Appendix 9c-H:

Calculations of Potential VOC and NO_x Reductions - Tables & Explanations

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Potential Houston/Galveston (HGA) Mobile Source Emission Reductions

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Please note that all projections were made using a high-level analysis of potential emission reductions available from a control strategy and applying it to the Houston/Galveston emissions inventory. This estimation is performed for the purpose of giving the reader an idea of the order of magnitude of reductions available from a control strategy only, not to commit to a particular emissions number or budget. Actual emission reductions can only be determined by development of a rule proposal, and a detailed analysis of the exact emission points that rule will apply to. This caveat applies to all source categories. These numbers are subject to further refinement at the discretion of the state.

Non-Road Mobile Sources:

Off-Road Emission Reductions

Non-road Mobile Source Reductions--Houston/Galveston 2007							
Category		VOC Inventory (tpd)	Percent Reduction or Increase	Tons/Day Reduced or Increased	NO_x Inventory	Percent Reduction or Increase	Tons/Day Reduced or Increased
Heavy Duty Diesel[1]		20.34	-90.5	-18.41	159.71	-77.38	-123.59
Small Gasoline Engines[2]		85.30	-74.7	-63.72	1.35	+98.7	+1.33
Recreational Marine[3]		29.07		-23.57	2.45		+.32
	OB	21.23	-76.99	-16.34	.21	+1.05	+.01
	IB/SD	7.84	-92.20	-7.23	2.24	+1.38	+.31
Locomotives[4]		1.48	-8.7	-.13	23.67	-36.0	-8.52
Commercial Aircraft[5]		2.93	-40.0	-1.17		Percent Not Available	
Marine Vessels[6]			Percent Not Available			Percent Not Available	
RFG[7]		125.03	-3.68	4.60		Percent Not Available	

Footnotes for Off-Road Emission Reductions Table

1. Heavy-Duty Diesel - EPA has proposed rules (September 24, 1997) requiring new heavy-duty diesel equipment to meet more stringent standards. Based on the projected impacts in the proposed rule making staff were able to estimate these emission reductions.

2. Small Gasoline Engines - EPA imposed new small gasoline engine emission standards in 1995 (lawn mowers, string trimmers, chain saws, etc.). Staff estimated the emission reductions from small gas engines using the latest guidance, a memo from EPA's Phil Lorang dated November 1994.

3. Recreational Marine - EPA imposed new emission standards covering new recreational marine equipment, in October 1996 (outboards and stern drive boats). Personal water craft are also covered but there is no emissions inventory for this type of watercraft. Staff estimated the emission reductions from recreational marine engines using the latest guidance, a memo from EPA's Phil Lorang dated November 1994.

4. Locomotives - EPA has imposed emission standards for new and re-built locomotives. Staff used the regulatory support document (December 1997) to estimate emissions from this category of vehicles.

5. Commercial Aircraft - New turbine powered aircraft engines have to meet more stringent noise and efficiency limits. These new standards also have a positive impact on the VOC emissions of these aircraft. A 40% reduction in VOCs was taken for this control measure.

6. Marine Vessels - The EPA is expected to proposed marine vessel regulations this Spring. They are expected to follow the diesel non-road standards and schedule. The larger marine engines may follow EPA's locomotive rules. Emission reductions from this program are currently not available but may become available before this SIP is finally adopted.

7. Reformulated Gasoline - Reformulated gasoline used in non-road equipment in the 8 county Houston/Galveston nonattainment area. Memos from EPA's Phil Lorang dated August 1993, February 1994, March 1994, and June 1997 were used to estimate the emission benefits associated with RFG in non-road equipment.

On-Road Emission Reductions

1. National Low Emission Vehicle (NLEV) program - The NLEV program is a voluntary program where the Northeast states and auto manufacturers would agree to bring cleaner cars to the Northeast. If this agreement goes through, cleaner cars would also become available in Texas by model year (MY) 2001. By 2007 in the 8-county Houston/Galveston area, the NLEV program would get **4.66 TPD VOC** reductions and **12.15 TPD NO_x** reductions.

2. On Road Heavy-Duty standards - EPA promulgated the final rules requiring heavy duty on-highway diesel trucks to meet a much more stringent emission standards in October 1997. Emission reductions from this program are **6.987 TPD NO_x** in the 8-county Houston/Galveston area.

3. I/M VOC reductions in Harris County are included with the federal motor vehicle control program (FMVCP, Tier I) and RFG reduction estimates in Tables 32 and 33.

4. RFG reductions out to 100 km and 200 km.

   100 km **16.33 TPD VOC** and **3.85 TPD NO_x**

   200 km **55.55 TPD VOC** and **12.38 TPD NO_x**

   These reductions were estimated using the Mobile 5B model.

Point Sources:

Discussion of Technically Feasible NO_x Emission Reductions from Point Sources

Demonstrated technology exists to remove more than 90% of the NO_x emissions from most uncontrolled point sources in the Houston/Galveston area. Reductions of this magnitude require a combination of combustion modification techniques, such as are routinely required in current new source review (NSR) permits, and post-combustion control techniques, primarily selective catalytic reduction (SCR). SCR relies on injecting ammonia upstream of a catalytic bed; the NO_x and ammonia react in the bed to form nitrogen and water. SCR is the most effective demonstrated technology for NO_x reduction from stationary fossil fuel combustion, capable of achieving reductions in the range of 80-90%. The agency has not moved to requiring SCR-level controls in new source permits because of the high costs involved, which may run to 10% of the capital cost of a large new combustion unit, such as a gas turbine. SCR is widely used in California, Japan and parts of Europe, and in limited, but growing numbers outside these areas.

A portion, perhaps even a majority, of the point source NO_x emissions in Houston/Galveston are emitted from sources substantially uncontrolled for NO_x emissions, ones that are grandfathered from NSR permits, or were permitted in the 1970s. The requirement to use combustion modification controls to reduce NO_x began with utility boilers in the 1970s under federal New Source Performance Standards, and by 1981, evolved under state and federal NSR program guidance to include almost all new units. Combustion modification techniques such as low-NO_x burners for boilers and heaters, low-emission lean-burn controls for lean-burn engines (or non-selective catalytic reduction for rich-burn), and water or steam injection for gas turbines have been typical types of control required on new sources. Since 1982, most new engines, and since 1990, most new gas turbines, have been controlled in the range of 90% below 1970 levels. However, the relative longevity of NO_x point sources has limited the effectiveness of the NSR permits program. Because the majority of sources have not been controlled with SCR, a 90% reduction from the entire point source inventory could be technically feasible.

POTENTIAL NO_X EMISSION REDUCTIONS BY POINT SOURCE CATEGORY FOR HOUSTON/GALVESTON NONATTAINMENT AREA COUNTIES [1] - Revised 4/17/98

Category	1993[2] Emissions (tpd)	% of Total Point	Chapter 117 Reductions (%; tpd)	Tier I Reductions BACT/Combustion Modifications[3]	Tier II Reductions Flue Gas Cleanup[3]	Tier III Reductions = Tier I + II
Utility Boilers						
Gas Wall-fired	137		15%; 21tpd	50%; 69 tpd	90%; 123 tpd	95%; 130 tpd
Gas Tangential-fired	12		0%; 0 tpd	30%; 4 tpd	90%; 11 tpd	93%; 11 tpd
Coal Wall-fired	41		0%; 0 tpd	10%; 4 tpd	80%; 33 tpd	82%; 34 tpd
Coal Tangential-fired	32		0%; 0 tpd	20%; 6 tpd	80%; 26 tpd	84%; 27 tpd
Total Utility Boilers	222	30	9%; 21 tpd	37%[4]; 83 tpd	87%; 193 tpd	91%; 202 tpd
Gas Turbines[5]	175	24	17%[6]; 30 tpd	50%[7]; 88 tpd	90%; 151 tpd	95%; 166 tpd
Industrial Boilers	110	15	10%[8]; 11 tpd	50%; 55 tpd	90%; 99 tpd	95%; 105 tpd
IC Engines						
Rich-burn (40%)[9]	38		75%[10]; 29 tpd	0%; 0 tpd	80%[12]; 30 tpd	80%; 30 tpd
Lean-burn (60%)	58		0%; 0 tpd	50%[11]; 29 tpd	90%; 52 tpd	95%; 55 tpd
Total IC Engines	96	13	30%; 29 tpd	30%; 29 tpd	86%; 83 tpd	89%; 86 tpd
Process Heaters	93	13	0%; 0 tpd	25%; 23 tpd	80%; 74 tpd	85%; 79 tpd
Other	34	5	0%; 0 tpd	10%; 3 tpd	50%; 17 tpd	55%; 19 tpd
Overall Point Source	730	100	12%; 91 tpd	38%; 281 tpd	85%; 617 tpd	90%; 657 tpd

Footnotes for Houston/Galveston Table

1. Counties within the Houston/Galveston ozone nonattainment area.

2. Emissions are from commission attainment modeling inventory. Episode day is September 11, 1993. This modeling inventory includes COAST data. The numbers were projected for growth to the 2007 attainment year, but no rule effectiveness was applied.

3. Reductions from "Controlling Nitrogen Oxides Under the Clean Air Act: A Menu of Options," State and Territorial Air Pollution Program Administrators, July 1994. Tier I reduction estimates are intended to reflect maximal control through combustion modification, and therefore are roughly equal to current Best Available Control Technology (BACT) controls applied to new sources under Chapter 116. Note, however, the Chapter 117 emission limit for gas-fired rich-burn engines (based on nonselective catalytic reduction, a type of flue gas cleanup) is equal to current BACT, so the 29 tpd reductions from that category should be considered part of the BACT level of reductions.

4. Rough estimate adjusted for existing controls.

5. Includes 4 tons per day from industrial boiler natural gas cogeneration (duct burners).

6. Initial estimate based on analysis of initial control plans submitted in 1994.

7. Rough estimate subject to additional analysis.

8. Does not reflect analysis of initial control plans.

9. Split between rich-burn and lean-burn engine emissions is based on detailed Houston/Galveston engine population.

10. Chapter 117 emission limit represents about 90% control; rough adjustment for engines already controlled by New Source Review requirements and rule exemptions. Estimate does not reflect full analysis of inventory and initial control plans.

11. Rough estimate. Assumes limited availability of low-emission (90% reduction) rebuilds. Some engines are already controlled by New Source Review requirements.

12. Assumes STAPPA/ALAPCO recommendation of 0.4-0.8 g/hp-hr.

POTENTIAL NO_X EMISSION REDUCTIONS BY POINT SOURCE CATEGORY FOR HOUSTON/GALVESTON 200 KM PERIMETER COUNTIES [1]

Category	1993[2] Emissions (tpd)	% of Total Point	Chapter 117 Reductions (%; tpd)	Tier I Reductions BACT/Combustion Modifications[3]	Tier II Reductions Flue Gas Cleanup[3]	Tier III Reductions = Tier I + II
Utility Boilers						
Coal Tangential-fired[4]	333		5%[5]; 18 tpd	25%; 83 tpd	80%; 266 tpd	85%; 283 tpd
Coal Wall-fired[4]	172		0%; 0 tpd	50%; 86 tpd	80%; 138 tpd	90%; 155 tpd
Gas Tangential-fired	24		0%; 0 tpd	30%; 7 tpd	90%; 22 tpd	93%; 22 tpd
Gas Wall-fired	88		11%[5]; 10 tpd	50%; 44 tpd	90%; 79 tpd	95%; 84 tpd
Total Utility Boilers	617	63	5%; 28 tpd	36%[6]; 220 tpd	82%; 505 tpd	88%; 544 tpd
IC Engines						
Rich-burn (40%)[7]	69		60%[8]; 41 tpd	0%; 0 tpd	65%[9]; 45 tpd	65%; 45 tpd
Lean-burn (60%)	103		0%; 0 tpd	50%; 52 tpd	90%; 93 tpd	95%; 98 tpd
Total IC Engines	172	17	24%; 41 tpd	30%; 52 tpd	80%; 138 tpd	83%; 143 tpd
Industrial Boilers	67	6	10%; 7 tpd	50%; 33 tpd	90%; 60 tpd	95%; 64 tpd
Mineral Products						
Cement & Lime Kilns	45		0%; 0 tpd	20%; 9 tpd	85%; 38 tpd	88%; 40 tpd
Glass & Mineral Wool	10		0%; 0 tpd	25%; 3 tpd	75%; 8 tpd	81%; 8 tpd
Total Mineral Products	55	6	0%; 0 tpd	21%; 12 tpd	83%; 46 tpd	87%; 48 tpd
Process Heaters	35	3	0%; 0 tpd	25%; 9 tpd	80%; 28 tpd	85%; 30 tpd
Gas Turbines	22	2	20%[10]; 4 tpd	20%; 4 tpd	90%; 20 tpd	92%; 20 tpd
Other	28	3	0%; 0 tpd	10%; 3 tpd	50%; 14 tpd	55%; 15 tpd
Overall Point Source	996	100	8%; 80 tpd	33%; 333 tpd	81%; 811 tpd	87%; 864 tpd

Footnotes for H/GA Perimeter Table

1. Counties in Texas within 200 kilometers of the Houston/Galveston Ozone nonattainment area boundaries, not including Beaumont/Port Arthur or HGA ozone area counties.

2. Emissions are from 1993 commission emissions inventory. These numbers are neither projected for growth to the 2007 attainment year, nor has rule effectiveness been applied.

3. Reductions from "Controlling Nitrogen Oxides Under the Clean Air Act: A Menu of Options," State and Territorial Air Pollution Program Administrators, July 1994. Tier I reduction estimates are intended to reflect maximal control through combustion modification, and therefore are roughly equal to current Best Available Control Technology (BACT) controls applied to new sources under Chapter 116. Note, however, the Chapter 117 emission limit for gas-fired rich-burn engines (based on nonselective catalytic reduction, a type of flue gas cleanup) is equal to current BACT, so the 41 tpd reductions from that category should be considered part of the BACT level of reductions.

4. Coal category includes lignite-fired boilers. Coal tangential-fired category also includes 3 industrial boilers (Sandow 1-3).

5. Rough estimate. Reductions are based on observed emissions from 1995 acid rain monitoring data and assume separate coal and gas system-wide averaging by utilities within the perimeter counties.

6. Rough estimates. Existing controls on some coal-fired units have not been fully evaluated, so estimates may be high. Since 1993, better emissions monitoring under the acid rain program has reduced reported rates, which may contribute to apparent reductions.

7. Assumed split between rich-burn and lean-burn engine emissions is similar to split observed in detailed Houston/Galveston engine population.

8. Rough estimate assumes a significant portion of rich-burn engines already controlled to 2.0 g NO_x/hp-hr by New Source Review requirements.

9. Assumes STAPPA/ALAPCO recommendation of 0.4-0.8 g/hp-hr.

10. Rough estimate assumes most gas turbines are already controlled by New Source Review requirements.

ESTIMATED VOC EMISSION REDUCTIONS ASSOCIATED WITH THE EXTENSION OF CHAPTER 115 RULES TO COUNTIES WITHIN 100 KM OF THE HOUSTON/GALVESTON OZONE NONATTAINMENT AREA

SIC	Description	Current VOC Emissions (tpd)	Potential Chapter 115 Rule(s)	Control Efficiency (%) (not RE adjusted)	VOC Emissions Available for Control (assuming 50% is under a New Source Review permit) (tpd)	Estimated VOC Reductions (tpd)
2436	Softwood Veneer and Plywood	11	115.121	90.0	5.6	2.0
2869	Industrial Organic Chemicals	10	115.121 & 115.352	----	----	----
2493	Reconstituted Wood Products	9	115.121	90.0	4.6	1.7
2621	Paper Mills	8	115.121	----	----	----
1321	Natural Gas Liquids	7	115.121 & 115.352	90.0 & 93.0	3.6	0.8 + 0.8 1.6
3334	Primary Aluminum	4	None	----	----	----
1311	Crude Petroleum and Natural Gas	4	115.121 & 115.352	90.0 & 93.0	1.9	0.4 + 0.4 0.8
4911	Electric Services	2	None	----	----	----
2821	Plastics Materials and Resins	2	115.121 & 115.352	----	----	----
2631	Paperboard Mills	2	115.121	----	----	----

4612	Crude Petroleum Pipelines	1	115.112	61.9	0.7	0.4
4922	Natural Gas Transmission	1	None	----	----	----
5171	Petroleum Bulk Stations and Terminals	0.8	115.112 & 115.212	98.0	0.4	0.3
3053	Gaskets, Packing/Sealing Devices	0.6	115.421(a)(5)	55.6	0.3	0.2
2421	Sawmills and Planing Mills - General	0.5	None	----	----	----
4613	Refined Petroleum Pipelines	0.5	115.112	61.9	0.3	0.2
2819	Industrial Inorganic Chemicals	0.5	115.121	----	----	----
3499	Fabricated Metal Products, Not Elsewhere Classified	0.5	115.421(a)(9)	55.6	0.2	0.1
2434	Wood Kitchen Cabinets	0.4	115.421(a)(14)	31.1	0.2	0.1
3322	Malleable Iron Foundries	0.3	None	----	----	----
3441	Fabricated Structural Metal	0.3	115.421(a)(9)	55.6	0.1	0.1
3743	Railroad Equipment	0.3	115.421(a)(9)	55.6	0.1	0.1
2491	Wood Preserving	0.2	115.121	----	----	----
4741	Rental of Railcars	0.2	115.421(a)(9)	55.6	0.1	0.1
3496	Miscellaneous Fabricated Wire Products	0.2	115.421(a)(9)	55.6	0.1	0.1

4619	Pipelines, Not Elsewhere Classified	0.2	None	----	----	----
2999	Petroleum and Coal Products, Not Elsewhere Classified	0.2	None	----	----	----
3498	Fabricated Pipe and Fittings	0.2	115.421(a)(9)	55.6	0.1	<0.1
4226	Special Warehousing and Storage	0.2	115.212	98.0	0.1	0.1
3317	Steel Pipe and Tubes	0.1	115.421(a)(9)	55.6	0.1	<0.1
2752	Commercial Printing - Lithographic	0.1	115.442	55.0	0.1	<0.1
3355	Aluminum Rolling and Drawing, Not Elsewhere Classified	0.1	None	----	----	----
9511	Air, Water, and Solid Waste Management	0.1	None	----	----	----
	TOTALS	**68**				**8**

Explanation of Extension of Chapter 115 Rules to Perimeter Counties:

VOC emission reductions associated with the possible extension of Chapter 115 ozone nonattainment area rules to counties within 100 km of the Houston/Galveston ozone nonattainment area boundaries were estimated by first obtaining an emissions inventory retrieval of the most current emissions for all accounts with VOC emissions equal to or greater than 25 tons per year. The information retrieved represents a mixture of inventories submitted in 1995 and 1996.

For sources subject to a MACT standard which has been proposed or promulgated, it was generally assumed that the MACT would achieve equivalent emission reductions to Chapter 115. Therefore, no emission reductions due to the possible extension of Chapter 115 rules were calculated for these sources in order to avoid double counting.

For sources not subject to a currently proposed or promulgated MACT standard, emission reductions were calculated based upon the extension of Chapter 115 rules. For sources which are expected to be subject to a MACT standard that has yet to be proposed, no emission reductions were estimated based upon the future MACT standards since the control requirements and efficiency are unknown. Emission reductions were, however, calculated for these sources based upon the extension of Chapter 115 rules.

Sources which would potentially be subject to Chapter 115 rules were assumed to already have half of their emissions covered by a New Source Review (NSR) permit. These permitted emissions were considered unavailable for Chapter 115 emission reductions since NSR permits represent Best Available Control Technology (BACT), which is generally equivalent to or more stringent than Reasonably Available Control Technology (RACT) requirements under Chapter 115. The control efficiencies determined in previous SIPs were then used to calculate estimated emission reductions from the non-permitted sources.

VOC emission reductions resulting from implementation of Chapter 115 rules in counties within 100 km of the Houston/Galveston ozone nonattainment area were estimated to be 8 tons per day. This represents a 12% reduction in VOC emissions from sources with VOC emissions equal to or greater than 25 tons per year in these counties.

It should be noted that Anderson, Freestone, and Limestone Counties fall within the 100 km area for both the Dallas/Fort Worth and Houston/Galveston ozone nonattainment areas. The estimated 8 tons per day reduction includes 0.4 tons per day from sources in SIC codes 1311, 2819, 4612, and 4911 which are located within these three counties.

ASSUMPTIONS IN ESTIMATING VOC EMISSION REDUCTIONS FROM EXTENDING CHAPTER 115 TO PERIMETER COUNTIES:

SIC 2436 — The dryers are the main VOC emission sources. Assume that 40% of the total emissions are associated with the dryers, and apply the vent gas rule (90% control efficiency). Note that a future MACT (not yet proposed) is expected to achieve greater reductions.

SIC 2869 — Various MACTs may apply (HON, DD, R). Assume that the MACTs will achieve greater reductions than the vent gas rule and fugitive emissions rules. (Note: The vent gas rule already applies at sources representing 94% of the emissions in this SIC code.)

SIC 2493 — The dryers are expected to be the main VOC emission sources. Assume that 40% of the total emissions are associated with the dryers, and apply the vent gas rule (90% control efficiency). A future MACT (not yet proposed) is expected to achieve greater reductions.

SIC 2621 — The vent gas rule would apply, but the pulp/paper MACT is expected to achieve greater reductions (49%, according to the pulp/paper MACT Fact Sheet).

SIC 1321 — Assume 50% of the emissions in this category are from combustion sources, and the rest is equal parts vent gas emissions (such as from glycol dehydrators) and fugitives emissions. Apply 93% control efficiency to fugitives, and 90% to vent gas. The estimated percent reduction is from the 9% SIP's Appendix 11-C.

SIC 3334 — Assume all of the emissions in this category are from combustion sources, so no emission reductions are expected.

SIC 1311 — Assume 50% of the emissions in this category are from combustion sources, and the rest is equal parts vent gas emissions (such as from glycol dehydrators) and fugitives emissions. Apply 93% control efficiency to fugitives, and 90% to vent gas. The estimated percent reduction is from the 9% SIP's Appendix 11-C.

SIC 4911 — Assume all of the emissions in this category are from combustion sources, so no emission reductions are expected.

SIC 2821 — Various MACTs may apply (HON, V). Assume that the MACTs will achieve greater reductions than the vent gas rule and fugitive emissions rules. (Note: The vent gas rule already applies at sources representing 48% of the emissions in this SIC code.)

SIC 2631 — The vent gas rule would apply, but the pulp/paper MACT is expected to achieve greater reductions (49%, according to the pulp/paper MACT Fact Sheet).

SIC 4612 — Assume that most of the VOCs are from storage tanks along the pipeline. Apply 61.9% control efficiency (the estimated percent reduction in the 9% SIP's Appendix 11-C "catchup" table).

SIC 4922 — Assume that these emissions are associated with internal combustion engines at natural gas compressor stations, so no emission reductions are expected.

SIC 5171 Assume that these sources are gasoline terminals, and that emission reductions are available at the loading racks and storage tanks. Assume that the loading racks currently meet the 0.33#/kgal emission specification (86.6% control, per the estimated percent reduction in the 9% SIP's Appendix 11-C "catchup" table), the terminals will upgrade to meeting the 0.09#/kgal emission specification (98% control), and that a similar improvement in control efficiency will occur with storage tank emissions.

SIC 3053 The fabric coating rule appears to apply. Apply 55.6% control efficiency (the estimated percent reduction in the 9% SIP's Appendix 11-C "catchup" table).

SIC 2421 Source of VOCs is not clear, but is probably not readily controllable.

SIC 4613 Assume that most of the VOCs are from storage tanks along the pipeline. Apply 61.9% control efficiency (the estimated percent reduction in the 9% SIP's Appendix 11-C "catchup" table).

SIC 2819 The vent gas rule and a MACT standard (DD) already apply at sources representing 64% of the emissions in this SIC code, and the remainder of the sources are likely to be below the exemption level.

SIC 3499 The miscellaneous metal parts/products (MMPP) rule would apply. The estimated percent reduction from the 15% SIP's "catchup" discussion was used.

SIC 2434 Estimated reductions are 31.1% based upon the wood furniture Control Techniques Guideline. The wood furniture MACT may also apply to these sources, but reductions are estimated to be approximately the same.

SIC 3322 Assume all of the emissions in this category are from combustion sources, so no emission reductions are expected.

SIC 3441 The MMPP rule would apply. The estimated percent reduction from the 15% SIP's "catchup" discussion was used.

SIC 3743 The MMPP rule would apply. The estimated percent reduction from the 15% SIP's "catchup" discussion was used.

SIC 2491 A MACT which would have applied has been canceled. The vent gas rule would apply, but these sources are likely to be below the exemption level.

SIC 4741 The MMPP rule would apply. The estimated percent reduction from the 15% SIP's "catchup" discussion was used.

SIC 3496 The MMPP rule would apply. The estimated percent reduction from the 15% SIP's "catchup" discussion was used.

SIC 4619 Assume all of the emissions in this category are from fugitives, so no emission reductions are expected.

SIC 2999 The vent gas rule already applies at sources representing 100% of the emissions in this SIC code, but these sources are likely to be below the exemption level, so no emission reductions are expected.

SIC 3498 The MMPP rule would apply. The estimated percent reduction from the 15% SIP's "catchup" discussion was used.

SIC 4226 Assume that this source should be classified as a gasoline terminal under SIC 5171, and that emission reductions are available at the loading racks and storage tanks. Assume that the loading racks currently meet the 0.33#/kgal emission specification (86.6% control, per the estimated percent reduction in the 9% SIP's Appendix 11-C "catchup" table), the terminals will upgrade to meeting the 0.09#/kgal emission specification (98% control), and that a similar improvement in control efficiency will occur with storage tank emissions.

SIC 3317 The MMPP rule would apply. The estimated percent reduction from the 15% SIP's "catchup" discussion was used.

SIC 2752 The offset printing rule would apply. The estimated percent reduction from the 9% SIP's Appendix 11-C "contingency measures" table was used.

SIC 3355 Assume all of the emissions in this category are from combustion sources, so no emission reductions are expected.

SIC 9511 Assume all of the emissions in this category are from fugitives, so no emission reductions are expected.

VOC REDUCTIONS DUE TO EPA MACT FOR HOUSTON/GALVESTON NONATTAINMENT COUNTIES

Mact	Subpart	Date Promulgated	Compliance Date	VOC Total for Identified Sources (tpd)	VOC Targeted by MACT (tpd)	% Reduction from MACT	Total VOC Reduction from MACT (tpd)	Comments
Halogenated Solvents	T	12/2/94	12/2/97 for existing sources. On start-up for new sources.	1	---	---	---	No significant VOC reductions expected beyond those resulting from Reg V and Permitting.
SOCMI HON	F, G, H, I	4/22/94	The compliance dates range from 10/22/94 to 1/18/00.	31	---	---	---	No significant VOC reductions expected beyond those resulting from Reg V and Permitting.
Marine Vessel Loading	Y	9/19/95	9/1/99 for existing MACT sources; 9/19/98 for existing RACT sources. On start-up for new sources.	58	---	---	---	No significant VOC reductions expected beyond those resulting from Reg V and Permitting.
Gasoline Distribution Stage I	R	12/14/94	12/14/97 for existing sources. On start-up for new sources.	46	---	---	---	No significant VOC reductions expected beyond those resulting from Reg V and Permitting.
Aerospace	GG	9/1/95	9/1/98 for existing sources. On start-up for new sources	0	---	---	---	No VOC emissions reported.
Petroleum Refineries	CC	8/15/95	8/18/98 for existing sources; on start-up for new sources	68	20	60% (as cited in EPA Fact Sheet)	12	Reduction estimate based on data from Emissions Inventory and EPA.
Polymers and Resins II	W	3/8/95	3/8/98 for existing sources; on start-up for new sources	No sources identified (see 1 below)	---	---	---	---
Commercial Sterilization Facilities	O	12/6/94	Originally was 12/6/97 for new and existing sources. EPA has extended the deadline untill 12/6/98.	No sources identified (see 1 below)	---	---	---	---

Polymers and Resins I	U	9/5/96	The compliance deadline for most emission points is 9/5/99. The compliance deadline for equipment leak provisions was 7/31/97.	1	---	---	---	Reductions expected to be insignificant.
Polymers and Resins IV	JJJ	9/12/96	The compliance deadline for most emission points is 9/12/99. The compliance deadline for equipment leak provisions was 7/31/97.	No sources identified (see 1 below)	---	---	---	---
Printing and Publishing	KK	5/30/96	5/30/99	No sources identified (see 1 below)	---	---	---	---
Shipbuilding and Ship Repair (Surface Coating)	II	12/15/95	The compliance deadline for existing sources was 12/15/96. For area sources, the compliance date is one year after becoming major.	—1	---	---	---	Reductions expected to be insignificant.
Wood Furniture	JJ	12/7/95	The compliance deadline for sources emitting 50 tpy or greater is 11/27/97. Sources emitting less than 50 tpy must comply by 12/7/98. New sources must comply upon start-up.	No sources identified (see 1 below)	---	---	---	---
Off-Site Waste Recovery	DD	7/1/96	7/1/99	---	---	---	---	Staff has been unable to estimate the VOC emission reductions.
Oil & Natural Gas Production (production)	HH	2/6/98	---	14	7	50% (as cited in EPA Fact Sheet)	3.5	Reduction estimate based on data from Emissions Inventory and EPA
Publicly Owned Treatment Plants (POTW)	---	Not proposed	---	97	---	---	---	MACT has not yet been proposed.
Pulp & Paper (noncombustion)	S	1/98	Mills have up to 8 years from 1998 promulgation.	6			1	Reduction estimate based on data from Emission Inventory and information provided by industry representatives.

Total				322			16.5	

1. MACT sources were identified by querying the Point Source Data Base for the most current emissions (1995 and 1996 data) for accounts which are classified by the SIC and SCC numbers appropriate to each of the MACT standards. The identified sources also reported speciated hazardous air pollutant (HAP) emissions of 10 tons per year (tpy) of any single HAP or 25 tpy of any combination of HAPs. Sources not meeting this search criteria were not identified.

VOC REDUCTIONS DUE TO EPA MACT FOR HOUSTON/GALVESTON 100 KM PERIMETER COUNTIES
(excluding Beaumont/Port Arthur nonattainment counties)

Mact	Subpart	Date Promulgated	Compliance Date	VOC Total for Identified Sources (tpd)	VOC Targeted by MACT (tpd)	% Reduction from MACT	Total VOC Reduction from MACT (tpd)	Comments
Halogenated Solvents	T	12/2/94	12/2/97 for existing sources. On start-up for new sources.	No sources identified (see 1 below)	---	---	---	---
SOCMI HON	F,G,H,I	4/22/94	The compliance dates range from 10/22/94 to 1/18/00.	7	2	79% (as cited in EPA SOCMI preamble)	2	Assumption is that only 30% of total VOC emissions will be targeted by MACT, to account for NSR BACT permitting.
Marine Vessel Loading	Y	9/19/95	9/1/99 for existing MACT sources; 9/19/98 for existing RACT sources. On start-up for new sources.	No sources identified (see 1 below)	---	---	---	---
Gasoline Distribution Stage I	R	12/14/94	12/14/97 for existing sources. On start-up for new sources.	—1	---	---	---	Reductions expected to be insignificant.
Aerospace	GG	9/1/95	9/1/98 for existing sources. On start-up for new sources	No sources identified (see 1 below)	---	---	---	---
Petroleum Refineries	CC	8/15/95	8/18/98 for existing sources; on start-up for new sources	No sources identified (see 1 below)	---	---	---	---
Polymers and Resins II	W	3/8/95	3/8/98 for existing sources; on start-up for new sources	No sources identified (see 1 below)	---	---	---	---
Commercial Sterilization Facilities	O	12/6/94	Originally was 12/6/97 for new and existing sources. EPA has extended the deadline untill 12/6/98.	No sources identified (see 1 below)	---	---	---	---

Polymers and Resins I	U	9/5/96	The compliance deadline for most emission points is 9/5/99. The compliance deadline for equipment leak provisions was 7/31/97.	No sources identified (see 1 below)	---	---	---	---
Polymers and Resins IV	JJJ	9/12/96	The compliance deadline for most emission points is 9/12/99. The compliance deadline for equipment leak provisions was 7/31/97.	No sources identified (see 1 below)	---	---	---	---
Printing and Publishing	KK	5/30/96	5/30/99	No sources identified (see 1 below)	---	---	---	---
Shipbuilding and Ship Repair (Surface Coating)	II	12/15/95	The compliance deadline for existing sources was 12/15/96. For area sources, the compliance date is one year after becoming major.	No sources identified (see 1 below)	---	---	---	---
Wood Furniture	JJ	12/7/95	The compliance deadline for sources emitting 50 tpy or greater is 11/27/97. Sources emitting less than 50 tpy must comply by 12/7/98. New sources must comply upon start-up.	No sources identified (see 1 below)	---	---	---	---
Off-Site Waste Recovery	DD	7/1/96	7/1/99	---	---	---	---	Staff has been unable to estimate the VOC emission reductions.
Oil & Natural Gas Production (production)	HH	Proposed 2/6/98	---	2	1	50% (as cited in EPA Fact Sheet)	0.5	Reductions expected to be insignificant.
Publicly Owned Treatment Plants (POTW)	---	Not proposed	---	18	---	---	---	MACT has not yet been proposed.
Pulp & Paper (noncombustion)	S	1/98	Mills have up to 8 years from 1998 promulgation.	10			1	Reduction estimate based on estimate made for HGA mills.
Total				37			3.5	

1. MACT sources were identified by querying the Point Source Data Base for the most current emissions (1995 and 1996 data) for accounts which are classified by the SIC and SCC numbers appropriate to each of the MACT standards. The identified sources also reported speciated hazardous air pollutant (HAP) emissions of 10 tons per year (tpy) of any single HAP or 25 tpy of any combination of HAPs. Sources not meeting this search criteria were not identified.