PETROCHEMICALS
Victoria Plant
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cc: Norm Bell
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Mr. Dennis Beauregard
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U.S. Environmental Protection Agency
Research Triangle Park, NC 27711

Herein is requested input for update of AP-42, Compliation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources.

Capacities for Dupont's adipic acid plants at Orange (Sabine River Works) and Victoria, Texas were shown in EPA's 1991 draft document titled Alternative Control Techniques Document - Nitric and Adipic Acid Manufacturing Plants as 190,000 and 350,000 tons/yr respectively. These capacities are still appropriate.

Attachment 1 is our process description with a current process flow diagram.

Emissions data are shown in the summary tables in Attachments 2, 3 and 4, and include:

- Criteria pollutants
- Global warming gases
- Ozone depleters
- 1990 Clean Air Act Title III toxics

Current emission data are based on current facilities operating at capacity. Future emission data assumes emission controls will be in place, and the plants will be operating at capacity.

A separate confidential document is being forwarded with the basis for the emissions values shown in this letter, as requested by Colin Campbell (Pacific Environmental Services). It references some test data for current emission controls. It includes more discussion of expected emission controls to meet state continuance permitting requirements in 1993-1994.

As far as the request for information on relative commercial significance of alternative processes and industry trends, we generally use available sources of industry information such as profiles of the adipic industry published by SRI. The new adipic acid plant we are building in Singapore also

utilizes cyclohexane oxidation to produce KA, followed by nitric oxidation of KA to produce adipic acid. This new facility will still involve the major off-gas streams that exist in our Texas facilities, although pollutant emissions will be lower than our current facilities in Texas.

Sincerely,

James M. Rung
Sr. Technical Associate
Victoria Plant

Attachment 1

DUPONT ADIPIC ACID PROCESS DESCRIPTION

In the manufacture of adipic acid, cyclohexane is first oxidized with air to produce an intermediate mixture of cyclohexanone and cyclohexanol called KA. The KA is then oxidized with nitric acid to form adipic acid.

In the first step, a small quantity of cobalt and/or chromium is used for catalysis. Byproducts include CO, CO2, C1-C5 hydrocarbons, and a non-volatile residue (NVR) which includes C4-C6 mono and dibasic acids. A small quantity of benzene also enters the process with the cyclohexane. Spent air from the oxidizer is first scrubbed to recover cyclohexane before it is either vented to atmosphere (at Sabine River) or burned in the boilers (at Victoria). There is also a low pressure vent stream which is vented to atmosphere at both locations. These off-gases contain the majority of the CO and hydrocarbon emissions from the entire adipic acid process.

The reaction is conducted in a large excess of cyclohexane, requiring distillation for separation and recycle of cyclohexane. NVR is removed in another distillation step and burned in the boilers at both sites. It represents a source of CO2 and a small quantity of combustion products (CO, VOC, NOx and particulates). This first step also contains some storage tank and distillation column vents with minor emissions. There are two separate cyclohexane oxidation units at Victoria (Op1 and Op1A), while there is only one at Sabine River.

In the second step, a small quantity of copper and vanadium is used for catalysis. Byproducts include N2O, NOx, CO, CO2 and dibasic acids (DBA). The effluent from nitric oxidation (a mixture of adipic acid, nitric acid and water) is stripped of NOx in the bleacher using air. Off-gas from the reactor and bleacher is processed through an absorber to recover NOx. Extended absorption is used at Sabine River to minimize NOx in the absorber offgas before it is vented to atmosphere, although N2O exits unabated. At Victoria the offgas is sent to the boilers where it is burned using reducing flame burners to control NOx emissions and destroy N2O. The vents from tanks containing high concentrations of nitric acid are collected and burned in the boilers (at Victoria) or in flares (or cone burners at Sabine River) to control NOx.

After removing excess water in a concentrating still, the crude adipic solution is refined by vacuum crystallizers where adipic acid crystals are formed. The crystals are separated in centrifuges and/or filters, which involve a few minor vents. The remaining nitric acid solution is recycled to the nitric oxidation reactor. Purified wet adipic acid is dried, cooled and transferred to a storage bin. Scrubbers and bag filters are used

to control emissions of adipic acid dust particulates.

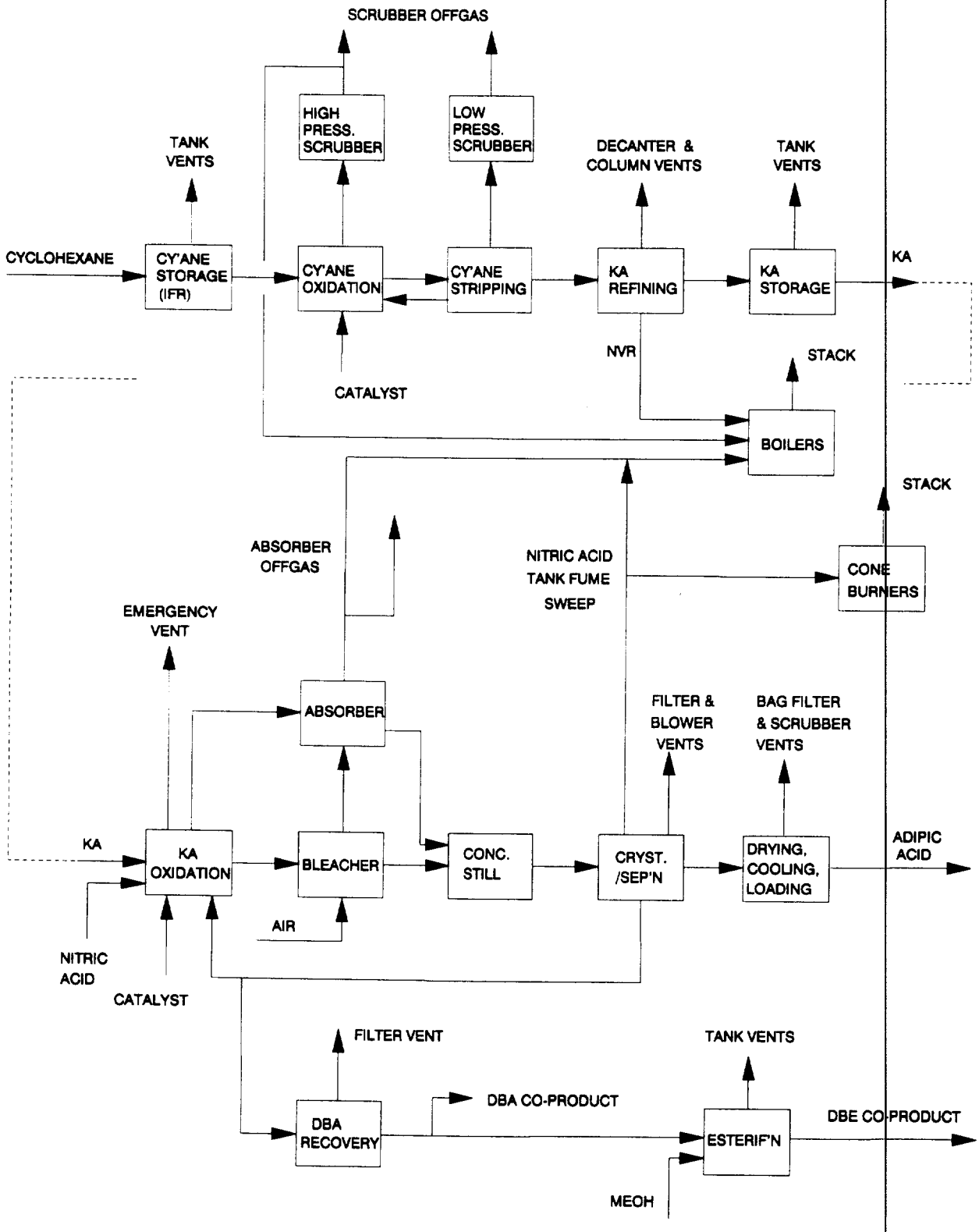
A purge is taken on the recycled nitric acid solution to remove DBA byproducts. DBA is recovered by crystallization and removal of catalyst. Some is sold as coproduct (Victoria), while some is converted to dibasic ester using methanol (Sabine River), where some tank vent and fugative emissions occur.

It is expected that BACT controls will be installed in these plants over the next few years as the Texas Air Control Board operating permits are renewed. This will involve abatement of all scrubber offgas. Dupont is committed to stop emitting N2O from adipic acid manufacture by 1996, and to facilitate this we expect to further abate NOx in the absorber offgas and tank vent fume sweep streams.

A process flow diagram follows.

DUPONT ADIPIC ACID PROCESS FLOW DIAGRAM

CURRENT AIR EMISSIONS CONFIGURATION



Attachment 2

DUPONT ADIPIC ACID AIR EMISSION SUMMARY
(LB EMISSIONS / TON ADIPIC ACID)

	SABINE RIVER WORKS			VICTORIA PLANT		
	UNCON-	ACTUAL EMISSIONS		UNCON-	ACTUAL EMISSIONS	
	TROLLED	CURRENT	PLANNED	TROLLED	CURRENT	PLANNED
CRITERIA POLLUTANTS:						
NON-CH4 VOC	24.303	23.127	1.617	20.070	4.487	1.156
CO	77.257	77.109	3.867	61.532	20.638	3.053
NOX	4.690	4.090	1.364	16.781	16.781	4.643
PARTICULATES:						
ADIPIC ACID	21.005	0.215	0.215	60.011	0.102	0.102
NVR BURNING	0.054	0.054	0.054	0.189	0.189	0.189
GLOBAL WARMING GASES:						
CH4	0.000	0.000	0.000	0.673	0.097	0.034
CO2	1119.	1189.	1274.	1127.	1621.	1272.
OZONE DEPLETERS:						
N2O	590.9	589.5	29.5	592.1	11.8	11.8
1990 CAAA POLLUTANTS:						
BENZENE	0.004	0.004	0.001	0.004	0.004	0.001
CHLORINE	0.046	0.046	0.046	0.025	0.025	0.025
CHROMIUM COMP'DS	0.015	0.015	0.015	0.002	0.002	0.002
COBALT COMP'DS	0.018	0.018	0.018	0.015	0.015	0.015
HCL	0.000	0.000	0.000	0.037	0.037	0.037
METHANOL	0.191	0.191	0.191	0.000	0.000	0.000
OTHERS:						
NITRIC ACID	0.000	0.000	0.000	0.074	0.074	0.074

Attachment 3a

AIR EMISSIONS FROM ADIPIC ACID MANUFACTURE AT VICTORIA BY PROCESS STREAM, LB/TON AA

	UNCON-TROLLED	AMOUNT DESTROYED CURRENT	AMOUNT DESTROYED PLANNED	ACTUAL EMISSIONS CURRENT	ACTUAL EMISSIONS PLANNED
CYCLOHEXANE STORAGE TANKS (3)					
CYCLOHEXANE	4.0000	3.9672	3.9672	0.0328	0.0328
BENZENE	0.0005	0.0005	0.0005	0.0000	0.0000
TOTAL NON-CH4 VOC	4.0005	3.9676	3.9676	0.0328	0.0328
HIGH PRESSURE SCRUBBER OFFGAS					
OP1:					
NON-CH4 VOC:					
ETHANE	0.054	0.051	0.052	0.004	0.003
ETHYLENE	0.093	0.087	0.088	0.006	0.005
PROPANE	0.278	0.260	0.264	0.018	0.014
PROPYLENE	0.000	0.000	0.000	0.000	0.000
BUTANE	3.198	2.987	3.038	0.211	0.160
PENTANE	0.803	0.750	0.762	0.053	0.040
CYCLOHEXANE	0.228	0.213	0.217	0.015	0.011
TOTAL NON-CH4 VOC	4.654	4.346	4.421	0.307	0.233
CH4	0.043	0.041	0.041	0.003	0.002
CO	25.620	23.928	24.339	1.692	1.281
CO2	18.103	16.907	17.198	1.196	0.905
CO2 FROM BURNING	0.000	0.000	0.000	50.936	51.811
OP1A:					
NON-CH4 VOC:					
ETHANE	0.135	0.134	0.128	0.001	0.007
ETHYLENE	0.025	0.025	0.024	0.000	0.001
PROPANE	0.493	0.490	0.468	0.003	0.025
PROPYLENE	0.000	0.000	0.000	0.000	0.000
BUTANE	3.901	3.879	3.706	0.023	0.195
PENTANE	0.969	0.963	0.920	0.006	0.048
CYCLOHEXANE	1.193	1.186	1.133	0.007	0.060
TOTAL NON-CH4 VOC	6.715	6.677	6.380	0.039	0.336
CH4	0.538	0.535	0.511	0.003	0.027
CO	16.295	16.201	15.480	0.094	0.815
CO2	9.847	9.790	9.355	0.057	0.492
CO2 FROM BURNING	0.000	0.000	0.000	47.311	45.207
LOW PRESSURE SCRUBBER OFFGAS					
OP1:					
NON-CH4 VOC:					
ETHANE	0.023	0.000	0.022	0.023	0.001
ETHYLENE	0.017	0.000	0.016	0.017	0.001
PROPANE	0.051	0.000	0.049	0.051	0.003

PROPYLENE	0.000	0.000	0.000	0.000	0.000
BUTANE	0.538	0.000	0.511	0.538	0.027
PENTANE	0.103	0.000	0.098	0.103	0.005
CYCLOHEXANE	0.256	0.000	0.243	0.256	0.013
TOTAL NON-CH4 VOC	0.988	0.000	0.938	0.988	0.049
CH4	0.017	0.000	0.016	0.017	0.001
CO	6.749	0.000	6.412	6.749	0.337
CO2	2.745	0.000	2.607	2.745	0.137
CO2 FROM BURNING	0.000	0.000	0.000	0.000	12.993
OP1A:					
NON-CH4 VOC:					
ETHANE	0.074	0.000	0.070	0.074	0.004
ETHYLENE	0.087	0.000	0.083	0.087	0.004
PROPANE	0.333	0.000	0.316	0.333	0.017
PROPYLENE	0.000	0.000	0.000	0.000	0.000
BUTANE	1.197	0.000	1.137	1.197	0.060
PENTANE	0.219	0.000	0.208	0.219	0.011
CYCLOHEXANE	0.042	0.000	0.040	0.042	0.002
TOTAL NON-CH4 VOC	1.953	0.000	1.855	1.953	0.098
CH4	0.074	0.000	0.070	0.074	0.004
CO	12.087	0.000	11.483	12.087	0.604
CO2	4.348	0.000	4.130	4.348	0.217
CO2 FROM BURNING	0.000	0.000	0.000	0.000	23.867
STEAM STILL DECANTER VENTS (OP1 + OP1A)					
CYCLOHEXANOL	0.0019	0.0000	0.0018	0.0019	0.0001
CYCLOHEXANONE	0.0052	0.0000	0.0050	0.0052	0.0003
HEXANOL	0.0127	0.0000	0.0121	0.0127	0.0006
CO2 FROM BURNING	0.0000	0.0000	0.0000	0.0000	0.0495
TOPPING COLUMN VENT (OP1 + OP1A)					
CYCLOHEXANOL	0.0006	0.0000	0.0006	0.0006	0.0000
CYCLOHEXANONE	0.0001	0.0000	0.0001	0.0001	0.0000
HEXANOL	0.0054	0.0000	0.0051	0.0054	0.0003
CO2 FROM BURNING	0.0000	0.0000	0.0000	0.0000	0.0151
KA STORAGE					
OP1 RECEIVERS (2)					
CYCLOHEXANE	0.0002	0.0000	0.0000	0.0002	0.0002
BENZENE	0.0000	0.0000	0.0000	0.0000	0.0000
K	0.0123	0.0000	0.0000	0.0123	0.0123
A	0.0020	0.0000	0.0000	0.0020	0.0020
OTHER VOC	0.0009	0.0000	0.0000	0.0009	0.0009
OP1 CRUDE					
CYCLOHEXANE	0.0001	0.0000	0.0000	0.0001	0.0001
BENZENE	0.0000	0.0000	0.0000	0.0000	0.0000
K	0.0047	0.0000	0.0000	0.0047	0.0047
A	0.0008	0.0000	0.0000	0.0008	0.0008
OTHER VOC	0.0003	0.0000	0.0000	0.0003	0.0003

OP1A RECEIVERS					
CYCLOHEXANE	0.0003	0.0000	0.0000	0.0003	0.0003
BENZENE	0.0000	0.0000	0.0000	0.0000	0.0000
K	0.0156	0.0000	0.0000	0.0156	0.0156
A	0.0026	0.0000	0.0000	0.0026	0.0026
OTHER VOC	0.0012	0.0000	0.0000	0.0012	0.0012
OP1A CRUDE					
CYCLOHEXANE	0.0001	0.0000	0.0000	0.0001	0.0001
BENZENE	0.0000	0.0000	0.0000	0.0000	0.0000
K	0.0060	0.0000	0.0000	0.0060	0.0060
A	0.0010	0.0000	0.0000	0.0010	0.0010
OTHER VOC	0.0004	0.0000	0.0000	0.0004	0.0004
TWKA STORAGE					
CYCLOHEXANE	0.0015	0.0005	0.0005	0.0010	0.0010
BENZENE	0.0000	0.0000	0.0000	0.0000	0.0000
K	0.0816	0.0260	0.0260	0.0556	0.0556
A	0.0134	0.0043	0.0043	0.0091	0.0091
OTHER VOC	0.0062	0.0020	0.0020	0.0042	0.0042
TOTAL KA STORAGE					
CYCLOHEXANE	0.0023	0.0005	0.0005	0.0018	0.0018
BENZENE	0.0000	0.0000	0.0000	0.0000	0.0000
K	0.1203	0.0260	0.0260	0.0942	0.0942
A	0.0198	0.0043	0.0043	0.0155	0.0155
OTHER VOC	0.0090	0.0020	0.0020	0.0071	0.0071
FUGATIVES (CYCLOHEXANE OXIDATION)					
CYCLOHEXANE	0.756	0.000	0.520	0.756	0.236
BENZENE	0.004	0.000	0.003	0.004	0.001
OTHER VOC - K,A	0.248	0.000	0.213	0.248	0.035
NVR TANK VENT					
CAPROIC ACID	0.0002	0.0000	0.0000	0.0002	0.0002
VALERIC ACID	0.0034	0.0000	0.0000	0.0034	0.0034
BUTYRIC ACID	0.0024	0.0000	0.0000	0.0024	0.0024
SUCCINIC ACID	0.0002	0.0000	0.0000	0.0002	0.0002
NVR BURNING					
CO2	970.533	0.000	0.000	970.533	970.533
CO	0.009	0.000	0.000	0.009	0.009
VOC	0.005	0.000	0.000	0.005	0.005
NOx	1.046	0.000	0.105	1.046	0.941
PARTICULATES	0.189	0.000	0.000	0.189	0.189
COBALT COMPOUNDS	0.015	0.000	0.000	0.015	0.015
CHROMIUM COMPOUNDS	0.002	0.000	0.000	0.002	0.002
HCL	0.037	0.000	0.000	0.037	0.037

KA OXIDATION ABSORBER OFFGAS					
N2O	589.433	577.645	577.645	11.789	11.789
NOx	14.143	0.000	10.819	14.143	3.324
CO2	115.954	0.000	0.000	115.954	115.954
CO	0.492	0.486	0.486	0.006	0.006
VOC	0.549	0.545	0.545	0.004	0.004
CO2 FROM BURNING, INCL. FROM NAT. GAS FOR REDUCING FLAME					
CO2	0.000	0.000	0.000	388.909	41.046
NITRIC ACID TANK FUME SWEEP					
N2O	2.621	2.568	2.568	0.052	0.052
NOx	1.587	0.000	1.214	1.587	0.373
CO2	5.230	0.000	0.000	5.230	5.230
CO	0.279	0.279	0.279	0.000	0.000
VOC	0.014	0.014	0.014	0.000	0.000
CO2 FROM BURNING, INCL. FROM NAT. GAS FOR REDUCING FLAME					
CO2	0.000	0.000	0.000	34.224	3.855
KA OXIDATION EMERGENCY VENT TANKS					
NOX	0.0009	0.0000	0.0000	0.0009	0.0009
N2O	0.0014	0.0000	0.0000	0.0014	0.0014
CO2	0.0002	0.0000	0.0000	0.0002	0.0002
PURGE FILTER					
HNO3	0.0001	0.0000	0.0000	0.0001	0.0001
CRUDE FILTER					
HNO3	0.036	0.000	0.000	0.036	0.036
ADIPIC	0.002	0.000	0.000	0.002	0.002
S/R FILTER					
HNO3	0.036	0.000	0.000	0.036	0.036
ADIPIC	0.002	0.000	0.000	0.002	0.002
BLOWERS					
HNO3	0.001	0.000	0.000	0.001	0.001
ADIPIC	0.003	0.000	0.000	0.003	0.003
DRYERS					
ADIPIC	20.000	19.950	19.950	0.051	0.051
COOLERS					
ADIPIC	20.000	19.980	19.980	0.020	0.020
STORAGE BINS					
ADIPIC	20.000	19.980	19.980	0.020	0.020

FUGATIVES (KA OXIDATION)					
NOX	0.004	0.000	0.000	0.004	0.004
ADIPIC	0.005	0.000	0.000	0.005	0.005
COOLING TOWER					
CHLORINE	0.025	0.000	0.000	0.025	0.025

Attachment 3b

VICTORIA AIR EMISSION SUMMARY BY PROCESS STEP, LB/TON AA

	UNCON-TROLLED	AMOUNT DESTROYED CURRENT	AMOUNT DESTROYED PLANNED	ACTUAL EMISSIONS CURRENT	ACTUAL EMISSIONS PLANNED
RAW MATERIAL STORAGE					
NON-CH4 VOC	4.000	3.968	3.968	0.033	0.033
CYCLOHEXANE OXIDATION					
NON-CH4 VOC	15.317	11.023	14.329	4.294	0.988
CO	60.751	40.129	57.714	20.623	3.038
CH4	0.673	0.576	0.639	0.097	0.034
CO2	35.042	26.697	33.290	106.592	135.630
KA REFINING & STORAGE					
NON-CH4 VOC	0.177	0.033	0.057	0.145	0.120
CO2	0.000	0.000	0.000	0.000	0.065
NVR STORAGE & BURNING					
NON-CH4 VOC	0.011	0.000	0.000	0.011	0.011
CO	0.009	0.000	0.000	0.009	0.009
NOx	1.046	0.000	0.105	1.046	0.941
PART.	0.189	0.000	0.000	0.189	0.189
CO2	970.533	0.000	0.000	970.533	970.533
COBALT COMPOUNDS	0.015	0.000	0.000	0.015	0.015
CHROMIUM COMPOUNDS	0.002	0.000	0.000	0.002	0.002
HCL	0.037	0.000	0.000	0.037	0.037
NITRIC OXIDATION					
N2O	592.056	580.213	580.213	11.843	11.843
NOx	15.735	0.000	12.034	15.735	3.702
CO2	121.184	0.000	0.000	544.318	166.086
CO	0.771	0.765	0.765	0.006	0.006
NON-CH4 VOC	0.563	0.560	0.560	0.004	0.004
CHLORINE	0.025	0.000	0.000	0.025	0.025
ADIPIC ACID REFINING					
NITRIC ACID	0.074	0.000	0.000	0.074	0.074
ADIPIC ACID/PART.	0.006	0.000	0.000	0.006	0.006
DBA RECOVERY					
NITRIC ACID	0.0001	0.0001	0.0001	0.0001	0.0001
DRYING, COOLING, STORAGE					
ADIPIC ACID/PART.	60.005	59.910	59.910	0.096	0.096

Attachment 3c

VICTORIA ADIPIC ACID AIR EMISSION SUMMARY, LB/TON AA

	UNCON-TROLLED	AMOUNT DESTROYED CURRENT	AMOUNT DESTROYED PLANNED	ACTUAL EMISSIONS CURRENT	ACTUAL EMISSIONS PLANNED
CRITERIA POLLUTANTS:					
NON-CH4 VOC	20.070	15.583	18.914	4.487	1.156
CO	61.532	40.893	58.478	20.638	3.053
NOX	16.781	0.000	12.138	16.781	4.643
PARTICULATES:					
ADIPIC ACID	60.011	59.910	59.910	0.102	0.102
NVR BURNING	0.189	0.000	0.000	0.189	0.189
GLOBAL WARMING GASES:					
CH4	0.673	0.576	0.639	0.097	0.034
CO2	1126.760	26.697	33.290	1621.442	1272.314
OZONE DEPLETERS:					
N2O	592.056	580.213	580.213	11.843	11.843
1990 CAAA POLLUTANTS:					
BENZENE	0.004	0.000	0.003	0.004	0.001
CHLORINE	0.025	0.000	0.000	0.025	0.025
CHROMIUM COMPOUNDS	0.002	0.000	0.000	0.002	0.002
COBALT COMPOUNDS	0.015	0.000	0.000	0.015	0.015
HCL	0.037	0.000	0.000	0.037	0.037
OTHERS:					
NITRIC ACID	0.074	0.000	0.000	0.074	0.074

Attachment 4a

AIR EMISSIONS FROM ADIPIC ACID MANUFACTURE AT SABINE RIVER
BY PROCESS STREAM, LB/TON AA

	UNCON-TROLLED	AMOUNT DESTROYED CURRENT	AMOUNT DESTROYED PLANNED	ACTUAL EMISSIONS CURRENT	ACTUAL EMISSIONS PLANNED
CYCLOHEXANE STORAGE					
CYCLOHEXANE	1.179	1.169	1.169	0.010	0.010
HIGH PRESSURE SCRUBBER OFFGAS					
NON-CH4 VOC:					
PROPANE	1.155	0.000	1.097	1.155	0.058
BUTANE	12.291	0.000	11.677	12.291	0.615
PENTANE	5.064	0.000	4.811	5.064	0.253
CYCLOHEXANE	0.211	0.000	0.200	0.211	0.011
TOTAL NON-CH4 VOC	18.721	0.000	17.785	18.721	0.936
CO	59.765	0.000	56.777	59.765	2.988
CO2	23.738	0.000	22.551	23.738	1.187
CO2 FROM BURNING	0.000	0.000	0.000	0.000	143.273
LOW PRESSURE SCRUBBER OFFGAS					
NON-CH4 VOC:					
PROPANE	0.326	0.000	0.310	0.326	0.016
BUTANE	2.029	0.000	1.927	2.029	0.101
PENTANE	0.123	0.000	0.117	0.123	0.006
CYCLOHEXANE	0.164	0.000	0.156	0.164	0.008
TOTAL NON-CH4 VOC	2.642	0.000	2.510	2.642	0.132
CO	16.839	0.000	15.997	16.839	0.842
CO2	8.327	0.000	7.911	8.327	0.416
CO2 FROM BURNING	0.000	0.000	0.000	0.000	32.764
STEAM STILL VENTS					
CYCLOHEXANONE	0.0001	0.0000	0.0001	0.0001	0.0000
CYCLOHEXANOL	0.0000	0.0000	0.0000	0.0000	0.0000
CO2 FROM BURNING	0.0000	0.0000	0.0000	0.0000	0.0004
KA STORAGE					
DECANT TANKS (50 A,B,C,D)					
K	0.0005	0.0000	0.0000	0.0005	0.0005
A	0.0002	0.0000	0.0000	0.0002	0.0002
CRUDE KA TANK					
K	0.0064	0.0000	0.0000	0.0064	0.0064
A	0.0050	0.0000	0.0000	0.0050	0.0050
DIVERT TANKS (K-6,8,10)					

K	0.0010	0.0000	0.0000	0.0010	0.0010
A	0.0004	0.0000	0.0000	0.0004	0.0004
K-51 TANK (INTERMEDIATE TANK)					
K	0.0036	0.0000	0.0000	0.0036	0.0036
A	0.0015	0.0000	0.0000	0.0015	0.0015
KA STORAGE (K-5, & #11,52,53)					
K	0.0149	0.0000	0.0000	0.0149	0.0149
A	0.0059	0.0000	0.0000	0.0059	0.0059
TOTAL KA STORAGE					
K	0.0264	0.0000	0.0000	0.0264	0.0264
A	0.0130	0.0000	0.0000	0.0130	0.0130
DEINVENTORY TANK (311)					
CYANE	0.0871	0.0000	0.0828	0.0871	0.0044
BENZENE	0.0002	0.0000	0.0002	0.0002	0.0000
NVR TANK VENTS (3)					
CAPROIC ACID	0.0003	0.0000	0.0000	0.0003	0.0003
VALERIC ACID	0.0033	0.0000	0.0002	0.0033	0.0032
BUTYRIC ACID	0.0025	0.0000	0.0001	0.0025	0.0023
SUCCINIC ACID	0.0002	0.0000	0.0000	0.0002	0.0002
FUGATIVES (CYCLOHEXANE OXIDATION)					
CYCLOHEXANE	0.653	0.000	0.455	0.653	0.199
BENZENE	0.003	0.000	0.002	0.003	0.001
OTHER VOC - K,A	0.215	0.000	0.149	0.215	0.065
NVR BURNING					
CO2	970.533	0.000	0.000	970.533	970.533
CO	0.009	0.000	0.000	0.009	0.009
VOC	0.005	0.000	0.000	0.005	0.005
NOx	0.628	0.000	0.063	0.628	0.565
PARTICULATES	0.054	0.000	0.000	0.054	0.054
COBALT COMPOUNDS	0.018	0.000	0.000	0.018	0.018
CHROMIUM COMPOUNDS	0.015	0.000	0.000	0.015	0.015
KA OXIDATION ABSORBER OFFGAS					
N2O	589.433	0.000	559.961	589.433	29.472
NOx	3.155	0.000	2.548	3.155	0.607
CO2	115.954	0.000	0.000	115.954	115.954
CO	0.492	0.000	0.467	0.492	0.025
VOC	0.553	0.000	0.525	0.553	0.028
CO2 FROM BURNING	0.000	0.000	0.000	0.000	2.294

NITRIC ACID TANK FUME VENT					
N2O	1.458	1.429	1.429	0.029	0.029
NOx	0.856	0.599	0.715	0.257	0.141
CO2	0.098	0.000	0.000	0.098	0.098
CO	0.151	0.148	0.148	0.003	0.003
VOC	0.008	0.008	0.008	0.000	0.000
CO2 FROM BURNING, INCL. FROM NAT. GAS					
CO2	0.000	0.000	0.000	69.990	7.229
KA OXIDATION EMERGENCY VENT TANKS					
NOX	0.0358	0.0000	0.0000	0.0358	0.0358
N2O	0.0014	0.0000	0.0000	0.0014	0.0014
CO2	0.0002	0.0000	0.0000	0.0002	0.0002
ADIPIC REFINING TANK VENTS (PD 30-43)					
NOX	0.011	0.000	0.000	0.011	0.011
DRYERS					
ADIPIC	20.000	19.800	19.800	0.200	0.200
RAILCAR LOADING					
ADIPIC	1.000	0.990	0.990	0.010	0.010
FUGATIVES (KA OXIDATION)					
NOX	0.004	0.000	0.000	0.004	0.004
ADIPIC	0.005	0.000	0.000	0.005	0.005
DBA ESTERIFICATION					
METHANOL	0.191	0.000	0.000	0.191	0.191
COOLING TOWER					
CHLORINE	0.046	0.000	0.000	0.046	0.046

Attachment 4b

SABINE RIVER AIR EMISSIONS SUMMARY BY PROCESS STEP, LB/TON AA

	UNCON-TROLLED	AMOUNT DESTROYED CURRENT	AMOUNT DESTROYED PLANNED	ACTUAL EMISSIONS CURRENT	ACTUAL EMISSIONS PLANNED
RAW MATERIAL STORAGE					
NON-CH4 VOC	1.179	1.169	1.169	0.010	0.010
CYCLOHEXANE OXIDATION					
NON-CH4 VOC	22.321	0.000	20.984	22.321	1.337
CO	76.604	0.000	72.774	76.604	3.830
CO2	32.065	0.000	30.462	32.065	177.640
KA REFINING & STORAGE					
NON-CH4 VOC	0.0396	0.0000	0.0001	0.0396	0.0394
CO2	0.0000	0.0000	0.0000	0.0000	0.0004
NVR STORAGE & BURNING					
NON-CH4 VOC	0.012	0.000	0.000	0.012	0.011
CO	0.009	0.000	0.000	0.009	0.009
NOx	0.628	0.000	0.063	0.628	0.565
PARTICULATES	0.054	0.000	0.000	0.054	0.054
CO2	970.533	0.000	0.000	970.533	970.533
COBALT COMPOUNDS	0.018	0.000	0.000	0.018	0.018
CHROMIUM COMPOUNDS	0.015	0.000	0.000	0.015	0.015
NITRIC OXIDATION					
N2O	590.892	1.429	561.390	589.464	29.502
NOx	4.051	0.599	3.263	3.452	0.789
CO2	116.052	0.000	0.000	186.042	125.575
CO	0.643	0.148	0.616	0.495	0.028
NON-CH4 VOC	0.561	0.008	0.533	0.553	0.028
CHLORINE	0.046	0.000	0.000	0.046	0.046
ADIPIC ACID REFINING					
NOX	0.011	0.000	0.000	0.011	0.011
ADIPIC ACID/PART.	0.005	0.000	0.000	0.005	0.005
DBA RECOVERY/ESTERIFICATION					
NON-CH4 VOC	0.191	0.000	0.000	0.191	0.191
DRYING, LOADING					
ADIPIC ACID/PART.	21.000	20.790	20.790	0.210	0.210

Attachment 4c

SABINE RIVER ADIPIC ACID AIR EMISSIONS SUMMARY, LB/TON AA

	UNCON-TROLLED	AMOUNT DESTROYED CURRENT	AMOUNT DESTROYED PLANNED	ACTUAL EMISSIONS CURRENT	ACTUAL EMISSIONS PLANNED
CRITERIA POLLUTANTS:					
NON-CH4 VOC	24.303	1.177	22.686	23.127	1.617
CO	77.257	0.148	73.390	77.109	3.867
NOX	4.690	0.599	3.326	4.090	1.364
PARTICULATES:					
ADIPIC ACID	21.005	20.790	20.790	0.215	0.215
NVR BURNING	0.054	0.000	0.000	0.054	0.054
GLOBAL WARMING GASES:					
CO2	1118.650	0.000	30.462	1188.640	1273.748
OZONE DEPLETERS:					
N2O	590.892	1.429	561.390	589.464	29.502
1990 CAAA POLLUTANTS:					
BENZENE	0.004	0.000	0.002	0.004	0.001
CHLORINE	0.046	0.000	0.000	0.046	0.046
CHROMIUM COMPOUNDS	0.015	0.000	0.000	0.015	0.015
COBALT COMPOUNDS	0.018	0.000	0.000	0.018	0.018
HCL	0.000	0.000	0.000	0.000	0.000
METHANOL	0.191	0.000	0.000	0.191	0.191