TRC
Environmental
Consultants, Inc.

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October 18, 1989

Mr. Thomas N. Houck, P.E.
Dominion Terminal Associates
Harbor Road, Pier 11
P. O. Box 967-A
Newport News, Virginia 23607

Dear Tom:

Enclosed please find a permit application and supporting basis report. This cover letter includes a verbal summary of the permit application.

Need for a Revised Permit

Dominion Terminal Associates plans an increase in the physical size of their operating area. This increase in acreage (from 68 to 101 acres) will allow for:

- Better pile management through greater flexibility in locating shipments for transfer.
- Lower height of piles through more acreage and better access.
- Reduced bulldozer traffic through better access to piles by the stacker/reclaimer equipment.

While the increase in acreage can be called a physical "expansion" the actual operational changes could better be described as "debottlenecking", i.e., increasing the area of storage and pile management in order to attain a larger capability for throughput.

Permit Modifications

The present permit is based upon maximum allowable emissions, annual throughput and maximum allowable tons in storage.

Dominion Terminal Associates is requesting only one substantive change in the permit, i.e. an increase of the maximum allowable quantity of coal storage from a maximum 1 million tons on the ground to a maximum of 1.4 million tons on the ground (Specific Condition 5). As an allowable average, there will be 975,000 tons on the ground. Peak pile heights will be reduced from 75 feet to

28.4 feet because of the better pile management obtainable through increased acreage. On average, pile heights will be reduced from 28.3' (650,000 tons) to 22.5' (850,000 tons).

Due to the uncertainty in emission factors for fugitive emissions, Dominion Terminal is not asking for any change in maximum allowable emissions. The maximum emissions calculated in this permit application are 60.8 tons per year of total suspended particulate and 26.4 tons per year of particulate matter less than 10 microns in diameter.

The calculated reductions in maximum emissions from the original permit (91.4 tons per year of total suspended particulate) occur because of slight changes in the facility as-built versus the design and the use of new published emission factors, including those recommended by EPA (AP-42). These changes result in a calculation that the allowable emissions (to be compared to the original application) would be 60.8 tons per year of TSP and 26.4 tons per year of PM_{10}.

These maximum emissions are a decrease in emissions. This is true primarily because the calculated emissions from storage pile wind erosion for the proposed maximum of 1.4 million tons stored on 101 acres are much less than the originally permitted 1 million tons on 66 acres. The reason is that lower pile heights and less disturbances of the piles result in better pile management and less wind erosion per quantity of coal stored.

The original permit application did not include the propane fired heaters used to thaw coal cars prior to offloading were not included. These emissions are included in the attached permit application. The use of the heaters results in only 0.004 tons per year of particulate matter emissions which are all smaller than 10 microns.

Allowable emission changes and permit conditions are summarized in Table I.

Actual Emissions

Dominion Terminal has been operating at less than maximum capacity, in part, because of the limited area and, in part, because of market conditions. Using the same calculation techniques, an estimate has been made of actual emissions for 1987, 1988 and under proposed operation. These calculations are not required in the permit application, but may be helpful in explaining the "expansion." Table II shows a summary of actual emissions. The proposed operation case assumes 17,500,000 tons per year throughput (a 45% increase) which is the forecast for improved market conditions but is still well below the current allowable throughput of 25,000,000 tons per year. A reduction of allowable throughput to 20,000,000 tons per year is shown in Table I and reflected in the permit application. It is also assumed that there will be an average of 850,000 tons stored at the facility. These projected actual emission are still substantially less than allowable.

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The increases in expected actual emissions are not as great a percentage increase as expected from 45% greater throughput because the increased acreage will lead to better pile management. This calculation has also not taken credit for an increased and enhanced spray system, including closer spacing, whose control may be better than 90%.

TRC wishes to acknowledge the assistance and work of Dr. David Emmitt of Simpson Weather Associates who provided invaluable understanding of the terminal operations and the calculations of wind erosion from storage piles.

It is clear that the "expansion" will result in a decrease in allowable emissions and that actual emissions as calculated will not increase as much as the increased throughput would indicate and in reality may not increase.

If you or anyone else has questions about the enclosed, please call.

Sincerely,

TRC ENVIRONMENTAL CONSULTANTS, INC.

Gale F. Hoffnagle, CCM
Vice President
and Technical Director

GFH/wpc
Enclosures

TABLE I
SUMMARY OF ALLOWABLE EMISSIONS
DOMINION TERMINAL ASSOCIATES

	Allowable Emissions Tons/Year		Allowable Throughput Millions Tons/Year	Maximum Allowable Storage Millions of Tons
	TSP	PM_{10}		
Original Permit	91.4	NA	25	1
Recalculated Original Permit	60.8	26.4	25	1
Proposed Permit Modification	51.9	22.3	20	1.4

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TABLE II
SUMMARY OF ACTUAL EMISSIONS
DOMINION TERMINAL ASSOCIATES

	1987	1988	Proposed
Coal Handling			
Throughput (Millions of Tons)	9.9	12.0	17.4
Emissions			
TSP (tons/year)	16.6	20.0	31.0
PM_{10} (tons/year)	7.7	9.3	14.4
Wind Erosion from Piles			
Storage (millions of tons)	0.585	0.586	0.850
Emissions			
TSP (tons/year)	4.5	5.5	7.8
PM_{10} (tons/year)	1.6	1.9	2.7
Total			
TSP (tons/year)	21.1	25.5	38.8
PM_{10} (tons/year)	9.3	11.2	17.1

BASIS FOR SAPCB PERMIT MODIFICATION APPLICATION

Submitted to:

Dominion Terminal Associates
Newport News, Virginia

TRC Project Number 5974-T11

October 18, 1989

Submitted by:

John E. Yocom, P.E.
TRC Environmental Consultants, Inc.

G. David Emmitt, Ph.D.
Simpson Weather Associates, Inc.

1.0 BASIS FOR PERMIT APPLICATION

1.1 Applicable References

A. AP-42 (9/88)

B. Dominion Terminal Associates, SAPCB Form 7, Submitted July, 6, 1981.

C. TRC Environmental Consultants, "Determination of Fugitive Coal Dust Emissions from Rotary Railcar Dumping", May 1984.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations

The existing facility and the proposed modification have been divided into three emission sources:

Coal Receiving Area
Coal Transfer and Storage Area
Coal Loadout Area

Note that the coal piles may be emitting while the terminal is inoperative.

1.2.1 Assumptions for Computations For Air Emissions From Dumping/ Stacking/Reclaiming Operations

1) Annual throughput of coal is 20,000,000 tons.
2) Dumping capacity - maximum 5150 TPH based on 100 tons/car and 2.3 min/2 car cycle time, average 2874 TPH based on grade change, switching and delivery delays.
3) Stacking capacity - maximum 5900 TPH, average 2874 TPH with delays.
4) Reclaiming capacity - 20,000 to 188,000 ton capacity ships will be loaded at a design rate of 6,500 TPH and an average rate of 3,614 TPH with delays.
5) Pile height of 27.8' and an average annual storage capacity of 975,000 tons has been used in pile emission calculations.

1.2.2 Control Efficiencies

The following control efficiencies are used in this application and are based on previously filed air pollution reports:

1) 90% control for enclosed transfers where wet suppression with surfactants is used.

2) 75% control for transfer using lowering chutes and for open discharges using wet suppression.

3) 90% control for storage piles and their maintenance using wet dust suppression.

4) 99% control for baghouse dust collection and surge bin hoppers.

5) 50% control for spray controls on bucket wheel stacker/reclaimers in the reclaiming mode.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.3 Equipment Transfer Tonnage Rates

	Maximum (TPH)	Average (TPH)
Car Dumpers	5150	2874
Conveyer C-1 and C-2	5150	2874
Conveyer C-3 and C-5	5900	2874
Conveyer C-4 and C-7: Stacking	5900	2874
Reclaiming	6200	3614
Conveyer C-6, C-8 and C-9	6200	3614
Conveyer C-10	6500	3614

Total suspended particulate (particle) emissions from each source point or area were calculated as follows:

Annual Uncontrolled Emissions
Ton/Yr = Process Flow Rate (Ton/Yr) x Emission Factor (lb/ton)

Annual Controlled Emissions
Ton/Yr = Annual Uncontrolled Emissions (Ton/Yr) x (100 - Percent Dust Control Efficiency)/100

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.4 Rotary Car Dumper (From "Determination of Fugitive Coal Dust Emissions from Rotary Railcar Dumping" TRC Environmental Consultants, May 1984.)

TRC emission factor (EF) for Maryland site = EF_{TSP} = 0.001 lb/ton

Aerodynamic particle size multiplier (k) for PM10 = 0.35 (Table 11.2.3-2, AP-42, 9/88)

$EF_{PM10} = EF_{TSP} \times k = 0.001(0.35) = 0.00035$ lb/ton

To account for differences in silt and moisture content between the Maryland site and DTA, the emission factors were multiplied by the following correction factor as follows:

$$EF_{DTA} = EF_{MD} \times (S_D/S_M)/(M_D/M_M)^{1.4}$$

where,
S_D = Silt Content of Coal @ DTA = 6.17%
S_M = Silt Content of Coal @ Md. Site = 2.16%
M_D = Moisture Content of Incoming Coal @ DTA = 5.5%
M_M = Moisture Content of Coal @ Md. Site = 4.46%

Silt and moisture values were determined from samples collected at DTA and the Maryland site, with the exception of M_D, which was estimated from moisture data from companies supplying coal to DTA.

Emission factors were calculated as follows:

$$EF_{TSP} = 0.001 \times (6.17/2.16)/(5.5/4.46)^{1.4}$$
$$= 0.00213 \text{ lb/ton}$$

$$EF_{PM10} = 0.00035 \times (6.17/2.16)/(5.5/4.46)^{1.4}$$
$$= 0.000746 \text{ lb/ton}$$

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.5 Transfer Points (From AP-42, 9/88)

$EF = k \times (0.0032)(U/5)^{1.3}/(M/2)^{1.4}$ (lb/ton)

where,
k = Aerodynamic particle size multiplier
$k_{TSP} = 0.74$
$k_{PM10} = 0.35$

U = Mean wind speed = 10.7 mph (from National Climate Center Data for Norfolk, Virginia).

M = Moisture content of coal = 5.5% for incoming coal, = 6.5% for outgoing coal

Emission factors for dumping/stacking incoming coal are calculated as follows:

$EF_{TSP} = 0.74 \times (0.0032)(10.7/5)^{1.3}/(5.5/2)^{1.4}$
$= 0.00154$ lb/ton

$EF_{PM10} = 0.35 \times (0.0032)(10.7/5)^{1.3}/(5.5/2)^{1.4}$
$= 0.00073$ lb/ton

Emission factors for reclaiming/loading outgoing coal are calculated as follows:

$EF_{TSP} = 0.74 \times (0.0032)(10.7/5)^{1.3}/(6.5/2)^{1.4}$
$= 0.00122$ lb/ton

$EF_{PM10} = 0.35 \times (0.0032)(10.7/5)^{1.3}/(6.5/2)^{1.4}$
$= 0.00058$ lb/ton

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.6 Storage Piles - Comparisons between current and proposed DTA ground storage.

1.2.6.1 Assumptions for pile emission calculations for permitted ground storage and throughput

Bulk density of coal:	60 lb/ft^3 (962 kg/m^3)
Angle of repose:	37°
Stackout (SO) Refresh:	Entire average pile surface
Reclaim (RC) Refresh:	Entire average pile surface
Bulldozing done on same day as SO or RC	
Average pile base:	(230 x 300) = 69,000 ft^2
5' Margin area/pile:	8,500 ft^2
Total base area/pile:	77,500 ft^2

	Current	Proposed
Permitted peak ground storage (tons):	1.0 x 10^6	1.4 x 10^6
Permitted average ground storage (tons):	1.0 x 10^6	.975 x 10^6
Permitted annual throughput (tons):	25.0 x 10^6	20.0 x 10^6
Average stackout tonnage:	7400	7400
Average # SO/day:	9.26	7.40
Average reclaim tonnage:	20,316	20,316
Average # of RC/day:	3.37	2.70

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.6 Storage Piles - continued

1.2.6.2 Allowable emissions both current and proposed and net % change

	Current Allowable	Proposed Allowable	% Change
Annual throughput (tons)	25×10^6	20×10^6	
Average tons on ground	1.0×10^6	0.975×10^6	
Number of piles:	15	22.8	+52
Tonnage of average pile:	66,666	42,763	-36
Height of average pile:	75' (22.9 m)	27.8' (8.5 m)	-63
Surface area of avg. pile:	85,205 ft^2 (7,920 m^2)	77,489 ft^2 (7,203 m^2)	-9
Area disturbed/day:	1,760,163 ft^2 (100,030 m^2)	782,639 ft^2 (72,736 m^2)	-27
Annual TSP emissions:			
Uncontrolled:	162.8 tons	92.0 tons	-43
90% controlled:	16.3 tons	9.2 tons	-43
Annual PM10 emissions[1]			
Uncontrolled:	57.0 tons	32.2 tons	-43
90% controlled:	5.7 tons	3.2 tons	-43

[1] The fraction of PM10 particles in TSP is assumed to be 0.35; therefore, annual PM10 emissions were calculated by multiplying annual TSP emissions by 0.35.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.7 Other Emission Sources

1.2.7.1 Propane-fired thaw shed

Manufacturer and Model number: Solar Flow, #1RT-350
Rated heat capacity: 35 MBTU/hr
Rated heat content of propane: 1000 BTU/ft^3
Rated fuel consumption: 35,000 ft^3/hr (102 heaters, 350 ft^3/hr/heater)

Actual heat capacity: 35.413 MBTU/hr
Actual heat content of propane: 2516 BTU/ft^3
Annual fuel consumption (1987): 85,900 gallons = 3.13 million ft^3

Hourly fuel consumption:

$$\frac{35{,}413{,}000 \text{ BTU/hour}}{2516 \text{ BTU/ft}^3} = 14{,}075 \text{ ft}^3\text{/hour propane}$$

The amount of sulfur and ash in the fuel is assumed to be negligible.

Emission rates were calculated as follows:

Compound	Emission Rate (lb/1000 gal. LPG)	Annual Consumption (x 1000 gal. LPG)	Annual Emissions (tons/yr)
Particulate	0.265	85.90	0.0114
Sulfur oxides	0.014	85.90	0.0006
Carbon monoxide	3.10	85.90	0.1331
Nitrogen oxides	12.40	85.90	0.5326
VOCs			
Non-methane	0.25	85.90	0.0197
Non-methane	0.27	85.90	0.0116
		TOTAL VOCs	0.0223

[1] Emission rates for LPG from Table 1.5-1, A-42 (9.88)

[2] Average value from Table 1.5-1, AP-42, (9/88)

The propane heater is used approximately 222 hours a years, depending on the ambient temperture. The heater is used during December, January, and February at an average rate of 18.5 hours/week.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.3 Terminal Emissions

1.3.1 Operation Description

The following section describes individual transfer components and operating procedures of the coal terminal.

Modes of Operation	Source Point and Area No.	Description
1,2,3	1.	Coal discharged from railcars into hopper.
1,2,3	2.	Coal fed onto Conveyer C-1 by vibrating feeders.
1,2,3	3.	Conveyor C-1 discharges onto Conveyor C-2.
1,2,3	4a.	Conveyor C-2 discharges at Tower TT-1.
1,2,3	4b.	Surge Silo SS-1.
1,2,3	5.	Surge Silo SS-1 discharges onto Conveyor C-3.
1,2,3	6.	Conveyor C-3 discharges onto Conveyor C-4, C- 5 or C-6 at Tower TT-2.
2	7.	Conveyor C-4 discharges onto S/R #1 Elevating Conveyor.
2	8.	S/R #1 Elevating Conveyor discharges onto S/R #1 Boom Conveyor.
2	9.	S/R #1 Boom Conveyor discharges (Stacking Mode).
4	10.	S/R #1 Boom Conveyor loads (Reclaiming Mode).
4	11.	S/R #1 Boom Conveyor discharges onto Conveyor C-4.
4	12.	Conveyor C-4 discharges onto Conveyor C-6.
3	13.	Conveyor C-5 discharges onto Conveyor C-7 at Tower TT-3.
3	14.	Conveyor C-7 discharges onto S/R #2 Elevating Conveyor.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.3 Terminal Emissions - continued

1.3.1 Operation Description -continued

Modes of Operation	Source Point and Area No.	Description
3	15.	S/R #2 Elevating Conveyor discharges onto S/R #2 Boom Conveyor.
3	16.	S/R #2 Boom Conveyor discharges (Stacking).
5	17.	S/R #2 Boom Conveyor loads (Reclaiming Mode).
5	18.	S/R #2 Boom Conveyor discharges onto C-7.
5	19.	Conveyor C-7 discharges onto Conveyor C-8 at Tower TT-3.
5	20a.	Conveyor C-8 discharges at Tower TT-4 (if going to Surge Silo SS-2) or onto Conveyor C- 11 (if going to Surge Silo SS-3).
5	20b.	Surge Silo SS-2 or SS-3.
1,4,6	21.	Conveyor C-6 discharges onto Conveyor C-9 at Tower TT-3.
1,4,6	22a.	Conveyor C-9 discharges at Tower TT-4 (if going to Surge Silo SS-2) or onto Conveyor C- 11 (if going to Surge Silo SS-3).
1,4,6	22b.	Surge Silo SS-2 or SS-3.
1,4,5,6	23.	Surge Silos SS-2 and SS-3 feed coal by vibrating feeders onto Conveyor C-12.
1,4,5,6	24.	Conveyor C-12 discharges onto Conveyor C-10.
1,4,5,6	25.	Pier Conveyor C-10 discharges onto Shiploader Boom Conveyor.
1,4,5,6	26.	Coal discharge from Shiploader Boom Conveyor through a telescoping chute into the ship.
6	27.	R-3 Boom Conveyor loads (Reclaiming Mode).
6	28.	R-3 Boom Conveyor discharges onto C-13.
6	29.	Conveyor C-13 discharges onto C-5 or C-6.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.3 Terminal Emissions - continued

1.3.2 Terminal Operating Modes

In calculating annual emissions, the total time the facility is expected to operate in one of the following six modes was used. It should be noted that the facility can operate in certain combinations of these modes (i.e. Modes 2 and 5, Modes 2 and 6, Modes 3 and 4, and Modes 3 and 6).

Mode	Description	Hours/Year[1]
No.1	Coal loaded directly to ship	557
No.2	Coal transferred from dumper to S/R #1	3201
No.3	Coal transferred from dumper to S/R #2	3201
No.4	Coal transferred from S/R #1 to vessel	1926
No.5	Coal transferred from S/R #2 to vessel	1395
No.6	Coal transferred from R #3 to vessel	2214

The terminal will operate 24 hours per day, 365 days per year.

[1] Maximum number of hours operations expected to occur.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.3 Terminal Emissions - continued

1.3.3 Emissions from Material Transfer Points

The maximum annual emissions of fugitive dust from the facility is summarized in Table 1. Maximum hourly emission rates for TSP and PM10 are summarized in Table 2 and Table 4, respectively. Maximum annual emission rates for TSP and PM10 are summarized in Table 3 and Table 5, respectively.

TABLE 1

AS-BUILT ANNUAL EMISSIONS
20,000,000 TPH THROUGHPUT

EMISSION POINTS	MODES	HOURS	AVERAGE FLOW-RATE (TPH)	EMISSION FACTOR TSP (#/TON)	EMISSION FACTOR PM-10 (#/TON)	CON-TROL (%)	AVG HOURLY TSP EMISSION (#/HR)	AVG HOURLY PM-10 EMISSION (#/HR)	AVERAGE YEARLY EMISSIONS TSP (TONS/YR)	AVERAGE YEARLY EMISSIONS PM-10 (TONS/YR)
1	1,2,3	6958.4	2874	0.0021	0.00075	90%	0.612	0.214	2.130	0.746
2	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
3	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
4(a)	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
4(b)	1,2,3	6958.4	2874	0.0015	0.00073	99%	0.044	0.021	0.154	0.073
5	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
6	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
7	2	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
8	2	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
9	2	3200	2874	0.0015	0.00073	75%	1.110	0.525	1.776	0.840
10	4	1920.8	3614	0.0012	0.00058	50%	2.209	1.045	2.122	1.004
11	4	1920.8	3614	0.0012	0.00058	90%	0.442	0.209	0.424	0.201
12	4	1920.8	3614	0.0012	0.00058	90%	0.442	0.209	0.424	0.201
13	3	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
14	3	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
15	3	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
16	3	3200	2874	0.0015	0.00073	75%	1.110	0.525	1.776	0.840
17	5	1394.4	3614	0.0012	0.00058	50%	2.209	1.045	1.540	0.729
18	5	1394.4	3614	0.0012	0.00058	90%	0.442	0.209	0.308	0.146
19	5	1394.4	3614	0.0012	0.00058	90%	0.442	0.209	0.308	0.146
20(a)	5	1394.4	3614	0.0012	0.00058	90%	0.442	0.209	0.308	0.146
20(b)	5	1394.4	3614	0.0012	0.00058	99%	0.044	0.021	0.031	0.015
21	1,4,6	4698.4	3614	0.0012	0.00058	90%	0.442	0.209	1.038	0.491
22(a)	1,4,6	4698.4	3614	0.0012	0.00058	90%	0.442	0.209	1.038	0.491
22(b)	1,4,6	4698.4	3614	0.0012	0.00058	99%	0.044	0.021	0.104	0.049
23	1,4,5,6	6092.8	3614	0.0012	0.00058	90%	0.442	0.209	1.346	0.637
24	1,4,5,6	6092.8	3614	0.0012	0.00058	90%	0.442	0.209	1.346	0.637
25	1,4,5,6	6092.8	3614	0.0012	0.00058	90%	0.442	0.209	1.346	0.637
26	1,4,5,6	6092.8	3614	0.0012	0.00058	75%	1.105	0.522	3.365	1.592
27	6	2219.2	3614	0.0012	0.00058	50%	2.209	1.045	2.451	1.159
28	6	2219.2	3614	0.0012	0.00058	90%	0.442	0.209	0.490	0.232
29	6	2219.2	3614	0.0012	0.00058	90%	0.442	0.209	0.490	0.232
									---	---
								SUBTOTAL =	35.591	16.572
								PILE EMISSION =	9.200	3.220
									---	---
								TOTAL (tons/yr) =	44.791	19.792

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TABLE 2

AS-BUILT
AVERAGE ANNUAL PM10 EMISSION RATES (lb/hr)

20,000,000 TONS PER YEAR
THROUGHPUT

EMISSION POINT	No.1	No.2	No.3	No.4	No.5	No.6
1	0.214	0.214	0.214			
2	0.210	0.210	0.210			
3	0.210	0.210	0.210			
4(a)	0.210	0.210	0.210			
4(b)	0.021	0.021	0.021			
5	0.210	0.210	0.210			
6	0.210	0.210	0.210			
7		0.210				
8		0.210				
9		0.525				
10				1.045		
11				0.209		
12				0.209		
13			0.210			
14			0.210			
15			0.210			
16			0.525			
17					1.045	
18					0.209	
19					0.209	
20(a)					0.209	
20(b)					0.021	
21	0.209			0.209		0.209
22(a)	0.209			0.209		0.209
22(b)	0.021			0.021		0.021
23	0.209			0.209	0.209	0.209
24	0.209			0.209	0.209	0.209
25	0.209			0.209	0.209	0.209
26	0.522			0.522	0.522	0.522
27						1.045
28						0.209
29						0.209
SUBTOTAL =	2.874	2.230	2.440	3.051	2.842	3.051
EMISSION =	0.735	0.735	0.735	0.735	0.735	0.735
(tons/yr) =	3.609	2.965	3.175	3.786	3.577	3.786

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TABLE 3

AS-BUILT
AVERAGE ANNUAL PM10 EMISSION RATES (lb/hr)

20,000,000 TONS PER YEAR
THROUGHPUT

MODE	HOURLY EMISSION (lb/hr)	HOURS OF OPERATION 1988 (hr)	1988 ANNUAL EMISSION (ton)
1	2.874	558.4	0.802
2	2.230	3200	3.568
3	2.440	3200	3.904
4	3.051	1920.8	2.930
5	2.842	1394.4	1.982
6	3.051	2219.2	3.386
		SUBTOTAL =	16.572
		PILE EMISSION =	3.220
		TOTAL (tons/yr) =	19.792

TABLE 4

TABLE 4

AS-BUILT
AVERAGE ANNUAL TSP EMISSION RATES (lb/hr)

20,000,000 TONS PER YEAR
THROUGHPUT

EMISSION POINT	No.1	No.2	No.3	No.4	No.5	No.6
1	0.612	0.612	0.612			
2	0.444	0.444	0.444			
3	0.444	0.444	0.444			
4(a)	0.444	0.444	0.444			
4(b)	0.044	0.044	0.044			
5	0.444	0.444	0.444			
6	0.444	0.444	0.444			
7		0.444				
8		0.444				
9		1.110				
10				2.209		
11				0.442		
12				0.442		
13			0.444			
14			0.444			
15			0.444			
16			1.110			
17					2.209	
18					0.442	
19					0.442	
20(a)					0.442	
20(b)					0.044	
21	0.442			0.442		0.442
22(a)	0.442			0.442		0.442
22(b)	0.044			0.044		0.044
23	0.442			0.442	0.442	0.442
24	0.442			0.442	0.442	0.442
25	0.442			0.442	0.442	0.442
26	1.105			1.105	1.105	1.105
27						2.209
28						0.442
29						0.442
SUBTOTAL =	6.234	4.874	5.318	6.451	6.009	6.451
EMISSION =	2.100	2.100	2.100	2.100	2.100	2.100
(tons/yr) =	8.334	6.974	7.418	8.551	8.109	8.551

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TABLE 5

TABLE 5

AS-BUILT
AVERAGE ANNUAL TSP EMISSION RATES (tons/yr)

20,000,000 TONS PER YEAR
THROUGHPUT

MODE	AVERAGE HOURLY EMISSION (lb/hr)	HOURS OF OPERATION 1988 (hr)	ANNUAL EMISSION (ton)
1	6.234	558.4	1.741
2	4.874	3200	7.799
3	5.318	3200	8.509
4	6.451	1920.8	6.195
5	6.009	1394.4	4.190
6	6.451	2219.2	7.158
		SUBTOTAL =	35.591
		PILE EMISSION =	9.200
		TOTAL (tons/yr) =	44.791

TRC

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TVC

800 Connecticut Blvd., East Hartf4' d, CT 06108 (203) 289-8631
Environmental
ED
Consultants, Inc.

October 18, 1989

Mr. Thomas N. Houck, P.E.
Dominion Terminal Associates
Harbor Road, Pier 11
P. 0. Box 967-A
Newport News, Virginia 23607

Dear Tom:

Enclosed please find a permit application and supporting basis report. This cover letter includes a verbal summary of the permit application.

Need for a Revised Permit

Dominion Terminal Associates plans an increase in the physical size of their operating area. This increase in acreage (from 68 to 101 acres) will allow for:

9 Better pile management through greater flexibility in locating shipments for transfer.

* Lower height of piles through more acreage and better access.

* Reduced bulldozer traffic through better access to piles by the stacker/reclaimer equipment.

While the increase in acreage can be called a physical "expansion" the actual operational changes could better be described as "debottlenecking", i.e., increasing the area of storage and pile management in order to attain a larger capability for throughput.

Permit Modifications

The present permit is based upon maximum allowable emissions, annual throughput and maximum allowable tons in storage.

Dominion Terminal Associates is requesting only one substantive change in the permit, i.e. an increase of the maximum allowable quantity of coal storage

from a maximum 1 million tons on the ground to a maximum of 1.4 million tons on the ground (Specific Condition 5). As an allowable average, there will be 975,000 tons on the ground. Peak pile heights will be reduced from 75 feet to

28.4 feet because of the better pile management obtainable through increased acreage. On average, pile heights will be reduced from 28.3' (650,000 tons) to 22.5' (850,000 tons).

Due to the uncertainty in emission factors for fugitive emissions, Dominion Terminal is not asking for any change in maximum allowable emissions. The maximum emissions calculated in this permit application are 60.8 tons per year of total suspended particulate and 26.4 tons per year of particulate matter less than 10 microns in diameter.

The calculated reductions in maximum emissions from the original permit (91.4 tons per year of total suspended particulate) occur because of slight changes in the facility as-built versus the design and the use of new published emission factors, including those recommended by EPA (AP-42). These

changes result in a calculation that the allowable emissions (to be compared to the original application) would be 60.8 tons per year of TSP and 26.4 tons per year of PM10.

These maximum emissions are a decrease in emissions. This is true primarily because the calculated emissions from storage pile wind erosion for the proposed maximum of 1.4 million tons stored on 101 acres are much less than the originally permitted 1 million tons on 66 acres. The reason is that lower pile heights and less disturbances of the piles result in better pile management and less wind erosion per quantity of coal stored.

The original permit application did not include the propane fired heaters used to thaw coal cars prior to offloading were not included. These emissions

are included in the attached permit application. The use of the heaters results in only 0.004 tons per year of particulate matter emissions which are all smaller than 10 microns.

Allowable emission changes and permit conditions are summarized in Table I.

Actual Emissions

Dominion Terminal has been operating at less than maximum capacity, in part, because of the limited area and, in part, because of market conditions. Using the same calculation techniques, an estimate has been made of actual emissions for 1987, 1988 and under proposed operation. These calculations are

not required in the permit application, but may be helpful in explaining the "expansion." Table II shows a summary of actual emissions. The proposed operation case assumes 17,500,000 tons per year throughput (a 45% increase) which is the forecast for improved market conditions but is still well below the current allowable throughput of 25,000,000 tons per year. A reduction of allowable throughput to 20,000,000 tons per year is shown in Table I and reflected in the permit application. It is also assumed that there will be an

average of 850,000 tons stored at the facility. These projected actual emission are still substantially less than allowable.

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The increases in expected actual emissions are not as great a percentage increase as expected from 45% greater throughput because the increased acreage

will lead to better pile management. This calculation has also not taken credit for an increased and enhanced spray system, including closer spacing, whose control may be better than 90%.

TRC wishes to acknowledge the assistance and work of Dr. David Emmitt of Simpson Weather Associates who provided invaluable understanding of the terminal operations and the calculations of wind erosion from storage piles.

It is clear that the "expansion" will result in a decrease in allowable emissions and that actual emissions as calculated will not increase as much as

the increased throughput would indicate and in reality may not increase.

If you or anyone else has questions about the enclosed, please call.

Sincerely,

TRC ENVIRONMENTAL CONSULTANTS, INC.

&TL.
F. Hofinag
Vice President
and Technical Director

GFH/wpc
Enclosures

T?C

TABLE I
SUMMARY OF ALLOWABLE EMISSIONS
DOMINION TERMINAL ASSOCIATES

	Maximum Allowable Emissions Tons/Year		Allowable Throughput Millions Tons/Year	Storage Millions of Tons
	TSP	PM10		
Original Permit	91.4	NA	25	1
Recalculated Original Permit	60.8	26.4	25	1
Proposed Permit Modification	51.9	22.3	20	1.4

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TABLE II
SUMMARY OF ACTUAL EMISSIONS
DOMINION TERMINAL ASSOCIATES

	1987	1988	Proposed
Coal Handling			
Throughput (Millions of Tons)	9.9	12.0	17.4
Emissions			
TSP (tons/year)	16.6	20.0	31.0
PM10 (tons/year)	7.7	9.3	14.4
Wind Erosion from Piles			
Storage (millions of tons)	0.585	0.586	0.850
Emissions			
TSP (tons/year)	4.5	5.5	7.8
PM10 (tons/year)	1.6	1.9	2.7
Total			
TSP (tons/year)	21.1	25.5	38.8
PM10 (tons/year)	9.3	11.2	17.1

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BASIS FOR SAPCB PERMIT MODIFICATION APPLICATION

Submitted to:

Dominion Terminal Associates
Newport News, Virginia

TRC Project Number 5974-Tll

October 18, 1989

Submitted by:

John E. Yocom, P.E.
TRC Environmental Consultants, Inc.

G. David Emmitt, Ph.D.
Simpson Weather Associates, Inc.

1.0 BASIS FOR PERMIT APPLICATION

1.1 Applicable References

A. AP-42 (9/88)

B. Dominion Terminal Associates, SAPCB Form 7,
Submitted July, 6, 1981.

C. TRC Environmental Consultants, "Determination of Fugitive Coal Dust Emissions from Rotary Railcar Dumping", May 1984.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations

The existing facility and the proposed modification have been divided into three emission sources:

Coal Receiving Area
Coal Transfer and Storage Area
Coal Loadout Area

Note that the coal piles may be emitting while the terminal is inoperative.

1.2.1 Assumptions for Computations For Air Emissions From Dumping/ Stacking/Reclaiming Operations

1) Annual throughput of coal is 20,000,000 tons.
2) Dumping capacity - maximum 5150 TPH based on 100 tons/car and 2.3 min/2 car cycle time, average 2874 TPH based on grade change, switching and delivery delays.
3) Stacking capacity maximum 5900 TPH, average 2874 TPH with delays.
4) Reclaiming capacity 20,000 to 188,000 ton capacity ships will be loaded at a design rate of 6,500 TPH and an average rate of 3,614 TPH with delays.
5) Pile height of 27.8' and an average annual storage capacity of 975,000 tons has been used in pile emission calculations.

1.2.2 Control Efficiencies

The following control efficiencies are used in this application and are based on previously filed air pollution reports:

1) 90% control for enclosed transfers where wet suppression with surfactants is used.

2) 75% control for transfer using lowering chutes and for open discharges using wet suppression.

3) 90% control for storage piles and their maintenance using wet dust suppression.

4) 99% control for baghouse dust collection and surge bin hoppers.

5) 50% control for spray controls on bucket wheel stacker/reclaimers in the reclaiming mode.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.3 Equipment Transfer Tonnage Rates

	Maximum (TPH)	Average (TPH)
Car Dumpers	5150	2874
Conveyer C-1 and C-2	5150	2874
Conveyer C-3 and C-5	5900	2874
Conveyer C-4 and C-7: Stacking	5900	2874
Reclaiming	6200	3614
Conveyer C-6, C-8 and C-9	6200	3614
Conveyer C-10	6500	3614

Total suspended particulate (particle) emissions from each source point or area were calculated as follows:

Annual Uncontrolled Emissions
Ton/Yr = Process Flow Rate (Ton/Yr) x Emission Factor (lb/ton)

Annual Controlled Emissions
Ton/Yr = Annual Uncontrolled Emissions (Ton/Yr) x (100 - Percent Dust Control Efficiency)/100

1.2 Description of Emission Calculations - continued

1.2.4 Rotary Car Dumper (From "Determination of Fugitive Coal Dust Emissions from Rotary Railcar Dumping" TRC Environmental Consultants, May 1984.)

TRC emission factor (EF) for Maryland site = EFTSP 0-001 lb/ton

Aerodynamic particle size multiplier (k) for PM10 0.35 (Table 11.2.3-2, AP-42, 9/88)

EFpMl0 = EFTSP x k = 0.001(0.35) = 0.00035 lb/ton

To account for differences in silt and moisture content between the Maryland site and DTA, the emission factors were multiplied by the following correction factor as follows:

EFDTA = EFMD x (SD/SM)/(MD/MM) 1.4

where,
SD = Silt Content of Coal @ DTA = 6.17%
SM = Silt Content of Coal @ Md. Site = 2.16%
MD = Moisture Content of Incoming Coal @ DTA = 5.5%
MM = Moisture Content of Coal @ Md. Site = 4.46%

Silt and moisture values were determined from samples collected at DTA and the Maryland site, with the exception of MD, which was estimated from moisture data from companies supplying coal to DTA.

Emission factors were calculated as follows:

EF TSP = 0-001 x (6.17/2.16)/(5.5/4.46)1.4
=0.00213 lb/ton

EFpMl0 = 0.00035 x (6.17/2.16)/(5.5/4.46)1.4
=0.000746 lb/ton

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.5 Transfer Points (From AP-42, 9/88)

EF = k x (0.0032)(U/5)1.3/(M/2)l.4 (lb/ton)

where,
k = Aerodynamic particle size multiplier
kTSP 0.74
kpM10 0.35

U = Mean wind speed = 10.7 mph (from National Climate Center Data for Norfolk, Virginia).

M = Moisture content of coal = 5.5% for incoming coal, = 6.5% for outgoing coal

Emission factors for dumping/stacking incoming coal are calculated as follows:

EF TSP = 0.74 x (0.0032)(l0.7/5)l-3/(5.5/2)l.4
= 0.00154 lb/ton

EFpMlo = 0.35 x (0.0032)(l0.7/5)l.3/(5.5/2)l.4
= 0.00073 lb/ton

Emission factors for reclaiming/loading outgoing coal are calculated as follows:

EF TSP = 0.74 x (0.0032)(l0.7/5)l.3/(6.5/2)l.4
= 0.00122 lb/ton

EFpMl0 = 0.35 x (0.0032)(10.7/5)1.3/(6.5/2)1.4
= 0.00058 lb/ton

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.6 Storage Piles - Comparisons between current and proposed DTA ground storage.

1.2.6.1 Assumptions for pile emission calculations for permitted ground storage and throughput

Bulk density of coal: 60 lb/ft3 (962 kg/m3)

Angle of repose: 370

Stackout (SO) Refresh: Entire average pile surface

Reclaim (RC) Refresh: Entire average pile surface

Bulldozing done on same day as SO or RC

Average pile base: (230 x 300) = 69,000 ft2
51 Margin area/pile: 8,500 ft2

Total base area/pile: 77,500 ft2

	Current	Proposed
Permitted peak ground storage (tons):	1.0 x 106	1.4 x 106
Permitted average ground storage (tons):	1.0 x 106	.975 x 106
Permitted annual throughput (tons):	25.0 x 106	20.0 x 106
Average stackout tonnage:	7400	7400
Average # SO/day:	9.26	7.40
Average reclaim tonnage:	20,316	20,316
Average # of RC/day:	3.37	2.70

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.6 Storage Piles - continued

1.2.6.2 Allowable emissions both current and 2roposed and net change

	Current Allowable	Proposed Allowable	% Change
Annual throughput (tons)	25 x 106	20 x 106	
Average tons on ground	1.0 x 106	0.975 x 106	
Number of piles:	15	22.8	+52
Tonnage of average pile:	66,666	42,763	-36
Height of average pile:	75' (22.9 m)	27.81 (8.5 m)	-63
Surface area of avg. pile:	85,205 ft2 (7,920 m2)	77,489 ft2 (7,203 m2)	-9
Area disturbed/day:	1,760,163 ft2 (100,030 m2)	782,639 ft2 (72,736 m2)	-27
Annual TSP emissions:			
Uncontrolled:	162.8 tons	92.0 tons	-43
90% controlled:	16.3 tons	9.2 tons	-43
Annual PM10 emissionsi			
Uncontrolled:	57.0 tons	32.2 tons	-43
90% controlled:	5.7 tons	3.2 tons	-43

1 The fraction of PM10 particles in TSP is assumed to be 0.35; therefore, annual PM10 emissions were calculated by multiplying annual TSP emissions by 0.35.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.2 Description of Emission Calculations - continued

1.2.7 Other Emission Sources

1.2.7.1 Propane-fired thaw shed

Manufacturer and Model number: Solar Flow, #lRT-350
Rated heat capacity: 35 MBTU/hr
Rated heat content of propane: 1000 BTU/ft3
Rated fuel consumption: 35,000 ft3/hr (102 heaters, 350 ft3/hr/heater)

Actual heat capacity: 35.413 MBTU/hr
Actual heat content of propane: 2516 BTU/ft3
Annual fuel consumption (1987): 85,900 gallons = 3.13 million ft3

Hourly fuel consumption:
35,413,000 BTU/hour
2516 BTU/ftJ 14,075 ft3/hour propane

The amount of sulfur and ash in the fuel is assumed to be negligible.

Emission rates were calculated as follows:

Compound	Emission Rate (lb/1000 gal. LPG)	Annual Consumption (x 1000 gal. LPG)	Annual Emissions (tons/yr)
Particulate	0.265	85.90	0.0114
Sulfur oxides	0.014	85.90	0.0006
Carbon monoxide	3.10	85.90	0.1331
Nitrogen oxides	12.40	85.90	0.5326
VOCS			
Non-methane	0.25	85.90	0.0197
Non-methane	0.27	85.90	0.0116

TOTAL VOCs 0.0223

1 Emission rates for LPG from Table 1.5-1, A-42 (9.88)

2 Average value from Table 1.5-1, AP-42, (9/88)

The propane heater is used approximately 222 hours a years, depending on the ambient temperture. The heater is used during December, January, and February at an average rate of 18.5 hours/week.

1.3 Terminal Emissions

1.3.1 Operation Descriptio

The following section describes individual transfer components and operating procedures of the coal terminal.

Modes of Operation	Source Point and Area No.	Description
1,2,3	1.	Coal discharged from railcars into hopper.
1,2,3	2.	Coal fed onto Conveyer C-1 by vibrating feeders.
1,2,3	3.	Conveyor C-1 discharges onto Conveyor C-2.
1,2,3	4a.	Conveyor C-2 discharges at Tower TT-1.
1,2,3	4b.	Surge Silo SS-1.
1,2,3	5.	Surge Silo SS-1 discharges onto Conveyor C-3.
1,2,3	6.	Conveyor C-3 discharges onto Conveyor C-4, C- 5 or C-6 at Tower TT-2.
2	7.	Conveyor C-4 discharges onto S/R #1 Elevating Conveyor.
2	8.	S/R #1 Elevating Conveyor discharges onto S/R #1 Boom Conveyor.
2	9.	S/R #1 Boom Conveyor discharges (Stacking Mode).
4	10.	S/R #1 Boom Conveyor loads (Reclaiming Mode).
4	11.	S/R #1 Boom Conveyor discharges onto Conveyor C-4.
4	12.	Conveyor C-4 discharges onto Conveyor C-6.
3	13.	Conveyor C-5 discharges onto Conveyor C-7 at Tower TT-3.
3	14.	Conveyor C-7 discharges onto S/R #2 Elevating Conveyor.

Modes of Operation | Source Point and Area No. | Description

3 15. S/R #2 Elevating Conveyor discharges onto S/R #2 Boom Conveyor.

3 16. S/R #2 Boom Conveyor discharges (Stacking).

5 17. S/R #2 Boom Conveyor loads (Reclaiming Mode).

5 18. S/R #2 Boom Conveyor discharges onto C-7.

5 19. Conveyor C-7 discharges onto Conveyor C-8 at Tower TT-3.

5 20a. Conveyor C-8 discharges at Tower TT-4 (if going to Surge Silo SS-2) or onto Conveyor C- 11 (if going to Surge Silo SS-3).

5 20b. Surge Silo SS-2 or SS-3.

1,4,6 21. Conveyor C-6 discharges onto Conveyor C-9 at Tower TT-3.

1,4,6 22a. Conveyor C-9 discharges at Tower TT-4 (if going to Surge Silo SS-2) or onto Conveyor C- 11 (if going to Surge Silo SS-3).

1,4,6 22b. Surge Silo SS-2 or SS-3.

1,4,5,6 23. Surge Silos SS-2 and SS-3 feed coal by vibrating feeders onto Conveyor C-12.

1,4,5,6 24. Conveyor C-12 discharges onto Conveyor C-10.

1,4,5,6 25. Pier Conveyor C-10 discharges onto Shiploader Boom Conveyor.

1,4,5,6 26. Coal discharge from Shiploader Boom Conveyor through a telescoping chute into the ship.

6 27. R-3 Boom Conveyor loads (Reclaiming Mode).

6 28. R-3 Boom Conveyor discharges onto C-13.

6 29. Conveyor C-13 discharges onto C-5 or C-6.,

1.0 BASIS FOR PERMIT APPLICATION - continued

1.3 Terminal Emissions - continued

1.3.2 Terminal Operating Modes

In calculating annual emissions, the total time the facility is expected to operate in one of the following six modes was used. It should be noted that the facility can operate in certain combinations of these modes (i.e. Modes 2 and 5, Modes 2 and 6, Modes 3 and 4, and Modes 3 and 6).

Mode	Descriptio	Hours/Year!
No.1	Coal loaded directly to ship	557
No.2	Coal transferred from dumper to SIR #1	3201
No.3	Coal transferred from dumper to SIR #2	3201
No.4	Coal transferred from SIR #1 to vessel	1926
No.5	Coal transferred from SIR #2 to vessel	1395
No.6	Coal transferred from R #3 to vessel	2214

The terminal will operate 24 hours per day, 365 days per year.

1 Maximum number of hours operations expected to occur.

1.0 BASIS FOR PERMIT APPLICATION - continued

1.3 Terminal Emissions - continued

1.3.3 Emissions from Material Transfer Points

The maximum annual emissions of fugitive dust from the facility is summarized in Table 1. Maximum hourly emission rates for TSP and PM10 are summarized in Table 2 and Table 4, respectively. Maximum annual emission rates for TSP and PM10 are summarized in Table 3 and Table 5, respectively.

TABLE 1

AS-BUILT ANNUAL EMISSIONS
20,000,000 TPH THROUGHPUT

POINTS	MODES	HOURS	AVG HOURLY EMISSION RATE (TPH)	AVG HOURLY EMISSION FACTOR TSP (t/TON)	AVG HOURLY EMISSION FACTOR PH-10 (I/TON)	CON-TROL (1)	TSP EMISSION (I/RR)	TSP (t/HR)	PH-10 EMISSIONS (TONS/YR)	PH-10 (TONS/YR)
1	1,2,3	6958.4	2874	0.0021	0.00075	90%	0.612	0.214	2.130	0.746
2	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
3	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
4(.a)	1,2,3	6958.4	2874	0.0015	0.00073	901	0.444	0.210	1.545	0.731
4(b)	1,2,3	6958.4	2874	0.0015	0.00073	99%	0.044	0.021	0.154	0,073
5	1,2,3	6958.4	2874	0.0015	0.00073	901	0.444	0.210	1.545	0.731
6	1,2,3	6958.4	2874	0.0015	0.00073	90%	0.444	0.210	1.545	0.731
7	2	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
8	2	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
9	2	3200	2874	0.0015	0.00073	751	1.110	0.525	1.776	0.840
10	4	1920.8	3614	0.0012	0.00058	50%	2.209	1.045	2.122	1.004
11	4	1920.8	3614	0.0012	0.00058	90%	0.442	0.209	0.424	0.201
12	4	1920.8	3614	0.0012	0.00058	90%	0.442	0.209	0.424	0.201
13	3	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
14	3	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
15	3	3200	2874	0.0015	0.00073	90%	0.444	0.210	0.710	0.336
16	3	3200	2874	0.0015	0.00073	75%	1.110	0.525	1.776	0.840
17	5	1394.4	3614	0.0012	0.00058	50%	2.209	1.045	1.540	0.729
18	5	1394.4	3614	0.0012	0.00058	90%	0.442	0.209	0.308	0.146
19	5	1394.4	3614	0.0012	0.00058	901	0.442	0.209	0.308	0.146
20(a)	5	1394.4	3614	0.0012	0.00058	90%	0.442	0.209	0.308	0.146
20(b)	5	1394.4	3614	0.0012	0.00058	99%	0.044	0.021	0,031	0.015
21	1,4,6	4698.4	3614	0.0012	0.00058	90%	0.442	0.209	1,038	0.491
22(a)	1,4,6	4698.4	3614	0.0012	0.00058	90%	0.442	0.209	1,038	0.491
22(b)	1,4,6	4698.4	3614	0.0012	0.00058	99%	0.044	0.021	0,104	0.049
23	1,4,5,6	6092.8	3614	0.0012	0.00058	90%	0.442	0.209	1.346	0.637
24	1,4,5,6	6092.8	3614	0.0012	0.00058	90%	0.442	0.209	1.346	0.637
25	1,4,5,6	6092.8	3614	0.0012	0.00058	90%	0.442	0.209	1.346	0.637
26	1,4,5,6	6092.8	3614	0.0012	0.00058	751	1.105	0.522	3.365	1.592
27	6	2219.2	3614	0.0012	0.00058	50%	2.209	1.045	2.451	1.159
28	6	2219.2	3614	0.0012	0.00058	90%	0.442	0.209	0.490	0.232
29	6	2219.2	3614	0.0012	0.00058	90%	0.442	0.209	0.490	0.232
									35.591	16.572
PILE EMISSION									9.200	3.220
TOTAL (tons/yr)									44.791	19.792

T?C

7.1. f, E 2
TABLE 2

AS-BUILT
AVERAGE ANNUAL PH10 EMISSION RATES (lb/hr)

20,000,000 TONS PER YEAR
THROUGHPUT

POINT	EMISSION X0.1 No. 2.	Xo.3. No.4 -	Wo.5 No-.6 -	;.		
1	0.214	0.214	0.214			
2	0.210	0.210	0.210			
3	0.210	0.210	0.210			
4(a)	0.210	0.210	0.210			
4(b)	0.021	0.021	0.021			
5	0.210	0.210	0.210			
6	0.210	0.210	0.210			
7	0.210					
8	0.210					
9	0.525					
10	1.045					
11	0.209					
12	0.209					
13	0.210					
14	0.210					
15	0.210					
16	0.525					
17	1.045					
18	0.209					
19	0.209					
20(a)	0.209					
20(b)	0.021					
21	0.209	0.209	0.209			
22(a)	0.209	0.209	0.209			
22(b)	0.021	0.021	0.021			
23	0.209	0.209	0.209	0.209		
24	0.209	0.209	0.209	0.209		
25	0.209	0.209	0.209	0.209		
26	0,522	0.522	0.522	0.522		
27	1.045					
28	0.209					
29	0.209					
SUBTOTAL =	2.874	2.230	2.440	3.051	2.842	3.051
EMISSION =	0.735	0.735	0.735	0.735	0.735	0.735
(tons/yr) =	3.609	2.965	3.175	3.786	3.577	3.786

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TABLE 3 E. 3

AS-BUILT
AVERAGE ANNUAL PH10 EMISSION RATES (lb/hr)

20,000,000 TONS PER YEAR
THROUGHPUT

MODE	1988 HOURLY EMISSION (lb/hr)	HOURS OF OPERATION 1988 (hr)	ANNUAL EMISSION (ton)
1	2.874	558.4	0.802
2	2.230	3200	3.568
3	2.440	3200	3.904
4	3.051	1920.8	2.930
5	2.842	1394.4	1.982
6	3.051	2219.2	3.386

SUBTOTAL = 16.572
PILE EMISSION = 3.220

TOTAL (tons/yr) = 19.792

T?C

TABLE 4 TAKE 4

AS-BUILT
AVERAGE ANNUAL TSP EMISSION RATES (lb/hr)

20,000,000 TONS PER YEAR
THROUGHPUT

EMISSION POINT	X0.1	No.2	No.3	No.4	No.5	No.6
1	0.612	0.612	0.612			
2	0.444	0.444	0.444			
3	0.444	0.444	0.444			
4(a)	0.444	0.444	0.444			
4(b)	0.044	0.044	0.044			
5	0.444	0.444	0.444			
6	0.444	0.444	0.444			
7	0.444					
8	0.444					
9	1.110					
10	2.209					
11	0.442					
12	0.442					
13	0.444					
14	0.444					
15	0.444					
16	1.110					
17	2.209					
18	0.442					
19	0.442					
20(a)	0.442					
20(b)	0.044					
21-	0.442	0.442	0.442			
22(a)	0.442	0.442	0.442			
22(b)	0.044	0.044	0.044			
23	0.442	0.442	0.442	0.442		
24	0.442	0.442	0.442	0.442		
25	0.442	0.442	0.442	0.442		
26	1.105	1.105	1.105	1.105		
27	2.209					
28	0.442					
29	0.442					
SUBTOTAL =	6.234	4.874	5,318	6.451	6.009	6.451
EMISSION =	2.100	2.100	2.100	2.100	2.100	2.100
(tonS/yr) =	8.334	6.974	7.418	8.551	8.109	8.551

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TABLE 5

AS-BUILT
AVERAGE ANNUAL TSP EMISSION RATES (tons/yr)

20,000,000 TONS PER YEAR
THROUGHPUT

MODE	AVERAGE HOURLY EMISSION (lb/hr)	HOURS OF OPERATION ...1988 (hr)	ANNUAL EMISSION (ton)
1	6.234	558.4	1.741
2	4.874	3200	7.799
3	5.318	3200	8.509
4	6.451	1920.8	6.195
5	6.009	1394.4	4.190
6	6.451	2219.2	7.158

SUBTOTAL = 35.591
PILE EMISSION = 9.200

TOTAL (tons'/yr) = 44.791

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