ExxonMobil Out of Control:

Pollution Problems and TNRCC Enforcement Failures at the ExxonMobil Baytown Refinery

Review of Air Discharges, Federal/State Air Enforcement
and Other Selected Air Pollution Issues at the ExxonMobil Baytown Texas Petroleum Refinery

SEED
Sustainable Energy and Economic Development

A report by the Texas Sustainable Energy and Economic Development (SEED) Coalition
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Forward

Petroleum refinery emissions are a serious local and regional problem for communities in Texas, Louisiana and other states. Petroleum refinery emissions tend to function as respiratory irritants when inhaled and such irritants can cause individuals with pre-existing respiratory disease significant adverse health effects. Several pollutants emitted by petroleum refineries are known or suspected cancer-causing agents that can elevate predicted lifetime cancer risks.

Volatile organic compounds and nitrogen oxides emitted by petroleum refineries are smog-forming precursor pollutants which must be controlled on a regional basis because of severe air pollution in metropolitan areas like Houston-Galveston. Petroleum refinery emissions can adversely affect the quality of life in neighborhoods from odors and property damage.

Because these matters are of public concern in Harris County and other Texas communities, the Sustainable Energy and Economic Development (SEED) Coalition commissioned this report to review pollution and toxic air discharges at the ExxonMobil Baytown Refinery. According to a recent presentation by ExxonMobil officials to the SEED Coalition during a tour of this facility, the Baytown Refinery is one of the largest petroleum refineries in the United States measured in terms of barrels of crude handling capability.

Given the problem of emissions from the Baytown Refinery and the serious public health problems of the Houston-Galveston area with smog, the SEED Coalition believes that this report will serve an important role in educating area residents about the ExxonMobil Baytown Refinery and informing the public about problems with regulation of the facility by the Texas Natural Resources Conservation Commission. This report can also show other refinery communities how to investigate and inquire into matters of refinery emissions and air pollution enforcement.

The Sustainable Energy and Economic Development (SEED) Coalition is an alliance of individuals, businesses, and organizations advocating sustainable energy strategies for Texas, including the use of renewable resources and conservation.

This report was produced as part of the Texas Air Crisis Campaign, which has been generously supported by the W. Alton Jones Foundation. We also thank Ms. Jane Dale Owen for her support of this study. For more information on the Texas Air Crisis Campaign, see http://www.texascenter.org/aircrisis/index.htm

The SEED Coalition is supported by Clear the Air, the Turner Foundation, the W. Alton Jones Foundation, the Energy Foundation and the National Environmental Trust as well as concerned Texans.

This report was produced for the SEED Coalition by Alexander J. Sagady & Associates of East Lansing, MI, an environmental consulting firm that addresses air, waste and wastewater permitting and enforcement matters for citizen groups, environmental and public health organizations and local government.

This report is free to non-profit organizations. Government agencies and businesses may order copies for $75. Please contact the SEED Coalition for availability at the address on the front cover.

Peter Altman, Executive Director
SEED Coalition, Austin, TX

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Executive Summary Concerning Emissions and Air Enforcement at the ExxonMobil Baytown Refinery

Emissions of Smog Forming Pollutants and Toxic Air Contaminants

The ExxonMobil Baytown Refinery is the largest point emission source of smog-forming pollutants in Harris County, TX. Because of Houston's first place ranking in the United States with serious, health-related ozone air quality standard violations, renewed attention must be placed on the largest sources of smog-forming precursors pollutants.

The ExxonMobil Baytown Refinery emission inventory information for 1999 shows that flare stack #4 is the largest single volatile organic compound source at the refinery at 266 tons per year. A alternative, more efficient flare combustion system should be considered for this large source.

Most Baytown Refinery emissions of benzene, a potent cancer-causing agent, are discharged by stack emission sources at the site. Total Baytown Refinery emissions of benzene are listed at 38,220 pounds for 1999 sources.

The largest hydrogen sulfide emission source at the Baytown Refinery is the CLAUS C vent at the sulfur recovery unit #2. This source discharged 10,000 pounds of this odorous, neurotoxic pollutant in 1999.

For the year 1999, the ExxonMobil Baytown Refinery emission inventory shows 14 large sources of smog-forming nitrogen oxide emissions each over 150 tons per year. More NOX emission control requirements imposed at an earlier date at the ExxonMobil Baytown Refinery could significantly cut this smog-forming pollutant.

The largest particulate emission sources at the Baytown Refinery are the two fluidized catalytic cracker regeneration units. These units are also known to release the carcinogenic toxic metal nickel. FCCU units also release cyanide and ammonia.

Although reported toxic releases from the Baytown refinery have fallen since reporting first began in 1987, the total toxic releases have largely leveled off in the period 1994-1998 at an average of about 1,160,000 pounds/year.

Although ExxonMobil has reported past emission of cresols, hydrogen cyanide, acrolein and carbon disulfide to TNRCC, no such report for these toxic release inventory pollutants was made to EPA and the public. In addition, the common refinery pollutants selenium and vanadium were not reported.

A review shows that ExxonMobil did not account for the specific chemical identity of 75% of its emissions of volatile organic compounds from the ExxonMobil Baytown Refinery in its 1998 report to the TNRCC.

A review of specific chemicals that are volatile organic compounds for which ExxonMobil must make reports to U.S. EPA shows that the total emissions of Toxic Release Inventory volatile organic compounds accounts for only 12% of the total volatile organic compound chemical emissions released in 1998. This means that the facility's EPA Toxic Air Release reports account for only a small portion of the airborne chemical compounds released at the ExxonMobil Baytown Refinery.

No information or reporting for the ExxonMobil Baytown Refinery is presently available for its carbon dioxide emissions as a global warming pollutant. No information or reporting is available on any emissions of mercury and chlorinated dibenzo dioxins/furans from the ExxonMobil Baytown Refinery, both of which are know to occur in petroleum refinery systems.

Episodic Upset Emission Events

Upset episode reports submitted to TNRCC show that 2000 was the worst year for total upset emissions in the last decade at the ExxonMobil Baytown Refinery. ExxonMobil's poor performance in recent years is primarily due to excessive carbon monoxide emissions.

Incident reports that ExxonMobil files with TNRCC on Baytown Refinery episodic emission events are frequently incomplete, frequently fail to identify process equipment implicated in upset incidents, frequently fail to properly state a primary cause of upset emissions and frequently do not contain adequate justification for emission estimates from upsets. TNRCC has not effectively enforced requirements for complete episodic emission reports.

A review of upsets from 1998-2000 shows that ExxonMobil Baytown Refinery episodic emissions can be frequently caused by repeated upsets at the same process equipment, by continued company operations at times when it does not maintain adequate availability of backup equipment, by equipment design that does not incorporate backup controls, by the scheduling of major maintenance at times when the facility continues to operate and by avoidable human error.

The ExxonMobil Baytown Refinery's longest incident of flaring waste gases went on for 53 days starting August 30, 1998 and released 168 tons of sulfur dioxide, 5.3 tons of volatile organic compounds and 2 tons of hydrogen sulfide.

Out of 162 upset episodes and 80 maintenance episodes during 1998-2000, TNRCC issued Notices of Violation on only 13 upset incidents. Of enforcement actions on the 13 incidents, not all addressed ExxonMobil's culpability in causing such episodes; some of the NOVs concerned the filing of incomplete reports.

One of the worst upset incidents at the ExxonMobil Baytown Refinery occurred on May 26, 1999 and lasted 2.5 days; the upset caused the release of 102 tons of volatile organic compounds, 20 tons of sulfur dioxide and 1 ton of hydrogen sulfide. The episode was caused by operator error that caused a power outage. No TNRCC Notice of Violation was issued.

Enforcement

As of April, 2001, the ExxonMobil Baytown Refinery currently has two unresolved Notices of Violation, one issued by the U.S. Environmental Protection Agency (U.S. EPA) and the other issued by TNRCC. According to these enforcement documents, ExxonMobil has violated the Federal Clean Air, EPA Federal Regulations and regulations of the TNRCC.

Last year, TNRCC gave prior notice to ExxonMobil of when it would conduct a major inspection of the Baytown Refinery and the parts of the facility it would be viewing.

Since July of 1984, the ExxonMobil Baytown Refinery received 28 TNRCC Notices of Violation (NOV) involving 72 specific rules violations. The Baytown Refinery had the highest number of TNRCC rule violations in the years 1989, 1990 and 2000. Of the 28 TNRCC NOVs,

only 8 were resolved with 6 legally enforceable consent orders; the rest were resolved without any enforceable order or penalty. Of the 6 consent orders, 5 had penalties. Total penalties paid to TNRCC for this record of violations over a 16 year period was an absolutely minimal $64,000, an amount unlikely to deter future violations.

Permit Issues

In November, 2000, TNRCC gave ExxonMobil a "flexible permit" for operations at the Baytown Refinery. The permit abolished nearly all of the stack and process-specific emission limitations that were previously in effect. Instead, ExxonMobil must only comply with plant-wide emission limitations that are very difficult to enforce and which far exceed 1999 emissions. The new permit will make it almost impossible to show that a single process upset violated the plant-wide emission limitations.

TNRCC apparently has no policy that limits the issuance of construction permits to a company like ExxonMobil that is presently in violation of federal and state clean air law at the Baytown Refinery.

ExxonMobil may have performed major renovation work on its carbon monoxide boilers without first obtaining a construction permit required by the Clean Air Act.

TNRCC's procedures and policies on public notice and participation for Prevention of Significant Deterioration air discharge permits violate EPA regulations for public participation in clean air permitting programs. TNRCC rules and procedures fail to require mandatory public hearings, impose high burdens on citizens attempting to participate in the permit granting process, and do not provide adequate public notice of the exact dates of deadlines for public comment. TNRCC procedures allow inappropriate roles for industrial permit applicants in the public notice and participation process and discourage public involvement in contested case hearings through improper standing requirements.

Acknowledgments

The SEED Coalition appreciates the review and the suggestions that went into production of this report by **Neil Carman, Ph.D.** of the Lone Star Chapter of the Sierra Club and the Galveston-Houston Association for Smog Prevention

The SEED Coalition also appreciates the Offsite Consequence Analysis information for the three ExxonMobil facilities provided by **Paul Orum** of the Working Group on Community Right-to-Know, Washington, DC

1 Introduction

This report reviews selected air emissions data, air enforcement information and some air pollution regulatory issues involving the ExxonMobil Baytown Refinery. The report analyzes information obtained from the Texas Natural Resources Conservation Commission (TNRCC) and the U.S. Environmental Protection Agency concerning emissions and air enforcement in regard to this facility.

A file review was conducted of relevant materials in the TNRCC-Houston Regional Office and in the TNRCC-Austin file room during the week of February 12, 2001. Additional materials were gained in both electronic and paper form from TNRCC officials by subsequent request. This review also reflects federal Freedom of Information Act requests concerning selected air enforcement materials from EPA Region 6. In addition to these materials, this review utilized access to selected materials published on the World Wide Web by both TNRCC and EPA.

2 Reported Air Discharges at the ExxonMobil Baytown Petroleum Refinery

2.1 Analysis of ExxonMobil Emission Inventory Reports of Common "Criteria"Air Pollutants

All available information concerning emissions from the ExxonMobil Baytown Refinery was reviewed for this report. The most readily available source of such emissions information to the public is the AIRData web site operated by the U.S. Environmental Protection Agency,[1] which contains the National Emission Trends database on point and other air pollution sources throughout the United States. Emission inventories for 1996 are available at this site and show the following information for the Exxon-Baytown refinery (annual emissions in tons for 1996):

Pollutant	**Carbon Monoxide**	**Oxides of Nitrogen**	**Particulate Matter < 10 Microns**	**Sulfur Dioxide**	**Volatile Organic Compounds**	**Particulate Matter < 2.5 Microns**
Emission (t/y)	3,871	10,717	988	1,734	5,821	798

EPA data also shows that the Baytown Refinery is the sixth largest source of volatile organic compound emissions in the State of Texas.

Upon review it was found that EPA's AirsData web site contained incorrect information about the ExxonMobil Baytown Refinery. The EPA data for 1996 conflicted with corresponding data from TNRCC. EPA is supposed to get their emission inventory data from states like Texas, so the TNRCC data is presumed to be correct. This situation begins to illustrates the types of problems that ordinary members of the public might encounter when attempting to find out about air pollution sources in their community.

[1] See http://www.epa.gov/air/data/

The Texas Natural Resources Conservation Commission (TNRCC) maintains an electronic database of emissions information for major stationary air discharge sources starting in the 1990 inventory year in its Point Source DataBase (PSDB) system. For purposes of this report, both detailed and summary annual emissions inventory information from the TNRCC Information Resources Division (IRD) were reviewed and utilized. No inventory was available for 1991. The TNRCC IRD emission inventory reports show the following for the ExxonMobil Baytown Refinery (TNRCC account #HG0232Q):

Pollutant / Year	Carbon Monoxide	Oxides of Nitrogen	Particulate Matter < 10 Microns	Sulfur Dioxide	Non-methane Organic Compounds	Total Suspended Particulate
1990	4,687	10,767	0	1,038	7,997	722
1992	4,528	10,033	0	1,261	5,824	648
1993	4,752	10,937	549	1,133	6,133	96
1994	4,729	11,165	749	1,128	5,249	27
1995	4,284	11,855	1,074	1,689	5,722	1,107
1996	4,023	11,591	1,011	1,876	4,008	1,038
1997	3,701	10,901	921	2,239	3,941	949
1998	3,103	9,336	864	1,050	3,767	912
1999	4,991	7,771	923	1,127	3,657	971

TNRCC data showing that the ExxonMobil Baytown Refinery discharged no PM10 in 1990 and 1992 must be considered in error . TNRCC data on total suspended particulate matter emissions for 1993-1994 must be considered erroneous since total suspended particulate matter emissions cannot be less than reported PM10 emissions.

ExxonMobil's reported data shows a continual decline between 1990 and 1999 in emissions of volatile organic compounds. The recent decline in 1998 and 1999 of nitrogen oxide reported emissions probably reflects some installations of Reasonably Available Control Technology (RACT) on a few of the facility's furnaces and heaters. RACT is a requirement of the Federal Clean Air Act for areas like Houston where National Ambient Air Quality Standards for ozone are violated.

There is no available explanation for the rising trend spike in sulfur dioxide emissions during 1995-1997.

2.2 Houston-Galveston's Serious Ozone Air Quality Violations as a Context to Consider the ExxonMobil Baytown Refinery Emissions

The Houston-Galveston Metropolitan Area has become the #1 ranked ozone nonattainment region in the United States for 1999-2000, surpassing Los Angeles for both peak 1-hour ozone and the number of days above the old 1 hour health-related National Ambient Air Quality Standard. The table below clearly shows the ExxonMobil Baytown Refinery is the largest individual source of the smog-forming ozone precursors nitrogen oxides and volatile organic compounds in Harris County, TX.

At present there is considerable interest in identifying emission sources of smog precursors and getting such emissions under control programs. Although the Houston smog problem exists as a result of the combined effect of point, area and mobile source emissions, point sources must still be strongly scrutinized for their contributing role in this problem. The table below shows the 25 largest point emission sources in Harris County from 1997 TNRCC emissions inventory data:

PLANT NAME	COMPANY	NOX	VOC	CO	PM	SO2
Baytown Refinery	Exxon Company USA*	10,901	3,941	3,701	921	2239
Deer Park Plant	Shell Oil Company	7,727	2,915	2,291	260	6831
Channelview Complex	Equistar Chemicals**	7,735	2,436	8,803	218	27
Clear Lake Plant	Celanese, Ltd.*	1,347	585	14,173	28	1310
West Tank Farm	Lyondell-Citgo Refining Co.	5,572	3,368	810	7	942
A.E.S. Deepwater, Inc.	A.E.S. Deepwater, Inc.	3,701	7	327	4	4756
Rhodia	Rhodia, Inc.	98	2	5	12	8219
Houston Refinery	Valero Refining Company-	1,435	1,386	776	355	3200
Channelview Plant	Cogen. Lyondell Incorporated	5,498	2	652	2	2
Rohm & Haas Texas	Rohm & Haastexas Incorporated	1,717	1,273	1,601	5	1289
Air Liquide	Bayou Cogeneration Plant	4,519	2	279	26	4
Baytown Olefins Plant	Exxon Chemical Company	2,757	257	1,139	130	166
Clear Lake	Enron Powercorporation	4,114	2	19	51	13
Donohue Industries,	Donohue Industries, Inc.	971	1,650	1,001	2	345
Clear Lake Gas Plant	Exxon Corporation	2,635	16	1,109	28	0
Pasadena	Crown Central Petroleum Corp	685	796	277	519	1434
Chevron Chemical	Chevron Chemical Company*	1,426	811	436	2	1022
Engineered Carbons	Engineered Carbons, Inc	87	16	1,792	65	1599
San Jacinto Mill	Simpson Pasadena Paper	704	386	1,623	317	524
Enron Methanol Co	Enron Methanol Company	2,710	654	172	15	0
Tx. Petrochemicals	Texas Petrochemicals Corp	2,316	333	255	2	7
Baytown Chemical	Exxon Chemical Americas*	1,139	983	288	73	11
La Porte Complex	Equistar Chemicals, L.P.	910	1,052	305	42	28
Battleground Plant	Occidental Chemical Corp	1,577	29	165	2	7
Haden Road	Elf Atochem North America,	41	29	42	6	1457

The ExxonMobil Baytown Refinery also is the largest single point source of both particulate matter and sulfur dioxide and the third largest carbon monoxide emission source in Harris County.

When considering that the ExxonMobil Baytown Refinery, the ExxonMobil Baytown Olefins plant and the ExxonMobil Baytown Chemical plant are really one emission source, the significance of the point source problem grows as shown in this table (emission numbers in tons for 1997):

	NOX	VOC	CO	PM	SO2
Baytown Refinery	10,901	3,941	3,701	921	2239
Baytown Olefins Plant	2,757	257	1,139	130	166
Baytown Chemical Plant	1,139	983	288	73	11
Total	14,797	5,181	5,128	1,125	2,417
Percent of Harris County Totals	16	14	10	20	6

Finally, because of the location of the Baytown Refinery, afternoon winds blowing from the Southern to the Easterly sector are in a position to send the Baytown Refinery's pollution towards central locations of known high ozone potential.

2.3 Review TNRCC Emission Inventory Data for the ExxonMobil Baytown Refinery

According to the ExxonMobil Baytown Refinery application for a Title V Operating Permit, the estimated number of emission units at the Baytown site is 1,100. Each year, the facility must make a detailed emission inventory report to TNRCC on all of these emission units.

The author obtained a total of 50,375 electronic records of individual emission point reporting made by the ExxonMobil Baytown Refinery from the TNRCC Information Resources Division.[2] The records reflected emission inventories for 1990 and 1992-1999. Delimited ASCII data TXT files provided by TNRCC-IRD were transformed to a Microsoft Visual Foxpro database file for exposition and more detailed analysis.

Of the 50,375 records obtained from TNRCC, 34,658 records were found to indicate zero emissions for annual total emissions, upset emissions and ozone season emissions. This means that some unique combinations of emission points and process points did not have emissions for the emission inventory years indicated in the listing. A detailed review was done to find the top emission process points for the most recent emission inventory year of 1999.

For 1999 nitrogen oxide emissions, the top emission points are shown in the following table; given the large emissions noted for the highest nitrogen oxide sources, it is not likely that all of these top nitrogen oxide (NOX) emission sources are utilizing available emission control technologies such as low NOX burners and selective catalytic reduction or selective non-catalytic reduction to achieve maximum NOX emission control efficiencies.

EPN Designator	Emission Point Name	Ozone Season NOX Emission (lbs/day)	Actual NOX Emissions (tons/year)
FCCU3WGS	FCCU 3, WET GAS SCRUBBER	4475.60	816.80
BH7B72	BOILER 72	3061.62	558.75
BH7B71	BOILER 71	2973.35	542.64
BH7B74	BOILER 74	2588.21	472.35
BH7B73	BOILER 73	2541.43	463.81
FCCU2WGS	FLUID CAT CRACKING UNIT 2	2421.71	441.96
BH6B64	BOILER 64	1473.77	268.96
HF4F401	FURNACE 401	1323.51	241.54
BH6B66	BOILER 66	1195.14	218.12
BH7WHB75	WASTE HEAT BLR-75 STACK	1113.77	203.26
FXKGTGWHB	FXK GTG301/WHB301	974.09	177.77

[2] Electronic mail communications with Jerry Blizzard, TNRCC Information Resources Division, April 4-6, 2001

EPN Designator	Emission Point Name	Ozone Season NOX Emission (lbs/day)	Actual NOX Emissions (tons/year)
BH6B67	BOILER 67	920.52	167.99
PS3F3F4	HEAT, STEAM AND POWER	881.12	160.80
LXU2B4	LUBES XTRCTN U 2-FURN B4	843.38	153.92
LXU2B2	LUBES XTRCTN U 2-FURN B2	815.61	148.85
HF4F402	HYDROFORMER FURNACE 402	766.98	139.97
BH6WHB68	WASTE BLR STACK	741.45	135.32
BH6B65	BOILER 65	715.14	130.51
PS8F802	PIPE STILL 8 F802	599.06	109.33
PS8F801	PIPE STILL 8 FURNACE F801	594.68	108.53
HF4F403	HYDROFORMER 4 FURNACE 403	570.18	104.06
HCU1F701	HYDROCRCKNG U 1-FURN F701	560.57	102.30
FCCU3F105	FCCU 3 FURNACE F105	557.17	101.68
H4F404F405	HYDROFORMER 4 F404 & F405	550.09	100.39
MEKC4VT	MEK LUBE PLT-GAS TURB C4	500.40	91.32
HF3F1	HYDROFORMER 3-FURNACE F1	489.60	89.35
HGU1F121A	H2 G.E. UNIT 1 FRN. F-121	480.50	87.69
HGU1F121B	H2 GEN. UNIT 1 FURN. F121	480.50	87.69
CLEU1B2	CAT LT ENDS U1-BOILER B-2	305.98	55.84
CLEU2F1	CLEU2F1	269.74	49.23

For 1999, the top emission points for volatile organic compounds (as non-methane organic compounds) are shown below:

EPN Designator	Emission Point Name	Ozone Season VOC Emission (lbs/day)	Actual VOC Emissions (tons/year)
FLARE04	FLARE STACK 4 (WLFS)	1459.26	266.31
MEKFUG	MEK DEWAXING PLANT	769.73	140.48
OM1FUG	OIL MOVEMENTS AREA 1 FUGI	732.97	133.79
DOCKSSHIP	DOCKS (LOADING LOSSES)	704.33	128.60
PLBFUG	PROPANE LUBE PLANT FUGITI	626.12	114.27
CT09FUG	COOLING TOWER NO. 9 FUGIT	345.60	63.07
OM3FUG	OIL MOVEMENTS AREA 3 FUGI	335.90	61.30
LEFUFUG	LIGHT ENDS FRACTIONATING	327.13	59.72
CT08FUG	COOLING TOWER NO. 8 FUGIT	319.68	58.34
TK0800	TANK 800	305.14	55.69
FL6	LEFU COLUMN 17	280.50	51.15
PS7FUG	PIPE STILL 7 FUGITIVES	348.94	50.98
TK0812	TANK 812	253.86	46.33

EPN Designator	Emission Point Name	Ozone Season VOC Emission (lbs/day)	Actual VOC Emissions (tons/year)
TK0863	TANK 863 - GASOLINE	250.72	45.76
ALKYFUG	ALKYLATION PLANT FUGITIVE	250.39	45.68
CT80FUG	COOLING TOWER NO. 80 FUGI	241.92	44.15
PS3FUG	PLANT FUGITIVES	240.66	43.91
TK0862	TANK 862 - GASOLINE	240.28	43.86
TK0860	TANK 860 - GASOLINE	239.85	43.77
CLEU3FUG	CAT LIGHT ENDS UNIT 3 FUG	236.50	43.18

For 1999 particulate matter, the top emission points are shown in the table below:

EPN Designator	Emission Point Name	Actual PM Emissions (tons/year)
FCCU3WGS	FCCU 3, WET GAS SCRUBBER	403.24
FCCU2WGS	FLUID CAT CRACKING UNIT 2	276.00
BH7B71	BOILER 71	120.92
BH7B72	BOILER 72	118.28
BH7B74	BOILER 74	116.84
BH7B73	BOILER 73	97.86
PS8F801	PIPE STILL 8 FURNACE F801	50.78
PS8F802	PIPE STILL 8 F802	50.20
HF4F401	FURNACE 401	42.88
FXKGTGWHB	FXK GTG301/WHB301	39.78
MEKC4VT	MEK LUBE PLT-GAS TURB C4	36.26
BH6B65	BOILER 65	31.38
BH6B66	BOILER 66	28.88
HF4F402	HYDROFORMER FURNACE 402	27.74

For 1999 carbon monoxide, the top emitters are shown below:[3]

EPN Designator	Emission Point Name	Actual CO Emissions (tons/year)
HF3C3A	HYDROFORM 3 COMPRESS C3A	2277.71
HF3C3B	HYDROFORM 3 COMPRESS C3B	645.04
FCCU2WGS	FLUID CAT CRACKING UNIT 2	410.00
SCU2T601	SCU2 T601 VENT	302.00
FXKGTGWHB	FXK GTG301/WHB301	98.74
BH7B71	BOILER 71	94.90
BH7B72	BOILER 72	92.30
BH7B74	BOILER 74	91.27
BH7WHB75	WASTE HEAT BLR-75 STACK	81.01
FL26	FLARE STACK 26	80.34
BH7B73	BOILER 73	76.43
BH6WHB68	WASTE BLR STACK	76.02
HF4F401	FURNACE 401	61.81

For 1999 sulfur dioxide, the top emitting units are shown below:

EPN Designator	Emission Point Name	Actual SO2 Emissions (tons/year)
FCCU2WGS	FLUID CAT CRACKING UNIT 2	186.62
PS8F801	PIPE STILL 8 FURNACE F801	91.44
PS8F802	PIPE STILL 8 F802	88.79
HF4F401	FURNACE 401	85.28
HF4F402	HYDROFORMER FURNACE 402	59.38
FXKGTGWHB	FXK GTG301/WHB301	50.01
HF4F403	HYDROFORMER 4 FURNACE 403	41.30
FCCU3WGS	FCCU 3, WET GAS SCRUBBER	37.04
BH7WHB75	WASTE HEAT BLR-75 STACK	34.37
HF3F1	HYDROFORMER 3-FURNACE F1	34.03
H4F404F405	HYDROFORMER 4 F404 & F405	33.02
BH6WHB68	WASTE BLR STACK	31.64
PS7F707	PIPE STILL 7 F-707	28.31

[3] Compressor engines for units HF3C3A and HF3C3B with the large carbon monoxide emissions were shut down by ExxonMobil in 2000 after a TNRCC Notice of Violation following a company stack test of these units. Telephone communication with Andrea Walter, Acting Refinery Environmental Coordinator, ExxonMobil, April 9, 2001

EPN Designator	Emission Point Name	Actual SO2 Emissions (tons/year)
PS8F803	PS8 F-803	26.35
CLEU2F3	REB STACK	25.96
PS8F804	PS8 F-804	25.44

For 1999 emissions of hydrogen sulfide, the top emitting units are shown below:

EPN Designator	Emission Point Name	Actual H2S Emissions (tons/year)
SCU2CVENT	SCU 2 CLAUS C VENT	5.00
SCU2T601	SCU2 T601 VENT	1.57
DOCKSSHIP	DOCKS (LOADING LOSSES)	1.16
TK0667	TANK 667	0.88
LHU1FUG	LUBES HYDROFNG UN 1 FUGS	0.28
SCU2FUG	SCU2 FUG	0.27
LHU2FUG	LUBE HYDROFINING UNIT 2	0.24
SDUFUG	SPECIALTIES DEWAXING FUGI	0.14
RHCFUG	RHC PROCESS FUGITIVES	0.05
HU5FUG	HYDROFINING UNIT NO 5 FUGS	0.03
LOTFUG	LIGHT OIL TREATERS FUGITI	0.03
HU6FUG	HYDROFINING UNIT 6	0.02
HU7	HYDROFINER 7 FUGITIVES	0.02
FXKFUG	FLEXICOKING FUGITIVES	0.01
HDU1FUG	HDS UNIT 1	0.01
PLTGIRFUG	PLANT GIRBOTOL UNIT FUGIT	0.01

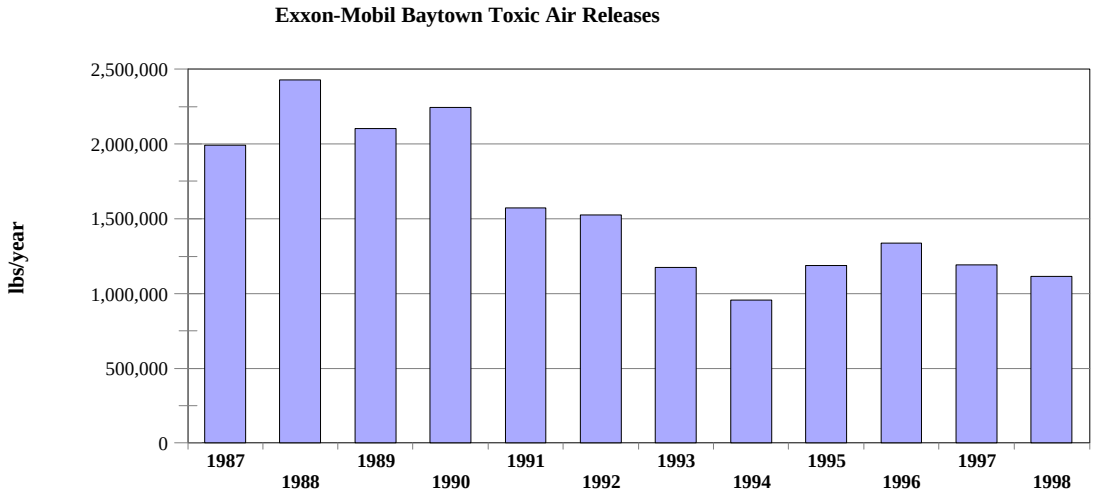
For 1999 Benzene emissions, the top emission points are shown below:

EPN Designator	Emission Point Name	Ozone Season Benzene Emission (lbs/day)	Actual Benzene Emissions (tons/year)
DOCKBZTO	DOCK BENZENE THERMAL OX	13.99	2.55
TK0337	337 - GASOLINE	7.98	1.46
HF4FUG	HYDROFORMER 4 FUGITIVES	5.07	0.92
HF3FUG	HYDROFORMER 3 FUGITIVES	4.92	0.90
CT58FUG	COOLING TOWER #58 FUGITIV	4.83	0.88
WOUFUG	WASTEWATER OXIDATION UNIT	4.63	0.84

EPN Designator	Emission Point Name	Ozone Season Benzene Emission (lbs/day)	Actual Benzene Emissions (tons/year)
COUD-9VT	COU D-9 PROCESS VENT	3.60	0.66
TK0342	TANK 342 - AXU RAFFINATE	2.38	0.44
HF3C3A	HYDROFORM 3 COMPRESS C3A	2.20	0.40
HF3C3B	HYDROFORM 3 COMPRESS C3B	2.15	0.39
TK0067	TANK 67	1.77	0.32
TK0732	TANK 732-SCN	1.29	0.24
TK0348	TANK 348	1.17	0.21
FCCU3FUG	FLUID CAT CRACKING UNIT 3	1.12	0.20

2.4 ExxonMobil Reports of Toxic Air Contaminants to EPA's Toxic Release Inventory

ExxonMobil has been making reports of toxic air releases for the Baytown Refinery since 1987. The following graph shows total toxic air releases for 1987-1998. The reader should note that this graph shows the total toxic air releases for any particular year based on what was reportable for that year. Some early reduction in the totals can be explained as a result of certain chemical reporting requirements, such as for fibrous aluminum oxides, being dropped in later years. In addition, some new mandatory reporting chemicals were added in some of the more recent years. Most of the long term reduction in TRI air discharges probably resulted from emission controls imposed in the last decade for VOC reduction to control smog and the advent of hazardous air pollutant regulations on petroleum refineries.



The following tables on the next two pages shows detailed, chemically-speciated data from the Baytown Refinery toxic air release reports for 1987-1999; all air release data in these table are pounds of emissions per year.

ChemicalName	Type	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987
1,1,1-trichloroethane	Fugitive	NR	NR	NR	NR	46042	48007	32052	32052	NR	NR	NR	NR	NR
1,2,4-trimethylbenzene	Fugitive	427	654	345	189	222	224	674	722	1900	1500	1600	1500	2400
1,2,4-trimethylbenzene	Stack	65	57	53	85	304	338	599	170	220	270	250	250	8000
1,3-butadiene	Fugitive	135	144	123	82	132	170	130	174	300	250	250	250	250
1,3-butadiene	Stack	1280	1874	1387	3016	1517	2360	2174	2580	400	3300	NR	300	250
2-methoxyethanol	Stack	NR	2	0	63	193	80	98	100	81	140	250	250	NR
Aluminumoxide (Fibrous)	Stack	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	280000	210000
Ammonia	Fugitive	21503	25369	55112	49128	11689	23905	26671	20924	32000	35000	16000	23000	17000
Ammonia	Stack	75908	69400	69587	75860	95796	36565	40905	17605	7165	43190	250	16030	250
Anthracene	Fugitive	26	26	26	26	26	NR	NR	NR	NR	NR	NR	NR	NR
Anthracene	Stack	89	76	911	869	852	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	Fugitive	7769	8639	9608	7245	8942	11320	29339	71905	75000	61000	63000	32000	59000
Benzene	Stack	30591	29988	27728	26939	33421	35202	55619	65201	46000	67000	61000	70000	1700
Carbon Tetrachloride	Fugitive	NR	NR	NR	NR	NR	NR	NR	5190	5300	4100	4500	1300	2300
Carbonyl Sulfide	Fugitive	4	4	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonyl Sulfide	Stack	53134	67826	61103	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chlorine	Fugitive	844	720	714	702	834	876	971	1117	1800	1200	1100	1200	1300
Chlorine	Stack	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	250	0
Chromium Compounds	Stack	NR	NR	NR	NR	NR	50	NR	NR	NR	NR	NR	NR	0
Cobalt Compounds	Stack	NR	203	0	106	NR	21	337	0	38	40	66	NR	22
Copper Compounds	Stack	NR	NR	NR	NR	NR	NR	NR	NR	130	NR	NR	NR	NR
Cumene	Fugitive	292	253	222	200	264	227	1057	1326	1300	1100	750	250	250
Cumene	Stack	788	667	660	2859	5295	4265	5660	6220	350	290	6300	10000	1200
Cyclohexane	Fugitive	5151	4778	3777	3375	5306	6477	48122	74125	74000	65000	77000	62000	27000
Cyclohexane	Stack	17283	15265	15282	16220	21521	23289	18378	26899	10000	7000	21000	37000	19000
Ethylbenzene	Fugitive	4797	5676	6012	4425	5633	9527	9940	19479	23000	17000	18000	8000	11000
Ethylbenzene	Stack	1713	1759	866	2565	5934	4688	9899	15487	6500	27000	16000	27000	24000
Ethylene	Fugitive	9829	8397	10360	10541	16889	21872	11345	18723	23000	19000	17000	17000	24000
Ethylene	Stack	72405	70464	28601	72989	9215	13023	32964	9299	10000	15000	13000	15000	4000
Ethyleneglycol	Fugitive	NR	NR	NR	3	NR	NR	125	972	950	4	1000	NR	0
Formaldehyde	Stack	64342	61625	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hydrochloric Acid Aerosols	Stack	20712	22784	25200	22653	24000	24000	24000	24000	24000	20000	24000	23000	23000
Lead Compounds	Fugitive	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	250
Lead Compounds	Stack	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	250

ChemicalName	Type	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987
Methanol	Fugitive	923	927	893	637	653	673	570	570	570	570	2400	1800	16000
Methanol	Stack	70919	59886	112894	123694	1642	240	150	NR	NR	NR	NR	NR	0
Methyl Ethyl Ketone	Fugitive	150956	115768	137837	131757	147312	109466	141006	367357	600000	880000	880000	740000	430000
Methyl Ethyl Ketone	Stack	1068	1234	3780	2131	1997	3850	6198	6000	9600	9900	9900	12000	18000
Methyl Isobutyl Ketone	Fugitive	150814	116027	140375	131710	147637	112170	145250	120107	NR	NR	NR	NR	NR
Methyl Isobutyl Ketone	Stack	115	148	204	1183	559	300	832	80	NR	NR	NR	NR	NR
Methyl tert-butyl Ether	Fugitive	705	514	465	97	119	514	9622	9021	1600	1900	2800	2300	250
Methyltert-butyl Ether	Stack	112277	109340	107442	89291	132534	86744	96810	133320	24000	5200	20000	37000	21000
Molybdenum Trioxide	Stack	858	77	42	267	80	1367	2249	396	480	1000	1083	424	27
N-hexane	Fugitive	10164	11277	11476	13651	18952	NR	NR	NR	NR	NR	NR	NR	NR
N-hexane	Stack	35261	39622	24415	102781	45005	NR	NR	NR	NR	NR	NR	NR	NR
N-methyl-2-pyrrolidone	Fugitive	15857	15857	15857	15857	18958	NR	NR	NR	NR	NR	NR	NR	NR
N-methyl-2-pyrrolidone	Stack	2785	147	16	12	18	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	Fugitive	1693	1689	662	640	386	1073	3365	4427	3800	3700	4600	750	750
Naphthalene	Stack	1110	1050	316	139	689	127	51	4	NR	NR	250	NR	3300
Nickel Compounds	Stack	515	158	146	216	178	549	614	375	520	470	480	1000	140
Phenanthrene	Fugitive	97	105	54	45	NR	NR	NR	NR	NR	NR	NR	NR	NR
Phenanthrene	Stack	164	141	221	213	NR	NR	NR	NR	NR	NR	NR	NR	NR
Phenol	Fugitive	4168	4291	3345	3363	3181	3193	3027	3464	3100	3000	3000	3300	20000
Phenol	Stack	4705	354	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
Polycyclic Aromatic Cmpds	Fugitive	71	61	68	60	60	NR	NR	NR	NR	NR	NR	NR	NR
Polycyclic Aromatic Cmpds	Stack	1049	997	291	279	134	NR	NR	NR	NR	NR	NR	NR	NR
Propylene	Fugitive	22161	19583	21711	22333	35345	49432	26497	36052	53000	43000	41000	41000	84000
Propylene	Stack	16722	21527	10601	87063	3579	16477	39327	13916	17000	24000	23000	22000	11000
Styrene	Fugitive	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	250	250	0
Styrene	Stack	592	538	652	239	182	100	804	1040	41	14	250	250	1100
Sulfuric Acid Aerosols	Fugitive	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	250
Sulfuric Acid Aerosols	Stack	55100	52946	127779	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
Tetrachloroethylene	Fugitive	4	7	3	5	619	586	498	NR	NR	NR	NR	NR	NR
Toluene	Fugitive	31991	33422	32742	24872	28138	33893	81927	176225	270000	270000	280000	220000	370000
Toluene	Stack	26638	27799	52170	188455	240138	198977	168813	116125	110000	420000	320000	530000	406000
Trichloroethylene	Fugitive	36682	24986	31595	54724	NR	NR	NR	NR	NR	NR	NR	NR	NR
Xylene(mixed Isomers)	Fugitive	25845	28673	26923	23507	31110	43091	41294	61583	99000	69000	91000	49000	58000
Xylene(mixed Isomers)	Stack	27178	27080	7264	13882	30668	24914	52008	60376	33000	120000	81000	140000	113000
Zinc Compounds	Stack	184	0	241	NR	NR	NR	NR	NR	550	NR	NR	NR	47

ExxonMobil's Baytown Refinery toxic air release reporting under the federal requirements of the Emergency Planning and Community Right to Know Act does not provide air discharge reporting for the following toxic air contaminants, some of which the company admits it discharged in past TNRCC emission inventory reports. Other TRI pollutants listed in the table are common materials found in petroleum refining systems which were not reported as TRI air discharges:

EPCRA-Listed Toxic Pollutants for Which EM Filed No EPCRA Report on the Baytown Refinery	**EM Discharge Reports to TNRCC of this Pollutant (tons/year)**
cresols	EM reported 0.17 ton in 1990
vanadium compounds	no report
selenium compounds	no report
hydrogen cyanide (hydrocyanic acid)	EM reported 9.78 tons in 1996 and 56 lbs in 1995; known to be discharged by FCC units
hydrogen sulfide[4]	EM reported 9.72 tons actual emissions and 6.66 tons of upset emissions in 1999
manganese	no report
methyl mercaptan	EM reported 0 emissions in 1999
acrolein	EM reported 0.88 tons of emissions in 1999
hexane	EM has reported between 19 and 66 tons per year of hexane air discharges to TNRCC from 1990 to 1999
carbon disulfide	EM reported 0.54 tons in 1998 and 1.1 tons in 1999

Further analysis of the EPCRA regulations as they apply to the ExxonMobil Baytown Refinery is warranted to determine if an ExxonMobil violation of EPCRA is indicated by any of these failures to report specific chemical emissions.

2.5 Comparison of Reported Volatile Organic Compound Emission Inventories to Reported Toxic Release Air Discharges for Volatile Airborne Toxicants

A subtable of Baytown Refinery toxic air release reports was developed to focus only on the EPCRA-reported pollutants that are volatile organic compounds (VOCs). These totals were then compared to total volatile organic compound emissions reported to TNRCC in ExxonMobil Baytown Refinery annual emission inventory reports. The TNRCC annual VOC emission reports

[4] Although hydrogen sulfide is a pollutant listed TRI reporting pollutant, the EPA issued an administrative stay of the reporting requirement for hydrogen sulfide at the request of the petroleum industry a number of years ago. This stay is still in effect and ExxonMobil technically does not have to report this pollutant.

is a separate reporting process from the EPA TRI air discharge inventory. However, comparing VOC emissions from both types of reporting allows a rough determination of how much many chemical compound emissions are missed solely by relying on the EPA toxic release inventory. This comparison is presented in the table below:

	1998	1997	1996	1995	1994	1993	1992	1990
EM's Report of EPCRA Airborne Toxicants which are VOCs (tons/year)	437	425	592	526	433	538	730	1070
EM's Report of Non-Methane Organic Compound Emissions (VOCs) (tons/year)	3767	3941	4008	5722	5249	6133	5824	7997
EPCRA VOCs/Total VOCs as percent	12%	11%	15%	9%	8%	9%	13%	28%

This table illustrates that toxic release reports filed with EPA under the Emergency Planning and Community Right to Know Act give only a small portion of the picture in reviewing toxic emissions that are volatile organic compounds in the case of the ExxonMobil Baytown Refinery. For example, the EPCRA toxic air release report for 1995 presented a chemical compound characterization of only 9% of non-methane hydrocarbon compounds discharged by this facility.

Failure to report all known chemical emissions may be one potential cause of this situation, as noted in the previous section. Another potential cause may be inherent petroleum industry inertia that persists in using refinery process flow nomenclature as the names of emitted pollutants in volatile organic compound (VOC) reporting. The nomenclature then persists when toxic air release reports are prepared and there is reluctance to chemically speciated these petroleum industry process flow names.

Such failure to speciate petroleum process flow streams when they are released as pollutants means that the toxic release inventory will not adequately inform all involved of the magnitude of toxic emissions that may be occurring. However, in making this statement it is also important to point out that many longer chain petroleum hydrocarbon compounds may still be considered as VOCs but will not be found on lists of reportable toxic substances for the EPA Toxic Release Inventory.

The table below shows selected emission inventory entries for non-methane organic carbon compounds from the ExxonMobil Baytown Refinery for listed TNRCC air contaminant codes tailor-made for the petroleum refining industry:

Petroleum Industry Pollutant Nomenclature Used at Baytown Refinery for Reporting Volatile Organic Compound Emissions, 1998 tons			
ALKYLATE	12.9	KEROSENE	331.2
COKER FEED	2.3	LUBRICATING OIL	74.4
CRUDE OIL	243.3	NAPHTHA	148.6
DIESEL	27.3	NONMETHANE VOC-U	1892.1
ETHERS-U	4.7	RAFFINATE	51.5

FCC FEED	5.4	REFORMATE	1.0
FUEL OIL-U	32.4	REFORMER FEED	0.9
GAS OIL	4.9	VACUUM BOTTOMS	15.5
GASOLINE	2.7	JET FUEL	0.3
JET FUEL	0.3	**TOTAL**	**2851.3**

Considering the total reported VOC emissions and the total emission of the pollutants listed above, ExxonMobil did not characterize the chemical specific identity of 75% of their VOC emissions for 1998.

Many of the petroleum industry process stream VOC names listed will have specific lighter molecular weight components that are toxic and which will be represented on required reporting lists. However, failure to identify these toxic emission components from the industry-named process stream VOC emissions will likely mean a significant underestimation of the toxic pollutant emissions from the facility.

A reliance on incomplete airborne toxicant reporting as a result of failure to more specifically characterize the chemical species of process emissions is likely to lead to significant errors in conducting future Baytown Refinery risk estimates. It is expected that future EPA rulemaking under Section 112 of the Federal Clean Air Act will require that a residual cancer risk assessment be completed for discharge of airborne carcinogenic compounds from the ExxonMobil Baytown Refinery.

2.6 Emissions of Global Warming Pollutants

Although the TNRCC lists carbon dioxide as a pollutant in its air contaminant table, there is no requirement to submit reports on carbon dioxide emissions. While the TNRCC is working to produce information on global warming pollutants for 2001, the most recent ExxonMobil Baytown Refinery emission inventory information contains no entries for carbon dioxide. According to EPA's Global Warming website,[5] there currently is no TNRCC information on global warming pollutants available and no individual site-specific information is available on the ExxonMobil Baytown Refinery from the EPA site.

ExxonMobil made the following emission inventory reports for methane emissions (in tons) in their TNRCC submittals; methane is a known greenhouse gas:

1990	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
36.20	25.67	0.11	30.24	27.65	18.39	17.83	15.58	16.96

[5] See:
http://yosemite.epa.gov/globalwarming/ghg.nsf/emissions/StateAuthoredInventories

ExxonMobil also reported discharges of a total of 142.95 tons of "process fuel gas" in 1995 which more likely than not contained a significant fraction of methane. After 1995, ExxonMobil did not report any more emissions of "process fuel gas."

3 Review of Episodic Emissions During Upsets, Malfunctions, Maintenance, Startup and Shutdown at the ExxonMobil Baytown Refinery

3.1 The Problem of Episodic Emissions

Petroleum refineries use extensive high pressure and high temperature processing and refinery processes typically have a high flux throughput of materials that can easily become airborne pollutants. Because of these factors, episodic emission releases during process upsets, emquipment maintenance and startup/shutdown pose unique and highly problematic pollution problems. Within minutes, high temperature and high pressure processes can discharge tons of emissions through pressure operated relief valves. When certain refinery sulfur handling facilities fail, flaring of hydrogen sulfide-containing gases can cause high emission events. Failures in process equipment handling cracking catalysts can cause discharge of tons of oily particulate matter.

Episodic emissions can cause high ambient air pollution impacts in adjacent neighboring communities. As a result, detailed review of such incidents and the resulting emissions is warranted.

3.2 Episodic Emission Reports from the ExxonMobil Baytown Refinery Emission Inventory

ExxonMobil must submit emission data on all excess emission episodes arising from both upsets (which includes unplanned maintenance) and planned maintenance/startup/shutdown as part of its annual emission inventory reporting obligations. Analysis of this reported data for 1990-1999 shows that annual total episodic upset emissions have comparatively high during 1998-1999.[6]

Comprehensive information on plant operating time was not available to compare these episodic emission totals to total annual operating time. Annual emission inventory data on plant excess emissions associated with planned maintenance/startups/shutdowns was not available in the data set obtained from TNRCC. Review of episode incident reports on planned maintenance activities show that emissions arising from these activities can at times be as high or higher than episodic upset emissions. See the chart below for illustration on summary totals for episodic upset emission events in tons per year from the ExxonMobil Baytown emission inventory:

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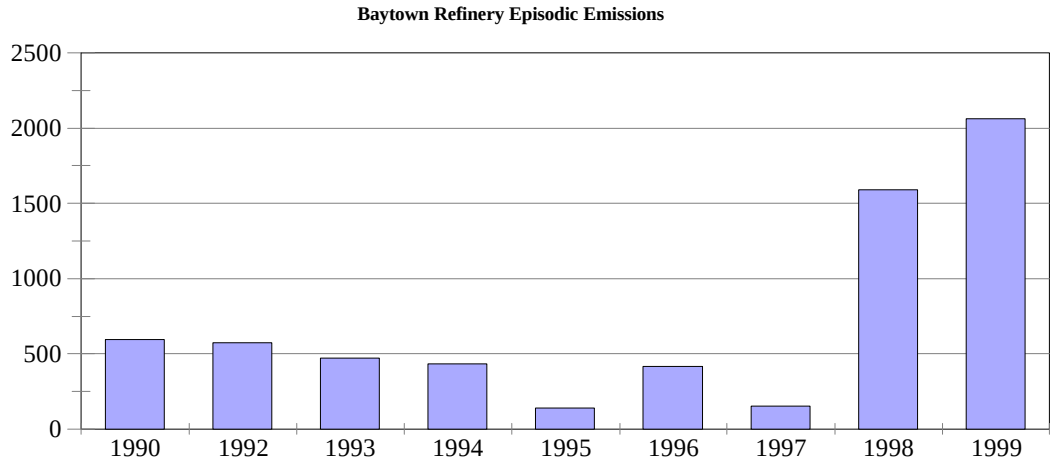
[6] TNRCC changed its upset/maintenance/startup/shutdown reporting rules in July 1997 through mid-2000 in ways that reduced reportable quantity requirements for prompt reporting of such incidents. As a result, it is possible that fewer reports were made in 1998-1999 than might otherwise be expected when comparing the incident frequency to that of year 2000. The new rules on upsets in year 2000 place more burden on industrial parties to prove that an emission problem was not a violation



The table below shows specific ExxonMobil reporting of selected pollutants for episodic upset emissions:

EPISODIC EMISSIONS (tons/year)	1990	1992	1993	1994	1995	1996	1997	1998	1999
Carbon Monoxide	17.1	0.0	323.3	166.7	23.2	90.9	71.7	863.0	1531.9
Hydrogen Sulfide	4.8	0.9	0.8	1.7	0.6	0.3	1.5	5.2	6.7
Volatile Organic Compounds	66.9	242.4	126.3	30.7	109.8	295.1	16.6	180.1	227.1
Sulfur Dioxide	499.4	301.7	10.2	211.0	4.7	7.5	61.9	534.0	294.3

As can be seen from the table, the apparent ability of ExxonMobil to limit these episodic emissions at the Baytown Refinery varies considerably from year to year (although, again, this table is not corrected to show an adjustment or apportionment to total operating time). The annual emission inventory data for 1990-1999 shows that ExxonMobil has had its worst performance as far as total upset emissions in year 1999 and second worst in 1998, primarily from carbon monoxide emissions.

3.3 Review of Episodic Emission Reports Submitted by ExxonMobil Baytown Refinery from 1996-2000

3.3.1 Introduction

Under current regulations in Texas, an emission source must make a prompt report of unauthorized emissions of air contaminants caused by upsets or unplanned events under TNRCC regulation 30 TAC §101.6 and similar events for planned maintenance, startups and shutdowns under Title 30 TAC §101.7. Such reports must be made if the emissions have exceeded, or will be expected to exceed, certain reportable quantities in a 24 hour period set forth at 30 TAC §101.1(82). The ExxonMobil Baytown Refinery must submit these prompt reports to the TNRCC District Office in Houston within 24 hours of the event.

For this review a complete file of Baytown Refinery episodic emissions reports was obtained for 1996 through 2000 from the Houston TNRCC office; other episode reports not found at the Houston office were obtained from the TNRCC-Austin file room. Because many reports submitted prior to 1998 did not contain sufficient detail to characterize the existence and magnitude of many emission events, the analysis of this report focuses on the 1998-2000 reports.

A Microsoft Visual Foxpro database was developed to track the 1998-2000 upset and planned maintenance emission episodes. All of the episode events for 1998-2000 were entered, a total of 242 excess emission events. "Upset" and "maintenance" designations were recorded in the database as they were shown by ExxonMobil on episode reports.

3.3.2 Summary Emissions Review of Prompt Emission Episode Events

The following table shows a summary of all of these events by year and pollutant emitted for prompt reports by ExxonMobil of both upset and maintenance emission episodes:

				Total Episode Emissions in Tons per Year by Year and Episode Type								
Year	**Type of Episode**	**Number of Events**	**Total Episode-Unit Hours**	**Particulate Matter**	**Carbon Monoxide**	**Total Volatile Organic Compounds**	**Sulfur Dioxide**	**Hydrogen Sulfide**	**Nitrogen Oxides**	**Benzene**	**Butadienes**	**All Pollutants**
1998	Maintenance	30	3492.5	3.1	9.0	73.4	715.6	8.1	2.6	0.02	1.71	811.8
1998	Upset	52	1897.4	0.1	326.3	125.4	457.1	5.0	0.8	0.08	0.02	914.7
Total		82	5389.9	3.2	335.3	198.8	1172.7	13.1	3.4	0.10	1.73	1726.5
1999	Maintenance	28	3355.7	1.0	247.1	5.2	104.3	0.8	0.4	0.00	0.00	358.8
1999	Upset	50	962.9	0.0	52.3	152.3	163.7	9.6	0.5	0.05	0.00	378.4
Total		78	4318.6	1.0	299.4	157.5	268.0	10.3	0.9	0.05	0.00	737.2
2000	Maintenance	22	2975.0	0.1	1.4	49.4	295.8	3.5	0.4	0.00	0.00	350.6
2000	Upset	60	3668.0	45.9	4639.9	93.4	123.4	2.5	0.3	3.16	0.00	4905.4
Total		82	6643.0	46.0	4641.3	142.8	419.2	6.0	0.7	3.16	0.00	5256.0

Several striking observations can be made from review of the table above and also from comparison to annual upet emission inventory reports.

The data indicate that ExxonMobil's upset emission performance over the interval of 1990-2000 will be the worse by far in year 2000 when comparing the reported episode incident data to 1990-1999 emission inventory upset reports. This is primarily due to the overwhelming influence of excessive carbon monoxide upset emissions in year 2000. The dramatically increasing trend in total upset emissions after 1997, based on the annual upset information in section 3.2 together with the year 2000 reported total upset emissions, doesn't indicate a performance befitting a system of continuous improvement.

The table above shows that maintenance-related episodic emission totals sometimes exceed upset-related episodic emissions totals, notably for sulfur dioxide and hydrogen sulfide in 1998. Comparisons can be made between the 1998-2000 annual emission inventory upset-related reporting for carbon monoxide, hydrogen sulfide, volatile organic compounds and sulfur dioxide reported in section 3.2 and the table above.

For carbon monoxide, total emissions from the upset episode incident reports in 1998-1999 shown in the table above are significantly below the annual carbon monoxide upset emission totals obtained from annual emission inventory reports (shown in earlier tables in this document). This means that ExxonMobil does not make upset incident reports on many smaller carbon monoxide upset incidents because they are below the reportable quantity for prompt incident reports. For example, the 1999 annual emission inventory for upsets shows a total of 1531.9 tons of carbon monoxide, whereas only 52.3 tons of carbon monoxide upsets were found on reports at the TNRCC Houston District Office. Similarly, for 1998, only 326.3 tons of emission upsets were promptly reported to TNRCC when the annual upset emission inventory shows a total of 863 tons of carbon monoxide upset emissions.

For volatile organic compounds (VOCs), prompt reports of upset emissions account for only 125.4 tons in 1998 out of a total of 180.1 tons total reported in the annual upset emission inventory. For 1999, prompt reports of VOC upsets only account for 152.3 tons of upset emissions out of a total of 227.1 tons reported on the annual emission inventory.

For sulfur dioxide, prompt reports of upset emissions account for only 457.1 tons in 1998 out of 534 tons reported in annual upset emission inventory reports. For 1999, prompt reports accounted for only 163.7 tons of upset emissions compared to a total of 294.3 tons reported for upset emissions on the annual inventory.

Conversely, more hydrogen sulfide upset emissions were reported in 1999 through prompt reports of episodic emissions than were reported in the 1999 annual upset emission inventory. This can only mean that the annual emission inventory report is not correct.

Comparing the sulfur dioxide information in the table above with the annual emission inventory report for non-upset and non-maintenance-related emissions also yeilds some striking comparisons. The data show that ExxonMobil emitted more sulfur dioxide in 1998 during combined maintenance and upset events through its flaring activities (a total of 1,173.2 tons) than it emitted from all of the emission sources at the facility during all of its usual and ordinary

operations in 1998 (a total of 1,050 tons). For 1999, ExxonMobil's Baytown emissions from from prompt reports of upsets and maintenance while running (a total of 268 tons) was a substantial fraction of (and in addition to) the total annual sulfur dioxide emissions for non-episode operating time (1,127 tons).

3.3.3 Baytown Refinery Industrial Process Summary Review of Prompt Emission Episode Event Reports

Almost all of the emission episode incidents were identified in the prompt reports by general refinery process descriptors. These descriptors were included in the database and analyzed for their impact over the entire period of 1998-2000.

The following table identifies the Baytown Refinery process groupings and provides some summary information about promptly reported episodes at each process for the period 1998-2000:

Process Descriptor	Process Name	Data For Episodes, 1998-2000		
		Number of Episodes	Total Amount of Unit-Hours of Episodes	Total Episode Pollutant Emissions (tons)
ALKY	Alkylation Unit	2	4.6	0.04
BLEND GAS SYS	Refinery Blend Gas	2	80.6	0.54
BS-4	Booster Station 4	20	2285.8	1020.07
CDCC BUILDING	CDCC Building	1	0.2	0.00
CLE	Crude Light Ends	2	13.0	5.93
CLEU	Catalytic Light Ends Unit	4	39.6	4.82
CLEU-3	Catalytic Light Ends Unit 3	16	208.0	82.04
DAU	Deasphalting Unit	2	5.5	66.72
FCCU-2	Fluidized Catalytic Cracking Unit - 2	21	280.8	79.71
FCCU-3	Fluidized Catalytic Cracking Unit - 3	28	1364.2	5319.67
FS-14	Hydrocracker 1	1	6.0	11.31
FUELS NORTH	Fuels North - North Flare System	6	2581.1	179.22
FXK	Flexicoker	14	344.6	52.81
GF-1	Gofiner 1	5	16.2	1.20
GIRBOTOL	Girbotol	1	9.0	2.02
HCU-1	Hydrocracking Conversion Unit 1	6	105.8	52.61
HDU-1	Hydrodesulfurization Unit -1	2	144.0	10.65
HF-3	Hydroformer 3	2	27.0	3.21
HF-4	Hydroformer 4	20	1035.3	180.56
HGU-1	Hydrogen Generaton Unit 1	1	1.0	0.01
HU-6	Hydrofiner Unit 6	2	6.0	6.99
KHF	Kerosene Hydrofiner	2	4.4	1.40
LEFU	Light Ends Fractionation Unit	3	7.6	18.31
LHF	Light Gas Oil Hydrofiner	2	13.3	2.81
LXU-1	Lubes Extraction Unit 1	1	0.2	0.00
OMCC	Omcc Propane Banks	2	58.5	0.47

PDU	Propane Dewaxing Unit	2	8.9	0.52
PHENOL	Unk	1	0.0	0.00
PLTGU	Pltgu	2	20.9	25.91
POWER PLANT 4	Power Plant 4	3	6.0	0.14
PS-3	Pipe Still 3	2	211.0	0.97
PS-7	Pipe Still 7	5	2722.5	8.79
PS-8	Pipe Still 8	3	276.3	89.41
SCU-2	Sulfur Conversion Unit 2	27	2647.7	319.62
TANK 1087	Tank 1087 Naphtha	1	2.0	0.35
TANK 741	Tank 741	1	2.5	9.60
TANK-1087	Tank 1087	1	0.4	0.00
TANK-858	Tank 858	1	72.0	0.00
TGCU-A	Tail Gas Cleanup Unit a	3	193.0	7.11
UNKNOWN	Unknown	2	0.0	0.12
UTILITIES	Utilities	4	103.5	132.64
WLFS	West Loop Flare System	16	1442.5	21.18
	Totals	**242**	**16351**	**7719**

The table below summarizes available episodic emissions information by process code for processes causing the release of more than 1 tons of episodic emissions in the three year period of 1998-2000. Although the processes that caused the episodes are identified, it should be understood that the episodic emissions shown will frequently not be emitted by discharge points at the process equipment that is identified. Many times, the episodic emissions are routed to flaring systems that are distinct from the process equipment that caused the episode.

The data in the table below is displayed so the processes near the top of the table have the greatest total episodic emissions:

Process Descriptor	Number of Episodes	Particulates	Carbon Monoxide	Volatile Organic Compounds	Sulfur Dioxide	Hydrogen Sulfide	Total, All Pollutants
FCCU-3	28	42.0	5255.8	0.3	20.5	0.4	5319.7
BS-4	20	0.0	1.4	81.4	926.3	10.7	1020.1
SCU-2	27	0.0	0.6	1.5	313.2	2.8	319.6
HF-4	20	0.0	8.5	13.3	155.3	1.8	180.6
FUELS NORTH	6	0.0	0.1	15.3	162.0	1.8	179.2
UTILITIES	4	0.0	2.4	103.5	24.9	1.1	132.6
PS-8	3	0.0	0.0	15.0	73.4	1.0	89.4
CLEU-3	16	0.0	0.0	67.2	11.1	3.7	82.0
FCCU-2	21	4.9	5.7	20.4	45.1	3.5	79.7
DAU	2	0.0	0.0	66.7	0.0	0.0	66.7
FXK	14	0.0	1.0	1.4	49.9	0.6	52.8
HCU-1	6	0.0	0.0	41.0	8.2	1.2	52.6
PLTGU	2	0.0	0.0	0.1	25.5	0.3	25.9
WLFS	16	0.0	0.4	16.3	2.7	0.1	21.2
LEFU	3	0.0	0.0	18.3	0.0	0.0	18.3
FS-14	1	0.0	0.0	10.4	0.0	0.1	11.3
HDU-1	2	0.0	0.0	0.0	10.6	0.0	10.6
TANK 741	1	0.0	0.0	9.6	0.0	0.0	9.6

PS-7	5	0.0	0.0	3.2	5.6	0.0	8.8
TGCU-A	3	0.0	0.0	0.0	7.1	0.0	7.1
HU-6	2	0.0	0.0	0.0	6.9	0.1	7.0
CLE	2	0.0	0.0	5.4	0.5	0.0	5.9
CLEU	4	0.0	0.0	0.1	4.6	0.0	4.8
HF-3	2	3.2	0.0	0.0	0.0	0.0	3.2
LHF	2	0.0	0.0	2.4	0.4	0.0	2.8
GIRBOTOL	1	0.0	0.0	0.0	2.0	0.0	2.0
KHF	2	0.0	0.0	0.1	1.3	0.0	1.4
GF-1	5	0.0	0.0	0.0	1.1	0.1	1.2
PS-3	2	0.0	0.1	0.0	0.8	0.1	1.0

The table shows that the Fluidized Catalytic Cracking Unit #3 causes the highest episodic emissions of carbon monoxide at the Baytown Refinery. Booster Station #4, Sulfur Conversion Unit #2 and Hydroformer Unit #4 also tend to cause high refinery emissions. Although the Utilities code shows high emissions of volatile organic compounds, this resulted from a single high impact incident that will be discussed in a subsequent section.

Booster Station #4 is the process causing the highest amount of episodic emissions of sulfur dioxide and hydrogen sulfide, followed by Sulfur Conversion Unit #2. Booster Station #4 also causes high episodic emissions of volatile organic compounds. The Catalytic Light Ends Unit #3 is also a prime contributor to volatile organic compound episodic emissions.

3.3.4 Observations Concerning ExxonMobil's Baytown Refinery Episodic Emission Reporting Practices and TNRCC Responses

Each reported episodic emission event report that ExxonMobil submitted for the Baytown Refinery for 1998-2000 was reviewed on fact issues, whether the episode was avoidable, the cause of the event, whether adequate reports were made, preventative responses by ExxonMobil and any TNRCC responses on record.

In reviewing the prompt reports of episodic emissions submitted by ExxonMobil for the Baytown Refinery, some fundamental aspects of the episode reporting system come into view. TNRCC rules have varied in their stringency over the period 1996-2000, with rules of the greatest stringency coming into effect on July 23, 2000. In general, TNRCC's response to ExxonMobil episodic emission reports became significantly more specific and detailed after that date.

The TNRCC Houston Regional Office commenced operation of a more refined database management system in March of 2000 to track all of the Baytown Refinery episodic emission events, along with other major industrial sources in the region. TNRCC air quality managers have become concerned that excess emission episodes from industrial plants in the Houston Metro area are significantly contributing to peak smog formation incidents. Thus more attention is being paid to such incidents from TNRCC-Houston in the last year.

Notwithstanding these regulatory developments, review of the individual reports still shows problems with both ExxonMobil's and TNRCC's conduct and that some longstanding problems in the handling of emission episodes continue to need attention.

One problem involves the specific substance of the reports made by ExxonMobil. Out of 82 incident reports submitted by ExxonMobil in year 2000, 35 (43%) did not show or otherwise identify specific equipment descriptors. With no reference to specific equipment descriptors (i.e. C-901 for Compressor 901) at specific process groups, it is not possible to track whether such equipment is causing repeated, unnecessary emission episodes. TNRCC's rules require that equipment causing an upset or maintenance excess emission event be specifically identified.[7]

In addition to frequent failures to report the equipment descriptor that caused an upset or other reported emission, ExxonMobil also frequently failed to identify in any way the particular point at which the episodic emission was released. Although many releases to a specific flare or flare system were identified, many other episode reports failed to identify the specific emission point. Episode information on whether an emission was released from a vent stack, a flare stack, a leak or an atmospheric discharge from an uncontrolled vent or pressure operated relief valve is highly relevant information for both emission calculation and risk assessment purposes. In addition, the epn number of the stack and the equipment descriptor for the equipment that caused the event is also highly relevant tracking information.

Sometimes some of this information can be inferred from the context by the reviewer, but the responsibility of being specific on episode reporting and avoiding reports requiring such interpretation rightly falls on ExxonMobil. For example, the reviewer should not have to guess whether an episodic release was made through a flare system vs. a direct discharge to the atmosphere. For too many of ExxonMobil's Baytown non-specific episodic emission reports the reviewer can only engage in speculation as to how the release was conveyed to the atmosphere and what caused the event.

Without some rudimentary information on how such releases take place there can be no qualitative or quantitative assessment of risk to surrounding communities. Once again, failure to specifically identify equipment involved in conveying and discharging a release to the atmosphere appears to be a violation of TNRCC rules on both upset episodes and maintenance-related excessive emission events. Such failure also potentially jeopardizes public health because it hampers the ability of regulators to make independent judgements of the risk posed to the public.

Many times a firm underlying cause of the episodic event could not be identified from ExxonMobil's reports. For example, a report might indicate that a certain compressor tripped, thus shutting down a process and causing excess emissions. But then no root cause was given for why the trip occurred in the first place. The authors could find no instance in which TNRCC brought these specific types of defective reporting to the attention of ExxonMobil with any type of enforcement action.

Another type of defective ExxonMobil reporting practice for the Baytown Refinery involves numerous failures over 1998-2000 to submit an "actual emission" report after first submitting a predictive "potential emission" report with estimated emissions. Often there will be virtual certainty that the expected episodic emissions did, in fact, occur and would involve high emissions and these should be documented with a final "actual emission" report.

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[7] 30 TAC §101.6(a)(3)(B) and 30 TAC §101(b)(2)(B)

Some ExxonMobil Baytown Refinery reporting deficiencies involve apparent inconsistencies in reporting speciated and unspeciated VOC emissions associated with flaring events. Although flaring events associated with acid gases in the sulfur conversion units will likely show relatively low levels of volatile organic compounds, large flaring events of other refinery process gases can be expected to show significant volatile organic compound content. For such large events sometimes ExxonMobil reported either speciated or unspeciated VOC emissions, but many times they did not.

In reviewing 1998-2000 Baytown Refinery episode reports, it is striking to observe the numerous occasions when the company submitted revised episode reports to show significantly lower emissions or emission rates than the first reports on a particular incident that were previously submitted. In the three year period, only a single episode report could be found for an event occurring on September 8, 1998 for which ExxonMobil's additional revised report showed higher emissions than the first report submitted.

Another striking finding is the apparent lack of attention that TNRCC pays to auditing the emission calculations ExxonMobil performs to justify its emission estimates. Out of 242 incident reports for 1998-2000 ExxonMobil submitted emission calculations to TNRCC only three times. This record indicates that TNRCC is uncritically accepting ExxonMobil's Baytown Refinery episodic emission estimates as reported at face value without review or audit for the vast majority of incidents.

The emission calculations that ExxonMobil did submit assume 98% destruction efficiency for both hydrogen sulfide and volatile organic compounds in discharges that are flared with traditional steam-assisted flaring systems. Although this assumption is a recognized industry practice that has also been incorporated into EPA regulations, available scientific evidence casts some considerable doubt on the ability of traditional open air flares to achieve such a high destruction efficiencies. For example, during field tests conducted of actual flares of gases emitted by sour crude wellhead facilities, measured flare destruction efficiencies were in the range of 82-84%.[8] A review using a model for flare combustion indicates:

> "Flaring of gases in the free atmosphere is a process routinely used in the petroleum and chemical industry for the disposal of unwanted flammable gases and vapours. It is, however, rarely successful in attainment of complete combustion because entrainment of air into the region of combustion gases restrict flame sizes to less than optimum values. These restrictions occur because the entrained air reduces hydrocarbon concentrations below values needed to support combustion.
>
> Equations which incorporate entrainment effects have been previously developed by Leahey and Schroeder for estimating flame dimensions as functions of gas exit velocity, stoichiometric mixing ratios and wind speed. These equations are used to estimate the rate of sensible heat exchange and heat radiation associated with flame behaviors for different hydrocarbons and variety of conditions related to exist gas velocity and wind speeds.

[8] Investigations of Flare Gas Emissions in Alberta, Final Report to Environment Canada, Alberta Energy and Utilities Board and Canadian Association of Petroleum Producers, M. Strosher, Environmental Technologies, Alberta Research Council, November 1996, Page 112

> Results of the calculations show that heat releases are usually much less than those which should accompany complete combustion. They [calculations] imply that actual flaring activities result in combustion efficiencies which are routinely less than 50 percent."[9]

As a result, flaring should not be viewed as an innocuous practice that will render as absolutely harmless the consequences of emission episodes.[10] At a minimum, flaring events will produce significant sulfur dioxide emissions during many such events. More likely, however, is that flaring events will not dispose of hydrogen sulfide and volatile organic compounds nearly as well as assumed in ExxonMobil emission calculations. Under more realistic assumptions, process upsets and other events that cause flaring will cause significant ambient downwind exposure to emissions of hydrogen sulfide and petroleum-related VOCs and airborne toxicants. The consequences for the Baytown environment will be increased odors and higher inhalation exposure to potentially toxic materials. The consequences for the Houston region will be increased and unacknowledged emissions of smog precursors from products of incomplete combustion and unburned petroleum hydrocarbons. As a result, it is crucially important that TNRCC assume responsibility for forcefully prodding the management of the ExxonMobil Baytown Refinery to significantly increase refinery process stability and emission control reliability to limit events leading to both flaring and atmospheric release episodes.

In the case of flaring, it is frequently possible to know the volume of gas directed to a flare or at least the change of gas volume sent to the flare during the particular episode. Such information can be input to an emission calculation model. In the case of direct discharges of acid gases and/or volatile organic compounds to the air through a pressure operated relief valve, there will be no gas meters to indicate the volume of flow. As a result, uncertainty increases in the emission estimation. No examples of calculations used by ExxonMobil for estimating emissions in such circumstances were found in the TNRCC files.

Review of the 1998 episodic emission reports shows a number of incidents where leaks in heat exchangers or failure of tank seals caused heavy emission incidents. In most of these circumstances, the cause of these episodes arose from long term deterioration processes that were most likely underway for some time. However, ExxonMobil's emission estimation on such incidents only assumes emissions from the time interval when the emission was discovered until the time it is resolved. For example, ExxonMobil determined that a tank with heptane on the floating roof at the Baytown Refinery with an uncontrolled emission rate of 7700 lbs of heptane per hour only discharged an amount equal to that rate times the interval from discovery to the time the tank was drained. In these types of reports, however, there is never an estimation of how long such a condition may have existed or information on the time and date of the last prior inspection that would have been capable of discovering such a condition.

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[9] A Theoretical Assessment of Flare Efficiencies as a Function of Gas Exit Velocity and Wind Speed by D.M. Leahey, M. B. Schroeder, M.C. Hansen, Paper presented at Flaring Technology Symposium, February 21, 1996 sponsored by Environmental Services Association of Alberta, Environment Canada and Alberta Research Council

[10] A very informative EPA enforcement alert on flaring at petroleum refineries and petrochemical plants is available at: http//es.epa.gov/oeca/ore/enfalert/vol3num9.pdf

Prior to March of 2000, numerous TNRCC "in house" inspection reports evaluating ExxonMobil Baytown episodic emission reports show that the inspector frequently wrote most of the ExxonMobil claimed facts as verbatim entries on TNRCC inspection reports with little or no evidence of further follow, inquiries to ExxonMobil, onsite inspections or other types of supervisory followup. These TNRCC staff then wrote a conclusion of "no problems noted" in their final report. Large groups of such so-called "TNRCC inspection reports" were signed on a single day, sometimes several months after the date of the Baytown emission episode in question. Our review should note that there were further significant inquiries on 2 upsets in August, 1998, an October 25, 1998 incident and a March 12, 1998 incident out of numerous episode events which were not followed up prior to March, 2000. In addition, it should also be noted that a June 1999 major inspection had a detailed discussion of episodic emission events for the very first time in all of the major inspection reports that were reviewed.

After March of 2000, the record indicates TNRCC's Houston office showed a significantly more consistent pattern of prompt followup on episodic emission events. These indications include the TNRCC staff writing detailed questions and answers on episodic emission reports and there is also more significant evidence of inquiries and followup back to ExxonMobil on their submitted episodic emission reports.

Out of 162 upset episodes and 80 maintenance episodes during 1998-2000, TNRCC issued only 13 Notices of Violation and Harris County Pollution Control issued at least 1. The Harris County agency may have issued more, but the one violation notice from that agency was the only one contained in TNRCC-Houston files on upsets. Even given the increased focus on upset emissions in the second part of year 2000, this record still justifies concern for the shear number of episodes occurring at the ExxonMobil Baytown Refinery and the relatively minimal response to these events from TNRCC.

Not all of the TNRCC episodic emission NOVs concerned the substance of the excess emission events and ExxonMobil's culpability in causing the episode; several of the TNRCC NOVs on upsets concerned the failure to submit a proper, complete and timely report of the event in question. A failure to submit a prompt and complete report means that ExxonMobil Baytown Refinery becomes vulnerable to an enforcement action as a result of the excessive emissions that may have occurred.

Finally, although the authors requested all information concerning episodic releases from the Baytown Refinery as well as all enforcement and compliance information, neither a search of records at the TNRCC Houston Office, nor a search of records in the TNRCC Austin Office, revealed a copy of any current comprehensive ExxonMobil plans and protocols for limiting emissions from startups, shutdowns and malfunctions.

3.3.5 Introductory Discussion on Criteria for Evaluating Refinery Episode Events from a Process Standpoint

For a large, complex industrial facility with a high potential for high episodic emissions, a facility such as the ExxonMobil Baytown Refinery must exercise considerable diligent attention to the design, operation and maintenance of its processes and process equipment. The best overall

philosophy to adopt is one of continuous improvement designed to avoid demonstrated problem occurring in the past based on engineering and operational review.

If a regulatory agency such as TNRCC intends to limit the impact of a large, high impact industrial source on an adjacent community, it must consistently and energetically question all reported episodic emission events and it must review each such incident in a *de novo* fashion, by raising significant questions, asking for detailed information and performing audits of the basis of a regulated party's claims as to both emissions and causes of episode incidents.

Unfortunately, the record of episodic reports and TNRCC's responses shows that both ExxonMobil and TNRCC have oftentimes failed in their respective roles to effectively deal with episodic emissions from the ExxonMobil Baytown Refinery.

The most important policy review criteria for evaluating episodic emission events are shown in the table below:

Review of Episodic Emission Events – Key Evaluation and Review Criteria to Highlight Facility Management, Event Culpability and Appropriateness of TNRCC Response
Repeated emission episode incidents from the same cause or causes
Failure to maintain process equipment leading to upset conditions
Failure to maintain operable backup equipment to reduce the length or severity of an emission episode, or conversion of backup equipment to usual and ordinary use to increase production capability
Design of critical process module does not include backup equipment
Conducting major maintenance leading to emission control outages while the balance of the facility continues to operate and generate episodic emission potential
Failure to provide manifold discharge to flare systems for pressure operated relief valves on processes having repeated overpressure incidents
Failure to test and inspect to verify process integrity
Avoidable human error in process operation leading to emission episodes
The facility failed to take measures to reduce emissions during upset and maintenance episodes, such as shutting down non-essential processes, reducing throughput or cutting the production rate
TNRCC acts to gain addititional information and/or make further inquiries beyond just receiving the ExxonMobil report
TNRCC conducts an onsite inspection or places the matter for further review at a comprehensive inspection
TNRCC issues a notice of violation

3.3.6 Discussion of Specific Refinery Emission Episodes and the Relation of Such Episodes to Process Equipment and Operational Management

All 242 of the emission episodes were reviewed to examine ExxonMobil claims about the cause of the episode and the connection between the claimed cause and refinery process equipment and any available operational information in the report. This section discusses the most significant findings from this review from a process standpoint.

ExxonMobil's unreliable carbon monoxide boilers at Fluidized Catalytic Cracker FCCU-3 are the principle cause of the company's comparitively poor performance for years 1999-2000 in the interval 1990-2000.

At FCCU-3, heavier gas-oils are reacted with a catalyst (most often aluminum oxide) in order to produce light hydrocarbons. The spent catalyst and hydrocarbon materials are first separated by steam stripping and residual coke that remains on the catalyst particles must be burnt off before the catalyst particles can be re-used. The coke particle burning produces large amounts of both particulate matter and carbon monoxide, along with toxic metals, ammonia and hydrogen cyanide. So much carbon monoxide is produced that it can be burned as a control measure and to recover its heat value. The carbon monoxide burning takes place in 3 carbon monoxide boilers that produce steam and destroy the toxic gas. Depending on the production rate in FCCU-3, 1 boiler can be down or offline and functioning as a backup and the other two can handle the coke burning effluent.

If the company operates FCCU-3 at too high of a production rate when one carbon monoxide boiler is down, or if 2 carbon monoxide boilers are down at the same time during nominal production rates, the coke burning gases will be bypassed to a stack and released uncontrolled. Under these circumstances, the uncontrolled bypass emission rate can be in the range of 2,600-7,700 lbs of carbon monoxide per hour.

The company has had repeated occurrances in which they've continued to operate the FCCU-3 unit at times when there is no backup boiler. Boilers B and C have each been primarily or secondarily implicated in 10 excess emission episodes each. Only the three worst FCCU-3 incidents in length and total emissions drew a TNRCC Notice of Violation for repeated violations caused by design, maintenance and/or operational failure. The most frequent failures involve electrical outages, tube and/or refractory failure, air blower failure, low water condition and unit to unit interactions. There is not always a clear indication in the upset reports that ExxonMobil reduced the FCCU-3 production rate during these conditions. The most significant ExxonMobil culpability is their frequent practive of running their FCCU-3 process during times when no operable carbon monoxide boiler is available as a backup unit.

Operation of FCCU units when carbon monoxide boilers are bypassed has the potential to cause very high carbon monoxide emissions and subsequent high ground-level ambient exposures to carbon monoxide. There has been no air quality modeling that considers the effect of all carbon monoxide emissions from all sources at the site plus worst case upset conditions at the FCCU. The only carbon monoxide monitor in the area is not in a location where maximum ground level carbon monoxide concentrations for FCCU upsets will occur outside the fence line during certain wind conditions.

Booster Station-4 (BS-4) is a frequent cause of heavy emissions of sulfur dioxide and volatile organic compounds from flaring events during 1998-2000. Definitive information could not be found in the TNRCC files, but the reviewer's speculation is that this unit is responsible for movement of hydrogen sulfide containing gases from process units to ethanolamine treatment units to remove hydrogen sulfide or for gas movement from the treatment sites to places where the cleaned refinery fuel gases will be burned.

Poor reliability of BS-4 compressor C-904 is responsible for repeated and preventable incidents of flaring at the Baytown Refinery. There were at least 7 such incidents involving this equipment. Unreliability at BS-4 compressor C-901 is responsible for at least 4 additional incidents. At least 5 incidents didn't properly identify the specific compressor which caused a problem. Although C-901 has a backup, which is C-902, apparently there is no backup unit for C-904.

ExxonMobil had one maintenance episode in which it conducted "planned maintenance" on BS-4 compressors while the rest of the plant continued to operate. This incident caused flaring to go on for 26 days, releasing 485 tons of sulfur dioxide, 48 tons of volatile organic compounds and 5.56 tons of hydrogen sulfide. At the time, this incident apparently drew no TNRCC enforcement interest as TNRCC issued no violation. Repeated cases of running major maintenance while the facility continued to operate caused significant maintenance-releated emission episodes. Additional installations of backup equipment out to be considered for these types of situations. Another 4 day "planned maintenance event" caused the release of 24 tons of volatile organic compounds.

The longest flaring incident at BS-4 was an upset caused by a low flow condition in a distillation unit. This flaring at a reduced rate went on for 53 days from August 30, 1998 until October 22, 1998 and released 5.3 tons of VOC, 168 tons of sulfur dioxide and 2 tons of hydrogen sulfide. TNRCC-Houston never issued any Notice of Violation on any of the incidents occurring at BS-4 during 1998-2000.

ExxonMobil had 27 episodic emission events involving sulfur conversion unit SCU-2. This is the unit where hydrogen sulfide cleaned from refinery fuel gases is converted to elemental sulfur. On only 1 of these events, which always involve significant emissions of sulfur dioxide, did ExxonMobil admit that they could cut throughput through SCU-2 by stopping the processing of sour water and temporarily storing this waste stream. No mention of this emission reduction technique is mentioned for the 26 other incidents.

One SCU-2 "planned maintenance" episode lasted 66 days and involved continual violation of the facility's air permit while a "pollution control project" was installed in one of the process units at SCU-2. There are repeated incidents of "planned maintenance" where the company burns sulfur out of catalyst beds. While sulfur in the beds can cause fires, the company never addressed any underlying design, operations or maintenance scheduling approaches to try to minimize these occurrances.

ExxonMobil frequently blames weather conditions for its problems. The company apparently operates process and electrical equipment without adequate lightning protection and hardening against lightning events in the storm-prone Houston area. ExxonMobil blames lightning for a 10 hour SCU-2 episode that released 100 tons of sulfur dioxide and 2350 lbs of hydrogen

sulfide, along with 40 lbs of carbon disulfide. Lightning was also claimed as the cause for some of the FCCU unit upsets.

Out of 27 SCU-2 episodic events, TNRCC issued Notices of Violation on only two. One NOV incident involved ExxonMobil allowing petroleum hydrocarbons to migrate into SCU-2 and the other involved improper operation of a block valve. For the SCU-2 unit, ExxonMobil is particularly deficient in reporting the specific piece of equipment that actually caused the episodic release. Out of 27 episodes, the specific equipment causing the problem was identified in only 7 cases.

Human error in the Baytown Refinery electric utilities center caused one of the largest emission episodes May 26, 1999. Fuses were removed from a electric utilities station in order to perform some electrical work, but the fuses were not replaced when the work was completed. When the refinery was put back on the electric grid, out of phase operation caused a complete power failure at the facility. During a 2.5 day period, this incident resulted in avoidable emissions of 102 tons of volatile organic compounds, 20 tons of sulfur dioxide and over 1 ton of hydrogen sulfide. No TNRCC NOV was issued for this avoidable event with massive emissions.

Of emission incidents at hydroformer-4 (HF-4), 7 were caused by either repeated unreliable operation of flare gas recovery compressor C-001 or maintenance outages at this unit. Apparently, ExxonMobil has no backup capability for this unit, which is designed to recover flare gases to the refinery fuel system. A 14 day outage at this unit from C-001 outages caused 87 tons of sulfur dioxide and 1 ton of hydrogen sulfide flaring emissions. A 15 day outage caused 65 tons of sulfur dioxide emissions and 1410 lbs of hydrogen sulfide. At HF-4 there have been 4-5 episodes of leaking hydrocarbons at heat exchangers which release uncontrolled volatile organic compounds from cooling towers.

The Catalytic Light Ends Unit-3 (CLEU-3) had 3 repeated uncontrolled volatile organic compound releases from a pressure operated relief valve discharging to the atmosphere on compressor C-74 over a 9 day period. There were no clear explanations of the underlying causes of these uncontrolled releases from ExxonMobil that would excuse such releases and there was no NOV response from TNRCC-Houston. The largest release occurred during a compressor performance test when over ten tons of volatile organic compound emissions were released in 36 minutes. The other releases were longer (165 minutes and 270 minutes), yet the claimed emissions were significantly lower (7.9 tons and 4.3 tons). This raises at least a few questions about ExxonMobil's emission estimation technique for direct releases from pressure operated release valves to the atmosphere.

Out of 14 pressure operated relief valve (PORV) incidents with discharge to the atmosphere that can be identified, 6 occurred at the CLEU-3 process. Direct releases of uncontrolled toxic and hazardous pollutants, petroleum hydrocarbons and volatile organic compounds from atmospherically vented PORVs are unnecessary, since blowdown drums and manifold systems can be designed to collect such emissions for recovery or for flaring control.

Based on review of the emission incidents from a process and operations standpoint, many other troubling incidents can be described, but available space does not allow a complete exposition. The incidents described above involve process units at the refinery where most of the problems with episodic emissions have occurred as a group. Other incidents of repeated episodes

from the same or similar causes, failure to document the episode cause, operational error, failures due to lack of either adequate or operational backup process equipment and significant maintenance operations that could be done during more frequently scheduled refinery turnarounds also show in the record.

4 Review of Recent Government Air Pollution Inspection and Enforcement Activity at the ExxonMobil Baytown Refinery

4.1 Summary Review of TNRCC Enforcement at ExxonMobil Baytown Refinery

Upon request, the TNRCC Information Resources Division can produce an up-to-date Air Compliance History Report for any Texas air discharge source. Such a report for the ExxonMobil Baytown Refinery was produced for the SEED Coalition on April 5, 2001. The report shows enforcement activity from July, 1984 to the present.

Since July 1984, TNRCC issued a total of 28 notices of violation (NOVs) involving 72 different TNRCC rules violations. These NOVs are summarized in the table below:

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Notices of Violation	2	1	4	0	1	1	6	0	2	0	0	0	1	0	2	2	5	1
No. of Rules	2	1	5	0	2	13	12	0	8	0	0	0	7	0	4	5	12	1

Out of 27 notices of violation resolved between July, 1984 to the present, only 8 NOVs were resolved by a total of 6 legally enforceable consent orders. The rest of the NOVs were resolved "informally" with no penalty and no legally enforceable order. The consent orders are summarized in the table below:

NOV Date	Order Date	Days from NOV to Order	Penalties Under Order
10/19/89	06/22/90	323	$10,750
02/14/90 & 02/22/90	10/25/91	457	$6,750
08/27/90	02'21'92	662	$5,400
12/04/92	09/05/95	1063	$39,000
07/31/96	11/19/98	771	$0
02/10/00	01/05/01	330	$2,500
Total TNRCC Penalties Against ExxonMobil Baytown Refinery, 1984-present			**$64,000**

For a large, complex source with this number of NOVs, $64,000 of penalties in about 16 years of operation is a very low amount. Note also the long time required to negotiate orders from the time of an NOV to the time of the entry of an order. Such long times can be caused by either regulated party resistance or lack of diligent attention by the regulatory agency.

In summary, the record shows that TNRCC has chosen to resolve most notices of violation against the ExxonMobil Baytown Refinery through informal means without entry of an immediately enforceable order and without the payment of penalties. Where orders have been adopted and penalties paid, the amount of the penalties has been minimal and such penalties will not have a deterrent effect on further violations and will not have the effect of removing the economic benefits of source non-compliance.

4.2 Case Review of TNRCC Air Inspection and Enforcement Activities Concerning the ExxonMobil Baytown Refinery, 1996 to Present

During review of the TNRCC Houston files, numerous inspection reports were found. However, the vast majority of these are not reports written to document an onsite inspection. They are evaluation reports written in reaction to reports submitted by ExxonMobil. Such "in house" evaluation/inspection reports will not be evaluated or mentioned in this section unless they have a bearing on further TNRCC enforcement activity. In addition, tank inspections will be discussed elsewhere in this report. This section will focus on major inspection reports reflecting onsite inspections by TNRCC Houston inspectors, subsequent notices of violation and the resolution of such notices in the time period of January 1, 1996 to present.

4.2.1 The 1996 TNRCC Major Inspection and the Flare Testing Enforcement Action

On March 28 and 29, 1996, TNRCC-Houston engineer Eugene L. Dobesh performed a comprehensive State Implementation Plan inspection at the Baytown Refinery. The 1996 inspection report found that ExxonMobil was in compliance with all TNRCC rules except for a problem with Federal New Source Performance Standards covering closed vent systems and control devices on 14 different refinery processes at the site.[11] In general this regulation requires affected units to test flare control devices for minimum BTU content of flare gases and gas exit velocities to ensure that the flaring systems perform at certain minimums in the destruction of regulated pollutants.

> "Based on this inspection and information received from an investigator from the Environmental Protection Agency (EPA), Ms. Minerva DeLeon, it has been determined that the company did not perform the required testing of 16 of affected flares as required by the EPA's Standards of Performance for New Stationary Sources."[12]

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[11] NSPS Subpart GGG and VV provisions found at 40 CFR §60.592(a) and 40 CFR 60.482-10(d)

[12] March 28, 1996 TNRCC Inspection Report on Baytown Refinery, Page 4.

In addition, TNRCC's Dobesh also articulated "two areas of concern" both related to the ExxonMobil Methyl Tertiary-Butyl Ether (MTBE) plant. The first area of concern dealt with potential applicability of Synthetic Organic Chemical Manufacuring Industry (SOCMI) standards to the MTBE plant for vapor destruction, monitoring, recordkeeping, etc. The second area of concern dealt with the matter of whether construction of the MTBE plant triggered applicability of Federal New Source Performance Standards for Petroleum Refinery Wastewater Systems at 40 CFR Subpart QQQ to "downstream" parts of the ExxonMobil Baytown Refinery wastewater treatment system.

In a April 25, 1996 letter to TNRCC, ExxonMobil denied that downstream units would become subject to NSPS Subpart QQQ because ExxonMobil provided offsetting emission reductions to keep the addition from being considered as a "modification." A subsequent December 30, 1996 letter from EPA Region 6 requested by TNRCC agreed that NSPS Subpart QQQ would not apply based on a re-interpretation of EPA's Subpart QQQ rules. The letter also stated that the facility was subject to certain SOCMI requirements but that an ExxonMobil proposed alternative approach to monitoring and recordkeeping under this standard would allow it to comply.

As a result of the March 1996 major inspection and because of information from an EPA inspection, TNRCC issued a Notice of Violation to ExxonMobil on July 31, 1996 because of its failure to perform required testing on 16 of its 17 flares. On August 15, 1996, ExxonMobil responded claiming that they previously didn't think any of their flares were subject to the NSPS standard. They indicated they re-examined their position again claiming that 12 of the flare were not subject to the standard, but that 4 of the flares (out of 16 in the NOV) should be tested under the standard and they would have a schedule in 30 days. The letter acknowledged that they had a difference of opinion with TNRCC on the matter. On September 16, 1996, ExxonMobil responded by claiming only 3 stacks were subject to the NSPS standard and that they proposed emission testing only after downtimes for each stack in September 1997, January 1998 and July 1999.

On November 22, 1996, ExxonMobil notified TNRCC about heating value and velocity tests on the 3 stacks with mention that they intended to deviate from the EPA test methods published in the regulations and that if they could deviate from such methods they could do the three tests in January 1997. On December 31, 1996, ExxonMobil sent a letter to TNRCC memorializing a meeting in which TNRCC and ExxonMobil agreed that 8 flares would be tested and the other flares would be regarded as safety backup devices that were not subject to EPA standards. A January 29, 1997 letter indicated that 9 of the original 16 flare stacks were proposed for testing with a deviation from the test method because ExxonMobil didn't have the required sample testing ports installed in their flare stacks.

Another letter written by ExxonMobil on January 29, 1997 references flare testing results and also mentions a November 15, 1996 inspection report which the authors did not find in the TNRCC files. There is an ExxonMobil admission in the file that they could not account for a "vapor tightness certification" for 11 barges which loaded benzene in 1995.

After the January,1997 correspondence with TNRCC, EPA apparently took the enforcement lead on the July, 1996 TNRCC NOV because correspondence continued between EPA and ExxonMobil with TNRCC then supporting Exxon's position in an April 18, 1997 letter

from Bruce K. Benton, P.E., TNRCC Houston Office to Peter Goerdel of EPA Region 6. After reviewing and approving test protocols, testing of 9 flares was conducted in early November, 1997. One flare failed to pass a test for gas heating value to ensure combustion and was subsequently retested.

However, the matter came back in front of TNRCC with a formal enforcement conference to discuss the results of the flare testing on January 13, 1998 concerning the original July, 1996 NOV. Because of the non-compliance noted, the TNRCC Houston office referred the matter to the TNRCC headquarters enforcement screening committee on February 20, 1998. However, the TNRCC screening committee responded on June 9, 1998 by indicating that a formal enforcement action may not be appropriate since EPA took back the enforcement lead on February 11, 1998, filed in Federal District Court and that a settlement is pending. On June 9, 1998, TNRCC concluded its enforcement action on the flare matter pending the EPA action. No TNRCC penalties were assessed.

On March 16, 1998, TNRCC sent a new Notice of Violation concerning the failure of Flare Stack 19 to pass the BTU content requirement of the Federal New Sources Performance Standard. On May 4, 1998, ExxonMobil discussed plans in a letter to TNRCC to guarantee the heating value of gas sent to the flare by using natural gas supplementation.

4.2.2 The 1997 TNRCC Inspection, Flexicoker Furnace Testing and Benzene Waste Spill

On May 29, 1997, TNRCC's Muhammad Arshad, Environmental Investigator, conducted a major inspection of the Baytown Refinery. No new violations were found, but there is extensive reference to the ongoing enforcement action from 1996 on which EPA was then the apparent lead enforcement agency. There were several requests for supplemental information on a number of refinery process areas, but the file does not indicate that any of these submittals resulted in a Notice of Violation.

An August 21, 1997 stack test review memorandum discussed a review commenced on August 4, 1997 of a stack test conducted in October 1996 of Boiler Flexicoker unit 301. The memo indicated that the furnace violated its particulate emission limitation in the 1996 test, however the data exposition of the memo indicated that it was actually the permit NOX limit that was violated. However, the memo also indicated that the company did a retest which showed compliance on April 30, 1997. No Notice of Violation appears to have been issued. In this case it appears that the delay in review by TNRCC of the stack test report appears to have allowed ExxonMobil to escape such a notice.

On August 5, 1997 at an unknown time, ExxonMobil spilled 4500 barrels of gasoline into its refinery wastewater collection sewer as a result of an upset at the Light Oil Treaters (LOT) unit. At the time of the incident, the company claimed only 1000 barrels were spilled and that there was a maximum of 2,200 lbs of volatile organic emissions. On November 17, 1997, ExxonMobil wrote TNRCC seeking to be exempted from more stringent provisions of EPA's National Emission Standards for Hazardous Air Pollutants for Benzene Waste Operations as a result of the 87 lbs of benzene introduced into their wastewater system with the rest of the gasoline. A January 29, 1998 TNRCC Engineering Services Team memorandum rejected

Exxon's interpretation saying that the company would be subject to the more stringent provisions of that rule.

4.2.3 The 1998 TNRCC Major Segment Inspections, Benzene Waste Enforcement and Continuous Monitor Requirements

On March 18-31, 1998, 3 TNRCC investigators conducted a three segment investigation with three different reports concerning the Baytown Refinery. The segments inspected in the three reports included oil movement areas, docks and petroleum liquid storage and loading, fuels north control-hydrodesulfurization, utilities and misc. fired sources. The three segment inspection found the facility to be in compliance with its state and federal requirements except for certain pending matters previously discussed and with other exceptions noted subsequently. The report mentioned that one matter dealing with degassing of petroleum storage tanks was pending as TNRCC Engineering Services had not yet made an applicability determination. The report indicated that the company's handling of its large gasoline/benzene spill to its wastewater sewers was improperly handled in violation of TNRCC rules and that the company failed to maintain documentation showing that Vent D-107 was exempt from certain exemption limits and control requirements.

On June 10, 1998, TNRCC issued a Notice of Violation for the matters found in the 1998 major inspection. On November 21, 1998, TNRCC declared the violation resolved with some submittals from ExxonMobil concerning both spill prevention for the Light Oil Treating unit and documentation for the D-107 vent emissions. No penalties or agreed order resulted.

As a result of the 1998 major inspections, TNRCC inspectors revisited a decision made in 1995 that ExxonMobil was exempt from certain continuous emission monitoring requirements for NOX and carbon monoxide for three waste heat boilers on site. This time, TNRCC decided that such monitoring was required for the units. However, they did not issue a notice of violation for ExxonMobil's failure to have such monitoring units in place. Instead, TNRCC and the company reached an informal agreement through exchange of correspondence to require an expedited schedule for the installation of the continuous emission monitors.

4.2.4 TNRCC Inspections in 1999 and the Beginnings of Episodic Emission Incident Enforcement for Avoidable Emissions

A July 7, 1999 inspection report indicates that a Notice of Violation was issued to ExxonMobil on June 22, 1998 for violations at Gas Turbine 45/Waste Heat Boiler 75. However this NOV could not be located at the TNRCC Houston or Austin offices. This violation involved a continuous emission monitoring system on this equipment. A subsequent test that was required to be performed by May 31, 1999 shows that ExxonMobil's continuous monitor at this site failed its relative accuracy test. On July 8, 1999, TNRCC certified as valid a retest of the CEM that passed its relative accuracy test.

In early 1999, TNRCC and ExxonMobil corresponded extensively concerning a March 12, 1998 incident involving a sulfur dioxide and hydrogen sulfide release from the refinery's sulfur conversion unit. TNRCC-Houston took exception to the incident which the company claimed

was caused by infiltration of petroleum hydrocarbons into the sulfur recovery unit. In October, 1998, the Houston office sought an opinion from the TNRCC Enforcement Division on whether the incident was actionable. However it took Enforcement Division at TNRCC-Austin until June 16, 1999 to finally make a determination that a March 12, 1998 upset incident at the Baytown Refinery was reasonably avoidable.

On May 17-20, 1999, TNRCC staff conducted another major inspection of the Baytown Refinery. The inspection report was published on June 28, 1999 and for the first time this "SIP" inspection report is significantly improved for the reader with a table of contents and significantly improved organizational table format. This inspection focused on the Fuels East Control Center, which included a number of important major refinery processes.

On July 26, 1999, TNRCC Houston issued a Notice of Violation to ExxonMobil based on the 1999 inspection and avoidable upset incidents on March 12, 1998 and April 5, 1999. ExxonMobil was also alleged to violate federal requirements when it tested its Caustic Oxidation Unit incinerator when it was not operating at its representative operating capacity for the process and under normal operating conditions. ExxonMobil responded by claiming that TNRCC's position that human error is avoidable is a "recent" development on the April 5, 1999 incident caused by "inadvertent" activation of a motor operated valve that closed thus causing isolation and overpressurization of a drum at the refinery. ExxonMobil denied the "reasonably avoidable" claim on the March 12, 1998 incident, denying the claim that its operational practices caused the upset; ExxonMobil also agreed to retest the incinerator at an appropriate operating rate. On March 24, 2000, TNRCC accepted all of Exxon's submittals and concluded the enforcement action without a penalty and/or agreed order.

On October 15, 1999, TNRCC-Houston conducted a brief on-site inspection to gather any available information concerning episodic releases that may have occurred from September 28 through October 7, 1999. The motivation for the inspection effort was to determine if any such releases may have played a role in ozone exceedances in the Houston area in early October. Two small releases of VOC were noted.

4.2.5 TNRCC's Gives ExxonMobil Prior Knowledge About a Pending Major Inspection in Year 2000

Perhaps the most unintentionally striking letter found in the enforcement file is one written by T. Victoria Wang, P.E., Engineering Team Leader at TNRCC-Houston. On December 2, 1999, Ms. Wang wrote to Exxon:

> "This is to advise you that your company is scheduled for a comprehensive compliance inspection by the Texas Natural Resource Conservation Commission (TNRCC) Houston Region Office during this fiscal year. This inspection is to evaluate compliance of your facility with applicable air quality requirements.....Our investigator will contact you to schedule specific inspection date(s) up to 14 days prior to the on-site inspection."
>
> "We will also contact you to request information be submitted to this office for our review prior to the inspection, so that the inspection can be conducted more smoothly and efficiently."

In other words, **TNRCC admits that its major inspection effort of the year 2000 will not be an unannounced inspection and that ExxonMobil will apparently have advanced notice of some of the areas in which TNRCC staff are expressing an interest in reviewing during the inspection**.

4.2.6 Year 2000 Enforcement on Excessive Carbon Monoxide Emissions from Compressor Engines at ExxonMobil Hydroformer 3 Process

On February 10, 2000, TNRCC sent a "Notice of Enforcement for Conference" to ExxonMobil concerning the results of a stack test conducted on engines C3A and C3B at Exxon's Hydrofiner 3. The notice concerned the very high carbon monoxide emissions from these two units, for which ExxonMobil reported carbon monoxide emissions of 2,277 tons and 645 tons, respectively, in 1999. The company knew the engines were high emission units from previous stack tests conducted in 1994, but allowed their operation to continue after a new rule effective date of November 15, 1999. The company subsequently shut down the engines in mid-December. This NOV was not resolved, however, until entry of a TNRCC agreed order on December 20, 2000, which contained a $2,500 penalty. This is the only penalty that ExxonMobil was required to pay to TNRCC during the entire period of this enforcement review from January, 1996 to the present (there were penalties paid to EPA; see the next section).

4.2.7 Year 2000 TNRCC Enforcement on ExxonMobil Baytown Odors, Upsets and Benzene Waste Operations

On February 8, 2000, ExxonMobil was issued a violation notice by the Harris County Pollution Control Division for violation of air pollution odor rules. On February 21, 2000, the company responded and denied the allegation that they were the cause of the odor problems observed by Harris County staff. No further information was available from TNRCC files on this incident.

On April 14, 2000, ExxonMobil had an upset at the Fluidized Catalytic Cracking Unit #2 as a result of operator error. This was further investigated by TNRCC on June 9, 2000 and found by the agency to be "reasonably avoidable." TNRCC staff indicated that the incident would be reflected in a future combined NOV.

On May 15, 24, 25, and 30, 2000, TNRCC did its major, previously announced inspection of the Baytown Refinery for year 2000. The inspection and subsequent activities resulted in an August 23, 2000 Notice of Violation for 5 different rule violations. TNRCC found that three upset incidents on December 8, 1999, February 4, 2000 and April 14, 2000 caused by operator and human error were reasonably avoidable and thus violations of TNRCC rules. TNRCC found that ExxonMobil did not conduct stack tests on 13 different refinery heaters and boilers using EPA approved stack testing methodologies when these were required to demonstrate compliance with applicable emission limitations. Finally, TNRCC found that ExxonMobil violated federal and state requirements on the control of benzene waste operations and emissions by attempting to consider the plant exempt from certain benzene hazardous air pollutant control requirements when the facility was not entitled to such an exemption.

On September 22, 2000, ExxonMobil submitted its response to the August 23, 2000 NOV. ExxonMobil proposed various procedural and minor responses to the avoidable upset charges and a re-test of the furnaces with EPA approved methods. On the benzene issue, ExxonMobil admitted:

> "During 1999, a valve on a line between Life Station 265 (LS-265) and Lift Station 239 (LS-239) was inadvertently left open, which resulted in 3.4 Mg of organic benzene waste (less than 10% water) from LS-265 being mixed with wastewater in LS-239. This resulted [in] a benzene quantity in uncontrolled wastewater streams of 6.8 Mg during 1999. Which exceeded the limit by 0.8 Mg. We have estimated that the excess benzene emissions to the atmosphere that resulted was 30 pounds."

ExxonMobil's response was to close the referenced valve to prevent a recurrence, but the company did not indicate exactly how it was going to comply with the National Emissions Standard for Hazardous Air Pollutants for Benzene Waste Operations for year 2000.

On January 16, 2001, TNRCC determined that ExxonMobil's response to the August 23, 2000 NOV was adequate and the matter was terminated with no agreed order and/or penalty.

On September 1, 2000, TNRCC issued a Notice of Violation to ExxonMobil concerning five upsets at Tower T-500 (March 15, 200), Gofiner-1 (April 14, 2000), Catalytic Light Ends Unit-3 (April 23, 2000), Cooling Tower E-407/Hydrofiner-4 (May 2, 2000) and Fuels North South Flare Unit (May 14, 2000). Four of these violations involved failure to follow reporting procedures on the timeliness or completeness of reports. The Gofiner-1 episode was determined to be reasonably avoidable. No response from ExxonMobil and no TNRCC resolution of this matter was found in the TNRCC-Houston file. However, it does not appear that this matter resulted in an agreed order and/or penalty assessment from review of the Enforcement History Report.

On September 11, 2000, TNRCC conducted an "Upset-Maintenance Level 1" investigation involving upset incidents on August 28, 2000 and September 6, 2000 at Hydrocracking-1 and the Fluidized Catalytic Cracker Unit 3, respectively. On November 10, 2000, TNRCC issued a Notice of Violation concerning the August 28, 2000 Hydrocracking -1 upset. On December 7, 2000, TNRCC issued a Notice of Violation concerning the September 6, 2000 incident at FCCU-3, plus two other similar incidents at FCCU-3 on October 1, 2000 and October 11-26, 2000. TNRCC found that the FCCU-3 upsets were part of a "...recurring pattern indicative of inadequate design, operations or maintenance," and thus were not exempted from being considered as violations. The FCCU-3 incidents were also violations of the permitted carbon monoxide limitations.

On January 25, 2001, TNRCC closed the November 10, 2000 NOV after receiving information from ExxonMobil. On January 26, 2001, TNRCC indicated that additional information must be submitted in regard to the FCCU-3 NOV of December 7, 2000. At this writing, this latter NOV is still ongoing and unresolved.

On December 14, 2000, the Harris County Pollution Control Division issued a violation notice to ExxonMobil for an upset incident with the Sulfur Conversion Unit-2 which was caused by operator error. The resulting 15,000 lbs of sulfur dioxide emissions in 20 minutes caused a

permit exceedance according to the notice. This matter was not completely documented in TNRCC files and may still be open at this writing.

Finally, a recent TNRCC Information Division printout indicates that TNRCC issued a Notice of Violation on March 30, 2001. This NOV again concerns upsets and high carbon monoxide emissions occurring at FCCU-3 from February 23 to March 5, 2001.

4.3 Case Review of U.S. Environmental Protection Agency Region 6 Air Inspection and Enforcement Activities Concerning the ExxonMobil Baytown Refinery

The authors executed Federal Freedom of Information Act requests concerning EPA air inspection and enforcement activities at both EPA Region 6 and EPA HQ Office of Air and Radiation. At this writing, only EPA Region 6 responded with disclosure so we are unable to provide details concerning any enforcement-related activities at EPA Headquarters or the EPA National Enforcement Investigations Center.

In the period from 1996 to the present, EPA Region 6 conducted only a single unannouced inspection at the ExxonMobil Baytown Refinery on April 1-10, 1996.

The EPA Region 6 inspection found that ExxonMobil had not tested 17 flares for gas BTU content and tip velocity as required under EPA New Source Performance Standards and this was the most important finding of the inspection. The EPA inspector shared this information with TNRCC staff who were expected to issue a Notice of Violation concerning this finding. The EPA inspection also expressed concern about compliance with Synthetic Organic Chemical Manufacturing Industry standards for the Methyl Tertiary Butyl Ether plant that was recently constructed. Also mentioned was the issue of Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems. No NOV was issued by EPA on these latter two points and TNRCC followed up making inquiries on these matters.

The 1996 EPA inspection also found problems with ExxonMobil's compliance with National Emission Standards for Hazardous Air Pollutants for Benzene Transfer Operations. According to the EPA inspection:

> "(1) Records indicated that the facility loaded the vessels without having certification of vapor tight test and, (2) records indicate that some vessels had never acquired certification or there were no certification records available. (3) Records also indicated that some certification tests were not conducted within a 12 month period and because of that [the company] failed to monitor or acquire any other information that would have demonstrated compliance [in regard to benzene transfer regulation]. This was also a concern since failure to comply with BB is also failure to comply with the TNRCC latest Board Order issued for 1995 and the board order 92-02 which required the company to comply with Subpart BB." (Inspection at p. 9)

The records disclosed by EPA Region 6 do not indicate that EPA issued a Notice of Violation to ExxonMobil on the benzene transfer operation matter, although the record indicates that ExxonMobil made additional submittals to EPA Region 6 which may have resolved the matter.

For a substantial period of time EPA left the enforcement lead on the flare matter to TNRCC. However, after a subsequent flare test at the Baytown Refinery showed one of the flares to be out of compliance with EPA regulations, and after the matter remain unresolved by TNRCC, EPA referred the matter to the U.S. Dept. of Justice. On February 11, 1998, a Civil Action was filed in the United States District Court for the Southern District of Texas.

The Federal Civil Action against ExxonMobil indicated the company was in violation of the flare testing requirement, requirements for Synthetic Organic Chemical Manufacturing Industry units and hazardous air pollutant controls on benzene waste operations and benzene transfer operations.

The EPA/ExxonMobil litigation was settled with the filing of a joint stipulation and order of dismissal on November 19, 1998. This settlement contained a $250,000 penalty to be paid by Exxon. There were no other substantial provisions of the settlement because, by the time it was filed, ExxonMobil had brought the facility into compliance even as it had denied the EPA allegations contained in the Civil Action filed by the Dept. of Justice.

On December 28, 1999, the EPA Region 6 Preparedness and Prevention Team in the CERLCA program sent an inquiry to ExxonMobil concerning an incident which occurred on October 19-23, 1999. This incident involved off-specification caustic used for wet gas scrubbing in the fluidized catalytic cracking units. The off-spec material was releasing sulfur odors. ExxonMobil indicated it released 1,442 lbs per day of hydrogen sulfide for the duration of this incident. There is no record of any CERCLA enforcement contained in EPA Region 6 air files on this incident.

On March 14, 2000, EPA Headquarters Air and Radiation Division sent a request to ExxonMobil under Section 114 of the Clean Air Act (CAA) for information concerning the Baytown Refinery. ExxonMobil submitted information in response in several segments.

Subsequently, on January 19, 2001, EPA Region 6 sent a Federal Notice of Violation to ExxonMobil based on the company's reply to the CAA Section 114 letter. The Notice of Violation indicated that ExxonMobil failed to get required Prevention of Significant Deterioration permits for modifications it made to the Fluidized Catalytic Cracking Unit-3.

In October 1988, ExxonMobil added capability for oxygen enrichment up to 25.7 percent oxygen in its combustion air to the catalyst regeneration process equipment in the FCCU-3 unit. In October 1989, ExxonMobil modified this unit by replacing air blowers in the unit with two new ones in such a way as to increase the combustion air capacity of the FCCU catalyst refeneration portion of the FCCU process. Because these modifications increased the production capability and potential to emit for this equipment, EPA Region 6 indicated that ExxonMobil should have obtained a Prevention of Significant Deterioration permit and have in place Best Available Control Technology before construction could commence on such modifications. ExxonMobil did not obtain such a PSD permit.

This EPA Notice of Violation is ongoing and ExxonMobil is presently considered to be in violation of the Federal Clean Air Act.

4.4 ExxonMobil Baytown Refinery Activities Under the Texas Audit Privilege and Environmental Immunity Statute

Records requested during this review included publicly available material filed pursuant to the Texas Audit Privilege and Environmental Immunity Statute. Under this statute, Notices of Audit and Disclosures of Violation made to TNRCC must be made public. TNRCC disclosed "Notice of Environmental Audit" documents filed on June 23, 1995, May 31, 1996, October 4, 1996 and April 29, 1997. Each of the audits were focused on a specific area and lasted about 6 months. The 1995 and the 1997 notices stated that the primary focus was on air requirements.

No ExxonMobile "Disclosures of Violation" were produced by TNRCC and TNRCC legal counsel indicated that no such Disclosures were filed by ExxonMobil under the statute.

4.5 Review of Compliance Reports

While conducting file reviews at TNRCC offices in Houston and Austin, the author reviewed all available ExxonMobil compliance reports filed by the company for periods from January 1, 1996 until December 31, 2000. The periodic reports that ExxonMobil files on the Baytown Refinery includes those listed in the table below:

Periodic Compliance Reports and Notices Typically Filed by ExxonMobil on the Baytown Refinery at the TNRCC Houston District Office
HON Periodic Report on Loading Racks 3 and 22, Naptha Fractionation Unit, Grp 1 Storage Tanks
Quarterly Report on NESHPA Benzene Incinerators
NESHAP Benzene Waste Operations Quarterly Reports, NESHAP Subpart FF
Benzene NESHAP Subpart V Semiannual LDSAR Report
Subpart VV NSPS Equipment Leaks of VOC Reports
Fuel Sulfur Content Gas Turbine and Gas Turbine Electric Generators
MTBE NSPS QQQ Inspection Reports
HON Subpart H Semiannual Report
Benzene Leak NESHAP Monitoring Semiannual Report
MTBE NSPS Subpart NNN Report
CEM Report of Hydrogen Sulfide Concentration in Fuel Gases
Annual Report under SB 1126
Sulfur Conversion Unit 2 CMS Subpart J Report
CEM Report of Steam Injection for NOX Control on GTG-45
HON Performance Testing Notification, Loading Racks 3 and 22
HON Notification of Compliance Status Reports, Group 1 Tanks, Loading Racks 2 and 22
NOX CMS Report for CLEU 2-F
CEM Report for Hydrogen Sulfide Concentrations in Fuels Gases
Subpart Kb Tank Annual Inspection Results
RMACT and Permit 1384 Inspection Notifications
HON Notification of Compliance Status Report Update
CEM report of Hydrogen Sulfide Concentration in Flexicoker Blend Gas
Refinery MACT 1 Semi-Annual Periodic Report
NSPS Db Semi-Annual Report
NOX RACT Control Plan Semi-Annual report

With few exceptions, nearly all of the compliance reports reviewed showed substantial compliance and the reports had very little content on which objections could be raised. Because of resource limitations, no effort was made to review all of the underlying regulations to ensure that all required elements of the reports were completed.

Of particular interest were reports that examine the hydrogen sulfide content of refinery fuel gases and other types of fuel gases that are used in heaters, boilers and turbines. In general, facilities generally do not draw enforcement attention from EPA for non-compliance with regulations limiting the hydrogen sulfide content in such gases until emission standard violations generally exceed about 5% of operating time. The vast majority of the reports submitted by ExxonMobil for the time frame in question showed excessive hydrogen sulfide excursions in fuel gas less than 2-3% of operating time.

Some objectionable items were found in the compliance report review. These are detailed in the table below:

Objectionable Items Found While Reviewing ExxonMobil Compliance Reports for January, 1996 to December, 2000
CEM report for January 1, 1996 to June 30, 1996 for hydrogen sulfide content of gas used in Turbines 38, 45 and 301 and Boilers 6, 7 and FXK showed the Continuous Emission Analyzer was off-line 50% of the time.
CEM report for January 1, 1998 to March 31, 1998 for NOX analyzer for F-3 furnace at CLEU-2 shows CEM wasdown for monitor equipment malfunctions 75% of operating time
Carbon monoxide CEM on PS-8 Furnace F-801 reports downtime of 5.75% for January 1, 2000 to June 30, 2000.
A MTBE distillation vent Subpart NNN report for January 1, 1996 to June 30, 1996 shows 7 incidents of control device outages when uncombusted volatile organic compounds were released, but the report provides no information about the length of the release, the amounts of the releases, what corrective measures were taken and measures to prevent recurrances.
Several leak detection and repair (LDAR) reports were reviewed. Some units appear to have elevated rates of leaks detected significantly above 2% for valves during LDAR activities, such as CLE, CLEU-1, CLEU-2, CLEU-3, LEFU, NWTF, and SWTF. Some units don't necessarily appear to be getting lower rates or showing a pattern of continuous improvement over the time period 1996 to present. A quantitative review was not done on the issue, so no such analysis is presented here because of resource limitations. ExxonMobil is showing that most leaks are promptly repaired.

4.6 Tank Inspections

There are at least 636 petroleum feedstock, intermediate, product and waste flow tanks of widely varying sizes that are distinguishable from permit records at the ExxonMobil Baytown Refinery site. A significant number of these tanks in certain types of service are subject to certain inspection and reporting requirements depending on the type and service of the tank.

The inspections are carried out and reported on by ExxonMobil personnel. TNRCC and EPA officials are given notice of these inspections in case they wish to attend these events. The vast majority of the large number of tank inspection records examined at the TNRCC office for 1996 to 2000 showed no significant or reportable problems. The exceptions are noted in the table below:

Failed Tank Inspections at ExxonMobil Baytown Refinery, 1996-2000		
Tank #	**Date**	**Remarks**
810	07/25/1996	Secondary seal out of compliance
1089	05/03/1998	Visible product on floating roof. 3 holes within 1 foot apart; secondary seal has holes, tears or defects.
345	03/08/1999	Excessive secondary seal gap; primary seal has holes, tears or defects.
861	07/23/1999	Defects in external floating roof; holes found in roof plate on south side
1089	10/29/1999	Liquid present on roof deck; hole was found in the roof deck in the NE quadrant
1096	11/29/1999	Liquid present on roof deck
37	03/03/2000	Excessive secondary seal gap; holes, tears or defects in secondary seal
856	05/09/2000	Holes found in roof deck; oil/oil stains on roof deck; sand, grit and debris on roof; areas of heavy corrosion
1088	05/11/2000	Primary seal has holes, tears or defects; oil/ oil stains on roof
841	06/08/2000	Primary seal has holes, tears or defects; heavy corrosion noted; heavy pitting in back of foam dam
796	10/17/2000	Secondary seal has holes, tears or defects
818	10/16/2000	Primary seal has holes, tears or defects; primary seal has 12 inch tear at western quadrant
905	10/24/2000	Liquid present on roof surface; oil/oil stains on roof (1-2 bbls of oil) and rainwater

5 Selected Air Discharge Permit Issues

5.1 ExxonMobil's "Flexible" Air Discharge Permit Granted by TNRCC

In April, 1999, ExxonMobil applied to TNRCC's rules for a "state flexible air permit" under TNRCC rules adopted in 1994 and amended in 2000. ExxonMobil claimed in its application:

> "Because there are no increases in emissions above current authorizations, public notice [on the flexible permit application] is not required."

ExxonMobil's flexible permit application was subsequently granted and then amended again November 3, 2000. Under TNRCC rules, an industrial discharger such as ExxonMobil can use TNRCC's flexible permitting rules to force the rescission of individual source-specific numerical emission limitations and control technology requirements on most of its individual stack emission sources and process discharge points.

With issuance of the ExxonMobil flexible permit, individual process/stack-specific limitations and control technology requirements that previously bound ExxonMobil were replaced with an overall total emission cap or "bubble" limiting total emissions from most of the Baytown Refinery sources collectively. In the process of setting up the ExxonMobil flexible permit, all of the formerly "grandfathered" sources that were not under any kind of permit were brought into the flexible permit bubble.

Industry argues such permitting approaches with the justification that it allows them to achieve emission reductions at the lowest possible cost by over-controlling some sources and under-controlling others, some of which they may choose to shut down in a few years.

However, TNRCC rules and permits like the ExxonMobil flexible permit are oversold as achieving emission reductions as can be seen from the information below. Under the ExxonMobil flexible permit, the following numbers of emission sources were incorporated into pollutant-specific "bubble" emission limitations:

Pollutant Bubble	**Number of Sources in Bubble**
Nitrogen Oxides	172
Carbon Monoxide	175
Sulfur Dioxide	173
Particulate Matter	162
Volatile Organic Compounds	866
Benzene	122
Hydrogen Sulfide	24

Under the ExxonMobil flexible permit, there is a tremendous disincentive against TNRCC doing an independent verification audit of compliance with plant-wide "bubble" emission limitations. With a normal permit TNRCC inspectors can just examine emissions at a single stack with a single emission limitation through review of records, monitoring reports or stack test results in order to verify compliance on any emission limitations that may exist. However with the ExxonMobil Baytown Refinery flexible permit, the process of doing a independent TNRCC compliance verification for air enforcement purposes is turned into an unrealistically and daunting task. For example, in order to enforce the ExxonMobil Baytown Refinery plant-wide sulfur dioxide pound per hour emission cap/limitation, a TNRCC inspector must determine, verify and document the hourly sulfur dioxide emission rate at 173 different sources in order to compare it to the plant-wide limit.

The ExxonMobil flexible permit essentially creates an incentive not to achieve the highest level of emission control when process units are operating at less than 100% capacity since

calculation of plant-wide mass rate emission limitations are based, in part, on 100% capacity operation at many of the sources.

Although all of ExxonMobil's "grandfathered" sources were brought into the limits of the flexible permit, the grandfathered unit's nitrogen oxide emissions were permitted in the initial emission cap at an emission rate factor used in the 1997 emission inventory at a maximum firing rate. This emission rate factor is not considered to reflect best available control technology or reasonably available control technology for nitrogen oxide emissions. As a result, the allowable emissions for the next several years is relatively high. Although the largest furnaces and boilers must install continuous nitrogen oxide emission monitors, many other sources came into the flexible permit with only calculated emissions and no real physical determinations of emissions based on monitoring and/or stack tests.

For other pollutants and sources, the contributions of such sources to the overall emission caps were also frequently derived from emission calculations using factors that could be wrong, were never verified by monitoring and/or stack tests and which mitigated for high permissible emissions. The table below shows the flexible permit emission limitations along with selected annual emission inventory information:

Pollutant	**Dates**	**Total Emission Cap**	
		lb/hour	**tons/year**
Flexible Permit Nitrogen Oxide Limits	until 12/31/2002	5324.05	21507.50
	until 12/31/2003	5027.77	20223.05
	until 12/31/2004	4731.48	18938.61
	until 12/31/2005	4138.91	16369.71
	until 12/31/2006	3398.20	13158.59
	until 12/31/2006	2361.20	8663.03
Actual NOX Emissions	1990		10,767
	1999		7,771
Flexible Permit Carbon Monoxide Limits	until 12/31/2006	3184.30	11440.06
	after 12/31/2006	3184.30	11401.90
Actual CO Emissions, 1990	1990		4,687
	1999		4,991
Flexible Permit Sulfur Dioxide Limits	until 12/31/2006	3611.70	13140.77
	after 12/31/2006	3611.70	13136.88
Actual SO2 Emissions	1990		1,038
	1999		1,127
Flexible Permit Particulate Limits	Initial cap within 6 months	441.10	1499.74
	Final cap	441.10	1499.74
Actual Particulate Emissions	1990		722
	1999		971
Flexible Permit Volatile Organic Compound Limits	Initial cap within 6 months	7429.92	7032.77
	Final cap	5944.18	6102.08
Actual Volatile Organic Compound Emissions	1990		7,997
	1999		3,657

Flexible Permit Benzene Limits	Initial cap within 6 months	73.30	42.5
	Final cap	72.90	41.1
Flexible Permit Hydrogen Sulfide Limits	Initial cap within 6 months	6.0	9.53
	Final cap	6.0	9.53

When flexible permit "bubble" emission limitations for NOX, CO, SO2, PM and VOCs are compared to the annual emissions the company reported in 1999 for the entire plant,[13] the flexible permit limits frequently far exceed the emission control performance from recent past emission inventories reflecting emission control performance that has already been achieved. **In essence, ExxonMobil operating under its TNRCC-issued Baytown Refinery flexible permit is sort of like getting a license to drive 150 MPH on Interstate 10.** Under TNRCC's flexible permit scheme in the absence of any other countervailing measure, ExxonMobil can potentially relax emission control performance over currently achieved emission control performance because of the high bubble limits that the flexible permit contains.

With nitrogen oxide emissions, there are some countervailing influences. TNRCC's NOX RACT rule has mandated a first level of nitrogen oxide controls that must be reflected in average control technology performance at a level roughly equivalent to providing low NOX burners on many of the units subject to the rule. However, even though aspects of NOX RACT should be in place now, the Exxon Mobil Baytown Refinery flexible permit was still not structured to show grandfathered units with a NOX RACT level of permissible emissions as they contributed to plant-wide bubble emission totals when the flexible permit was granted. Those units came in with 1997 emission inventory factors.

Phase II of the NOX RACT rule will require as much as 90% emission reductions from many of the fuel burning units at the ExxonMobil Baytown Refinery. Even with the bubble permit, this average level of performance will still ultimately be required as a plant-wide average in the mid to late 2000 decade (although these rules must still survive potential challenges). This second level of NOX control will probably require selective catalytic reduction or selective non-catalytic reduction in addition to low NOX burners on many of the heater and boiler units at the ExxonMobil Baytown Refinery, notwithstanding the presence of the bubble permit.

Although flexible permits were "sold" on the basis of potential nitrogen oxide control reductions that might be achieved, a review of the initial and final caps for the other pollutants shows nonetheless that very little emission control progress will be achieved using "flexible" permits in the early years of implementation. At the same time, the practical enforceability of emission limitations other than NOX that were also reorganized as bubble limits will also have been reduced with the advent of these plant-wide "bubble" limits. There are no other countervailing rules on the horizon for pollutants other than NOX.

Because ExxonMobil is free to move emissions around its complex from one stack to another under its flexible permit, the flexibility afforded to ExxonMobil at the Baytown Refinery

[13] The ExxonMobil Baytown Refiney sulfur conversion unit (SCU-2) is not included in the flexible permit but its emissions are included in the annual inventory information shown in this table.

has the potential to create "hot spots, " particularly with volatile organic compound and sulfur dioxide emissions. "Hot spots" are stack locations and subsequent surrounding receptor sites of high emissions of toxic and hazardous air pollutants and high ambient community impacts. The effect of a "hot spot" is that refinery neighbors may be exposed to deleterious effects from such unplanned high ambient community impacts if they live, work or play close to such high emitting refinery process units.

Emission "flexibility" arising from flexible permits may also have repercussions for impermissible but poorly characterized significant deterioration of air quality as defined by EPA regulations since nothing in the flexible permit requires air quality demonstrations for all potential operational and emission configurations that the flexible permit affords. For example, ExxonMobil's Baytown Refinery flexible permit potentially allows the company to shift emissions from less toxic volatile organic compounds emitted from higher stacks to more toxic organic compounds emitted from lower stacks; this type of shift will always increase ambient impacts and airborne toxicant risks. Since there is no required comprehensive air toxics review of these issues and comprehensive, enforceable standards to control these impacts in Texas, toxic hot spots have the potential to be a serious but unreviewed and unacknowledged problem.

Finally, many past permitting decisions were essentially inherent in the previous source-specific permitted emission limitations that previously existed in the ExxonMobil Baytown Refinery. These included source-specific technology determinations that were reflected in emission limitations and other federally enforceable emission requirements that were assumed for netting calculations in permitting decisions. The destruction of these source-specific and permit-specific determinations of federally enforceable emission limitations may have impermissibly undermined the effect of such past decisions with the issuance of the flexible permit. In addition, the form of flexible permitting employed in the ExxonMobil Baytown Refinery flexible permit may be incompatible with federal requirements to ensure that contemporaneous emission decreases used in future permitting decisions are, in fact, federally enforceable as required by the Clean Air Act and EPA regulations.

5.2 ExxonMobil May Have Commenced Projects that Triggered Required Prevention of Significant Deterioration (PSD) Review at their FCCU-3 Carbon Monoxide Boilers Without First Obtaining a Required PSD Permit and Performing Required Technology and Impact Reviews

Information in the TNRCC files indicates that substantial investments were made in at least one (or more) of the carbon monoxide boilers at the FCCU-3 unit at the ExxonMobil Baytown Refinery. There was extensive work done on boiler refractory, boiler tubes and control systems. Some of the boiler tube replacements may not have been "like-kind" replacements because of differing metallurgy used. Although ExxonMobil investments in the carbon monoxide boilers at the Baytown Refinery FCCU-3 units to increase reliability are laudable, it is also possible that this work triggered requirements for Prevention of Significant Deterioration (PSD) major modification review. Major improvements and renovations that are not routine maintenance and that increase the reliability of process equipment have the potential to trigger required PSD review. It is not necessary, for example, that such equipment actually increases the potential hourly emissions rate of the units in question. All that is necessary is to increase annual emissions above the PSD thresholds merely by increased unit utilization. There appears to be no evidence that ExxonMobil

obtained a PSD permit prior to commencing construction on the FCCU-3 carbon monoxide boiler projects.

EPA has very clearly indicated that federal PSD reviews must countenance that an increase in utilization or capacity is a factor for determination of whether significance levels are exceeded from an increase in emissions, even when short term actual emission rates stay the same or decline:

> "Moreover, virtually any major capital improvement project at an existing source is designed in part to increase efficiency of production, and this will in turn almost always have the collateral effect of reducing emissions per unit of production, even though it may provide an economic incentive to increase total production, with the net result that actual emissions of air pollution to the atmosphere could increase significantly. There is nothing in the statutory terms or structure or in EPA's regulations which suggests that such major changes should be accorded exempt status under the NSR program. To the contrary, major capital investments in industrial equipment, where they could result in an increase in emissions, appear to be precisely the type of change at an existing source that Congress intended should be subject to PSD and nonattainment area NSR permitting. See Prevention of Significant Deterioration and Nonattainment New Source Review; Proposed Rule, 61 Fed. Reg. 38250, 38262 (July 23, 1996) ("NSR Reform" proposed rulemaking). See also Puerto Rican Cement Co. v. EPA, 889 F.2d 292, 297-98 (1 st Cir. 1989) (modification of emissions unit that decreases emissions per unit of output, but may result in sufficient production increase such that actual emissions will increase, is subject to PSD). Conversely, nonroutine and otherwise nonexcluded changes of any type, regardless of whether they are projects such as the Dense Pack intended to increase production efficiency, or even the complete replacement of an entire industrial plant, are excluded from PSD coverage so long as they do not result in significant emissions increases. See infra note 4."

> "The argument that only changes that increase a unit's emissions rate can trigger the NSR modification provisions has been rejected by two courts of appeals. As noted, see supra note 1, in Puerto Rican Cement, the First Circuit rejected a claim that modifications to a cement kiln, which made production more efficient and decreased the hourly emissions rate but could increase the plant's utilization rate, such that actual emissions to the atmosphere might increase, were exempt from PSD. The company argued that the project fell under the PSD regulatory exclusion for changes that result in an "increase in the hours of operation or in the production rate." See 889 F.2d at 298. Similarly, in WEPCO, where the company was making "like-kind" replacements of components to restore the original design capacity of the plant, there was no increase in emissions per unit of output; rather, for PSD purposes, the emissions increase was attributable to increased utilization. The Seventh Circuit rejected the company's reliance on the exclusion for increased hours of operation/rates of production. See 893 F.2d at 916 n. 11."[14]

A more detailed review of the ExxonMobil Baytown Refinery FCCU-3 carbon monoxide boiler matter should be undertaken by both government and citizen clean air enforcement entities.

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[14] U.S. EPA determination concerning NSR applicability for the Detroit Edison Monroe Power Plant, May 2000, footnotes #1 and #9 (available at http://www.epa.gov/ttn/nsr)

5.3 TNRCC Gives Air Discharge Permits to Current Clean Air Violators Like ExxonMobil Baytown Refinery

At the present time, ExxonMobil is considered to be in violation of the Clean Air Act because of an outstanding Notice of Violation issued by U.S. EPA. In addition, the TNRCC enforcement tracking system indicates an unresolved Notice of Violation was also issued by TNRCC in late March, 2001.

However, the record also indicates that TNRCC is about to issue an air discharge construction permit for a major modification to the ExxonMobil Baytown Refinery in order to install process equipment to produce desulfurized gasoline. As worthy a project as that is for reducing vehicle emissions of VOC and NOX, the question must still be asked as to why TNRCC is issuing a construction air discharge permit to the ExxonMobil Baytown Refinery when current EPA and TNRCC Notices of Violation remain unresolved. Construction permit issuance at a time that a source is in violation undermines effective enforcement.

5.4 Several Minor Source Permits for ExxonMobil Baytown Refinery Justifies Need for Further Review to Determine Whether TNRCC/ExxonMobil Engaged in "Sham Permitting"

A comprehensive review of all previous ExxonMobil permitting actions was not done during this review. However, the TNRCC permitting review tracking database shows that TNRCC issued a number of permits for specific smaller process groups over the last 2-3 years.

When an emission source goes through several minor source permitting actions over a relatively short time, such situations should be reviewed to determine if "sham permitting" has taken place.

With "sham permitting," a source cuts up a major project into a succession of small pieces each of which may be smaller than the threshold that triggers major modification review under the Clean Air Act. Sources sometimes use "sham permitting"[15] in order to escape public participation requirements and important control technology and impact reviews that occur in new source review of major modifications under the Clean Air Act.

In the case of the ExxonMobil Baytown Refinery, an additional complication arises in reviews to determine whether "sham permitting" has taken place because the Refinery, the Chemical Plant and the Olefins Plant are all considered to be a single major stationary source under federal permitting regulations. Additional background information about common techniques for illegally evading Clean Air Act New Source Review requirements is available in an EPA "Enforcement Alert."[16]

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[15] A more complete description of a couple of different types of "sham permitting" is available in an EPA interpretive memo at: http://www.epa.gov/rgytgrnj/programs/artd/air/nsr/nsrmemos/maplwood.pdf

[16] http://es.epa.gov/oeca/ore/enfalert/psd.pdf

5.5 Pending ExxonMobil Baytown Refinery Air Permit Applications

At the present time, ExxonMobil has two active permit applications on file with the TNRCC. One involves modification to a delayed coker process and this application was submitted on March 2, 2001. Another permit application for an unknown process was submitted on April 3, 2001. Both of these applications offer potential opportunities for public review and involvement. In addition, ExxonMobil has applied to TNRCC for a Clean Air Act Title V operating permit for the Baytown Refinery.

If members of the public wish to be informed about pending permit decisions at the Baytown Refinery or the other units at the Baytown site, it is important to write to the TNRCC head clerk and ask to be put on a mailing list for permit notices and public participation packages for all three units at the complex[17]. This is the only way to be assured that notice will be given. In addition, it is important also to be aware of the public comment deadline to file comments ask for hearings and other aspects of the permit decision administrative process.

5.6 TNRCC Public Participation Rules for Air Permits Violate Federal Requirements and Act to Discourage Public Involvement in Air Permitting Decisions

Unfortunately, many aspects of TNRCC's public notice and public participation procedures presently violate EPA regulations for public participation and some aspects of TNRCC public involvement processes are quite hostile to public participation, notwithstanding general statements of policy by TNRCC commissioners and staff.

EPA regulations for state programs to issue Prevention of Significant Deterioration (PSD) permits for major stationary sources or major modifications require that states hold a public hearing with at least a 30 day public comment period and a mandatory public hearing with 30 days of prior notice.[18] In Texas, TNRCC doesn't issue the public notices; the industrial applicant is required to issue the public notice and this is the first aspect that violates EPA rules those rules require public notice actions by the state air pollution agency. TNRCC has adopted EPA PSD permit regulations but explicitly left out adoption of the EPA public participation sections of the federal rules at 40 CFR §52.21(q).

In Texas, TNRCC rules put the burden of requesting a public meeting concerning a PSD permit on citizens rather than comply with the mandatory public hearing requirement of Federal clean air regulations. <u>But the situation is actually much more of a burden than it first appears.</u>

The first burden is finding out the deadline for public comment. The comment deadline is not explicitly contained in the public notice published by the industrial applicant, so it is easy to

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[17] Write to Chief Clerk's Office (MC 105), TNRCC, PO Box 13087, Austin, TX 78711-3087 (512)239-3300; 239-3311 (fax) and ask to be put on the mailing list to receive public notices and public participation packages for air permits at the ExxonMobil Baytown Refinery, ExxonMobil Chemical plant and the ExxonMobil Olefins plant, all at Baytown, TX.

[18] 40 CFR §51.166(a)(5); 40 CFR §51.166(q); 40 CFR §51.161

miss. No web site or paper notices published by TNRCC show the deadline for public comment. In order to find out the deadline for public comment, a member of the public must track down the permit engineer or find a TNRCC public involvement official with access to the permit computer system which will eventually have the comment period deadline entered after the permit applicant notifies TNRCC when they actually published the public notice – remember that the timing of the public notice publication is solely in the hands of the industrial applicant.

Next comes an enormous quadruple burden for a citizen interested in influencing an air permit decision. First, if a citizen wants a public meeting on a proposed permit, the citizen can submit the request to the TNRCC prior to the public comment deadline. If a public meeting is granted, then the public comment period is automatically extended to the public meeting which means one has additional time to submit comments. However, the TNRCC is under no obligation to grant a public meeting and the TNRCC Director has broad discretion. If there is a significant degree of public interest then the TNRCC Director must hold a public meeting, but this is a judgement call which is not defined explicitly.[19] The Director may deny a request for a public meeting as it is in his discretion and judgement to do so. If the interested citizen was planning on submitting comments at the public meeting which is subsequently denied, you will not have necessarily prepared detailed comments because of anticipation of the public meeting which is not held.

If this is not enough, just submitting public comments is not enough to reserve an interested citizen's right to appeal or otherwise challenge the permit. In general, 40 CFR 124.19 and 40 CFR §166(q) guarantees the right of administrative appeal of PSD permits in other states merely by submitting comments or speaking at a public hearing, but not in Texas. In Texas, to proceed with contested administrative appeals, the interested citizen must submit a formal request for a contested hearing under TNRCC rules <u>before the end of the public comment period.</u>

But it gets even worse. Federal Clean Air PSD Permitting regulations binding on state programs require the state agency to make a final decision to issue or deny a permit after hearing all public comments and taking testimony at a mandatory public hearing[20] – but apparently not in Texas. TNRCC rules require that an interested citizen file their request for a contested hearing process <u>before even knowing whether TNRCC will issue or deny the permit, before knowing the final form of the permit that TNRCC will issue after taking public comment and before having TNRCC's responsiveness summary to public comments.</u>

Aside from violating federal air permitting regulations, this type of procedure violates fundamental constitutional due process rights of a citizen commentor as a petitioner of government process since the citizen commentor has no idea of what the TNRCC's final findings of fact and conclusions of law will be in a final statement of basis on its permit decision before having to formally challenge a permit action with a contested appeal.

But even that is not the end of the hostile barriers raised by TNRCC to effective public participation in permitting decisions. A citizen and/or organization wishing to start a contested

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[19] See 30 TAC §55.25(b)(2)

[20] See 40 CFR §166(q)(2)(vi)

case hearing because a PSD air permit was illegally issued must pass a literal gauntlet of "standing" rules before such a contested hearing will be accepted. A person must show a "justiciable interest affected by the application" and must show:

> "the requestor's location and distance relative to the activity that is the subject of the application and how and why the requestor believes he or she will be affected by the activity in a manner not common to members of the general public."[21]

This kind of standing rule is probably going to rule out standing for the PTA mother in North Houston with an asthmatic daughter concerned about regional ozone and VOC and NOX precursor emissions at the ExxonMobil Baytown Refinery. Other standing rules at 30 TAC §55.23 can prevent organizations from getting standing. But if the PTA mother and a local community group somehow get through the standing demonstration, 30 TAC §55.27 gives several potential excuses for the TNRCC not to grant a contested hearing.

This Texas process should be contrast with the process at 40 CFR 124.19 for contested appeals. Under this federally required process, the mere filing of comments during a public comment period on a proposed PSD permit and/or speaking at a public hearing entitles the participant to bring a contested appeal to the EPA Environmental Appeals Board on any issue raised by any commentor in the public comment period or hearing after the permit granting agency makes a final decision as long as such appeal is filed within 30 days.

The entire citizen-hostile Texas PSD permitting process is an artifact of undue industrial influence over TNRCC rulemaking decisions coupled with a failure of EPA Region 6 to vigorously uphold the required citizen participation procedures of the Clean Air Act. It will probably take federal court litigation against EPA and TNRCC to overturn this situation and gain a disapproval and revision of the Texas permitting procedures. This reviewer is unaware of any other state PSD air permitting program with onerous and citizen-hostile provisions of the nature of those found in Texas.

A few of the same problems also exist in the Texas Title V operating permit program. As objectionable as the PSD process is, the operating permit approval process has an even more offensive element. Under 30 TAC §122.320(m), meetings for public input on proposed operating permits are governed by the following provision:

> "(m) The applicant, in cooperation with the executive director, may hold a public meeting in the county in which the site is located or proposed to be located."

So here it is the industrial party seeking the proposed permit that holds the public meeting for the purpose of seeking comment! For other objectionable aspects of the Texas operating permit program, see a recent petition to U.S. EPA seeking to disapprove major parts of the program.[22]

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[21] See 30 TAC §55.21(d)(2)

[22] http://www.titlev.org/Petitions/Texas%20Title%20V%20Comments.PDF

6 Community and Environmental Aspects of the Area Surrounding the Baytown Refinery

6.1 The Baytown Area Shares Many Characteristics of Typical Texas and Louisiana Refinery Communities

The SEED Coalition is concerned about the impact of refinery operations on neighboring residents. Across Texas and Louisiana, many of the largest petroleum refineries and petrochemical processing operations are located in or near communities of poverty and color. Although residents in these communities often recognize the deleterious effects of refinery emissions on neighborhood residents, they often feel powerless to do anything about such problems for a wide variety of reasons. Many refinery neighbors give up complaining to both refinery operators and regulatory agencies because they see these parties as un-responsive or non-responsive to their concerns.

TNRCC's failure to carry out effective public notice and participation procedures for air permits, and the TNRCC rules which are designed to frustrate public involvement on permitting actions, can both only exacerbate these public concerns about un-responsive industrial neighbors and environmental agencies.

The Baytown area around the refinery complex fits the profile for a refinery community of color and poverty typical for refinery neighbors. According to a demographic review obtained from U.S. EPA's Sector Facility Indexing Project, the area in a 3 mile radius of Baytown has the following demographic characteristics:

Demographic Characteristics of 3-Mile Radius Area from ExxonMobil Baytown Refinery – Poverty, Racial and Ethnic Characteristics	
Percent Racial and Ethnic Minority Population	45%
White	25,962
African-American	5,232
Hispanic-Origin	12,471
Other Race	7,702
Households in area	13465
Housing units in area	15127
Households on public assistance	935
Persons below poverty line	7306
Children 5 years and less	4,314
Minors 17 years and younger	12,577
Adults 18 years and older	26,646
Seniors 65 years and older	3,859
Households less than $15,000	3,699
Households $15,000-$25,000	2,591
Households $25,000-$50,000	4,667
Households $50,000-$75,000	1,706
Households greater than $75,000	4,314

6.2 Close-in Neighborhoods to the Baytown Refinery Complex

In some neighborhoods immediately adjacent to ExxonMobil and Exxon Chemical fence lines it appears that the company has been purchasing properties in subdivisions that abut company property lines. Many former house sites now display ExxonMobil "no trespassing" signs. However, this type of property acquisition can be expected to have destabilizing effects on community vitality and cohesiveness for citizens remaining in their homes in such neighborhoods.

Some of these property acquisitions may be motivated by safety concerns about potential fires and emissions from tanks and process units that are not too distant from property lines. The company may also be pursuing a course of property acquisition with a view to future regulations under the Clean Air Act on residual risk determinations. At some point, facilities like the ExxonMobil Baytown Refinery will be required to do risk assessments for lifetime cancer risk from exposure to airborne cancer-causing chemical agents emitted at such facilities. There may also be future rules limiting residual risks after the application of technology-based emission limitations on hazardous air pollutants.

If a greater distance to human receptors can be assumed in such risk analysis, the company may be able to demonstrate more dispersion of airborne carcinogens and lower predicted ambient concentrations with reductions in the amount of predicted lifetime cancer risks for the community.. In such a circumstance, extending company fencelines or possibly reducing population densities may end up being a substitute in the mind of the company for increased amounts of required risk-based emission control of chemical carcinogen emissions. This is not an approach that citizen groups, refinery neighbors and public health organizations would endorse. Such groups would rather see residual risks controlled with even more stringent emission control technologies. However, it is not entirely inconceivable that refinery risk assessors could countenance such an approach.

At this writing, we are aware of no comprehensive or cumulative risk assessments for airborne cancer-causing chemical exposures that have been done for the area around the Baytown Refinery. In addition, ExxonMobil does not appear to have addressed any other issues of persistent and bioaccumulative toxic substances that may be discharged by the refinery, such as the potential for emissions of mercury from any inputs of this toxicant present in refinery crude. Some crude oil is known to contain elemental mercury, mercury sulfides and chlorides and mercury organo-metallic compounds. Regeneration of catalytic reforming catalysts and some refinery combustion processes may also conceivably cause the formation of persistent and biolaccumulative chlorinated dibenzo-dioxin compounds. If mercury and PCDD/PCDF compounds are emitted at the ExxonMobil Baytown Refinery, non-inhalation risks associated with deposition of these materials to the Houston Ship Canal and Galveston Bay should be evaluated.

6.3 Sensitive Receptors in the Area Around the Baytown Refinery

As part of its obligations under the federal Comprehensive Environmental Response, Compensation , and Liability Act of 1980, ExxonMobil has compiled a list of sensitive receptors around its facility. These are indicated in the table below:

Sensitive Populations Located Within a One Mile Radius of the ExxonMobil Baytown Refinery	
NC Foote Park	2,800 ft South
Bergeron Basketball Court	2,800 ft South
St. Joseph's Parochial School	3,200 ft South
San Jacinto Elementary School	2,800 ft Southeast
Unidad Park	100 ft Southeast
Busch Terrace Park	1,400 ft Southeast
Baytown Nursing Home	2,800 ft East
Carver Jones Elementary School	6,300 ft Southeast
Robert E. Lee High School	3,500 ft Southeast
Bay Coast Medical Center	3,500 ft East
Jessie Lee Pumphrey Elementary School	4,900 ft North
Alternative Learning Center	5,280 ft West
San Jacinto Methodist Hospital	7,000 ft Northeast
St. James House of Baytown	8,400 ft Northwest
Central Heights Basketball Court	1,400 ft Southeast
San Jacinto Methodist Hospital, Decker Campus	4,900 ft East
Sensitive Ecosystems Located Within a One Mile Radius of the ExxonMobil Baytown Refinery	
Alexander Island	1,400 ft Southwest

Some pollutants known to be emitted by the ExxonMobil Baytown Refinery, such as sulfur dioxide and total reduced sulfur, are known pulmonary irritants. Human exposure to these pollutants may exacerbate asthma, bronchitis and other acute and chronic respiratory diseases in respiratory disease patients. Episodic high emission events for these pollutants will be a particular concern for the sensitive receptor sites identified above.

Existing health-related National Ambient Air Quality Standards do not adequately control or limit respiratory health risks from human exposure to sulfur dioxide and no such legally enforceable standards exist for human exposure to total reduced sulfur compounds.

6.4 Offsite Consequence Analysis Information from ExxonMobil's Risk Management Plans for the ExxonMobil Baytown Complex

Under specific provisions of the Clean Air Act,[23] ExxonMobil must file Risk Management Plans covering all three of their facilities at Baytown, TX – ExxonMobil Baytown Refinery, ExxonMobil Chemicals and ExxonMobil Olefins. One part of these Risk Management Plans is the Offsite Consequences Analysis for toxic releases and facility accidents.

[23] 42 USC §112(r)

The following content was provided in an April 27, 2001 memorandum by the Working Group on Community Right-to-Know[24] after one of their officers visited the EPA reading room for RMP information. In the past, Offsite Consequence Analysis information was provided on the EPA web site and was easily available. However, a recent Act of Congress sought by the American Chemistry Council and the Department of Justice now limits availability of this information to certain reading rooms and other locations. The Working Group's content concerning the 3 ExxonMobil units at the Baytown Complex and ExxonMobil's Offsite Consequence Analysis information follows in the remainder of this subsection:

> "ExxonMobil Baytown Refinery has more than 40 processes that store altogether over 160,000,000 lbs of flammable chemicals. ExxonMobil's own Risk Management Plan shows that a worst-case FLAMMABLE release would be a vapor cloud explosion involving 11,000,000 lbs of pentane. The explosion and fire would be strong enough to break windows and burn exposed skin 1.8 miles away. Some 7,300 people live within this "vulnerability zone" of 1.8 miles from the ExxonMobil Refinery, and more would be in this zone at schools, recreation areas, or other industrial sites.
>
> Five fires in the past five years have each caused over $50,000 damage on-site. One of these fires caused over $1,000,000 damage on-site. ExxonMobil Refinery has reported over 250 chemical spills or mishaps to the National Response Center in the past five years (since January 1, 1996) and over 450 events since January 1, 1990. ExxonMobil Refinery reported releasing 1,680,000 lbs of toxic chemicals to the environment in 1999 under the U.S. EPA Toxics Release Inventory.
>
> ExxonMobil Chemical Baytown Plant has some two-dozen processes that hold altogether over 21,000,000 pounds of flammable chemicals, and over 750,000 lbs of toxic chemicals. ExxonMobil Chemicals Risk Management Plan shows that a worst-case TOXIC chemical release would be a spill and vaporization of 90,000 pounds of liquid bromine. By ExxonMobil's own report, some 50,000 people live within 4.7 miles of the plant, within the "vulnerability zone" for potential serious harm or death from the resulting toxic cloud of bromine.
>
> Other persons would be harmed within this radius of 4.7 miles at schools, hospitals, prisons, recreation areas, and other industrial sites. The Exxon Chemical plant has reported at least 50 spills or mishaps to the National Response Center in the past five years, and over 120 events since January 1, 1990. ExxonMobil Chemical reported releasing 3,626,000 lbs of toxic chemicals to the environment in 1999 under EPA's Toxics Release Inventory.
>
> ExxonMobil Chemical Baytown Olefins Plant has only a couple of major processes. By the company ís own Risk Management Plan report, a worst case FLAMMABLE release would be a vapor cloud explosion of 11,675,000 lbs of a flammable mixture. The resulting explosion and fire would be strong enough to break windows and burn exposed skin within 1.8 miles. Some 14,200 people live within this distance of 1.8 miles. More people would

[24] Working Group on Community Right-to-Know, Paul Orum, 218 D Street, SE; Washington, DC 20003 (202)544-9586; (202)546-2461 (fax); paul_orum@yahoo.com

be present at schools, recreation areas, and other industrial sites. ExxonMobil Olefins plant has reported 14 spills or mishaps to the National Response Center in the past five years, and some 21 events since January 1, 1990. ExxonMobil Olefins plant reported releasing 259,000 lbs of toxic chemicals to the environment in 1999 under the EPA Toxics Release Inventory.

6.5 Community Air Quality and Meteorological Monitoring Sites

There are only three air quality monitoring sites in the immediate vicinity of the ExxonMobil Baytown Refinery.

The Houston Regional Monitoring Network operates site C-607 near Baker and Decker Rd., a location which is about 2 miles north-northwest of the approximate center of Baytown Refinery production process groups. Near real time and historical air quality information is available at a TNRCC web site.[25] Unfortunately, the internet site offers no annual summaries or compilations of data. Also available in real time at C-607 is meteorological data, which can be useful when severe air pollution and odors are detected and documentation is needed on wind directions and speeds. An additional meteorological site is available at site C-148 for met data only. This is a little farther from the Baytown process equipment and is located west of the C-607 site.

C-607 has monitoring for ozone and nitrogen oxides. Ozone is a regional pollutant which is not directly emitted by the Baytown Refinery. Although the Baytown refinery is a large source of nitrogen oxides, there is only an annual average National Ambient Air Quality health standard for exposure to nitrogen dioxide. There is no short term, one hour standard. C-607 apparently also monitors carbon monoxide, which is emitted by the Baytown Refinery, however TNRCC's web site doesn't indicate this capability. This monitoring site is located too far away from this facility to detect the maximum carbon monoxide concentrations that might occur closer to the Baytown Refinery's principle process equipment.

Although, TNRCC's web site doesn't indicate this capability, the website picture of C-607 clearly shows particulate samplers for PM-10 and total suspended particulate matter. It is not known whether these monitors are presently being operated at that location.

ExxonMobil operates two sulfur dioxide air quality monitoring stations located generally at fenceline locations adjacent to the Baytown Refinery. The air quality data from these stations is not generally or easily available to the public. TNRCC occasionally requests printouts of the data during refinery emission episodes. One monitor is cited as the "Goose Creek" location and the other monitor is known as the "Corral Gate" location. ExxonMobil is subject to a requirement to limit fence-line concentrations of sulfur dioxide.[26] Fenceline locations are not necessarily the location where the highest ambient concentrations of sulfur dioxide will occur; determination of

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[25] http://www.tnrcc.state.tx.us/cgi-bin/monops/site_photo?607

[26] The exact citation of this requirement was not located for this review, but other anecdotal information suggests the ambient limit is 0.32 ppm, half hour average.

that location requires referral to detailed air quality modeling studies which are usually not available to deal with high episodic emissions of sulfur dioxide.

During upset incidents, the Industrial Hygiene Department of ExxonMobil will occasionally do informal surveys of hydrogen sulfide concentrations downwind of sources. No comprehensive or detailed information is available on such ad hoc monitoring in public TNRCC files.

The author could locate no other air quality monitoring efforts undertaken around the ExxonMobil Baytown Refinery. There is no information available on ambient airborne concentrations of toxic, carcinogenic or hazardous air pollutants around the Baytown Refinery.