 2,000 = 7.8 TPY

2. Fuel Oil
1986 - 764,000 gal @ 2.5% S
1985 - 4,384,000 gal @ 1.97% S
AP-42: SO_2 = 157 S lb/1,000 gal

1986 - 764,000 x 157(2.5)/1,000 / 2,000 = 149.9 TPY
1985 - 4,384,000 x 157(1.97)/1,000 / 2,000 = 678.0 TPY
Avg. - 414.0 TPY

3. Total
7.8 TPY + 414.0 TPY = 421.8 TPY

D. Nitrogen Oxides

1. Fuel Oil Burning
AP-42: 67 lb/10^3 gal
Average of 2.574×10^6 gal/yr burned
2.574×10^6 gal x $67/10^3$ / 2,000 = 86.2 TPY

2. Bark Burning
   From AP-42: 2.8 lb/ton bark
   78,367 TPY x 2.8 lb/ton / 2,000 = 109.7 TPY

3. Total
   86.2 + 109.7 = 195.9 TPY

E. Carbon Monoxide

1. Fuel Oil Burning
   AP-42: 5 lb/10^3 gal
   2.574×10^6 gal x $5/10^3$ / 2,000 = 6.4 TPY

2. Bark Burning
   From NCASI Technical Bulletin No. 109, September 1980, four wood-waste boilers were tested continuously for CO. Boilers A and C operated at about 140,000 lb/hr steam, which is similar to Power Boiler No. 4 operation. The 1-hour CO tests ranged from 0.31 to 4.0 lb/10^6 Btu and averaged 1.84 lb/10^6 Btu. This average factor was used to calculate actual CO emissions:
   78,367 tons bark x 2,000 lb/ton x 4,250 Btu/lb
   = 0.67×10^{12} Btu/yr

   0.67×10^{12} Btu/yr x 1.84 lb/10^6 Btu / 2,000 = 616.4 TPY

3. Total
   6.4 + 616.4 = 622.8 TPY

F. Volatile Organic Compounds

1. Fuel Oil Burning
   AP-42: 0.76 lb/10^3 gal
   2.574×10^6 gal x 0.76 lb/10^3 gal / 2,000 = 1.0 TPY

2. Bark Burning
   AP-42: 1.4 lb/ton bark
   78,367 TPY x 1.4 lb/ton / 2,000 = 54.9 TPY

3. Total
   1.0 + 54.9 = 55.9 TPY

G. Lead, Mercury, Beryllium, Arsenic, Fluorides

1. Fuel Oil Burning
   From "Toxic Air Pollutant Emission Factors - A Compilation for Selected Air Toxic Compounds and Sources," EPA-450/2-88-006.
   a. Lead
      Factor is 8.9 lb/10^{12} Btu (uncontrolled)
      Fuel usage = 2.574×10^6 gal
      Heating value = 145,000 Btu/gal
      Heat input = 2.574×10^6 x 145,000
      = 0.373×10^{12} Btu/yr

Pb = 0.373×10^{12} Btu/yr x 8.9 lb/10^{12} Btu / 2,000
= 0.0017 TPY

b. Mercury
Factor is 3.2 lb/10^{12} Btu (controlled by multiclone)
Hg = 0.373×10^{12} x 3.2/10^{12} / 2,000 = 0.00060 TPY

c. Beryllium
Factor is 2.65 lb/10^{12} Btu (controlled by multiclone)
Be = 0.373×10^{12} x 2.65/10^{12} / 2,000 = 0.00049 TPY

d. Arsenic
Factor is 9.31 lb/10^{12} Btu (controlled by multiclone)
As = 0.373×10^{12} x 9.31/10^{12} / 2,000 = 0.00174 TPY

e. Fluorides
From "Emissions Assessment of Conventional Stationary Combustion Systems, Vol V: Industrial Combustion Sources," EPA-600/7-81-003a.
Factor is 2.7 pg/J = 6.27×10^{12} Btu (uncontrolled)
Fl = 0.373×10^{12} x 6.27/10^{12} / 2,000 = 0.00117 TPY

2. Bark Burning
All factors based on EPA-600/7-81-003a, for a controlled wood-fired stoker boiler. Emission factor is increased by 50% to account for only multiclone control on boiler.
a. Lead
Factor is 50 pg/J = 116 lb/10^{12} Btu x 1.5
= 174 lb/10^{12}Btu
0.67×10^{12} Btu/yr x 174 lb/10^{12} Btu / 2,000 = 0.058 TPY

b. Mercury
Not measured--no emission factor.

c. Beryllium
Factor is <1 pg/J, or <2.3 lb/10^{12} Btu x 1.5
= 3.5 lb/10^{12} Btu
0.67×10^{12} Btu/yr x 3.5 lb/10^{12} Btu / 2,000
= 0.00117 TPY

d. Arsenic
Factor is 12 pg/J = 27.9 lb/10^{12} Btu x 1.5
= 41.9 lb/10^{12} Btu
0.67×10^{12} Btu/yr x 41.9 lb/10^{12} Btu / 2,000 = 0.014 TPY

e. Fluorides
Not measured--no emission factor available.

3. Totals

a. Lead:	0.0017	+ 0.058	= 0.060	TPY
b. Mercury:	0.00060	+ 0	= 0.00060	TPY
c. Beryllium:	0.00049	+ 0.00117	= 0.00166	TPY
d. Arsenic:	0.00174	+ 0.014	= 0.0157	TPY
e. Fluorides:	0.00117	+ 0	= 0.00117	TPY

H. Sulfuric Acid Mist

Sulfuric acid mist is estimated at 3% of sulfur emissions

SO_2 = 421.8 TPY

Sulfur = 421.8 x 32/64 = 210.9 TPY

Sulfuric acid mist = 210.9 x 98/32 x 0.03 = 19.4 TPY

1983 - proposed CCA, proposed ITT, centered on ITT

10 24-hour average concentration on the above location

Rank	Con.	Day	Location	CCA Con.	ITT Con.
*	75.2	44	300-220	#VALUE!	#
*	93.5	44	500-220	#VALUE!	#
*	149.5	44	800-220	61.1	88.4
*	78.8	294	500-220	#VALUE!	#
*	66.1	294	300-220	#VALUE!	#
*	193.7	44	1100-220	59.1	134.6
*	125.3	294	800-220	#VALUE!	#
*	184.1	162	1100-220	46.5	137.6
*	186.8	294	1100-210	#VALUE!	#
* #		64	300-320	#VALUE!	#

* unrank #no data

10 maximum 24-hour average concentration

Rank	Con.	Day	Location	CCA Con.	ITT Con.
1	210.2	162	1400-220	46.6	163.6
2	209.2	294	1400-210	56.2	153
3	203.8	44	1400-220	57.2	146.6
4	193.7	44	1100-220	59.1	134.6
5	193.1	213	1100-290	0	193.1
6	191	294	1400-220	51.8	139.2
7	187.1	213	1400-290	0	187.1
8	186.8	294	1100-210	57.6	129.2
9	185.4	253	800-260	0	185.4
10	184.1	162	1100-220	46.5	137.6

1983 - current CCA, current ITT, centered on ITT

10 maximum 24-hour average concentration

Rank	Con.	Day	Location	CCA Con.	ITT Con.
1	551.6	44	300-220	87.6	464
2	448.7	44	500-220	85.5	363.2
3	398.5	44	800-220	82.3	316.2
4	378.7	294	500-220	78	300.7
5	372.8	294	300-220	79.9	292.9
6	359.3	44	1100-220	79.1	280.2
7	356.8	294	800-220	75.3	281.5
8	354.3	162	1100-220	64	290.3
9	352.8	294	1100-210	78.3	274.5
10	352.2	64	300-320	0	352.2

1983 - proposed CCA, current ITT, centered on ITT

10 24-hour average concentration on the above location

Rank	Con.	Day	Location	CCA Con.	ITT Con.
1	528.5	44	300-220	64.5	464
2	426.5	44	500-220	63.3	363.2
3	377.6	44	800-220	61.4	316.2
4	357.5	294	500-220	56.8	300.7
6	350.7	294	300-220	57.8	292.9
7	339.6	44	1100-220	59.4	280.2
9	336.8	294	800-220	55.3	281.5
8	337.1	162	1100-220	46.8	290.3
10	332.4	294	1100-210	57.9	274.5
5	352.2	64	300-320	0	352.2

CONTAINER CORPORATION OF AMERICA
FERNANDINA BEACH MILL
ADDITIONAL BATCH DIGESTER AND WASHER

Clair
Bruce

CALCULATION OF NO SIGNIFICANT NET EMISSIONS INCREASE

The Container Corporation of America ("CCA") Fernandina Beach mill has undertaken a project to refurbish and restart its existing No. 2 Paper Machine and increase the mill's capacity to recycle waste paper. CCA has obtained the necessary water discharge permit to commence construction on this equipment. In addition, the mill is proposing to add two air emission sources -- an eighth batch digester and a third brown stock washer -- that require air permits. The Department has issued an intent to deny construction permit applications for these two sources. Both of these sources will be controlled so as to result in no increase in emissions of criteria pollutants and a net decrease in TRS. CCA has further proposed to surrender its existing air permit for its No. 4 Power Boiler and to raise the stack height and limit the sulfur dioxide emissions from its No. 5 Power Boiler. As agreed with the Department, this report provides a calculation of the net emissions increase from the additional batch digester and washer in accordance with Rule 17-2.500(2)(e) to determine whether the addition of these two permitted sources will trigger PSD review.

There will be no increase in emissions from the eighth digester. The third washing line, because it is controlled and will process some pulp that would otherwise be washed in the two existing, uncontrolled washers, will reduce mill TRS emissions, without increasing emissions of other pollutants. No other source at the mill will exceed its currently permitted operating levels as a result of the new sources. The existing air permit limits for criteria pollutants for the sources at the CCA Fernandina Mill were established as part of the PSD permitting for the mill's No. 7 Power Boiler, as subsequently amended by submission of additional modeling. Therefore, any change in operating levels at the existing sources below those currently allowable would not be creditable under EPA and DER PSD regulations and would not be included in calculating the net emissions increase or decrease from the proposed installation of the additional batch digester and brown stock washer.

It remains our position that this straightforward analysis, which is totally consistent with EPA and DER rules, demonstrates that the project is not subject to PSD, even if the surrender of the No. 4 Power Boiler permit and the changes in the No. 5 Power Boiler permit are not considered.

Nevertheless, in order to further reassure the Department, we have calculated a worst case net emissions increase that might be deemed attributable to the additional digester and washer. For these calculations, we have determined that maximum pulp production from the new batch digester of 250 tons a day could be sustained as an annual average. There would be no additional production increase beyond 250 TPD associated directly with the third brown stock washer.

Starting from this worst case, we have then calculated the annual increase in emissions from the recovery boilers and power boilers from processing the additional pulp and black liquor from the new digester. We have again been conservative by assuming that any increased demand on the No. 5 Power Boiler would be supplied solely by fuel oil containing 2.5% sulfur. As provided in Rule 17-2.500(2)(e), the surrender of the air permit for No. 4 Power Boiler results in a contemporaneous and creditable decrease in emissions. For this purpose, we have used the average of the actual emissions over the last two years of the boiler's continuous operation instead of choosing a period in which emissions would have been maximized.

Even using these worst case assumptions, there is no significant net emissions increase as defined in Rule 17-2.500(2)(e) and Table 500-2. Therefore, the addition of the batch digester and brown stock washer do not require PSD review in order for the air construction permits to be issued.